THREE ESSAYS ON ACCOUNTING REGULATION AND ACCOUNTING IRREGULARITY

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ABSTRACT OF THE DISSERTATION

Three Essays on Accounting Regulation and Accounting Irregularity

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This dissertation is to study the effects of accounting regulation scrutiny, the interaction between accounting regulation and audit regulation and option market's perceptions of financial misreporting. In the first essay, I examine whether SEC oversight, specifically the review process, plays a significant role in shaping registrants' incentive to disclose material weakness in ICFR. My main results show that firms receiving SEC comment letters related to internal control disclosure are more likely to disclose material weaknesses in ICFR in the subsequent fiscal year than other firms. More importantly, I do not find that receiving comment letters related to any other disclosure deficiencies will increase firm's probability to disclose material weaknesses in the subsequent fiscal year. I also find that the SEC's scrutiny of one issuer could have a deterrence effect on other issuers, by raising the threat of future review or enforcement actions.

In the second essay of my dissertation, I examine the overall effectiveness of the current system of PCAOB inspections by exploring the potential information sharing between PCAOB and the SEC, another regulation authority. I find evidence that firms are

more likely to receive the SEC comment letters after their auditors get PCAOB inspection reports that disclose higher rate of audit deficiencies. This finding is not driven by audit specific attributes and other audit quality measures. Moreover, I ruled out the possible spurious relationship and found that firms are more likely to receive SEC comment letters related to revenue recognition after their auditors get PCAOB inspection reports that disclose higher rate of revenue audit deficiencies.

In the third chapter, I examine whether option market is informed of financial misreporting. I find that restatement firms have higher implied volatility skew before the revelation date than matched industry peer firms that do not have restatements. My results also indicate that implied volatility skew could predict stock market's negative reaction to restatements and the volatility skew is positively associated with the materiality of restatements. In addition, short interests are positively associated with volatility skew, suggesting both short sellers and option traders are informative of financial misreporting.

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Chapter 1: Regulatory Scrutiny and Reporting of Internal Control Deficiencies: Evidence from the SEC Comment Letters

1.1. Introduction

Financial reporting quality crucially hinges on the implementation of accounting standards and the effectiveness of accounting regulation. Among all the recent changes aiming at improving financial reporting quality, mandatory internal control disclosure is one of the most fundamental ones that affect all public firms. Section 302 of the Sarbanes-Oxley Act (SOX) requires firm's top manager team to periodically evaluate the effectiveness of disclosure controls and disclose any material weakness with internal control over financial reporting (ICFR). Furthermore, auditors also have to evaluate the effectiveness of internal control as required by Section 404 of SOX. Despite the stringent disclosure requirements over internal control of financial reporting, the effectiveness of internal control disclosure has been questioned by the regulators and researchers and these concerns coincided with a large portion of restating firms failing to reporting material weakness in ICFR before announcing financial restatements. Management discretion over internal control weakness disclosure originates from the approach they adopted to evaluate the internal control's effectiveness, the incentives to detect and disclose it, and more importantly, the regulatory scrutiny on internal control disclosure. The purpose of this study is to examine whether the regulatory oversight, specially the Securities and Exchange Commission's (SEC) review process, affects firm's internal control disclosure by increasing firm's probability to report material weakness in internal control.

The SEC's core function is to improve public firm's financial reporting quality through various regulatory frameworks aiming at preventing all filings from material misstatements and take enforcement actions on firms that violating the disclosure requirements. SOX 408 requires the SEC to review the filings, including financial statements, of all public firms and issue comment letters to firms when the SEC finds any disclosure deficiencies during the review process. After receiving comment letters, those firms have to respond by providing further information to clarify the disclosure deficiencies or fix it in current and future financial reports. Apparently, comment letters on firm's financial statement represent the SEC's concerns with poor financial reporting quality, suggesting possible significant deficiency exists in firm's internal control. But more importantly, the SEC will directly express concerns with firm's internal control disclosure if it finds any deficiency with it. Consequently, the litigation risk of not disclosing material weakness and possibility of future SEC enforcements increase because of this internal control disclosure deficiency, leading to change in firm's internal control weakness disclosure decision.

In this study, I hypothesize that firm's future internal control disclosure incentive could be affected by the comment letters, especially those related to internal control disclosure. However, the effect of comment letter on targeting firm's internal control disclosure could be highly conditional on the effectiveness of ICFR reported in the year to which the corresponding comment letter is referring to. Compared with firms that admit the existence of material weakness and the SEC asks these firms to provide full disclosure of it, firm's future internal control disclosure is more likely to be affected if the comment letter is criticizing the firm for failing to disclose material or significant

deficiency in internal control when the firm claimed to have effective ICFR. Besides directly affecting targeting firm's internal control deficiency disclosure, SEC's regulation scrutiny over internal control disclosure could have deterrence effect on other firms because of threats of future review or enforcement actions. Therefore, I also hypothesize that SEC's comment letters to one firm could affect peer firm's internal control deficiency reporting.

Using comment letters issued for fiscal years 2004-2012, I analyze how SEC's comment letters affect firm's internal control deficiency disclosure. I split the sample into three groups: 1) firms that receive internal control disclosure comment letters, 2) firms that receive 10-K comment letters that are not related to firms' internal control disclosure, and 3) firms do not receive any 10-K comment letters. In the pooled regression, I find that firms are more likely to disclose material weakness following the receipt of internal control disclosure comment letters. This result is robust to propensity score matching design that matches internal control letters firms with a group of no-letter firms that have similar likelihood to receive internal control comment letters but not reviewed by the SEC. However, this effect is only pronounced when the SEC issued internal control disclosure comment letters to firms that do not disclose material weakness. For firms that have disclosed material weakness with ICFR, receiving internal control comment letters does not affect firms' future internal control deficiency disclosure. Furthermore, receiving 10-K comment letters that are *not* related to internal control disclosure does not affect firm's internal control weakness disclosure. These results suggest that only targeted review on internal control disclosure affects firm's internal control disclosure behavior, while general review process itself does not have such an effect. My study also sheds

some light on internal control comment letter's spillover effect on peer firm's internal control reporting. More specifically, firms are more likely to disclose internal control if their industry leader, a greater number of industry peers or industry peers that share the same auditor receive comment letters addressing internal control disclosure deficiencies.

My research makes several important contributions to the literature. First, I contribute to the literature on the determinants of internal control reporting by registrant firms. While prior literature mostly focus on how firm characteristics and auditor attributes affect firm's reporting of internal control deficiencies (Doyler et al. 2007; Ashbaugh-Skaife et al. 2007; Rice and Webber, 2012), I complete current literature by directly showing that SEC scrutiny also plays an important role in internal control deficiency reporting. After SOX was enacted in 2002, there is wide debate on the benefits and costs of SOX's internal control reporting requirements, especially for smaller companies. Both investors and corporate insiders react negatively to the proposition of internal control weakness reporting despite documented compliance benefits, such as improved earnings quality (Zhang, 2007; Iliev 2010; Alexander et al, 2013; Singer and You, 2011). Recent rollback of regulation over ICFR responses to these concerns by exempting small firms permanently from SOX 404(b) and by reducing the internal-control testing for all firms (Glass and Lewis, 2007). However, without carefully examining the consequences of regulation over reporting the effectiveness ICFR, we are unable to understand what the cost is for us if we deregulate internal control reporting. My research helps us to understand how effective internal control reporting is and how regulation scrutiny affects firm's internal control deficiency reporting incentive.

Secondly, I provide some evidence of regulation scrutiny's spillover effect on internal control reporting. One of the most important function of accounting regulation and enforcement is their deterrence effects on other firms' financial reporting. Internal control weakness itself does not make firm an enforcement target, but management should be responsible for failing to detect and report it. I find that SEC's comments not only not only affect reviewed firm's internal control deficiency reporting but also increase industry peers' probability to report internal control deficiency.

Thirdly, I enrich the current developing literature that examines the consequences of SEC's review process (Robinson et al, 2011; Johnston and Petacchi 2012; Kubick et al. 2014; Brown et al. 2014) by specifically focusing on firm's internal control deficiency reporting. Prior research mostly focus on the change in qualitative aspect of disclosure after receiving comment letters, such as risk factor and management's discussion & analysis. I differentiate from those research by showing whether SEC's comment letters affect management incentive to disclose the existence of internal control deficiencies, which is more or less a yes or no question.

1.2. Institutional Background

1.2.1. SEC Comment Letters

To improve the quality and timeliness of public companies' material disclosure, the Securities and Exchange Commission (SEC) periodically reviews the filings of all public companies and issues comment letters to companies whose filings are determined to be deficient in some way. The review process is conducted by the SEC Corporation Finance Division, which assigns the review process to 12 assistant director offices that are organized based on industry. The assignment of issuers to offices is based on SIC code.

The relevant SEC division examines whether issuers' accounting policies are in accordance with GAAP, evaluates the adequacy of disclosures and evaluates compliance with reporting requirements. Firms have to respond to SEC review comments within 10 business days. Starting May 12, 2005, the SEC began to publicly release comment letters and firms' responses made after August 1, 2004. After the completion of each review, SEC will release the comment letters and issuers' response letters on EDGAR no earlier than 20 business days[1] (previously 45 days[2]).

The SEC's review process of corporate filings has been in place before the enactment of the Sarbanes-Oxley Act of 2002 (SOX), but without public disclosed selection criteria that are used to determine the timing and frequency with which firms are inspected. After several accounting scandals of high-profile companies in the early 2000s, public and regulatory concern over accounting quality led to a series of fundamental change in accounting regulation, including SOX Section 408, which mandates a maximum review cycle of 3 years for all SEC registrants' financial statements. Moreover, SOX 408 provides review criteria that the SEC should consider when selecting which firm to be reviewed, including previous material restatements, high stock return volatility, large market capitalization, emerging firms with high P/E ratio and the economic significance of a firm within an industry. In addition to these criteria, recent literature examines a groups of other factors that could affect registrants' likelihood of receiving comment letters and finds that company age, financial distress, M&A activity, poor financial performance, cash flow volatility and the use of a non-Big4 auditor all

[1] http://www.sec.gov/divisions/corpfin/cfannouncements/edgarcorrespondence.htm
[2] See SEC Press Release No. 2005-72 (May 9, 2005)

have an incremental effect on the likelihood of receiving comment letters on annual reports (Cassell, Dreher and Myers, 2013; Johnston and Petacchi, 2013).

Comment letters that are related to periodically filed financial statements, namely 10-Ks (annual reports) and 10-Qs (quarterly reports), constitute the majority (45 percent) of SEC's review outcomes. The reason that SEC allocates a major part of its budget to these filings is because the accuracy and value relevance of the information contained in these filings is of utmost importance to investors. Therefore, SEC's comments on accounting policies, such as revenue recognition (Dechow, Lawrence and Ryans, 2015), and disclosure issues, such as risk factors (Brown, Tian and Tucker, 2014) would be the most representative accounting regulation concerns.

When issuing the comment letters, the corporate finance division usually requests firms to provide additional information so that its staff can better understand the company's disclosure. Generally, the review process ends up with either (1) the conclusion that registrants' financial reports comply with SEC requirements, or (2) the suggestion that registrants fix material disclosure deficiencies in future financial reports, or (3) the registrant being required to amend its current or previous 10-K. The first two are the most likely outcomes and the last one rarely happens. Dechow et al. (2015) reports that less than 0.5% of firms restate their 10-Ks between the receipt of the initial letter and the comment letter correspondence disclosure date.

1.2.2. Effectiveness of Internal Control Deficiencies Reporting

Sections 302 and 404 of SOX were introduced in 2002 with the aim of enhancing financial reporting quality of public companies. Among all the rigorous and onerous regulation changes brought by SOX, the internal control reporting required by SOX 302

and 404 has been amongst the most controversial, because it requires firms to disclose their effectiveness of their internal control over financial reporting (ICFR). Under the Committee of Sponsoring Organizations (COSO) of the Treadway Commission's framework, adopted by both SOX 302 and 404, internal control is defined as "*a process, effected by an entity's board of directors, management, and other personnel, designed to provide reasonable assurance regarding the achievement of objectives relating to operations, reporting, and compliance*." For SOX 302, the firm's top management is responsible for establishing, maintaining and periodically evaluating the issuer's internal controls. If any material weakness exists, they are precluded from stating that the internal control within the firm is effective and they must disclose any material weakness identified (SEC 2002). SOX 404(a) also requires management to evaluate the effectiveness of firm's ICFR at the end of the company's most recent fiscal year and disclose whether any material weakness exists. Additionally, SOX 404(b) requires external auditors to attest to management's evaluation of ICFR and to provide their own evaluation of internal control for accelerated filers (SEC 2003)[3]. Our research question focuses on how the SEC's review process of annual filings affect management's reporting of material weaknesses in a firm's internal control system. Therefore, in this study, unless otherwise specified, I use material weaknesses that are deemed to be mandatory disclosures by firm's management under both 302 and 404(a) reporting regimes (Doyle et al. 2007).

[3] SOX 404 was effective on August 12, 2003. Accelerated filers (firms with market capitalization of at least $75m) are required to comply with it for fiscal years ending on or after June 15, 2004. For non-accelerated filers, the obligation to comply with SOX 404(a) was postponed to fiscal years ending after December 15, 2007, and with SOX 404(b) was postponed to June 30, 2010. On July 21, 2010, the Dodd-Frank Act 2010 permanently exempted non-accelerated filers from the requirement of providing auditor attestation to management's assessment of effectiveness of ICFR. Non-accelerated filers are still required to provide management's evaluation of ICFR under both SOX 302 and 404(a).

Despite widely-held concerns of high compliance costs for public companies, SOX 302 and 404 have played an important role in rebuilding investors' confidence in financial reporting quality. Feng and Li (2011) document that SOX 404 reduces material financial misreporting by influencing firm's earning manipulation incentives. High-quality internal controls also reduce unintentional errors in accruals, and the remediation of previously reported internal control deficiencies increases accrual quality (Ashbaugh-Skaife et al. 2008).

Despite these consequences, the effectiveness of internal control reporting has been questioned both by academic researchers and regulatory authorities. If internal control deficiency disclosures are intended to provide an advance warning of potential financial misstatements for financial statement users, then we would expect most firms to disclose material weakness of ICFR prior to the revelation of material misstatements. However, a large proportion of firms with material misstatements fail to report material weaknesses in internal control in a timely manner (Glass Lewis, 2007, Rice and Weber, 2012).

Regulatory authorities have also expressed their concerns with quality of ICFR. As a board member of PCAOB pointed out: "*Unfortunately, over the decades, we've seen multiple cycles in which company management and external auditors simply didn't get in right in the area of internal control, resulting in failures to effectively define, understand, implement, and assess internal control*"[4]. Even after the stringent ICFR requirement

[4] See PCAOB Board Member Jeanette Franzel's speech: "Institute of Internal Auditors 2014 General Audit Management Conference"

brought by SOX 302, SOX 404(a) and SEC's subsequent guidance[5], and SOX 404(b) and Auditing Standard No.5[6], registrants' disclosure of ICFR could still be deficient.

There are several inherent reasons why managers may fail to disclose material weaknesses in ICFR. First, the top-down and risk-based approach used by management to test the effectiveness of ICFR leaves them with a lot of discretion when designating which internal control weaknesses are considered material. Managers may mostly focus on controls that they believe to be high risk for financial misstatements and omit controls that they perceives to be low risk. For instance, after Citi Group recorded a $235 million after-tax ($360 million pretax) charge resulting from a fraud discovered in Banco Nacional de Mexico (Banamex) related to its accounts receivable financing program, [7] the SEC issued a comment letter to Citi Group that stated: "*Tell us how the identification of this fraud impacted your conclusion on the effectiveness of your disclosure controls and procedures and internal control over financial reporting (ICFR) as of December 31, 2013*". Citi responded to the comment letter by stating that it found 5 of its 1,100 receivable facilities had deficiencies when evaluating its internal control, and that it continued to believe that its ICFR was effective in preventing material misstatement.

Second, there are many factors affecting management's incentives to detect and disclose material weaknesses, conditional on the existence of weaknesses. Regulatory scrutiny, litigation risk and heightened costs of external financing are all potentially important costs to reporting internal control deficiencies (Rice and Weber 2012, Ashbaugh-Skaife et al. 2007). While there are no enforcement actions for firms with material weakness in internal control, regulatory authorities could sanction firms or

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[5] See SEC Press Release No. 2007-101 (May 23, 2007)
[6] See PCAOB Release No. 2007-005A (June 12, 2005)
[7] See: http://www.sec.gov/Archives/edgar/data/831001/000000000014038967/filename1.pdf

auditors for not disclosing material weaknesses. In addition, potential class action lawsuits put management at risk if investors can prove scienter. Moreover, firms in need of external capital would be less willing to disclose material weakness because of the resulting higher cost of equity and debt (Ashbaugh-Skaife et al., 2009; Costello and Wittenberg-Moerman, 2011). In fact, Rice, Weber and Wu (2013) document that class action lawsuits and top executive turnover are all *more* likely for firms that provide timely disclosure of internal control weaknesses, suggesting in turn that managers do not face significant market-based incentives to provide timely reporting. Overall, whether existing reporting of ICFR is completely effective is an ongoing research area that needs further research.

1.3. Literature Review and Hypothesis Development

1.3.1. The effect of comment letters on firms' reporting of internal control deficiencies

I propose to examine whether SEC oversight, specifically the review process, plays a significant role in shaping registrants' incentive to disclose material weakness in ICFR. Prior research has provided evidence that intense SEC oversight improves financial reporting quality. For instance, Blackburne (2014) finds that firms report lower discretionary accruals, fewer restatements, and lower bid-ask spreads when the SEC allocates more budgetary resources to the relevant review office.

Concurrently, there is a small but growing stream of literature examining how SEC comment letters affect firms' future disclosure practices. First, some research shows that comment letters affect firms' overall financial disclosure as well as disclosure behavior with respect to specific items. Using textual analysis, Bozanic, Dietrich and Johnson (2013) document that upon receiving an SEC comment letter, firms provide easier to

read, less optimistic, more numeric and more forward-looking disclosure in their annual reports. Brown, Tian and Tucker (2014) show that SEC comment letters addressing registrant's risk factor disclosures not only affect that registrant's risk factor disclosure in the following year but also lead to better risk factor disclosures amongst other firms in the same industry that have not received such a comment letter.

Second, another group of papers demonstrates the effect of comment letters on other dimensions of firm behavior. Kubick, Lynch, Mayberry and Omer (2014) document that tax-related comment letters lead to less aggressive tax avoidance behavior and also have some spillover effects on industry peers' tax avoidance behavior. Gietazmann, Marra and Pettinicchio (2014) find that the CFO is more likely to be replaced when firms receive comment letters. Gietazmann and Pettinicchio (2014) also provide evidence that the auditor increases audit fees in the period in which its client receives a comment letter.

I contribute to this literature by examining how SEC comment letters addressing internal control disclosure affect target firms' reporting of internal control weaknesses. There are several channels through which SEC scrutiny could affect firms' subsequent reporting of the effectiveness of ICFR. First, SEC's comments on internal control disclosure deficiencies could increase litigation risk because investors could sue management for not discovering and reporting the deficiencies earlier if the SEC discovers a material weakness with ICFR. Second, future potential SEC enforcement actions originated from this review process could affect management's incentive to disclose material weaknesses. An SEC official claimed that the SEC obtains half of its enforcement leads from reviews of financial statements and securities filings (Feroz, Park

and Pastena, 1991). Third, SEC comment letters could affect auditor scrutiny over the effectiveness of firm's ICFR because the audit firm engagement partners are copied on correspondence between issuers and the SEC (Laurion, Lawrence and Ryans, 2014).

The deficiencies in disclosure of ICFR raised by SEC comment letters in a given year are highly conditional on the effectiveness of ICFR reported in that year. If a firm reports effective ICFR or no material weakness for a given year, SEC's review staff may question the firm's conclusion if financial restatements or significant deficiencies are discovered later, like Citi's case. Therefore, being subject to SEC review could alert management that the effectiveness of its ICFR may have to be re-evaluated, leading to potential changes in ICFR disclosure for the subsequent period. On the other hand, if the firm admitted that it has a material weakness with ICFR, then SEC's review staff may find that management has failed to explain in detail the nature of the material weakness identified, as required in Regulation S-K Item 308(a)(3), or that management has failed to disclose actions taken to remediate this deficiency. In this case, firm's internal control disclosure incentives may not be as affected, because it has already disclosed a material weakness.

It is an open question whether firms are also more likely to disclose material weaknesses if the SEC issued comment letters to the firm that address issues other than material weakness disclosure. This is plausible because other financial reporting deficiencies could be related to or arise from material deficiencies in ICFR; the SEC's drawing attention to various financial reporting issues could hence alert management to the possibility that internal controls in particular areas may be defective. Therefore firms may be more likely to disclose internal control problems in the following fiscal year

when SEC comment letters address other financial reporting deficiencies. Taken together, we would predict that SEC comment letters affect target firms' reporting of the effectiveness of ICFR. Hypothesis 1 follows:

H1*: Firms receiving SEC comment letters related to internal control weaknesses or comment letters related to any other disclosure deficiencies are more likely to disclose material weaknesses in the subsequent fiscal year than firms that do not receive SEC letters.*

1.3.2. Spillover effect of comment letters on industry peers' internal control deficiency reporting

The role of public enforcement is not limited to regulating the target issuer for each review process or enforcement action. The SEC's scrutiny of one issuer could have a deterrence effect on other issuers, by raising the threat of future review or enforcement actions. Prior research provides some evidence that such peer effects exist. Jennings, Kedia and Rajgopal (2011) find that SEC enforcement actions deter peer firms' earnings management. Brown et al. (2013) find that SEC comment letters on one firm's risk factor disclosure are followed by improvements in peer firms' risk disclosures. Similarly, Kubick et al. (2014) find that industry peers engage in lower tax avoidance after a given firm receives tax-related comment letters.

Correspondingly, SEC comment letters to one firm on internal control reporting could affect peer firms' internal control reporting. Conditional on the existence of material weaknesses, firms may be more likely to disclose them in the following fiscal year if they have noticed SEC scrutiny over the reporting of ICFR for a peer firm. However, an alternative possible consequence is that firms are more likely to remediate

internal control deficiencies upon observing peer firms' comment letters, thus becoming less likely to disclose a material weakness subsequently.

The spillover effect of SEC comment letters can depend on and vary with a number of factors. First, if the SEC comments on an industry *leader*'s disclosure deficiency in ICFR, then a peer firm's disclosure incentives could be affected because of the industry leader's high visibility. Current literature find that industry leaders' disclosure is positively associated with industry followers' discretionary performance reporting (Bratten, Payne and Thomas, 2014) and that the egregiousness of industry leaders' accounting problems is positively related to the deterrence effect of SEC enforcement and class actions (Jennings et al. 2011).

Second, the deterrence effect from SEC review will be increasing with the *number of firms* in an industry receiving comment letters on internal control disclosure. Jennings et al. (2011) suggest that correcting firms' misreporting behavior requires repeated and sustained enforcement activity. Therefore, managers could be more incentivized to discover and report material weakness if they observe a larger number of industry peers receiving comments on internal control disclosure.

Third, we would expect some knowledge spillover effect from auditors if a firm shares the same auditor with another industry peer that receives SEC comments on internal control disclosure. Auditors play an important role in ICFR because SOX 404(b) requires auditors of accelerated filers to provide evaluations of the effectiveness of firm's ICFR. Even for non-accelerated filers, auditor technology and scrutiny play an important role in discovering and disclosing internal control deficiencies (Ashbaugh-Skaife et al. 2007). Moreover, auditors regularly publish reports that analyze SEC comments and

provide recommendations on improving financial statement disclosures (Ernst & Young, 2014; Deloitte 2014). Our second set of hypotheses follows:

H2a*: Firms are more likely to disclose material weaknesses if the SEC issues comment letters addressing internal control disclosure deficiencies to the industry leader of the industry the firms belong to.*

H2b*: Firms are more likely to disclose material weaknesses if the SEC issues comment letters addressing internal control disclosure deficiencies to a greater number of their industry peers.*

H2c*: Firms are more likely to disclose material weaknesses if the SEC issues comment letters addressing internal control disclosure deficiencies to their industry peers that share the same auditor.*

1.4. Data and Sample Selection

The SEC's comment letters data is obtained from Audit Analytics Comment Letter database, which collects all the comment letters on EDGAR since the SEC started releasing comment letters issued after later 2004. In total, there are 14,770 10-K related comment letter conversations from 2006 to 2012. The comment letter conversation is a related series of SEC Division of Corporate Finance Comment Letters and Company's response letters. Therefore there could be more than one comment letters for each round of review process because of the consecutive rounds of conversations between SEC and the firm. In this study, I use the first comment letter of each conversation because most of the subsequent letters simply ask for further clarifications depending on firm's response letters and carry little incremental information beyond the first letter. In each comment letter, the SEC states clearly which filings the comment letter is referring to and then lists

all the issues that the SEC comments on. The database also categorizes the comment letter's topics, such as internal control disclosure, accounting rule and accounting disclosure type issues and MD&A. Therefore, I designate a firm-year observation as receiving comment letter related to internal control issues if the internal control text column is coded.

The sample selection process is as follows. I begin with all the annual filings that reported SOX 302 opinion, which is management's assessment of effectiveness of internal control over financial reporting. After merging with available financial and stock return data, I merge it with comment letters data and designate the firm-year observation as 1) receiving 10-K comment letters that are related to the internal control disclosure, 2) receiving 10-K comment letters addressing any other disclosure issues, or 3) not receiving 10-K comment letters. As reported in Panel A of Table 1, there are 23,202 firm year observations from fiscal year 2005 to 2011. Because SEC started issuing comment letters from 2004, I use firm years starting from 2005 so that so I can explore the effect of previous year's comment letters. Among the total sample, 63 percent of them don't receive any kind of comment letters on its 10-K filings. Around 668 firm-year observations, which is around 3 percent of the total sample, receive 10-K comment letters on their internal control disclosure. The rest of sample are firms receive 10-K comment letters that are not related to its internal control disclosure, which is 34 percent of the total sample. In Panel B, I breakdown the sample by fiscal year. Notably, the number of firms that receive 10-K comment letters are reasonably stable over the years, ranging from 972 (28 percent) to 1,279 (38 percent). More importantly, the number of firms that receive internal control comment letters decreases from year of 2005 to 2011. There are two

possible reasons for this decreasing trend. First, the SEC's scrutiny over firm's disclosure of ICFR could be more stringent in the early period when the regulatory authority wants to strengthen the implementation effectiveness of SOX 302 (404), which started requiring firm's management (auditor) to assess the internal control effectiveness. Second, as firms, especially small ones, became more familiar with the internal control disclosure guidelines provided by the SEC in recent years, the SEC may believe the prospect of ICFR disclosure non-compliance will be less likely and thus lessen regulatory scrutiny over internal control disclosure. However, this trend is expected to reverse to higher level since firms are beginning, though not mandatorily required, to use new updated COSO internal control framework in 2013[8].

In Panel A of Table 2, I report the categorization of internal control comment letters depending on the comments in the letters. The comments are mostly concentrated on criticizing firms for 1) using incorrect language in internal control disclosure, 2) failing to disclose changes of internal control from last period, 3) failing to fully disclose material weakness in ICFR, and 4) failing to propose remedies for material weakness after disclosing it. As reported in Panel B, most of the firms that receive internal control comment letters claim to have effective ICFR and there is no material weakness existed in the disclosure controls. In addition, most of the firms are accelerated filers that are also required to report auditor's opinion of the effectiveness of ICFR.

1.5. Baseline Model

1.5.1. Pool Regression Model

To test the first hypothesis, as discussed in the previous section, I classify registrant firms into four groups: 1) firms that receive comment letters addressing internal control

[8] See WSJ: SEC Outlines Priorities for Division of Corporate Finance

disclosure issues in the annual report, 2) firms that receive comment letters addressing any other disclosure issues (other than internal control disclosure) in the annual report, and 3) firms that do not receive 10-K comment letters, which include firms that receive other kinds of comment letters not related to annual reports and firms that do not receive any kind of comment letters[9]. Accordingly, I construct two dummy variables: *CL_IC* and *CL_NOT_IC*. *CL_IC* is coded as 1 in year *t* if a firm receives internal control disclosure comment letters that are related to its year *t* annual report, and 0 otherwise. *CL_NOT_IC* is coded as 1 in year *t* if a firm receives other kinds of 10-K comment letters on its year *t* annual report except internal control disclosure issues, and 0 otherwise. Naturally firms don't receive 10-K comment letters are used as the baseline group. I run a pooled regression model including *CL_IC* and *CL_NOT_IC* as the main independent variable of interest. Consistent with my first hypothesis, my prediction for the coefficient of *CL_IC* is positive and significant. However, no prediction is made for the coefficient of *CL_NOT_IC*. The reason is that any disclosure deficiencies, other than internal control specific disclosure deficiencies, addressed by SEC's comment letters suggest that these 10K-letter firms are more likely to have internal control problems over financial reporting compared with no-letter firms. However, whether a negative SEC's review consequence (i.e. issuance of comment letter) sufficiently justify a material weakness' existence in firm's internal control of financial reporting remains a debatable question. Thus I do not

[9] I do not make any assumption about the difference between firms that receive other-than-10-K comment letters and firms don't receive any kind of comment letters. It is unclear to us whether firms believe their annual filings are also reviewed when they get other kind of comment letters. Since this research is focusing on SEC scrutiny on firms' annual reporting behavior, I keep both kinds of firms as my baseline or control group. In sensitivity analysis, I drop firm-year observations receiving non-10K-related comment letters and the results are similar.

make any prediction for the coefficient of CL_NON_IC. The model I use to test Hypothesis 1 is:

$$\begin{aligned} MW = \alpha + \beta_1\, CL_IC + \beta_2\, CL_NOT_IC + \beta_3\, MW_{t-1} + \beta_4\, SEGMENT + \beta_5\, FOREIGN \\ + \beta_6\, SIZE + \beta_7 M\&A + \beta_8 AGG_LOSS + \beta_9 RESTRUCT \\ + \beta_{10} AZSCORE + \beta_{11} INVENTORY + \beta_{12} AGE + \beta_{13} EXT_GROWTH \\ + \beta_{14} EXT_FINANCING + \beta_{15} BIG4 + \beta_{16} LITIGATION \\ + \sum_{m=1}^{M} \beta_{17,m} INDUSTRY + \sum_{n=1}^{N} \beta_{18,n} YEAR + e \end{aligned}$$

To explore the incremental effect that SEC comment letters have on internal control weakness reporting, I need to control for the determinants of disclosing material weaknesses in firms' internal control. Following Ashbaugh-Skaife, Collins and Kinney (2007) and Doyle, Ge and McVay (2007), several groups of firm characteristics that are related to the *existence* of internal control weaknesses are included in my model. Frist, I control for firm's business and structure complexity by including: *SEGMENT*, measured by total number of operating and geographic segments; *FOREIGN*, equal to 1 if firm has a foreign segment and 0 otherwise; *INVENTORY*, measured by inventory scaled by total asset. Secondly, I control for firm's significant organizational change by including: *M&A*, equal to 1 if the firm non-zero acquisition value and 0 otherwise; *RESTRUCTURING*, equal to 1 if firm has non-zero restructuring charge and 0 otherwise; *EXT_GROWTH*, equals to 1 if the sales growth is in the first quintile of year t and 0 otherwise; *SIZE*, measure by the natural logarithm of market value. Thirdly, I use variables to proxy firms potential investment in internal controls: *AGE*, measured by natural log of firm years on CRSP; *AZSCORE*, measured by the decile rank of Altman z-score; *LOSS*, equal to 1 if the aggregate earnings before interests and taxes of year t and t-1 is negative and 0 otherwise. All the control variables are defined in more details in appendix and are

computed for each firm over its fiscal year t. I obtain data for control variables from Computat and CRSP.

Besides these fundamental firm characteristics, Ashbaugh et al. (2007), Leone (2007), and Rice and Weber (2012) suggest that internal control weakness reporting is also determined by the firm's or auditor's ability incentive to detect and disclose weaknesses. Specifically, they found that previously reported restatement and internal control weakness are important factors in detecting existing internal control weakness because managers and auditors have been aware of past accounting and control problems. I was also found that firms looking for external financing would be less forthcoming about their internal control problems because of higher cost of raising external capital if disclosed (Ashbaugh-Saife et al. 2009; Costello and Wittenberg-Moerman 2011). Additionally, auditor quality and audit effort would be positively associated with detection of internal control weakness. In this chapter, I propose a model with those additional determinants, in which I control for *RESTATE*, equal to 1 if firms file restatement in last 3 fiscal years and 0 otherwise; *MW*, equal to 1 if firms disclose material weakness in last 3 fiscal years and 0 otherwise; *EXT_FINANCING*, measured by total debt and equity financing in the next fiscal year; *BIG4*, equal to 1 if current fiscal year's auditor is a big 4 auditor and 0 otherwise. As suggested in Leone (2007), we have to be very cautious when interpreting the coefficients of these variables because we cannot distinguish between firms with and without underling control weakness and they cannot provide direct evidence of the incentive to disclose MWs because of the endogeneity problem. All the models are estimated using logistic regression including

year and industry dummies and robust standard errors clustered by each company and by year.

1.5.2. Univariate Test

In Table 3, I report the summary statistics of major variables in Panel A and more importantly partition the sample into three groups: internal control comment letter firms, other 10-K letter firms and no 10 10-K letter firms in Panel B. The mean value and *t*-statistics across the three groups of samples are also reported. Several findings emerge. First, firms that receive internal control comment letters are more likely to report material weakness with ICFR when comparted with other 10-K letter firms and no letter firms. The finding confirms my conjecture that the SEC's scrutiny over internal control disclosure is highly conditional on firm's reporting of internal control effectiveness. In addition, there are two possible reasons for this regulation asymmetry over internal control disclosure. First, because the SEC has limited budget and its primary role is protecting investors from financial misreporting, the SEC is likely to allocate more resources on reviewing the internal control disclosure compliance of firms that report material weakness in ICFR. Second, firms that report significant weakness in internal control over financial reporting are apparently by their nature less likely to have a disclosure that is free from disclosure deficiencies. One surprising finding is that firms receiving other 10-K comment letters are less likely to report material weakness than firms that are free from any disclosure deficiencies in 10-K.

The second finding is that firms that receive either internal control comment letters or other 10-K comment letters have more business segments and are more likely to have foreign operations than firms that do not receive any 10-K comment letters. However,

internal control letter firms have fewer business segments and are less likely to have foreign business segments than firms other 10-K letter firms. Third, there is no difference in size, financial performance and stress, financing activities and volatility between firms that receive internal control comment letters and firms that do not receive any 10-K letter. But firms that receive internal control letters are smaller and less profitable and have less *M&A*, less inventory and more restatements than firms that receive other 10-K comment letters.

1.5.3. Multivariate regression results

The regression results of Model (1) are reported in the Table 4. The coefficient of major variable of interest *CL_IC* in column (1) is positive and significant at <5% level (z-statistics=2.14). This result suggests that firms are more likely to disclose material weakness in ICFR after receiving internal control comment letters than *any* other firms. Notably, the coefficient of MW_{t-1} is highly significant (z-statistics=32.74), suggesting that internal control weakness is rather sticky and many firms failed to remedy it after acknowledging its existence. Next I separate the baseline sample into firm that receive other 10-K comment letters and firms don't receive10-K comment letters by including dummy variable *CL_NOT_IC* in the model. As reported in column (2), the coefficient of *CL_NOT_IC* is *not* significant while *CL_IC* remains significant at <5% level. This finding supports H1 that receiving internal control comment letter will affect firm's disclosure of internal control weakness, while receiving any other kind of comment letters don't have such an effect on firm's internal control disclosure behavior. In addition, as reported in the bottom of the table, the marginal effects of *CL_IC* is

As discussed before, the issues addressed in internal control comment letters are highly conditional on whether firm's reporting internal control weakness. I predict that the effect of internal control letters on internal control disclosure in year $t+1$ is different between firms that report material weakness in year t and firms that don't report material weakness in year t. To prove this, I refine the model by including interact term $CL_IC \times MW_{t-1}$ and $CL_NOT_IC \times MW_{t-1}$. For firms that don't report material weakness in year t, the coefficient of *CL_IC* now represents the effect of internal control comment letters on these firm's material weakness reporting in year $t+1$; for firms that report material weakness in year t, the effect is estimated by the coefficient of *CL_IC* plus the coefficient of $CL_IC \times MW_{t-1}$. Because the interaction terms in the non-linear model is interpreted differently from those in the linear model, I calculate the interaction effect of this non-linear logit model following Ai and Norton (2003) and Puhani (2008).

Column (3) shows that the coefficient of *CL_IC* is positively significant at <0.01 level (z-statistics=3.98), while the coefficient of $CL_NOT_IC \times MW_{t-1}$ is negatively significant at <0.05 level (z-statistics= -2.79). The results suggest that the regulatory scrutiny over internal control disclosure only affect firms' internal control reporting for firms that do not report any material weakness in ICFR. For firms that have reported material weakness, the SEC's scrutiny does not affect their reporting choice over internal control disclosure. In addition, the coefficients of control variables are generally consistent with prior literature. The coefficients of *SIZE* and *AGE* are both negative, suggesting that larger and older firms are less likely to report material weakness in internal control. Firms that have foreign operations, extreme sales growth, more external

financing activities, and non-Big-4 auditors are more likely to report material weakness. Also firms in less financial distress are less likely to report material weakness.

In Panel B, I also separate the sample based on MW_{t-1} and estimate the model respectively. For firms that does not report material weakness (MW_{t-1} =0) in previous year, the coefficient of *CL_IC* is positively significant at <0.01 level and the coefficient of *CL_NOT_ IC* is not significant. However, for firms that report material weakness (MW_{t-1} =1) in previous year, neither coefficients of *CL_IC* and *CL_NOT_ IC* is significant. The results are similar to those in the previous pool regression. In summary, the results suggest that SEC disclosure regulation scrutiny significantly affects firms' internal control effectiveness reporting choice, but this effect only exists in firms that don't report material weakness in previous year.

1.6. Propensity Score Matching

Like many other empirical studies, one of the most fundamental research design issues this study faces is endogeneity. Specifically, some firm characteristics that are associated with a firm's propensity to receive SEC comment letters may also be associated with its likelihood of experiencing and/or reporting an internal control weakness (Cassell et al. 2013; Johnston and Petacchi 2014). In the baseline model, I control for any such observable firm characteristics. As the SEC review process is conducted at least every 3 years among all public listed firms, this mandatory review schedule alleviates part of the concern that firms receiving comment letters are selected by the SEC to review because they are more likely to have internal control weaknesses.

Nevertheless, the endogeneity issue arises primarily from some *unobservable* firm characteristics that affect both the firm's probability of receiving internal control-related

comment letters and its reporting of internal control weaknesses. To clearly identify the treatment effect of the SEC's comment letters, the treatment group (firms receiving internal control-related comment letters) and control group (firms not receiving internal control-related comment letters) should ideally be randomly chosen, conditional on observable characteristics of the firms (Roberts and Whited 2011). I propose to tackle the endogeneity issue using Propensity Score Matching (PSM).

When applying the propensity score matching, a key issue is to find out firms that are similar to the treatment group (i.e. firms get internal control letters) in the probability to receive internal control comment letter but *not* reviewed by the SEC. So first I identify the potential matching sample group in year *t* by keeping no-10K-letter firms that receive at least one comment letter for the last two fiscal years. Imposing this restriction on the no letter firms will increase the probability that the control group are *not* reviewed in that year because the firm is usually reviewed every 3 years. In the meanwhile, the treatment group (i.e. internal control letter firms) are reviewed by the SEC. Therefore, receiving the comment letters could be deemed as random in certain degree because the control group has a large probability not reviewed by the SEC in that fiscal year. Second, a discrete choice model is used to estimate firm's probability or likelihood to receive internal control letters. In other words, for every treatment sample, I should choose a match firm that is going to receive internal control comment letters with the highest probability as if it was reviewed by the SEC. Therefore I use the logit model below to estimate the propensity score to receive internal control comment letters:

$$\begin{aligned} CL_{IC} = \alpha + \beta_1\ MW + \beta_2\ RESTATE\ + \beta_3\ VOLATILITY + \beta_4\ SIZE \\ + \beta_5\ SEGMENT\ + \beta_6\, FOREIGN + \beta_7 M\&A + \beta_8 ALOSS \\ + \beta_9 RESTRUCTUR + \beta_{10} AZSCORE + e \end{aligned}$$

The dependent variable is *CL_IC*, which is equal to 1 if the firm receives comment letters that are related to internal control disclosure and equal to 0 for all the potential matched sample identified in step 1. Following the institutional background and prior literature, I use a group of covariates in the determinants model to estimate firm's probability to receive internal control comment letters. All the variables are computed for each firm over its fiscal year *t*. First, I control for material weakness (*MW*) in year *t* because the SEC's comments on the internal control disclosure are highly conditional on the existence of material weakness in the ICFR. For example, if firm acknowledges the existence of material weakness, then the SEC's comments are more likely to ask the firm to provide propose remedies rather than questioning the existence of material weakness. Moreover, internal control weakness could be sticky. Last year's internal control weakness problem implies higher likelihood that internal control weakness also exists in this year. As matching is done within firms that have internal control weakness, matching on the reporting of last fiscal year's internal control weakness is trying to hold the omitted firm characteristics that determine the existence of internal control weakness in similar tread across pre-treatment and post-treatment periods for the treatment sample and control sample. Therefore I try to force the pre-treatment trends to be similar among the treatment and control sample by increasing the probability that matching group to be drawn from no comment letters firms in the same fiscal year with same internal control weakness reporting in last fiscal year. Thus I'm trying to disentangle the variable of interest *CL_IC* from the possible omitted correlated variables and alleviate the concern that *CL_IC* is capturing some firm characteristics that determines the existence of internal control weakness. In addition, some unobservable firm characteristics may also affect

firm's propensity to disclose internal control weakness conditional on the existence of it. Matching on the prior year's reporting of internal control weakness is trying to make to make the detection and reporting incentive of the treatment sample and control sample similar. Second, SOX 408 review criteria which are considered by the SEC when scheduling the review process are used as control variables. They include *REST*, equal to 1 if firm announces financial restatement on annual reports and 0 otherwise; *VOLATILITY*, measured by the abnormal stock return volatility in the past 36 months before the fiscal year end month; *SIZE*, measured by natural log of the market capitalization; *LEADER*, equal to 1 if the firm's sales is more than 20 percent of total sales of all firms in the same 3-digit industry. Third, I also control for other factors that are associated with firm's probability to receive comment letters (Johnston and Petacchi, 2014; Cassell et al., 2013), including *SEGMENT*, *FOREIGN*, *M&A*, *AGG_LOSS*, *RESTRUCT* and *RZSCORE*. Their definitions are the same as those in the baseline model.

I estimate the model using observations with sufficient data for both matching period and post-comment-letter period. I then match, without replacement, each internal control letter firm to a no-letter firm in the same year that has the closest predicted probability to receive internal control letters with a caliper of 3%. In total, 668 observations that receive comment letters related to internal control disclosure are matched to 668 observations that do not receive comment letters. In Panel A of Table 5, I report the univariate comparisons between the treatment group and control group's characteristics and the corresponding *t*-statistics. It can be seen that none of the independent variables used in the model shows statistically significant difference between

the two groups, suggesting that there is no observable differences along firm's probability to receive internal control comment letters.

In the next step, I investigate the treatment effect of SEC's internal control disclosure comment letters by Model 2 and denote firms with internal control related comment letters with dummy variable *CL_IC*. The regression results are reported in Panel B of Table 5. The coefficient of *CL_IC* is positive and significant at <0.05 level. This finding is consistent with the previous finding that internal control letters affect firms' internal control weakness reporting choices.

$$\begin{aligned} MW = \alpha + \beta_1\, CL_IC + \beta_2\, SEGMENT + \beta_3\, FOREIGN + \beta_4\, SIZE + \beta_5 M\&A \\ + \beta_6 AGG_LOSS + \beta_7 RESTRUCT + \beta_8 AZSCORE + \beta_9 INVENTORY \\ + \beta_{10} AGE + \beta_{11} EXT_GROWTH + \beta_{12} EXT_FINANCING + \beta_{13} BIG4 \\ + \beta_{14} LITIGATION + \sum_{m=1}^{M} \beta_{15,m} INDUSTRY + \sum_{n=1}^{N} \beta_{16,n} YEAR + e \end{aligned}$$

1.7. Spillover effects of comment letters on other firm's ICW reporting

After identifying the effect of internal control issue comment letters on firm's internal control reporting behavior, another interesting question is whether other firms that don't receive internal control letters are also affected by this SEC's regulation scrutiny. To answer this question, I limit the sample to no-10-K-letter firms only. This is because for firms with 10-K letters, their internal control disclosure is reviewed and firms believe they have passed the SEC's review over internal control disclosure.

As discussed in Hypothesis 2, I use three channels to identify the spillover effects. First, for the industry leader channel, I use dummy variable *Leader*, which is equal to 1 if the firm's industry leader receives internal control related comment letters in year t and 0 otherwise. Industry leader is defined as a firm that has more than 20 percent of market

share in year t within same 3-digit SIC. Second, I use rival channel. *Rival* is the total number of firms that have internal control related comment letters within each industry in year t. Third, I use same auditor channel. *Same_Auditor* is equal to 1 if the no-letter firm has the same auditor with its industry peers that receive internal control related comment letters in year t. As reported in Table 6, the coefficients of *LEADER*, *RIVAL* and *SAME_AUDITOR* are all positive and significant at <0.05 level. But the spillover effect mainly comes from the industry leader because only *LEADER* remains significant after all channels area included in the model. The results suggest that the SEC's internal control comment letter has the spillover effect on other firm's internal control reporting choice and this deterrence mostly comes from the leaders who are the most observable one in the industry. The controls are similar to the previous results and also consistent with prior literature.

1.8. Conclusion

Since the onset of internal control disclosure requirement brought by SOX 2002, the effectiveness of internal control reporting has been widely questioned. In an effort to improve firm's financial reporting, the SEC periodically reviews public firm's filings and issues comment letters to the firm if the SEC discovers any disclosure deficiency. The purpose of this study is to test how regulation scrutiny, specifically the SEC's review process over firm's financial statements, affects firm internal control deficiency reporting. I find that comment letters that address firm's internal control disclosure deficiencies increase firm's likelihood to disclose material weakness with firm's internal control. This regulatory scrutiny only affects firms that do not disclose material weakness in ICFR when receiving the internal control comment letters. Furthermore, I provide some

evidence that internal control comment letters has spillover effect on firms that do not receive 10-K comment letters. These firms are more likely to disclose material weakness in internal control if their industry leader, a greater number of industry peers or peer firms that share the same auditor receive internal control comment letters. Taken together, these findings suggest that the effectiveness of internal control reporting is affected by regulatory scrutiny over firm's financial reporting.

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1.10. Appendix for Chapter 1

Appendix 1.1

SEC's Comment Letter on Citi group's Internal Control Reporting

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

DIVISION OF
CORPORATION FINANCE

July 31, 2014

Via E-mail
Michael L. Corbat
Chief Executive Officer
Citigroup, Inc.
399 Park Avenue
New York, NY 10022

Re: Citigroup Inc.
Form 10-K for the Fiscal Year Ended December 31, 2013
Filed March 3, 2014
File No. 001-09924

Dear Mr. Corbat:

We have reviewed your filing and have the following comments. In some of our comments, we may ask you to provide us with information so we may better understand your disclosure.

Please respond to this letter within ten business days by amending your filing, by providing the requested information, or by advising us when you will provide the requested response. If you do not believe our comments apply to your facts and circumstances or do not believe an amendment is appropriate, please tell us why in your response.

After reviewing any amendment to your filing and the information you provide in response to these comments, we may have additional comments.

Management's Discussion and Analysis…, page 5

1. As noted in the Board's letter to shareholders, included with the annual meeting proxy statement, Mr. Corbat has set reducing expenses as one of the key elements of your three-year plan. Similarly, you discuss the importance of expense reductions in the first full risk factor on page 67. We also note that on page 6 you indicate that essentially overall expenses have remained relatively unchanged in 2013 over 2012. Please tell us, with a view towards revised disclosure in future filings, if your overall expense reduction strategy has changed since you set the 2013-2015 goals and discuss any challenges you have met in implementing the strategy for Citigroup as a whole, or with regard to your key business segments.

Citigroup Residential Mortgages – Representations and Warranties Repurchase Reserve, page 92

2. We note your disclosure here and your response to our prior comment regarding the June 28, 2013 agreement you reached with Fannie Mae. Please file the agreement or expand your analysis to discuss why entering into the settlement itself, regardless of the dollar amount of the settlement, is not a material agreement. Your expanded analysis should also include a discussion of what, if any, accruals for litigation and regulatory matters that were settled as a result of this agreement.

3. We note your disclosure here as well as previous disclosures regarding the September 25, 2013 agreement you reached with Freddie Mac to resolve potential future repurchase claims for breaches of representations and warranties on 3.7 million residential first mortgage loans sold to Fannie Mae that were originated between 2000 and 2012. Please file this agreement or provide us with a thorough analysis as to why you are not required to file this agreement.

Item 9A. Controls and Procedures, page 147

4. We note your disclosure in Note 29 that you recorded a $235 million after-tax ($360 million pretax) charge resulting from a fraud discovered in Banco Nacional de Mexico (Banamex) related to your accounts receivable financing program. Additionally, per page 218 of your Form 10-Q for the quarter ended March 31, 2014, we note that you incurred an additional $165 million of incremental credit costs related to the Pemex supplier program, which includes some incremental credit costs associated with an additional supplier to Pemex within the Pemex supplier program that was found to have similar issues. Please address the following:

   - Tell us how the identification of this fraud impacted your conclusion on the effectiveness of your disclosure controls and procedures and internal control over financial reporting (ICFR) as of December 31, 2013. As part of your response, please explain how you considered whether locations other than Banamex have controls that are similar in design to those that failed at your Banamex location.

   - To the extent you identified significant deficiencies in your original assessment of ICFR as of December 31, 2013, tell us the nature of each, including the impacted component(s) of the Committee of Sponsoring Organizations of the Treadway Commission (COSO) Internal Control Integrated Framework, and how you evaluated their severity individually and in the aggregate, including in aggregation with any deficiencies identified upon discovery of the above fraud, if applicable.

   - Tell us the extent to which you have considered the findings of the Mexican bank regulator, Comision Nacional Bancaria y de Valores (CNBV) in your analysis of the deficiencies you identified, and explain how you considered whether CNBV's findings are indicative of a material weakness in ICFR at December 31, 2013.

- Tell us the nature of the controls that have been put in place to remediate this issue and prevent similar situations from re-occurring. Tell us when those controls were implemented and tested.

We urge all persons who are responsible for the accuracy and adequacy of the disclosure in the filing to be certain that the filing includes the information the Securities Exchange Act of 1934 and all applicable Exchange Act rules require. Since the company and its management are in possession of all facts relating to a company's disclosure, they are responsible for the accuracy and adequacy of the disclosures they have made.

In responding to our comments, please provide a written statement from the company acknowledging that:

- the company is responsible for the adequacy and accuracy of the disclosure in the filing;
- staff comments or changes to disclosure in response to staff comments do not foreclose the Commission from taking any action with respect to the filing; and
- the company may not assert staff comments as a defense in any proceeding initiated by the Commission or any person under the federal securities laws of the United States.

You may contact Stephanie Ciboroski, Senior Assistant Chief Accountant at (202) 551-3512 if you have questions regarding comments on the financial statements and related matters. Please contact Eric Envall at (202) 551-3234 or Christian Windsor, Special Counsel at (202) 551-3419 with any other questions.

Sincerely,

/s/ Christian Windsor
Special Counsel

Suzanne Hayes
Assistant Director

(http://www.sec.gov/Archives/edgar/data/831001/000000000014038967/filename1.pdf)

Appendix 1.2 Variable Definitions

Variable Name	Definition	Data source
Dependent Variable		
MW	=1 if firms report material weakness in year t, 0 otherwise	Audit Analytics (AA)
Test Variables		
CL_IC	=1 if firm's last year annual reports gets 10-K comment letters that are related to internal control disclosure, 0 otherwise	AA
CL_NOT_IC	=1 if firm's last year annual report gets 10-K comment letters that are NOT related to internal control disclosure, 0 otherwise	AA
LEADER	=1 if the industry leader, which has market sales share of more than 20 percent in the same 3-digit SIC code industry, receives a comment letter related to internal control disclosure in year t-1, 0 otherwise	AA
PEER_NUMBER	Number of firms in the same 3-digit SIC industry get comment letters in year t-1	AA
SAME_AUDITOR	=1 if an industry peer, which has the same auditor, gets internal control related comment letters in year t-1	AA
Control Variables		
RESTATE	=1 if firm announced a restatement in year t, t-1 or t-2, 0 otherwise	AA
VOLATILITY	Standard deviation of abnormal stock return in the previous 36 months (abnormal return = monthly return – value weighted monthly market return)	CRSP
SEGMENTS	Operating and Geographic segments	Compustat
FOREIGN	=1 if firm has foreign segment, 0 otherwise	Compustat
SIZE	Logarithm of market value common shares outstanding × stock close price at fiscal year end	Compustat
FIRM AGE	Logarithm of firm's years that have CRSP data	CRSP
AGG_LOSS	=1 if the sum of EBIT in year t and t-1 is negative, 0 otherwise	Compustat
EXT_ GROWTH	=1 if firm's sales growth of year t is in the highest quintile, 0 otherwise	Compustat
RESTRUCTURING	=1 if restructuring costs pretax (RCP, Compustat Item 376) are not zero, 0 otherwise	Compustat
M&A	=1 if acquisition value (AQC, Compustat Item 129) is not zero, 0 otherwise	Compustat
INVENTORY	=Inventory/Total Asset	Compustat
RZSCORE	Decile rank of Altman Z-SCORE, which is equal to 1.2Working Capital/TA + 1.4Retained Earnings/TA + 3.3EBIT/TA + 0.6Market Value of Equity/TL + 1.0Sales/TA	Compustat
EXTFINANCING	Equity financing +Debt Financing; Equity Financing: SSTK (Sale of Common and	Compustat

	Preferred Stock) - PRSTKC (Purchase of Common and Preferred Stock) – DV (Cash Dividends (Cash Flow)) Debt Financing: DLTIS (Long-Term Debt Issuance) - DLTR (Long-Term Debt Reduction) - DLCCH (Current Debt Changes)	
LITIGATION	=1 if firms SIC code is equal to 2833-2836, 3570-3577, 3600-3674,5200-5961 or 7370-7374, 0 otherwise	Compustat
BIG FOUR	=1 if firm's auditor is a big four auditor, 0 otherwise	AA
INDUSTRY	Fama-French 12 Industry Classification Dummy	Compustat
YEAR	Fiscal year dummy	Compustat

1.11. Tables for Chapter 1

Table 1.1
Sample Selection

Panel A: Observations breakdown	#	%
• Internal Control Letter Firms	668	2.89%
• Other 10-K Letter Firms: receive 10-K comment letters but not related to internal control disclosure	7,951	34.36%
• No-10K-letter Firms	14,583	63.02%
Total firm-year observations	23,202	100%

Panel B: Sample Distribution by Fiscal Year

	Internal Control letter Firms	**Other 10-K Letter Firms**	**No-10K-letter Firms**	**Total**
2005	159 4.59%	972 28.05%	2,364 68.23%	3,465
2006	97 2.88%	963 28.58%	2,339 69.43%	3,399
2007	119 3.53%	1,140 33.84%	2,110 62.63%	3,369
2008	146 4.29%	1,279 37.55%	1,981 58.16%	3,406
2009	74 2.26%	1,409 43.08%	1,788 54.66%	3,271
2010	47 1.49%	1,049 33.22%	2,062 65.29%	3,158
2011	26 0.84%	1,139 36.69%	1,939 62.47%	3,104
Total	668 2.89%	7,951 34.36%	14,583 63.02%	23,202

Table 1.2
Internal Control Comment Letter Characteristics

Panel A: Internal Control Comment Letters Categorization	Number of Observations
Incorrect language for DC/IC disclosure	442
Changes in internal controls (IC)--disclose	422
Material weakness in DC/IC--fully disclose	209
Material weakness in DC/IC--proposed remedies	134
Material weakness in DC/IC--impact on fin statements	16
Non-effectiveness of DCs/ICs--needs to be stated explicitly	7
Timetable needed for remedy of DC/IC deficiency	6
Material weakness in DC/IC--disclose who discovered	6

Panel B: Firm's Internal Control Reporting Characteristics				
	Total	**YES**	**NO**	**Did not disclose**
Is SOX 302 **Effective**?	668	494	170	4
Does the management indicates a **material weakness** existed in the disclosure controls?	668	179	489	0
Is the firm accelerated filer?	668	477	164	27
Is the firm Large accelerated filer?	668	278	389	1
Is the firm voluntary accelerated filer?	668	7	643	18

Table 1.3 Summary Statistics

	Internal Control Letters Firm C(1)	Other 10-K Letter Firms C(2)	No 10K-letter Firms C(3)	C(1)-C(3)	C(2) - C(3)	C(1)-C(2)
Variables	***Mean***	***Mean***	***Mean***	***Mean Diff***	***Mean Diff***	***Mean Diff***
MW	0.268	0.0470	0.0790	0.189***	-0.032***	0.221***
SEGMENT	5.226	5.528	4.801	0.425***	0.727***	-0.302**
FOREIGN	0.603	0.623	0.557	0.046**	0.066***	-0.0200
SIZE	6.025	6.880	5.920	0.105	0.960***	-0.855***
M&A	0.100	0.137	0.109	-0.00900	0.028***	-0.037***
AGG_LOSS	0.269	0.192	0.289	-0.0200	-0.097***	0.078***
RESTRUCT	0.305	0.332	0.255	0.051***	0.077***	-0.0260
RZSCORE	5.894	6.089	5.938	-0.0440	0.151***	-0.195**
INVENTORY	0.112	0.0940	0.103	0.010*	-0.009***	0.019***
AGE	2.397	2.566	2.473	-0.076**	0.093***	-0.169***
EXT GROWTH	0.235	0.210	0.208	0.027*	0.00200	0.0250
EXTFINANCING	0.0300	0.0240	0.0560	-0.0260	-0.032***	0.00600
BIG4	0.569	0.735	0.612	-0.043**	0.123***	-0.166***
LITIGATION	0.247	0.273	0.288	-0.041**	-0.015**	-0.0260
REST	0.135	0.0680	0.0790	0.056***	-0.011***	0.067***
VOLATILITY	0.141	0.126	0.143	-0.00200	-0.017***	0.015***
# of Observations	668	7951	14583			

Table 1.4
The Probability of Disclosing Material Weakness of ICFR after Receiving SEC Comment Letters

Panel A: Pool Regression

	(1) Material Weakness	(2) Material Weakness	(3) Material Weakness
CL_IC	0.259**	0.277**	0.610***
	(2.14)	(2.24)	(3.98)
MW_{t-1}	2.395***	2.399***	2.441***
	(32.74)	(32.83)	(29.33)
CL_NOT_IC		0.0700	0.0601
		(1.05)	(0.77)
$CL_IC \times MW_{t-1}$			-0.622**
			(-2.79)
$CL_NOT_IC \times MW_{t-1}$			0.0425
			(0.29)
SEGMENT	0.0123	0.0121	0.0119
	(1.00)	(0.99)	(0.97)
FOREIGN	0.216**	0.217**	0.216**
	(2.74)	(2.75)	(2.74)
SIZE	-0.171***	-0.173***	-0.171***
	(-7.99)	(-8.04)	(-7.94)
M&A	0.0652	0.0639	0.0650
	(0.62)	(0.61)	(0.62)
AGG_LOSS	0.132*	0.132*	0.133*
	(1.70)	(1.70)	(1.73)
RESTRUCT	0.0519	0.0509	0.0505
	(0.71)	(0.70)	(0.69)
RZSCORE	-0.0491***	-0.0486***	-0.0492***
	(-3.69)	(-3.65)	(-3.69)
INVENTORY	0.401	0.399	0.404
	(1.49)	(1.48)	(1.50)
AGE	-0.103***	-0.104***	-0.102***
	(-2.87)	(-2.88)	(-2.84)
EXT_GROWTH	0.309***	0.309***	0.307***
	(4.46)	(4.46)	(4.41)
EXTFINANCING	0.179***	0.181***	0.180***
	(2.66)	(2.68)	(2.67)
BIG4	-0.516***	-0.515***	-0.515***
	(-7.05)	(-7.04)	(-7.04)
LITIGATION	-0.106	-0.104	-0.106
	(-1.29)	(-1.27)	(-1.30)
CONSTANT	-0.960***	-0.966***	-0.999***
	(-4.51)	(-4.54)	(-4.68)
YEAR FE	*YES*	*YES*	*YES*
INDUSTRY FE	*YES*	*YES*	*YES*
MARGINAL EFFECTS [%]			
CL_IC	1.05	1.12	2.89
CL_NOT_IC	*N/A*	0.28	0.26
p-value for *CL _IC= CL_NOT_IC*	*N/A*	0.11	<1%

N	23,202	23,202	23,202
Pseudo R-square	0.219	0.219	0.22

All the stand errors are clustered at firm level. ***, ** and * indicate significance level at 1%, 5% and 10% respectively.

Panel B: Partition on whether disclosing Material Weakness in year t-1 (MW_{t-1})		
Dependent Variable = MW_t		
	MW_{t-1}=0	*MW_{t-1}=1*
CL_IC	0.597***	-0.0235
	(3.80)	(-0.15)
CL_NOT_IC	0.101	0.0315
	(1.27)	(0.26)
SEGMENT	0.00196	0.0287
	(0.13)	(1.42)
FOREIGN	0.265***	0.136
	(2.77)	(1.00)
SIZE	-0.186***	-0.0878**
	(-7.57)	(-2.11)
M&A	0.264**	-0.303
	(2.15)	(-1.46)
AGG_LOSS	0.122	0.208*
	(1.21)	(1.70)
RESTRUCT	0.0665	0.0951
	(0.75)	(0.75)
RZSCORE	-0.0622***	-0.0240
	(-3.93)	(-1.02)
INVENTORY	0.579*	0.143
	(1.68)	(0.33)
AGE	-0.178***	0.0682
	(-4.22)	(1.14)
EXT_GROWTH	0.399***	0.0395
	(4.86)	(0.32)
EXTFINANCING	0.140	0.352**
	(1.49)	(2.11)
BIG4	-0.534***	-0.451***
	(-5.93)	(-3.62)
LITIGATION	-0.204***	0.0900
	(-2.10)	(0.62)
CONSTANT	-0.667***	0.302
	(-2.60)	(0.79)
YEAR FE	YES	YES
INDUSTRY FE	YES	YES
MARGINAL EFFECTS [%]		
CL_IC	1.76	-0.01
CL_NOT_IC	0.30	0.07
p-value for *CL _IC= CL_NOT_IC*	<1%	0.76
N	21,269	1,933
Pseudo R-square	0.091	0.046

All the stand errors are clustered at firm level. ***, ** and * indicate significance level at 1%, 5% and 10% respectively.

Table 1.5 Propensity Score Matching

Panel A: Mean Comparison of Treatment Sample and Matched Sample in year t-1					
	IC Letter Sample		Matched Sample		
Variables	#	Mean	#	Mean	Mean Diff
MW	668	0.228	668	0.219	0.00900
REST	668	0.0990	668	0.110	-0.0110
VOLATILITY	668	0.145	668	0.151	-0.00600
SIZE	668	5.813	668	5.890	-0.0770
SEGMENT	668	5.189	668	5.083	0.106
FOREIGN	668	0.615	668	0.609	0.00500
M&A	668	0.0630	668	0.0680	-0.00500
LOSS	668	0.264	668	0.286	-0.0210
RESTRUCT	668	0.256	668	0.270	-0.0130
RZSCORE	668	6.032	668	6.050	-0.0170

Panel B: Effect of Internal Control Comment Letter in year t-1 on material weakness reporting in year t

	Material Weakness
CL_IC	0.417**
	(0.166)
SEGMENT	0.033
	(0.029)
FOREIGN	0.156
	(0.221)
SIZE	-0.110*
	(0.060)
M&A	-0.481
	(0.399)
AGG_LOSS	0.491**
	(0.208)
RESTRUCT	0.143
	(0.203)
RZSCORE	-0.070*
	(0.037)
INVENTORY	-0.506
	(0.868)
AGE	-0.047
	(0.106)
EXT_GROWTH	0.072
	(0.209)
EXTFINANCING	-0.865
	(0.528)
BIG4	-0.860***
	(0.213)
LITIGATION	0.006
	(0.226)
CONSTANT	-1.089
	(1.255)
N	1,336
YEAR FE	YES
INDUSTRY FE	YES
Pseudo R2	0.107

All the stand errors are clustered at firm level. ***, ** and * indicate significance level at 1%, 5% and 10% respectively.

Table 1.6
Spillover effects of Internal Control Comment Letters on the Probability of Peer Firm's Material Weakness Disclosure

	(1)	(2)	(3)	(4)
LEADER	0.504**			0.536**
	(0.257)			(0.257)
PEER_NUMBER		0.008**		0.006
		(0.004)		(0.004)
SAME_AUDITOR			0.229**	0.180
			(0.106)	(0.112)
SEGMENT	0.028**	0.029**	0.029**	0.029**
	(0.014)	(0.014)	(0.014)	(0.014)
FOREIGN	0.230**	0.227**	0.225**	0.226**
	(0.093)	(0.093)	(0.093)	(0.093)
SIZE	-0.130***	-0.129***	-0.131***	-0.130***
	(0.025)	(0.025)	(0.025)	(0.025)
M&A	0.061	0.064	0.057	0.060
	(0.118)	(0.118)	(0.118)	(0.118)
AGG_LOSS	0.170*	0.172*	0.168*	0.175*
	(0.091)	(0.091)	(0.091)	(0.091)
RESTRUCT	0.201**	0.203**	0.200**	0.203**
	(0.082)	(0.082)	(0.082)	(0.082)
RZSCORE	-0.097***	-0.096***	-0.097***	-0.096***
	(0.015)	(0.015)	(0.015)	(0.015)
INVENTORY	0.639**	0.715**	0.668**	0.702**
	(0.319)	(0.319)	(0.318)	(0.319)
AGE	-0.214***	-0.216***	-0.215***	-0.212***
	(0.029)	(0.029)	(0.029)	(0.029)
EXT_GROWTH	0.237***	0.233***	0.232***	0.233***
	(0.073)	(0.073)	(0.073)	(0.073)
BIG4	-0.572***	-0.574***	-0.580***	-0.578***
	(0.089)	(0.089)	(0.089)	(0.089)
LITIGATION	0.020	0.026	0.014	0.028
	(0.100)	(0.099)	(0.099)	(0.099)
CONSTANT	-2.896***	-2.879***	-2.850***	-2.885***
	(0.280)	(0.280)	(0.279)	(0.280)
YEAR FE	*YES*	*YES*	*YES*	*YES*
INDUSTRY FE	*YES*	*YES*	*YES*	*YES*
N	19,222	19,222	19,222	19,222
PSEUDO R2	0.0903	0.0903	0.0903	0.0903

All the stand errors are clustered at firm level. ***, ** and * indicate significance level at 1%, 5% and 10% respectively.

Chapter 2: Are PCAOB Inspections Informative to the SEC?

2.1. Introduction

In response to several high-profile audit failures and public's criticism of lacking independent and effective regulation over the accounting profession, Public Company Accounting Oversight Board (PCAOB) was established in 2002 to implement audit standards and conduct inspection on auditors periodically. Before that, the accounting profession was self-regulated by the AICPA. The most noteworthy duty of PCAOB is to inspect auditors of public companies and issue inspection reports for each audit firm after concluding the inspection. In the inspection reports, PCAOB discloses audit firm's engagement deficiencies for a sample of audits inspected and whether quality control defects exist in the audit firm's quality control system. However, some important information, such as the identities of inspected audit offices and identities of inspected client engagements, are not disclosed in the publicly disclosed inspection reports. While prior literature has questioned PCAOB's ability to inspect audit firms and criticized the inspection reports for being uninformative to the audit market, the inherent limitation of those research is that they focus on the publicly disclosed inspection findings and naturally cannot evaluate the informativenss of not-disclosed information. In this study, I'm trying to evaluate the informativeness of PCAOB's inspection reports from a different perspective by examining whether PCAOB's inspection is informative to another regulatory agency the Securities and Exchange Commission (SEC).

Since its establishment, PCAOB has been criticized for its constitutional legitimacy because it is a created as a private-sector nonprofit corporation but also a "heavily controlled component" of the SEC. Not only the PCAOB's board members, including the

chairman, are appointed by the SEC, the board's rules, standards and budget are also required to be approved by the SEC. More importantly, PCAOB is obligated to inform the SEC with any finding that relates to potential violation of securities law during the PCAOB's inspection work. In the footnote of PCAOB's inspection reports, PCAOB has explicitly stated that: "*When it comes to the Board's attention that an issuer's financial statements appear not to present fairly, in a material respect, the financial position, results of operations, or cash flows of the issuer in conformity with applicable accounting principles, the Board's practice is to report that information to the SEC, which has jurisdiction to determine proper accounting in issuers' financial statements*." In addition, the SEC could solicit any PCAOB's confidential documents that are prohibited to be disclosed to the general public. Therefore, compared with investors or any other related parties, the SEC could be more informative of audit quality based on PCAOB's inspection results because of this potential private information sharing between PCAOB and the SEC. Consequently, after PCAOB report higher rates of auditor's engagement deficiencies, the SEC may increase regulation scrutiny over the audit firm clients' financial reporting. Therefore I hypothesize that public firm is more likely to receive SEC's comment letters on financial statements if PCAOB's inspectors find higher rate of deficiencies in the firm's auditor's engagements.

However, there are several reasons why I may not find evidence to support my prediction that the SEC will increase regulation scrutiny over firms if their auditors are reported with higher rates of audit deficiencies in PCAOB's inspection reports. One is that the regulation focus of the two regulatory authorities are very different. PCAOB's inspection process is trying to detect audit failures by identifying and addressing audit

deficiencies. Audit firm's failure to perform substantive procedures to test a specific account or failure to obtain sufficient audit evidence does not necessarily mean that the SEC would raise concerns with firm's disclosure compliance in that account. Additionally, the "*world-view*" of PCAOB and the SEC seems very different. The SEC has publicly criticized PCAOB for its slow progress in audit standard rule making and its work agenda.

In this study, I am trying to examine whether firms are more likely to receive SEC's comment letters after PCAOB reports that their auditors have higher rates of audit engagement deficiencies. Since PCAOB's inspection reviews audits performed by each auditor, I use comment letters that are addressing disclosure deficiencies of firm's annual filings. Then I examine every issue that the SEC addressed in each comment letter and exclude comment letters that are not associated with PCAOB's inspections. As the SEC reviewed firm's financial statement at least one every three years and PCAOB started disclosing the number of audits inspected from 2010, my sample includes firm-year observations with fiscal year-ends from December 31, 2009 to December 31, 2011.

My empirical results show that firms are more likely to receive comment letters on their financial statements if their auditors are reported with higher rate of audit deficiencies. This result is robust to alternative measures of audit deficiencies reported in the inspection reports and control for S0X 408 criteria and other firm characteristics that affect firm's probability to receive comment letters. More importantly, the results still hold after controlling for other measures of audit quality and auditor firm fixed effects, suggesting that PCAOB's inspection is providing incremental information of audit quality. In addition, I find that firms are also more likely to receive revenue recognition comment letters if their

auditors are criticized for higher rates of revenue audit deficiencies in the PCAOB's inspection reports.

My research make the following contributions to the literature. Firstly, I contribute to the literature on the informativeness of PCAOB's inspection reports. While prior literature explore the information content of PCAOB's inspection by examining whether audit client market reacts to the issuance of PCAOB's inspection reports and whether the disclosed inspection findings are associated with other measures of audit quality or accounting quality, I complete current literature by showing that the PCAOB could share its inspection findings with the SEC and the they are informative to the SEC's review process. All current research that examine PCAOB's inspection findings are limited by the publicly disclosed inspection reports that some important inspection information is not disclosed. Therefore, my research is trying to explore the "dark matter" of the PCAOB's inspection and showing that PCAOB could have share those important confidential information with the SEC. As PCAOB's inspection reports has been criticized for lacking of sufficient or useful information for the general public (Lennox and Pitman, 2010), my research could help more comprehensively evaluate the effectiveness of PCAOB's inspection and the informativeness of its inspection findings.

Secondly, I enrich the current developing literature that examines the determinants of firm's probability to receive SEC comment letters by specifically focusing on whether information sharing by another regulation authority, i.e. the PCAOB, could affect the SEC's review process. Prior research mostly focus on the selection criteria specified in the SOX 408 and some firm specific characteristics that are expected to be associated with the probability to receive comment letters issued by the SEC (Cassell et al, 2013; Johnston and

Petacchi, 2012). My research differentiates from prior research by showing that PCAOB's inspection findings constitute a significant source of information that is used by the SEC when conducing its review process. The PCAOB's inspections on audit engagements provide valuable information with regarding to audit quality, thus helping the SEC to identify some potential disclosure deficiencies within firm's annual report.

Section 2 provides the institutional background and Section 3 develops the hypothesis. I describe the data and research design in Section 4 and present the main results in Section 5. Section 6 concludes this study.

2.2. Institutional Background

2.2.1. The onset of statutory regulation under the PCAOB

The issuance of the Sarbanes-Oxley Act of 2002 (SOX) caused a seismic shift in the governance of the accounting profession in the United States. By requiring all accounting firms auditing publicly traded firms to register with and submit to periodic inspections by an independent regulatory authority - the Public Company Accounting Oversight Board (PCAOB), SOX marked the onset of statutory regulation for the profession. The profession had, until that time, been self-regulated by a system of peer review administered by the American Institute of Certified Public Accountants. The peer review system has historically been subject to the criticisms of lacking independence and perpetuating "friendly" reviews (Fogarty 1996, Coffee 2001, Public Oversight Board 2002, Williams 2002, Anantharaman 2012); these criticisms contributed to its demise around the passage of SOX.

PCAOB not only writes and enforces auditing standards, more importantly it inspects all registered audit firms. PCAOB inspections are conducted annually for audit firms that

audit more than 100 public firms and triennially for smaller audit firms. In the inspections, PCAOB inspectors evaluate a sample of prior audit engagements to identify any deficiencies in the performance of these engagements, and also perform a thorough evaluation of the quality control systems in place at the audit firm. Deficiencies identified in the engagements could range from insufficient substantive testing for various items (or insufficient documentation of work done) to relatively severe situations of material misstatements in client financial statements due to failure to comply with GAAP. Quality control systems are evaluated along the broad dimensions of audit performance, training, compliance with independence standards, client acceptance and retention, and establishment of procedures. A few weeks after the inspection has concluded, the PCAOB's inspection report is made publicly available through its website.

Even though the PCAOB makes the inspection report publicly available, some key information revealed during the inspection is not disclosed in the publicly available part of the report. Specifically, while some data on the inspected firm and details of the types of engagement performance deficiencies identified are disclosed, the (i) identities of the inspected audit office(s), the (ii) identities of the client engagements sampled and for which deficiencies were identified, and (iii) details of any defects identified in the inspected firm's quality control systems, are not disclosed in the initial version of the inspection report released to the public. While the details of the quality control review are not disclosed, the initial report includes an affirmation if no quality control defects were identified at the inspected firm. The inspected firm is then given one year to remediate the quality control defects identified; if it so remediates the weaknesses satisfactorily within that period, the initial quality control review continues to remain non-public. However, if the firm fails to

satisfactorily remediate quality control weaknesses within the allowed period, then an "expanded" inspection report is made available to the public, with the initial quality control review disclosed.

The new system of statutory regulation under the PCAOB, however, has not been free of criticism either. Many commentators believe that the PCAOB is a manifestation of regulators' urgent need – following the revelation of the accounting scandals in the early 2000s' – to demonstrate that "something was being done" (Kinney 2005, Radin 2007). Many accounting firms that have been inspected by the PCAOB criticize it for being overly prescriptive and following a "form over substance" approach (Daugherty and Tervo 2010). In contrast to criticisms of peer review – that revolved primarily around its *independence* – perhaps the most serious concerns about the PCAOB revolve around its *ability* to inspect and evaluate audit firms, particularly given that the PCAOB's board is composed primarily of non-accountants (to minimize the accounting profession's control over the board, and to enhance the board's independence). Furthermore, whether full-time PCAOB staff inspectors have the expertise (and the incentives to update their expertise over time) that currently practicing partners and managers at peer firms are likely to have, remains to be seen (Palmrose, 2006, Glover, Prawitt and Taylor, 2009). Therefore, while statutory regulation is now the primary governance mechanism of the U.S. accounting profession, the debate around the overall effectiveness of the current system of PCAOB inspections is far from being settled (Anantharaman, 2012).

2.2.2. The Relationship between the SEC and PCAOB

Since the establishment of PCAOB after the passage of SOX 2002, there is a huge debate on its constitutional legitimacy. Although created as a private-sector, nonprofit

corporation to oversee public accounting firms, PCAOB itself is frequently deemed a *heavily controlled component* of the SEC. In 2006, the Free Enterprise Fund and Beckstead and Watts, LLP filed a lawsuit in the Supreme Court to challenge the constitutionality of PCAOB, arguing that the PCAOB's structure does not comply with the Appointments Clause and the doctrine of separation of powers. In 2008 the U.S. Court of Appeals for the District of Columbia Circuit finally rules PCAOB as constitutional. The constitutional controversy represents the unclear relationship between the SEC and PCAOB. On one hand, PCAOB's "subordinate" role of the SEC arises from fact that the SEC appointed PCAOB's five board members, including the chairman, and approved the board's rules, standards and budget. On the other hand, the statutory context of PCAOB suggests its substantive independence from the SEC (Nagy, 2010). The board's members have fixed terms of service of five years and are only removed for good cause shown before the term is expired[1]. More importantly, the PCAOB has large discretion over the rule-making, inspections and enforcement action despite the SEC's role of final review of rules and disciplinary actions.

The tight relationship between the SEC and PCAOB not only arises from the statutory regulation setting but also from the interactive role they played in each other's regulatory work. First, it is the obligation for PCAOB to notify the commission of any pending PCAOB investigation that relates to potential violation of securities laws and to coordinate its work with the SEC's Division of Enforcement[2]. If PCAOB's inspection on audit engagements discover any potential material misstatement with financial statements of audit firm's clients, then PCAOB will refer this case to the SEC. Second,

[1] See 15 U.S. Code § 7211(e)(6)
[2] See 15 U.S. Code § 7215(b)(4)(A)

notwithstanding the confidentiality of the related documents during the PCAOB inspection, the SEC could solicit the documents and materials obtained by PCAOB without loss of their status as confidential[3]. Therefore, while general public is prohibited from knowing the identities of local office inspected, the identities of the issuers being inspected and the identities of the issuers with audit engagement deficiencies, the SEC has access to all these information that is relevant to a specific inspection. This potential "private" information sharing between the SEC and PCAOB gives the SEC's an advantage to better knowing the audit quality of specific audit inspected by PCAOB. With respect to the PCAOB's inspection reports, exploring whether the SEC is more informative compared with the general public because of the *extra* information that is *not* disclosed in the public version of the inspection reports is a worthwhile research question.

2.3. Literature Review and Hypothesis Development

2.3.1. How informative are PCAOB inspection reports?

A small but growing stream of literature has examined the contents of PCAOB inspection reports issued so far. One stream of research examines whether the "outcomes" of inspections – captured using the number and severity of engagement performance deficiencies disclosed in the initial inspection report – correlate predictably with indicators of audit quality, and find that they do. Hermanson, Houston and Rice (2007) find that firms receiving deficient inspection reports tend to be smaller, rapidly growing firms with a higher ratio of clients to personnel, suggesting that these firms may have over-extended into the audit market without sufficient resources to support their practice. Gunny, Krishnan and Zhang (2009) and Gunny and Zhang (2009) find that firms with deficient

[3] See 15 U.S. Code § 7215(b)(5)(B)

reports tend to have lower industry expertise and to have clients with lower earnings quality, suggesting that deficient reports associate predictably with other potential indicators of audit quality. Another stream of research examines whether PCAOB's inspection affect audit firm's future audit practices. DeFond and Lennox (2015) find that PCAOB's increased inspection scrutiny over internal control audit increase auditor's probability to issue adverse internal control audit opinions.

Research on the market impact and *perceptions* of PCAOB inspections, however, suggests very differently. Daugherty and Tervo (2010), in a survey of inspected firms, report that many smaller firms do not believe that PCAOB inspections helped to substantively improve their audit practice. Similarly, the former CEO of Deloitte, J. Michael Cook, has argued that the PCAOB inspection process "is not producing the kind of results that it should for people who are using the results and trying to understand what it means" (CFO Magazine, 2007). Lennox and Pitman (2010) examine whether inspection reports are perceived as being informative by the audit client market, by examining gains (or losses) of audit clients following inspection reports. They fail to find a significant response from the audit client market to the issuance of inspection reports, suggesting that the information contained in the (publicly disclosed) inspection reports is either insufficient or not useful to clients seeking to evaluate the effectiveness of their auditors. One possible factor operating behind the inconclusive findings on the informativeness of PCAOB reports is the extent to which the PCAOB's findings are disclosed in the public inspection report (Lennox and Pitman, 2010). The PCAOB inspection report reveals deficiencies related only to engagement-specific weaknesses for every sample PCAOB choose to inspect without disclosing the specific identity of the issuer and important information that are not

included in the inspection report mutes the market reaction.

First, sample design issues in prior studies examining the information content of inspection reports could be relevant. While the PCAOB conducts their inspections at the *audit office level* rather than at the *audit firm level*, researchers, however, usually test the informativeness of inspection reports at an audit-firm level (as the audit office where the problem is identified is kept confidential by the PCAOB). Further, as the identity of the audit office is kept non-public, the pool of clients audited by that office also becomes unknown. As a result, the audit office(s) and client(s) diagnosed with the problem are obscured to the researcher, particularly as the number of offices and clients of the audit firm increases. For illustration, let us assume that an audit firm (ABCD) has four offices located in the US: Office A, Office B, Office C, and Office D. Let us assume, further, that each office has five clients, yielding a total of twenty clients (Client 1, Client 2, Client 3, …, Client 20) audited by ABCD. Now, let us assume that the PCAOB chooses Client 1, Client 2, and Client 3 audited by Office A to conduct its triennial inspection of ABCD. Upon concluding the inspection, the PCAOB releases a report stating that audit firm ABCD has some engagement-specific weaknesses. The PCAOB does not reveal, however, that these deficiencies were identified in Office A or that the engagements were for Client 1, Client 2, and Client 3. Once the inspection report is public, therefore, any potential response by audit clients of Firm ABCD could be weakened by the fact that audit committees are unaware if the problems were diagnosed at their audit office or at another office. This is particularly relevant as a stream of research has documented that quality control practices and procedures differ widely from one office to another office of the same firm (Reynolds and Francis, 2000; Chung and Kallapur, 2003; Francis and Yu, 2009; Choi,

Kim, Kim and Zang, 2010). The non-disclosure of the identities of the audit offices, therefore, could mute the audit market's response to the PCAOB inspection report. The identification of the effects could, therefore, be greatly improved in situations where the audit client market is able to identify more narrowly the specific portfolio of client firms that are subject to the PCAOB's evaluation.

Second, the quality control problems identified remain non-public unless the audit firm fails to address them within one year from the inspection report date. Therefore, extant research has mostly focused (necessarily) only on engagement-specific weaknesses, as the nature and severity of quality control defects identified are unknown to the public and to the researcher at the time the initial inspection report is disclosed. The non-disclosure of the quality control review could seriously hamper our evaluation of whether PCAOB inspections produce new and useful information for the audit market. The engagement-specific weaknesses speak only to the performance of a specific group of engagements sampled, and may or may not help in drawing a comprehensive picture of the firm's practice. The quality control review, on the other hand, is a review of more fundamental, *firm-level* policies and practices (such as policies on client acceptance, training, staff and partner independence, *etc*) that potentially affect the conduct of *all* its engagements, and thus are crucial to an overall assessment of the quality of the firm's practice. The potential importance of the PCAOB's quality control review is also highlighted by Lennox and Pitman (2010). For comparison, they re-examine the information content of the peer review reports produced under the AICPA peer review regime pre-SOX, first evaluated by Hillary and Lennox (2005). Hillary and Lennox (2005) find in their study that negative (positive) peer review reports are followed by a significant loss (gain) of audit clients, suggesting that

peer review reports provide valuable information to the audit client market. Lennox and Pitman (2010), while confirming this overall finding, find further that the information content of peer review opinions derives primarily from the reviewers' overall evaluation of the reviewed firm's quality control systems, and relatively little of the information content derives from the disclosure of the engagement-specific deficiencies. However, as they point out, the engagement-specific deficiencies are the only finding initially disclosed by the PCAOB, which could explain why the PCAOB reports elicit little or no market reaction.

While prior literature documenting that the PCAOB's inspection report is uninformative to the public, one unanswered question is how informative is PCAOB's inspection report to the SEC, another regulation authority. The private information sharing between PCAOB and the SEC implies that there could be association between the inspection reports and SEC's point of view of the audit quality.

2.3.2. SEC Comment Letters

Similar to PCAOB's duty is to evaluate the audit quality of the public audit firms, the SEC's duty is to make sure the public firms' financial statements is free of material misstatement and regulate the issuer's disclosure and take enforcements on the violators. In this research, I use the SEC's comment letters to proxy for the SEC's knowledge with regarding to firm's financial statements. Compared with comment letters, restatements and SEC enforcements, which are very egregious and rare accounting problems, are more widely used in prior accounting literature. The SEC's comment letters on firms' financial reports are more representative of less extreme accounting quality problem for the whole population of public firms.

The current SEC review process has been in place after the enactment of the Sarbanes-Oxley Act of 2002 (SOX), which includes Section 408 that mandates a maximum review cycle of 3 years for all SEC registrants' financial statements. The SEC's review process is used to improve the quality and timeliness of public companies' material disclosure. After periodically reviews the issuers' filing, the SEC Corporation Finance Division will comment on the filings if it finds that issuers' accounting policies violates GAAP, the disclosure in current filing is not sufficient and not complied with reporting requirements. After receiving the comment letters, firms have to respond to SEC review comments within 10 business days.

There are several factors that affect firm's likelihood to receive comment letters. SOX 408 explicitly disclose the criteria that the SEC should consider when selecting which firm to be reviewed, including previous material restatements, high stock return volatility, large market capitalization, emerging firms with high P/E ratio and the economic significance of a firm within an industry. Furthermore, recent literature examines a groups of other factors that could affect registrants' likelihood of receiving comment letters and finds that company age, financial distress, M&A activity, poor financial performance, cash flow volatility and the use of a non-Big4 auditor all have an incremental effect on the likelihood of receiving comment letters on annual reports (Cassell, Dreher and Myers, 2013; Johnston and Petacchi, 2013).

When issuing the comment letters, the SEC usually requests firms to provide additional information so that its staff can better understand the company's disclosure. Generally, at the end of the review process, SEC will conclude that registrants' financial reports comply with SEC requirement and suggest that registrants fix material disclosure

deficiencies in future financial reports. The registrant is seldom required to amend its current or previous 10-K. Dechow et al. (2015) reports that less than 0.5% of firms restate their 10-Ks between the receipt of the initial letter and the comment letter correspondence disclosure date.

Concurrently, there is a small but growing stream of literature examining how SEC comment letters affect firms' future disclosure practices. First, some research shows that comment letters affect firms' overall financial disclosure as well as disclosure behavior with respect to specific items. Using textual analysis, Bozanic, Dietrich and Johnson (2013) document that upon receiving an SEC comment letter, firms provide easier to read, less optimistic, more numeric and more forward-looking disclosure in their annual reports. Blackburne (2014) finds that firms report lower discretionary accruals, fewer restatements, and lower bid-ask spreads when the SEC allocates more budgetary resources to the relevant review office. Brown, Tian and Tucker (2014) show that SEC comment letters addressing registrant's risk factor disclosures not only affect that registrant's risk factor disclosure in the following year but also lead to better risk factor disclosures amongst other firms in the same industry that have not received such a comment letter. Second, another group of papers demonstrates the effect of comment letters on other dimensions of firm behavior. Kubick, Lynch, Mayberry and Omer (2014) document that tax-related comment letters lead to less aggressive tax avoidance behavior and also have some spillover effects on industry peers' tax avoidance behavior. Gietazmann, Marra and Pettinicchio (2014) find that the CFO is more likely to be replaced when firms receive comment letters. Gietazmann and Pettinicchio (2014) also provide evidence that the auditor increases audit fees in the period in which its client receives a comment letter.

2.3.3. Hypothesis Development

My research is trying to examine whether the information PCAOB have is shared with the SEC. In this study, I use PCAOB's inspection reports to proxy PCAOB's information that could be shared with SEC and examine the way these inspection reports affect SEC's opinion with financial statements in the comment letters. As discussed before, the information sharing between the SEC and PCAOB is legitimate. A deficient audit with an issuer's financial statements could raise the SEC's concern of potential financial reporting deficiency or material misstatement if PCAOB reports all details of their findings to the SEC or the SEC routinely solicit PCAOB's confidential documents or materials. Therefore, I would expect a positive association between the rates of audit deficiencies in the PCAOB's inspection reports and the probability of receiving SEC's comment letters on financial statements.

Nevertheless there are several some reasons why PCAOB's findings are not informative to the SEC informative despite the tight relationship between the SEC and PCAOB. First of all, the regulatory focuses of the two authorities are different. PCAOB's resources are mostly focus on standard setting, both auditing standard, e.g.: AS NO.5, and audit disclosure standard, e.g. proposal for disclosing audit engagement partner, and inspections on auditors' compliance with audit standards. However, the SEC's review process is not focusing on audit engagement but the disclosure compliance of company's financial statements. Moreover, PCAOB has larger discretion in carrying out its work and the SEC has criticized publicly for PCAOB's slow progress in auditing standard ruling making (Schnurr 2014). "*The difference views from the SEC and the PCAOB seem to*

reflect a "very different world-view" between the two agencies"[4]. Taken these together, my hypothesis 1 is stated as follows:

Hypothesis 1: Firms are more likely to receive SEC comment letters after their auditors get PCAOB inspection reports that disclose higher rate of audit deficiencies.

Finding a significant positive relationship between the probability of receiving comment letters and higher rate of audit deficiencies in PCAOB's inspections over auditors would provide initial and general evidence for the potential information sharing between the two agencies. But this relationship could be spurious if I failed to provide a more direct and rigorous examination whether PCAOB's finding of specific audit failures in one area will lead to the SEC's more scrutiny on that accounting item. Therefore, in order to provide more robust evidence, I further test the effect of PCAOB's inspection reports on SEC's review process in one specific accounting areas: revenue recognition.

I focus revenue recognition for several reasons. First of all, revenue recognition is one of the most important accounting policies that the SEC's review process draw attention to (SEC 2013) and revenue recognition letters are classified as more important comment letters (Dechow et al., 2014). Dechow et al. (2011) reports that more than half percent of accounting misstatements are related to revenue recognition. Additionally, revenue recognition is a very significant accounting item that needs auditor's attention. After observing frequent revenue audit deficiencies during its inspections, PCAOB urges auditors to perform sufficient audit procedures when testing revenue recognition[5].

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[4] See Wall Street Journal Article: SEC: Accounting Board Is Dragging Feet http://www.wsj.com/articles/sec-accounting-board-is-dragging-feet-1418605107

[5] See PCAOB Staff Audit Practice Alert NO.12, Matters Related to Auditing Revenue in an Audit of Financial Statements

Auditor's failure to testing client's revenue recognition process could lead to more scrutiny when the SEC is reviewing the revenue recognition issues related to account receivable or deferred revenue. Without auditor's substantive testing that the revenue recognition is free from potential material misstatement, the SEC would be more cautious when they are reviewing these accounts and are more likely to issue a comment letter to ask for further clarification regarding to the disclosure issues. I provide an example of revenue recognition comment letter in Appendix. The second hypothesis follows:

Hypothesis 2: Firms are more likely to receive SEC comment letters related to revenue recognition after their auditors get PCAOB inspection reports that disclose higher rate of revenue audit deficiencies.

2.4. Sample and Research Design

2.4.1. PCAOB Inspection Reports

As noted before, PCAOB inspect audit firms annually if audit firms have more than 100 clients. These audit firms include "Big 4" audit firms: Deloitte & Touche, Ernest & Young, KPMG and PricewaterhouseCoopers and other 4 large audit firms: BDO, Crowe Horwath, Grant Thornton and McGladrey. In addition, PCAOB inspects those small audit firms triennially if they have less than 100 clients. After the inspection, PCAOB release inspection reports in which audit engagement deficiencies are disclosed and quality control defects, if there is any, would be disclosed if the audit firm fails to remediate the quality control defects within 1 year. In this study, I focus on annually inspected firms because the triennially inspected audit firms' market share is relatively small and also it is impossible to have a clean research design to reconcile the PCAOB's 3-year review period with SEC's 3-year review period. Focusing on annually inspected firms would provide a more clean

design that examines the effect of PCAOB's inspection on the SEC's review of financial statements.

For the annually inspected firms, PCAOB disclosed the number of audits inspected for each audit firm in their 2005 inspection reports but stopped disclosing it thereafter until 2010. In the first two columns of Table 1, I report both the number of audits inspected and the number of deficient audits. For the Big Four audits firms, PCAOB reports around 20 deficient audits in the inspections reports after 2010, more than twice the number of deficient audits reported in the previous years from 2006 to 2010. I develop the first measure of inspection report severity *DEFIC_PERCENT*, which is the number of deficient audits divided by the total number of audits inspected. However, one limitation of *DEFIC_PERCENT* is that it measures every deficient audit equally and does not take into consideration of some deficient audits suggests lower audit quality than other deficient audits. To remediate this drawback, I collect the total number of deficient audits that potential material misstatements (PMM) risk in reported by PCAOB inspectors and calculate *PMM_PERCENT*, which is the rate of deficient audits related to PMM risk divided by total audits inspected. Next I examine whether each deficient audit reported in the PCAOB's inspection report is related to revenue recognition audit. *REVENUE_DEF* is calculated as the number of defect audits related to revenue recognition divided by the total audits inspected.

2.4.2. SEC Comment Letters

Starting May 12, 2005, the SEC began to publicly release comment letters and firms' responses made after August 1, 2004. After the completion of each review, SEC will release the comment letters and issuers' response letters on EDGAR no earlier than 20

business days[6] (previously 45 days[7]). Comment letters that are related to periodically filed financial statements, namely 10-Ks (annual reports) and 10-Qs (quarterly reports), constitute the majority (45 percent) of the total comment letters. The reason that the SEC allocates a majority part of its budget to these filings is because the accuracy and value relevance of the information contained in these filings is of utmost importance to investors.

I obtain the data from Audit Analytics Comment Letter Database, which collects all the comment letters issued until July, 2013 and tags each comment letter with specific disclosure issues. First, I classify comment letters into 10K or Non-10K letters and *only* keep the 10-K comment letters. Second, I examine every issue that the SEC addressed in each comment letter and *only* keep the comment letters that are possibly associated with PCAOB's inspections, for example: accounting rules, internal control disclosure, FASB codes and etc. I exclude the 10-K comment letters that *only* related to non-accounting issues, for example: MD&A, Risk Factor Disclosure, Exchange Act Rules and Regulations and etc. The classification of SEC comment letters' tags are presented in the Appendix 1. For every 10-K financial statements filed after 2004, I merge the comment letters data with the corresponding 10-K filings and create a dummy variable *CL*, which is equal to 1 if this 10-K filing gets comment letters that could be related to PCAOB's inspection and 0 otherwise. Thirdly, I further examine whether the SEC comments on firm's revenue recognition issues by searching the context of the comment letters and create a dummy variable *REVENUE_CL*.

To investigate how informative PCAOB's finding is to the SEC's review process, I merge each annual filing that received SEC's comment letters with the most recent

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[6] http://www.sec.gov/divisions/corpfin/cfannouncements/edgarcorrespondence.htm
[7] See SEC Press Release No. 2005-72 (May 9, 2005)

PCAOB inspection report that was *issued* before the issuance date of first comment letter for that annual filing. However, as the SEC's review process is unobservable for the no-letter firms, we do not know the starting date of the review process. I examine all the comment letters and find that the median (mean) days between the 10-K file date and first comment letter date is 137 (154) days. Therefore I create a *pseudo* comment letter issuance date for the no-letter firms that is 137 days after the 10-K filing date and merge no-letter firms with the closest PCAOB inspection report issued before the *pseudo* comment letter issuance date.

One important institutional feature of the SEC's review process is that the SEC is required to review all the registrants at least once every three years. As my audit deficient measures are available from the 2010 inspection reports and thereafter, I limit the sample to include all firm-year observations of which fiscal year-ends from December 31, 2009 to December 31, 2011. By doing this, my sample period includes 3 fiscal years corresponding to 3 post-inspection period. Figure 1 illustrates PricewaterhouseCooper's inspection reports in 2010, 2011 and 2012 and their relationship with subsequent issuance of SEC comment letters. For example, if a firm audited by PWC received the comment letters between August 12, 2010 and November 08, 2011, then the corresponding PCAOB inspection report is the one issued on August 12, 2010. This three-year period is similar to Cassell et al. (2013) and provides a cleaner window to test the hypothesis.

2.4.3. Research Design

To test the first hypothesis that firms are more likely to received comment letters if their auditors are criticized for more audit deficiencies in PCAOB's inspection reports, I estimate the following determinants model (1) of receiving SEC comment letters.

$$
\begin{aligned}
CL = \alpha + \beta_1\ DEFIC_PERCENT + \beta_2\ RESTATE + \beta_3\ VOLATILITY + \beta_4\ SIZE \\
+ \beta_5\ SEGMENT + \beta_6 M\&A + \beta_7 LOSS + \beta_8 RESTRUCTURE \\
+ \beta_9 AZSCORE + \beta_{10} AGE + \beta_{11} GROWTH \\
+ \beta_{12} EXTERNAL_FINANCE + \beta_{13}\ LITIGATION + \beta_{14} AUDIT\ FEE \\
+ \beta_{15} AUDITOR\ TENURE + \beta_{16} AUDITOR_CHANGE \\
+ Year\ fixed\ effect + Industry\ fixed\ effets \\
+ Auditor\ fixed\ effects + e
\end{aligned}
\tag{1}
$$

As noted before, the dependent variable *CL* is equal to 1 if firms receive PCAOB inspection related SEC comment letters and 0 otherwise. My test variable is *DEFIC_PERCENT*, which is the number of defect audits divided by the total number of audits inspected by PCAOB, and I predict that the coefficient of *DEFIC_PERCENT* is positive. Because accounting quality measures, such as comment letter, are strongly correlated with audit quality, the positive association between *CL* and *DEFIC_PERCENT* could be arising from the fact that PCAOB's finding is a measure of other aspects of audit quality rather than PCAOB's unique finding. Therefore, to isolate the treatment effect, i.e. PCAOB's findings, from audit quality, I control for *AUDIT_FEE*, *AUDIT_TENURE* and *AUDITOR_CHANGE* that are widely used as measures of audit quality in prior literature. *AUDIT_FEE* is the total audit fee divided by the total assets, *AUDIT_TENURE* is the number of years current auditor has in place, and *AUDITOR_CHANGE* is a dummy variable equal to 1 if the firm's auditor in year t is different from auditor in year t-1, and 0 otherwise. More importantly, I also include auditor fixed effects in the model to control for other unobservable auditor attributes that could affect firm's probability to receive comment letters.

I also incorporate several groups of other control variables in my model. First, similar to Cassell et al. (2013), *RESTATE*, *VOLATILITY* and *SIZE* are used to control for the SOX 408 criteria that the SEC used to select firms to review. *RESTATE* is equal to 1 if firm

announce a restatement during the past 12 months, *VOLATILITY* is the standard deviation of abnormal monthly stock return in the past 12 months and *SIZE* is the natural log of market capitalization at the end of fiscal year. Second, I include several other control variables that affect firm's probability to receiving 10-K comment letters based on prior research (Casell et al., 2013; Johnston and Petacchi, 2014). I control for firm age (*AGE)*, which is natural log of years firm existed in CRSP; firm's profitability (*LOSS*), which equals to 1 if firms net income is negative and 0 otherwise; bankruptcy risk (*AZSCORE*), which is docile rank of Altman's Z-Score in fiscal year t; firm's sale growth (*GROWTH*), which is revenue growth rate; business complexity (*SEGMENT*), which is total number of operating segments and foreign segments; changes in organization arising from merger and acquisitions (*M&A)*, which is coded 1 if firm has been involved in merger and acquisition in year t, and restructuring (*RESTRUCTRE*), which is coded 1 if firm has been involved in restructuring; external financing activities (*EXTERNAL_FINANCE*), which is total equity and debt capital raised in next fiscal year; litigation risk (*LITIGATION*), which is coded 1 if firm is in a high litigation risk industry following Francis et al. (1994). Third, I also control for the year fixed effects and industry fixed effects, i.e. SEC's Division of Corporate Finance 12 offices. All the control variables are defined in appendix 2. The model is estimated using logistic regression and robust standard errors are clustered by each company.

For Hypothesis 2, I use additional variables to control for the specific firm characteristics that affect firm's probability to receive revenue recognition related comment letters. Specifically, as revenue recognition is a timing issue that relates to either accounts receivable or deferred revenue, SEC's comment letters on firm's revenue

recognition should be positively associated with manager's discretion in revenue recognition. Following Caylor (2010), I augment model (1) with *AR*, which is account receivable scaled by total assets, and *DR*, which is deferred revenue scaled by total assets, to test hypothesis 2.

$$\begin{aligned} REVENUE_CL &= \alpha + \beta_1\ REVENUE_DEF + \beta_2 AR + \beta_3 DR + \beta_4\ RESTATE \\ &+ \beta_5\ VOLATILITY + \beta_6\ SIZE + \beta_7\ SEGMENT + \beta_8 M\&A + \beta_9 LOSS \\ &+ \beta_{10} RESTRUCTURE + \beta_{11} AZSCORE + \beta_{12} AGE + \beta_{13} GROWTH \\ &+ \beta_{14} EXTERNAL_FINANCE + \beta_{15}\ LITIGATION + \beta_{16} AUDIT\ FEE \\ &+ \beta_{17} AUDITOR\ TENURE + \beta_{18} DISMISSAL + Year\ fixed\ effects \\ &+ Industry\ fixed\ effets + Auditor\ fixed\ effects + e \end{aligned} \tag{2}$$

Where the dependent variable *REVENUE_CL* equals 1 if the comment letter is related to revenue recognition and 0 otherwise. My treatment variable *REVENUE_DEF* is the percentage of revenue recognition defect audits among the total number of audits inspected by PCAOB. Similarly, model (2) is estimated using logistic regression and the robust standard errors are clustered by each company.

2.5. Results

2.5.1. Univariate Test

In table 3, I report the summary statistics of major variables in Panel A and partition the sample based on the treatment variable *CL*, which equals 1 if the firm receives comment letters that are related to PCAOB's inspection and 0 otherwise, in Panel B. First, I find that for firms don't receive comment letters, PCAOB reported less defect audits in their auditors' inspection reports. Specifically, auditors of firms that get comment letters are reported with 22.3% percent defective audits of all audits inspected by PCAOB, whereas 20.9% percent of the audits inspected by PCAOB are found to be deficient for auditors of no comment letter firms. This difference is very significant in two tail t-test. Moreover,

auditors of firms that receive comment letters are reported with more defective audits, more audit deficiencies, more defective audits related to potential material misstatement and more defective audits related to revenue recognition. The strongly significant univariate test results provide some preliminary evidence for my hypothesis that firms are more likely to receive comment letters if their auditors are more profoundly criticized in the PCAOB inspection reports.

In addition, audit quality measures of firms that get comment letters are significantly different from the no-letter firms. Specifically, No-letter firms paid higher audit fees and has short auditor tenure than firms that get comment letters. While higher audit fees are widely used in audit research to proxy for higher audit quality because audit fee measures the auditor's effort level (DeFond and Zhang, 2014), prior literature provides mixed evidence of the direction auditor tenure affects audit quality (Tepalagul and Lin, 2014). For other control variables, consistent with my prediction, I find that firms receive comment letters are larger in market value and older in firm age. These firms are also more likely to have restructuring, M&A, foreign business and have more business segments than no-letter firms in that fiscal year. Surprisingly, contradictory to my prediction, firms receiving comment letters have less volatile stock return, lower bankruptcy and litigation risk and less debt or equity financing in next fiscal year. I further examine how audit quality and other factors affect's firm's probability to receive comment letters in the multivariate framework.

2.5.2. PCAOB Inspection and Firm's Probability to Receive Comment Letters

I examine how PCAOB's inspection report affect firm's probability of receiving comment letters by estimating model (1) and report the results in Table 4. All the standard

errors are corrected by clustering on each firm identifier. First, in column (1) the coefficient of *DEF_PERCENT* is positive and highly significant (z-statistics = 9.37), suggesting that firms are more likely to be criticized for disclosure deficiencies by SEC in the comment letters when the firms' auditors are reported with higher rates of audit deficiencies in the most recent PCAOB inspection report. This result is consistent with hypothesis 1. Second, I re-run model (1) by replacing *DEFIC_PERCENT* with *PMM_PERCENT*, which is the rate of defective audits that are related to potential material misstatement among all the audits inspected by PCAOB. This measure captures more severely defective audits compared with *DEFIC_PERCENT*, which weighs every defective audit equally. Similar to previous results, column (2) reports a positive and highly significant coefficient at <1% level (z-statistics=7.09) on *PMM_PERCENT*, providing additional evidence supporting hypothesis 1. Besides measuring PCAOB's findings with rate of defective audits or PMM audits, I also re-estimate model 1 by using the number of defective audits (*DEFIC_AUDITS*) or audit deficiencies (*DEFIC_NUMBER*) in lieu of *DEFIC_PERCENT*. The coefficient on *DEFIC_AUDITS* and *DEFIC_NUMBER* all still positive and significant at <1% level, indicating that more unfavorable PCOAB inspection reports will lead to higher likelihood to receive the SEC's critiques on disclosure deficiencies in annual reports.

Coefficients on the control variables are mostly consistent with prior research. Firms with larger market capitalization and firms filed restatements within last 12 months are more likely to receive comment letters after the firm filed its annual reports, corroborating with SOX 408's criteria used by the SEC for the review process. In addition, firms with restructuring, in high litigation risk industry and have more business segments are more

likely to be criticized for disclosure deficiencies related to accounting standards and etc. However, I do not find evidence that firms with higher stock volatility (*VOLATILITY*), poor financial performance (*LOSS*), higher financial distress risk (*RZSCORE*) and M&A (*M&A*) are more likely to receive comment letters, while they are all significant in Cassell et al. (2013). There are two possible reasons for the disparities between my findings and Cassell et al. (2013). First, my research focus on comment letters that are only related to PCAOB's inspection but prior research focus on *all* kinds of comment letters. Second, the sampling period of Cassell et al. (2013) is from 2006 to 2009, which is different from my data.

2.5.3. Revenue Audit Deficiency and Revenue Related Comment Letters

For hypothesis 2, I estimate Model (2) using the same sample and report the results in Table 5. First, the coefficient on *REVENUE_DEF* is positive and significant at <5% level, supporting hypothesis 2 that firms are more likely to receive comment letters that are related to revenue recognition if their auditors are reported with higher rate of defective revenue audits. Second, I find that firms are more likely to receive revenue recognition letters when they have higher level of deferred revenue and sales growth. The coefficients of *DEF_REV* and *SALES_GROWTH* are all positive and strongly significant at <0.01% level. However, I do not find that firms are more likely to receive comment letters when they have higher level of accounts receivables. This finding suggest that the SEC has paid more attention to firms with unusual sales growth and high level of deferred revenue. Thirdly, similar to previous analysis, large firms are also more likely to be criticized for disclosure deficiencies in revenue recognition. Surprisingly, the coefficient on *SEGMENT*

is negative and significant, suggesting that firms with less diversified business are more likely to receive revenue recognition comment letters.

2.6. Conclusion

The PCAOB has been criticized for lacking ability to inspect audit firms and providing uninformative inspection report since its establishment. Prior research suggested that the extent to which the PCAOB's findings are disclosed in the public inspection report makes the inspection report uninformative. In this research, I examine whether the SEC, which has legal access to all the confidential documents of PCAOB's inspection process, are informative to the PCAOB's findings. Using the comment letters as a proxy for the SEC's information with each firm's financial reporting quality, I find that firms are more likely to receive comment letters if their auditors are reported with higher rates of audit deficiencies. To sharpen inference with this potential private information sharing between the two regulators, I provide evidence that firms are more likely to receive revenue recognition comment letters if the auditors are reported with more revenue audit deficiencies. My research completes current literature by showing that the PCAOB could share its confidential information with the SEC and the non-public inspection findings could be informative to the SEC's review process.

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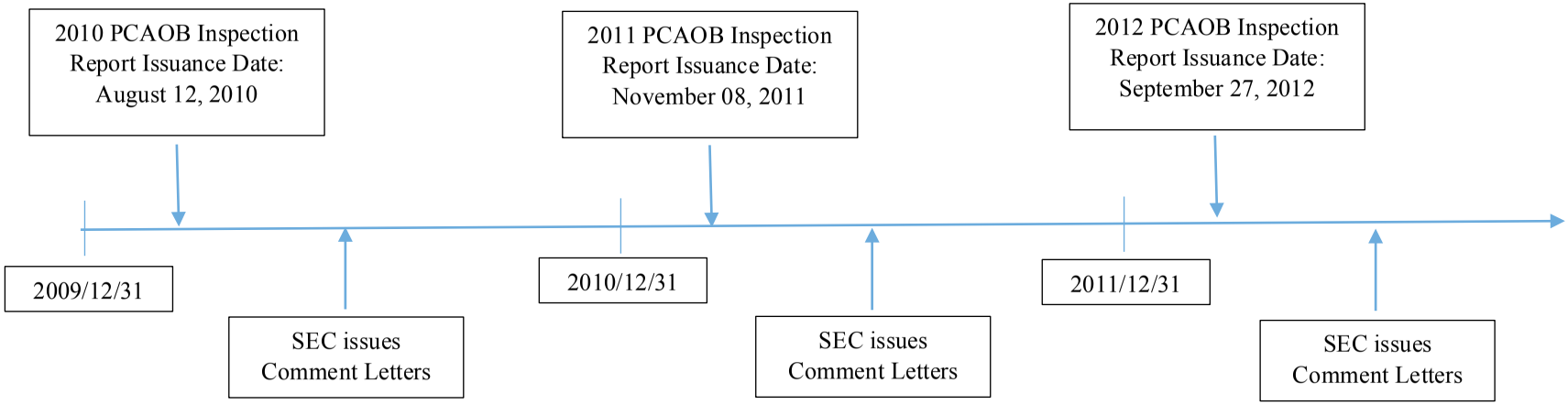
Figure 2.1 Example of PCAOB's inspection reports issued to PricewaterhouseCooper



2.9. Appendix for Chapter 2

Appendix 2.1 Types of the SEC comment letters

Comment Letter Issues Related to PCAOB's Inspection?	
Yes	***No***
✓ Accounting Rule and Accounting Disclosure Type Issues	× Event Disclosure Matters (primarily 8K, or 6K items)
✓ Disclosure and Internal Control Issues	× Exchange Act Rules and Regulations
✓ PCAOB Rules and Standards	× Risk Factors Disclosure
✓ FASB Accounting Standards Updates	× Management Discussion & Analysis Type Disclosure Issues
✓ EITF GAAP Standard Citations	× Federal Securities Statutes References
✓ FASB Concepts Statements	× Investment Advisers Act of 1940 Rules and Regulations
✓ FIN (FASB Interpretation) guidance	× Investment Company Act of 1940 Rules and Regulations
✓ FSP (FASB Staff Position) guidance	× Legal Matters and Supreme Court Decisions
✓ FTB (FASB Technical Bulletin) guidance	× Other Disclosure Matters
✓ IAS (International Accounting Standards)	× Registration Statement Specific Comments (S-1, 2, 3, 4 etc.)
✓ IFRS (International Financial Reporting Standards)	× Regulation AB
✓ International Financial Reporting Interpretations Committee	× Regulation M-A References
✓ SAB (Staff Accounting Bulletin) guidance	× Regulation S-K References
✓ SFAS GAAP Standards	× Regulation S-X References
✓ SIC (Standing Interpretations Committee)	× SEC Releases
✓ SOP (Statement of Position) AICPA guidance	× Securities Act Rules and Regulations
✓ FASB Keys	× Tender Offer Specific Comments
✓ FASB Code	× Whole Letter Description

Appendix 2.2 Variable Definitions

Variable Name	Definition	Data source
Dependent Variables		
CL	=1 if firms receive SEC comment letters, 0 otherwise	Audit Analytics (AA)
REVENUE_CL	=1 if firms receive SEC comment letters that are related to revenue recognition issues, 0 otherwise	AA
Test Variables		
DEFIC_PERCENT	number of defect audits divided by the total number of audits inspected by PCAOB	AA
PMM_PERCENT	Number of potential material misstatement defective audits divided by the total number of audits inspected by PCAOB	AA
DEFIC_AUDITS	the number of defective audits	AA
DEFIC_NUMBER	the number of audit deficiencies	AA
REVENUE_DEF	number of defect audits that are related to revenue recognition divided by the total number of audits inspected by PCAOB	AA
Control Variables		
AUDIT_FEE	total audit fee divided by the total assets	AA
AUDIT_TENURE	the number of years current auditor has in place	AA
AUDITOR_CHANGE	=1 if the firm's auditor in year t is different from auditor in year t-1, and 0 otherwise.	AA
RESTATE	=1 if firm announced a restatement in year t, t-1 or t-2, 0 otherwise	AA
VOLATILITY	standard deviation of abnormal stock return in the previous 36 months is in the highest quartile of the fiscal year, 0 otherwise (abnormal return = monthly return – value weighted monthly market return)	CRSP
SEGMENTS	Operating and Geographic segments	Compustat
FOREIGN	=1 if firm has foreign segment, and 0 otherwise	Compustat
SIZE	Logarithm of Market Value Common shares outstanding * Price-Fiscal year-close	Compustat
FIRM AGE	Logarithm of firm's years that have CRSP data	CRSP
LOSS	=1 if the IB in year t, t-1 or t-2 is negative, 0 otherwise	Compustat

EXTREME_ GROWTH	=1 if firm's sales growth of year is in the highest quintile, 0 otherwise	Compustat
RESTRUCTURING	=1 if restructuring costs pretax (RCP, Compustat Item 376) are not zero, 0 otherwise	Compustat
M&A	Merge and Acquisitions =1 if AQC is not zero	Compustat
INVENTORY	Inventories/Assets-Total	Compustat
RZSCORE	decile rank of Altman z-score, which is equal to 1.2Working Capital/TA + 1.4Retained Earnings/TA + 3.3EBIT/TA + 0.6Market Value of Equity/TL + 1.0Sales/TA	Compustat
EXTERNAL FINANCING	Equity financing +Debt Financing; Equity Financing: SSTK (Sale of Common and Preferred Stock) - PRSTKC (Purchase of Common and Preferred Stock) – DV (Cash Dividends (Cash Flow)) Debt Financing: DLTIS (Long-Term Debt Issuance) - DLTR (Long-Term Debt Reduction) - DLCCH (Current Debt Changes)	Compustat
LITIGATION	=1 if firms SIC code is equal to 2833-2836, 3570-3577, 3600-3674,5200-5961 or 7370-7374, 0 otherwise	Compustat SIC code
INDUSTRY	12 SEC Corporate finance divisions	
YEAR	Fiscal year dummy	

Appendix 2.3 Sample Comment Letters Related to Revenue Recognition

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

DIVISION OF
CORPORATION FINANCE

November 30, 2011

Via E-mail

Mr. Frank D. Martell
Chief Financial Officer
CoreLogic, Inc.
4 First American Way
Santa Ana, CA 92707-5913

Re: CoreLogic, Inc.
Form 10-K for the Fiscal Year ended December 31, 2010
Filed March 14, 2011
Form 8-K filed on May 5, 2011
Form 10-Q for the Quarterly Period ended September 30, 2011
Filed November 4, 2011
File No. 001-13585

Dear Mr. Martell:

We have reviewed your filings and have the following comments. In some of our comments, we may ask you to provide us with information so we may better understand your disclosure.

Please respond to this letter within ten business days by amending your filing, by providing the requested information, or by advising us when you will provide the requested response. If you do not believe our comments apply to your facts and circumstances or do not believe an amendment is appropriate, please tell us why in your response.

After reviewing any amendment to your filing and the information you provide in response to these comments, we may have additional comments.

General

1. We note that you submitted a request for confidential treatment. Any comments that we issue on your confidential treatment request must be resolved before you receive a Completion of Review letter on your Form 10-K.

Form 10-K for the Fiscal Year ended December 31, 2010

Item 1A. Risk Factors

1. We are dependent…, page 14

2. According to your risk factor disclosure, you rely extensively on data from third-party suppliers. Please tell us and confirm that you will disclose in future filings the nature of any material arrangements with third-party data suppliers. Please advise of the consideration given to filing these agreements as exhibits pursuant to Item 601(b)(10) of Regulation S-K.

Item 6. Selected Financial Data, page 27

3. We note that the total assets line item includes discontinued operations. In light of the significant impact of the Separation in June 2010, tell us how you considered quantifying the impact of the Separation on your total assets for each of the fiscal years presented. Refer to paragraph 2 of the instructions of Item 301 of Regulation S-K.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

Critical Accounting Policies and Estimates

Revenue recognition, page 31

4. We note your discussion of your various products and services beginning on page 4. Your current revenue recognition policy disclosures do not appear to fully disclose how you recognize revenue for each of your products and services. In this regard, we note your first sentence that most of your products are recognized at the time of delivery or performance of service. Please tell us how you considered providing disclosure of the other three criteria of revenue recognition under SAB 104, as well as how the four criteria specifically relate to each of your products and services. In your response, please also tell us your considerations of identifying the specific services recognized under the subscription method and those products and services recognized under other methods. Also tell us in greater detail about the tax service fee revenue and the impact of this revenue to your total revenue in each of the past three years.

(https://www.sec.gov/Archives/edgar/data/36047/000000000011068992/filename1.pdf)

2.10. Tables for Chapter 2

TABLE 2.1
PCAOB's Inspection on Annually Inspected Audit Firms

Panel A: Big 4 Audit Firms

Year	Mean # of audits examined by PCAOB	Mean # of deficient audits	Mean % of deficient audits	Mean # of deficiencies	Mean % of deficient audits related to *Potential Material Misstatement*	Mean % of deficient audits related to *revenue recognition*
2005	N.A.	16.25	N.A.	30.75	N.A.	N.A.
2006	N.A.	11.75	N.A.	18.5	N.A.	N.A.
2007	N.A.	7.25	N.A.	12	N.A.	N.A.
2008	N.A.	7.25	N.A.	11	N.A.	N.A.
2009	N.A.	7.5	N.A.	9.5	N.A.	N.A.
2010	66.75	9.25	0.14	15	0.02	0.02
2011	61.75	19.75	0.32	52.75	0.07	0.10
2012	55.5	20	0.36	49.25	0.09	0.10
2013	55.25	20.5	0.39	37.5	0.23	0.11

Panel B: Non-Big 4 Annually Inspected Audit Firms

Year	Mean # of audits examined by PCAOB	Mean # of audits found to have engagement deficiencies	Mean % of deficient audits	Mean # of deficiencies	Mean % of deficient audits related to *Potential Material Misstatement*	Mean # of audits found to have deficiencies related to *revenue recognition*
2005	N.A.	12.33	N.A.	21.00	N.A.	N.A.
2006	N.A.	8.00	N.A.	18.50	N.A.	N.A.
2007	N.A.	5.75	N.A.	13.75	N.A.	N.A.
2008	N.A.	4.25	N.A.	8.00	N.A.	N.A.
2009	N.A.	5.75	N.A.	8.25	N.A.	N.A.
2010	26.00	4.75	0.18	8.50	0.00	0.02
2011	26.00	10.00	0.43	24.25	0.10	0.10
2012	23.67	10.67	0.48	29.33	0.15	0.15
2013	22.00	13.00	0.57	44.00	0.24	0.15

TABLE 2.2
SEC Comment Letters

	10-K Comment Letters		10-K Comment Letters related to *PCAOB Inspection*		10-K Comment Letters related to *revenue recognition*	
Fiscal Year	Number	% of Total Issuers	Number	% of Total 10-K Comment Letters	Number	% of Total 10-K Comment Letters
2004	2,408	14.32%	2,125	88.25%	566	23.50%
2005	2,389	14.20%	2,087	87.36%	436	18.25%
2006	2,330	14.05%	1,957	83.99%	398	17.08%
2007	2,730	16.36%	2,188	80.15%	362	13.26%
2008	3,145	19.74%	2,412	76.69%	334	10.62%
2009	2,870	18.34%	2,094	72.96%	283	9.86%
2010	2,472	15.71%	1,898	76.78%	268	10.84%
2011	2,181	14.51%	1,670	76.57%	263	12.06%
2012	697	4.76%	544	78.05%	83	11.91%

TABLE 2.3
Descriptive Statistics

Panel A: Summary Statistics

	Mean	Standard Deviation	First Quartile	Median	Third Quartile
CL	0.311	0.463	0	0	1
REVENUE_CL	0.055	0.227	0	0	0
ICW_CL	0.009	0.097	0	0	0
DEF_PERCENT	0.213	0.116	0.118	0.205	0.231
DEFIC_AUDITS	12.990	7.529	8	12	15
DEFIC_NUMBER	30.352	20.716	12	24	54
PMM_PERCENT	0.038	0.040	0	0.038	0.048
REVENUE_PERCENT	0.058	0.053	0.017	0.039	0.065
ICW_PERCENT	0.100	0.067	0.053	0.067	0.129
AUD_FEE	0.003	0.008	0.001	0.001	0.003
AUD_CHANGE	0.035	0.184	0	0	0
AUD_TENURE	7.773	3.439	5	9	11
RESTATE	0.126	0.332	0	0	0
SIZE	6.754	1.932	5.453	6.696	7.975
VOLATILITY	0.144	0.090	0.086	0.123	0.176
AGE	2.409	1.134	1.792	2.621	3.157
LOSS	0.503	0.500	0	1	1
EXT_GROWTH	0.347	7.317	-0.026	0.074	0.212
RESTRUCTURING	0.292	0.455	0	0	1
M&A	0.228	0.419	0	0	0
RZSCORE	5.957	2.439	4	6	8
LITIGATION	0.249	0.433	0	0	0
SEGMENT	5.261	3.648	2	5	7
FOREIGN	0.572	0.495	0	1	1
EXTERNAL_FINANCE	0.029	0.191	-0.030	0	0.038
INVENTORY	0.086	0.120	0	0.033	0.131
ACCT_REC	0.930	3.058	0.353	0.697	1.166
DEF_REV	0.023	0.061	0	0	0.014

N=8456

Panel B: Univariate Test of Letter vs. No-letter Firms

	CL=0		***CL=1***		t-test
DEF_PERCENT	5,774	0.209	2,604	0.223	-0.014***
DEFIC_AUDITS	5,774	12.654	2,604	13.735	-1.081***
DEFIC_NUMBER	5,773	29.284	2,604	32.719	-3.436***
PMM_PERCENT	5,774	0.037	2,604	0.043	-0.006***
REVENUE_PERCENT	5,774	0.056	2,604	0.061	-0.005***
ICW_PERCENT	5,774	0.096	2,604	0.11	-0.014***
AUD_FEE	5,762	0.003	2,604	0.002	0.001***
AUD_CHANGE	5,774	0.036	2,604	0.032	0.004
AUD_TENURE	5,774	7.604	2,604	8.147	-0.543***
RESTATE	5,774	0.126	2,604	0.128	-0.003
SIZE	5,760	6.467	2,603	7.389	-0.922***
VOLATILITY	5,629	0.149	2,586	0.132	0.018***
AGE	5,774	2.35	2,604	2.541	-0.191***
LOSS	5,774	0.53	2,604	0.444	0.086***
EXT_GROWTH	5,774	0.231	2,604	0.218	0.014
RESTRUCTURING	5,774	0.273	2,604	0.335	-0.062***
M&A	5,774	0.218	2,604	0.249	-0.032***
RZSCORE	5,097	5.907	2,117	6.079	-0.173***
LITIGATION	5,774	0.256	2,604	0.234	0.022**
SEGMENT	5,774	5.058	2,604	5.71	-0.651***
FOREIGN	5,774	0.563	2,604	0.594	-0.032***
EXTERNAL_FINANCE	5,372	0.036	2,567	0.013	0.023***
INVENTORY	5,692	0.087	2,563	0.082	0.006**
ACCT_REC	5,774	0.972	2,604	0.836	0.135*
DEF_REV	5,774	0.024	2,604	0.021	0.003*

TABLE 2.4
PCAOB Inspections and probability of receiving SEC's comment letters

	(1)	(2)	(3)	(4)
DEF_PERCENT	5.029***			
	(9.37)			
DEFIC_AUDITS		0.0587***		
		(7.07)		
DEFIC_NUMBER			0.0229***	
			(8.11)	
PMM_PERCENT				9.951***
				(7.09)
AUD_FEE	-49.02***	-49.45***	-49.02***	-49.04***
	(-3.46)	(-3.52)	(-3.51)	(-3.49)
AUD_CHANGE	0.157	0.139	0.109	0.142
	(0.93)	(0.82)	(0.64)	(0.83)
AUD_TENURE	-0.00179	-0.00213	-0.00213	-0.00177
	(-0.17)	(-0.21)	(-0.20)	(-0.17)
RESTATE	0.147*	0.139*	0.143*	0.143*
	(1.87)	(1.77)	(1.83)	(1.83)
SIZE	0.310***	0.304***	0.304***	0.303***
	(10.56)	(10.39)	(10.39)	(10.35)
VOLATILITY	-0.134	-0.121	-0.0786	-0.129
	(-0.38)	(-0.35)	(-0.23)	(-0.37)
AGE	0.0102	0.0105	0.0112	0.00727
	(0.31)	(0.33)	(0.35)	(0.23)
LOSS	-0.0149	-0.0162	-0.0157	-0.0130
	(-0.23)	(-0.25)	(-0.25)	(-0.21)
EXT_GROWTH	-0.0204	-0.0189	-0.0268	-0.0263
	(-0.30)	(-0.27)	(-0.39)	(-0.38)
RESTRUCTURING	0.157**	0.161**	0.161**	0.161**
	(2.62)	(2.69)	(2.68)	(2.70)
M&A	0.00869	0.00482	0.00988	0.00741
	(0.13)	(0.07)	(0.15)	(0.11)
RZSCORE	-0.00934	-0.00846	-0.00857	-0.00736
	(-0.75)	(-0.68)	(-0.69)	(-0.59)
LITIGATION	0.125*	0.131*	0.131*	0.12*8
	(1.88)	(1.98)	(1.98)	(1.95)
SEGMENT	0.0185**	0.0183**	0.0182**	0.0189**
	(2.40)	(2.38)	(2.38)	(2.47)
INTERCEPT	-2.475***	-2.474***	-2.113***	-2.247***
	(-10.03)	(-9.49)	(-8.83)	(-9.01)
N	8,645	8,645	8,328	8,645
AUDITOR FE	***YES***	***YES***	***YES***	***YES***
YEAR FE	***YES***	***YES***	***YES***	***YES***
INDUSTRY FE	***YES***	***YES***	***YES***	***YES***
Pseudo R-Square	0.083	0.081	0.075	0.078

TABLE 2.5
Revenue Defect Audit and probability of receiving SEC's comment letters related to Revenue Recognition

Dependent Variable = *REVENUE_CL*

	Coeff.	**p-value**
REVENUE_DEF%	3.253	0.042
ACCT_REC	-0.073	0.373
DEF_REV	1.887	0.003
LOSS	0.180	0.175
SALES_GROWTH	0.006	0.009
AUD_FEE	-33.898	0.102
AUD_CHANGE	0.393	0.190
AUD_TENURE	0.024	0.231
RESTATE	0.081	0.578
SIZE	0.175	0.000
VOLATILITY	0.122	0.823
AGE	-0.095	0.121
INVENTORY	0.831	0.154
RESTRUCTURING	0.027	0.816
M&A	0.121	0.282
RZSCORE	0.031	0.170
LITIGATION	-0.161	0.197
SEGMENT	-0.063	0.000
INTERCEPT	-3.06	0.007
N	8,456	
AUDITOR FE	***YES***	
YEAR FE	***YES***	
INDUSTRY FE	***YES***	
Pseudo R-Square	0.0869	

Chapter 3: Information Advantage of Option Market and Financial Misreporting

3.1. Introduction

Regulatory and investment communities have expressed concerns with the financial reporting failure or accounting fraud of public firms for a very long time. Since several high profile accounting scams with detrimental market capitalization loss for firms with restatements before the issuance of Sarbanes-Oxley Act of 2002, regulatory authorities have made great efforts on improving public firm's financial reporting quality and preventing accounting fraud. For example, SOX 404 requires the auditor to provide attestation to management's assessment of internal control's effectiveness and report auditor's opinion with internal control. As for the investors, especially short-sellers, uncovering firm's potential financial misreporting risk has been widely seen in recent years. Such as Muddy Water targets on Chinese firms' financial misreporting. If there are some informed investors actively trading on this unfavorable information, then we could expect their information reflected in prices.

In this chapter, I examine whether the option market is informed of financial misreporting and whether it could predict stock market's reaction to restatement announcements. Prior research has demonstrated positive relation between financial misreporting and short selling (Karpoff and Lou 2010, Desai et al. 2006), but none of the existing research has explored the relation between financial misreporting and option

market, which may also be informed of negative information. The motivation for this research is that option volatility skew between put options and call options could predict equity returns, suggesting that option market is more informative than stock market. (Jin, Livnat and Zhang, 2012). If other informed investors, such as short sellers, can identify over-priced firms, then it is possible that option traders may also be proficient in identifying firms with high potential misreporting risk. But this conjecture may not be true because previous evidence suggests that volatility skew only has predictive power of future returns, especially large price crashes, of scheduled information disclosure events such as earnings announcement days. Nevertheless, sophisticated investors may still have some information before restatement announcements because 1) restatement itself is a way to correct past misstated financial statements and informed investors could identify over-valued firms by using the previous financial information, such as low accrual quality (Dechow et al, 2011), 2) management's incentive to misreporting is observable (Burns and Kedia, 2006), and 3) option investors may have private information of financial misreporting.

Using a sample of firms that admit financial misstatements, I find that the implied volatility skew of restating firms before the actual restatement announcement is higher than the implied volatility skew of a group of matching industry peer firms that do not restate. Moreover, the implied volatility skew could predict stock market's negative reaction to restatements and is significantly associated with the materiality of

restatements. In other words, prior to the revelation date, option markets have some information about which firms are more likely to misreport. The predictive power of volatility skew still holds after taking into consideration of potential information leakage before restatements. I also find that post-restatement volatility skews have predictive power for subsequent post-restatement long-term excess returns, suggesting superior ability to process restatements. In addition, short interests are positively associated with volatility skew, suggesting both short sellers and option traders are informative of financial misreporting.

The remainder of this study proceeds as follows. Section 2 discusses related literature of option markets and background. Second 3 presents the hypothesis development. Section 4 discusses the data and main variables. Sections 5 and 6 present the main empirical results. Section 7 provides robustness checks. Concluding remarks are given in Section 8.

3.2. Background and Literature Review

3.2.1. Relationship between Option Market and Stock Market

While Black and Scholes (1973) shows option is a redundant asset because a dynamic portfolio of the underlying stock and riskless bond could provide the same return as the option does, this may not be true in reality since it is not costless to continuously maintain a dynamic portfolio that mimics a security option when market is not complete. Additionally, investors in the option market and stock market are not

necessarily trading on the same information set. Back (1993) develops a theoretical model showing that the flow of information that generated by the existence of option market will affect the underlying stock, even if options can be synthesized by dynamic trading. If option market to some extent attracts investors with private information, then it may improve stock market efficiency by disseminating that information (Amin and Lee, 1997). There is a bundle of evidence showing that option market improves stock market efficiency. Jennings and Starks (1986) find stocks with options listed adjust to earnings announcement faster than those without options listed. Skinner (1990) shows earnings announcement is preempted by more private information trading after firm's stock options are listed in exchange market. Therefore, option is *not* a redundant asset and has unique and substantial role in capital market together with stock market.

3.2.2. Information Advantage of Option Market

Although option market has shown to be a non-redundant derivative product of stock market from the perspective of generating new information flow, whether option market's reaction leads stock market and whether information advantage drives option market's superior predictive ability are more important questions. If the two markets share the same trading attributes, then we should expect homogeneous investors between the two markets. However, some unique features make trading in the option market more attractive to some informed investors. Black (1975) shows that trading in option market has lower transaction costs and the margin requirement makes option traders prefer

writing options rather than shorting the stocks directly.

If informed investors choose to trade in the option market, then the information impounded into option prices may predict future price movement since option pricing is based on both first and second moments of future stock prices. In previous literature, one stream of research uses different measures of option market trading activity to predict stock market returns. Amin and Lee (1997) find that increase in long (short) positions of option is associated with subsequent positive (negative) earnings news. Easley, O'Hara, and Srinivas (1998) document that option trading volume leads stock price changes. Similarly, Cao, Chen, and Griffin (2005) show option market trading volume before Merger and Acquisition announcements could predict the takeover premiums.

Besides trading patterns, implied information inherent in the option price is also derived as a good candidate for predicting future significant stock market movements. Xing, Zhang, and Zhao (2010) report implied volatility skew (smirk) reflects traders' negative information and it could predict future cross-sectional equity returns. Using the same measure, Jin, Livnat, and Zhang (2012) provide direct evidence that option traders have information advantage as they become increasingly informed of forthcoming earnings releases and better at processing unanticipated information.

While stock market is more suitable for disseminating normal information flow, option market may be more informative ahead of material news. When information asymmetry is severe, e.g. during Merger and Acquisition (Cao, Chen, and Griffin, 2005),

the option market plays a more important role than stock market in information discovery.

3.2.3. Trading in Option Market before Revelation of Accounting Misstatements

Previous literature has documented the detrimental negative market reaction to SEC enforcements or fraudulent financial reporting, ranging from –5% to -15%. (Dechow et al. (1996) and Palmrose et al. (2004)). While the negative reaction represents the de-valuation of firms with fraudulent accounting information, it also suggests that the stock market did not expect the firm's sudden disclosure or acknowledgement of financial misconduct. There are two possible reasons why stock market investors do not have prior sophisticated information about those financial misconduct behaviors. One reason is that there is no public disclosure of any information that could help investors generate expectation of possible financial misconduct. For example, the auditor may fail to issue a qualified audit opinion on firm's annual reports. In this case, if investors do not have any access to private or inside information, then they could not anticipate the accounting fraud disclosure. Another explanation is that some investors have some prior inside information about the misstated financial information, but they could not fully profit from this information by trading on the stock market because the limitations of arbitrage. In other words, the available trading opportunities cannot meet the demands of the informed investors. Although Karpoff and Lou (2010) report the short interest is increasing before the revelation date of accounting fraud,

informed traders' information may not be fully incorporated into the short positions because of those constraints on short sales.

An important and substantial complement to the short sales is option market. There are several reasons why the existence of option market could facilitate the informed trading before the disclosure of fraudulent financial reporting. First, when there are constraints on short-selling, informed investors who want to take advantage of the arbitrage opportunities may choose to use options. Ofek, Richardson, and Whitelaw (2004) document an association between put-call parity violation and short sale constraints, suggesting a violation of the rule of no arbitrage which is a core concept of finance theory. More specifically, if private information about the possible restatement in the near future is withheld by an informed investor, it cannot be fully incorporated into the stock price because short-sellers' trading activities are limited by the amount of available stocks from brokers or other investors who are willing to lend. Figlewski and Webb (1993) report that short positions on average only account for 0.2 percent of total shares outstanding. The margin requirement also prevents the short-sellers from fully utilizing the proceeds generated by selling the stock. In contrast, the margin requirement of buying put options is just the total cost of the put option contract. While the options trades' loss would be the cost of buying the put option, the short sellers' loss is unlimited theoretically.

Second, option market improves market efficiency by effectively complementing

short sales. Theoretical research (e.g. Diamond and Verrecchia, 1987) shows that short-selling constraints impede stock's adjustment speed to bad news because some informed trading is blocked. In addition, Figlewski and Webb (1993) find that optioned stocks are associated with a higher level of short interests accumulated. Skinner (1990) shows that earnings announcements are less informative after options for the underlying stocks are listed because more information search activities are triggered by the analysts and option traders.

Third, option is more easily used to exploit some information than equity market, such as future volatility or negative news. Richardson et al. (2005) report that lower accrual reliability or quality leads to larger security mispricing. As fraud firms usually inflate earnings through accruals, it is expected that these firms will experience larger shareholder value loss in the future and also larger volatility because of more uncertainty about future cash flows. As implied volatility stock option is an expectation of future realized volatility, option investors could exploit the future volatility in their trading.

Giving the advantages of trading options, we could expect that if a sophisticated speculator wants to profit from the future stock price change which would be driven by the fraudulent financial reporting risk, he might trade in the option market before any public announcement that reveals to investors of a possible enforcement in the future, such as restatement, 8-k filings, press release and etc.

3.2.4. How to Measure Informativeness of Option Market?

In traditional option pricing theory, options are redundant assets because they can be replicated with a combination of underlying stock and riskless bonds (Black and Scholes, 1973). But this theory is built on the assumptions that 1) market is complete, which implies no violation of put-call parity, and 2) stock market and option market share the same set of information flow. If these two conditions hold, it suggests that the option measures could not predict future returns of underlying stocks, or more specifically, the crashing of stock price. However, both theoretical and empirical research has shown the violations or disapprovals of the assumptions. (See Cremers and Weinbaum 2010, Easley, O'Hara, and Srinivas 1998). Given the above evidence, it is possible that option market could predict the future financial reporting risk if option traders are informed about financial reporting quality because of their better ability to analyze or their access to private information.

Recent literature widely uses volatility skew to measure option traders' information. Volatility skew, which is also known as volatility smirk, is the difference between the implied volatilities of out-of-the-money (OTM) put options and the implied volatilities of at-the-money (ATM) call options. Implied volatility skew aims to measure information content of option trader's expectation of future return realizations, especially when negative information is forthcoming in the near future. When facing negative jump risk, an OTM put option becomes more expensive as risk-averse investors ask for price crash risk premium. Pan (2002) shows that the price crash risk contributes to 80 percent of

OTM put option's total risk premium. As fraudulent financial reporting triggers severe negative market reaction, I expect that volatility skew would be higher for firms with larger loss of market value if option traders are informed about the possible financial reporting risk.

3.3. Motivation and Empirical Predictions

Given the information advantage of option traders and the informativeness of implied volatility skew for the potential future negative news, it is a worthwhile research question to examine whether option market is informative about the potential future financial restatements. If option investors anticipate that certain firms are more likely to have financial reporting problems, then I conjecture that the implied volatility skew is higher for these firms than other firms that are not or less likely to restate. Although firms' ex-ante financial misreporting risk is unobservable, actual restatements can be used as a proxy for high financial reporting risk firms. Therefore, I predict that compared with other firms, the implied volatility skew of restatement firms is higher before actual restatements announcements. Hypothesis 1 is stated as follows:

Hypothesis 1: *Volatility skew before restatement announcements is higher for firms with restatements than for non-restating firms.*

Sophisticated investors choose to trade in one market rather than another if market is not complete, making one market leads another market (Jin et al. 2012). When investors are facing short-sell constraints before fraudulent financial reporting is

disclosed, informed investors may choose to trade in the option market. Therefore, the option market has information advantage over the stock market if the stock market does not or slowly incorporates option's information into prices. Meanwhile, the OTM put option will be more expensive if the demand for out-of-the-money put option is increasing. Therefore, if the option market is more informative in terms of generating or disseminating private information and is more proficient in analyzing financial information, then implied volatility skew before restatements could predict market's reaction to restatements. The second hypothesis is stated as follows:

Hypothesis 2: *Volatility skew before restatement announcements is negatively associated abnormal returns on restatement announcement days.*

However, Hypothesis 2 would provide only indirect evidence that the option market could predict accounting misstatements because it is possible that option traders are better at predicting crash risk without specific knowledge of financial reporting failure. If the option market really anticipates restatements before the public disclosure, then the magnitude of the volatility skew would vary across different restatement as restatements vary in their materiality and scope. To provide more direct evidence that the option market could predict restatement, I examine whether volatility skew is correlated with the materiality of restatement. Prior literature examines a variety of determinants of market's reaction to restatements. Palmrose et al. (2004) and Wu (2002) find that for restatements related to accounting fraud, more negative impact on previous reported net

income and restatement related to more accounts will lead to more negative stock returns. Therefore, if the option market anticipates the restatements, the implied volatility should be positively associated different measures of restatement's severity. The third hypothesis is stated as follows:

Hypothesis 3: *Volatility skew before restatements is positively correlated with materiality of restatements.*

3.4. Data and Variables

Option data is obtained from the OptionMetrics historical option prices database. OptionMetrics provides detailed data of historical option price, implied volatility, trading volume, open-interest and sensitivity information of index and equity options and the information of corresponding underlying stocks. The implied volatility of European option is derived from Black-Scholes model. To account for the early exercise of American options, OptionMetrics calculates the implied volatility of American options using an industry-standard Cox-Ross-Rubinstein (CRR) binominal tree model, which accommodates the underlying stock's dividend payment pattern. Following prior literature, volatility *SKEW* is defined as the difference between implied volatility of out-of-the-money put options and implied volatility of at-the-money call options:

$$\text{Volatility Skew} = \text{IV}_{\text{OTM put options}} - \text{IV}_{\text{ATM call options}}$$

To calculate implied volatility, I only include options with non-zero open interest and non-missing implied volatility data. Because my research tries to capture option

traders' information in the short-term period, I use options with the expiration day that is at least 10 days away but does not exceed 60s from the expiration date. The moneyness for all options is inferred from option's delta. The Out-of-the-money (OTM) put options are defined as put options with delta between -0.45 and -0.15. I select the one with delta closest to -0.3 for each trading day because it will maximize option trader's profit if price drops in the future. The At-the-money call options are defined as call options with delta in the range of (0.4, 0.7) and closest to 0.5. The volatility of ATM call option is used as the benchmark to calculate the volatility skew because ATM call options are most frequently traded in the option market. I calculate the volatility skew over each trading day with available data and get the *SKEW* measure, which is the average volatility skew of respective window.

The financial restatement database used in this study is from the General Accounting Office (GAO) restatement database. Besides GAO database, there are several other financial misconduct databases widely used in accounting and finance literature, such as: Audit Analytics and SEC AAERs. I choose the GAO database for the following reasons. First, the GAO database identifies more accurate initial revelation date of those financial misstatements. On average, the initial trigger date in Audit Analytics databases lag 150 to 1017 days compared to the other databases (Karpoff et al. 2013). Second, Audit Analytics databases wrongly classify financial reporting errors as financial reporting irregularities, which leads to biased fraudulent financial reporting sample. Third,

SEC enforcements are less representative of financial misreporting because SEC has its enforcement preferences (Kedia and Rajgopal, 2011). I acknowledge that GAO also has its limitations. Hennes et al. (2008) classify the restatements from GAO database as errors or irregularities to distinguish the restatements that are due to accounting errors from restatements caused by intentional misreporting. Their results show that irregular misstatements are more likely to be followed by subsequent class action lawsuits and top management turnover. I follow their methodology to strengthen my tests by focusing on intentional accounting fraud that is conjectured to be more material for investors.

GAO reports 2496 restatements from 1997 to 2006. I search the OptionMetrics database and identify 1221 restatements with available data to calculate volatility skew. I also drop 267 duplicated restatements because GAO identifies several restatement announcements for the same financial misreporting case. After matching the sample with available financial data and returns data, the final restatement sample size is 783.

3.5. Empirical Results

3.5.1. Descriptive statistics

In Table 1, I report the summary statistics for the primary variables. I set restatement day identified in the GAO database as day 0 and use cumulative abnormal returns from day -1 to day +1 to measure stock market's interpretation of the accounting misstatements. The mean market reaction to restatement is -4%, which is consistent with previous research. As discussed in previous section, volatility skew is calculated as the

difference between IV of OTM put option and IV of ATM call option. The mean (median) of *SKEW* (-60, -2), which is average skew of 60 days but at least 2 days before restatement announcement, is 0.059 (0.045), higher than 0.0357 (0.026) reported in Jin, Livnat and Zhang (2011). This is not surprising since Jin, Livnat and Zhang (2011) use all firms with option listed while our research focuses on firms that with pessimistic information. The reasons I select 60 days before restatement is as follows. First, Dechow et al. (1996) report that shot selling interests start increasing 2 months before the announcement of SEC investigation. Second, Jin et al. (2012) use 50 days before the earnings announcement as base window to measure option market's average informativeness. Third, if I limited the window to only several days before restatement, I would lose a substantial restatement sample because of no implied volatility skew data. I use days (-30, -2) as alternative windows, the results are similar but with a smaller sample size. In addition, the volatility skew of (-60, -2) is also higher than average volatility skew from 180 to 60 days before restatement, suggesting that implied volatility skew is increasing when getting close to restatements.

3.5.2. Stock market reaction to restatements

In this section, I report stock market's reactions around restatements. As Figure 1 shows, stock market views restatement as bad news and react very negatively to the restatement announcement. Therefore, the intrinsic value of OTM put options may become positive if the market price is lower than strike price. Following Hennes et al.

(2008), I further classified restatements as irregularities and errors. The mean reaction is stronger for restatements classified as irregularities (-6.78%) than error ones (-2%).

To check whether stock market reaction is associated with the information of contained in restatements in the regression analysis, I use four measures to capture the severity of financial restatements. The first one is *Irregularity*, which is equal to 1 if the restatement is classified as irregularity by Hennes et al. (2008) and 0 if it is classified as error. The second one is *Enforcement*, which is equal to one if the restatement is associated with subsequent SEC enforcement and is charged with accounting fraud according to the Securities Act of 1933 and Securities Exchange Act of 1934. The third one is *Total Accrual* of the fiscal year prior to restatement. Following Richardson et al. (2005), I define Total accrual as

$$TACC = (\Delta WC - \Delta NCO - \Delta FIN)/TA$$

where the ΔWC is the change in net working capital, ΔNCO is change in net non-current operating assets and ΔFIN is the change in net financial assets.

The fourth one is the discretionary accrual (DA) of the previous fiscal year before restatement. Non-DA is calculated using the Jones model and the DA is the residual of total accruals less Non-DA:

$$NDA_t = \alpha + \widehat{\beta_1}\frac{1}{TA_{t-1}} + \widehat{\beta_2}\frac{\Delta REV}{TA_{t-1}} + \widehat{\beta_3}\frac{PPE}{TA_{t-1}}$$

$$DA = TA - NDA$$

I examine stock market's reaction to restatement by estimating the following model:

$$CAR(-1,1) = \alpha + \beta_1 Severity + \beta_2 SUE + \beta_3 SIZE + \beta_4 Inst_{own} + \beta_5 ROA + \beta_6 Momentum + \beta_7 Turnover + \beta_8 Volatility + e$$

The results in Table 2 suggest that CAR (-1, +1) is significantly and negatively associated with the materiality of restatements. The results are mostly consistent with previous research, such as Palmrose et al. (2004) and Wu (2002). Therefore, I conclude these measures are valid proxies of restatement materiality.

Figure 1 also shows abnormal returns of the stock 120 days before and after the restatements. It is worth noting that the return drifts after the restatement announcement. One possible explanation is that stock market does not fully interpret restatement on the revelation day and the market continues to punish firm for financial misreporting. It is also obvious that stock returns start dropping 90 days before restatements. The possible explanations are poor financial performance, post-earnings announcement drift of previous quarterly earnings announcement and analyst's downward revision if there is no information leakage before restatement. To mitigate the concerns that both stock and option markets are informed about restatement before the announcement day, additional tests are will be conducted in following sections.

3.5.3. Could Option Market Predict Restatement?

3.5.3.1. Implied Volatility and Volatility Skew around the Revelation Date.

Figure 2 shows the weekly time-series plot of volatility skew and implied volatility (IV) of ATM call options. Both daily implied volatility skew and IV increase

around the time firms announce restatements. More interesting finding is that skew increases about 4 weeks before the revelation date, while IV increases 1 week before the revelation date. As implied volatility skew is the difference of IV between OTM put option and ATM call option, the increase in *SKEW* suggests that IV of OTM put option increases faster than ATM call option. Again this finding supports the argument that the demand of put options is higher than other options before restatement. In addition, the volatility skew decreases after IV of ATM call options increases, suggesting that put options may incorporate the information of price crash earlier than call options and IV of call and put options do not synchronize. The results imply that informed investors may accumulate put option positions before revelation of accounting fraud.

In Figure 3, I also classify restatements into irregularities vs. errors in the same way as discussed before. I find that firms that intentionally misreport their financial statements have higher volatility skew than other firms. It is consistent with the stock market reaction results that market reacts more negatively to firms intentionally misreporting.

3.5.3.2. Matching Restatement Firms with Non-restating Firms

To test hypothesis 1, I identify a group of matched sample that do not restate their financial statements. For each restatement sample, I select one matched sample 1) in the same fiscal year 2) with the closest market capitalization 3) in the same 2-digt SIC industry classification 4) do not have financial restatement before or in that fiscal year. In

total, I identified 639 matched non-restating sample that has available option data to calculate volatility skew 60 days before the matched restatement sample's restatement announcement date.

To examine whether option implied volatility skew is different between restating firms and non-restating firms before the revelation date, I use an indicator variable *RESTATE* to capture the difference between them. Building on Dennis and Mayhew (2002), I also include several control variables: 1) *SIZE*, which is log of market capitalization at the end of last fiscal year; 2) *LEVERAGE*, which is long-term debt divide by total assets at the end of last fiscal year; 3) *BM*, which is the book-to-market ration measured as total assets divided by the sum of total liabilities plus market value at the end of last fiscal year; 4) *VOLATILITY*, which is the realized stock return volatility; 5) *BETA*, which is market beta for the firm in (-60, -2); 6) *VOLUME*, which is the log of the average daily trading volume of shares in (-60, -2).

$$SKEW = \alpha + \beta_1 RESTATE + \beta_2 ATMIV + \beta_3\, SIZE + \beta_4\, LEVERAGE + \beta_5\, BM + \beta_6\, CFVOL + \beta_7 BETA + \beta_8 VOLUME + \beta_9\, RETURN + e$$

The regression results are reported in Table 4. The coefficient of my test variable *RESTATE* is positive and significant at <5% level, suggesting that restatement firm have higher implied volatility skew than the non-restating firms. The coefficients of the control variables are also consistent with the prior literature. Firms with larger market capitalization and larger market beta have less implied volatility skew. In addition, firms

with larger realized stock return volatility and higher BM ratio have larger implied volatility skew. In summary, this test provide evidence for hypothesis 1 that firms with financial misstatements have larger implied volatility skew before the misstatement revelation date, suggesting that option investors are informative about the potential financial misreporting risk.

3.5.3.3. Volatility Skew and Materiality of Financial Restatement

Previous results have shown that stock market's reaction to restatement is positively associated with the materiality of restatement. Therefore, I explore the information content of volatility skew by examining whether volatility skew is also associated with those proxies of restatement's severity. Table 5 reports the regression results of regressing volatility skew, which is measured 2 months before restatement, on the four different measures of materiality. All the coefficients of materiality measures are positive and significant except when using the *DA* measure, suggesting that option market has some prior information about accounting misstatement even before restatement announcement. The insignificance of DA's coefficient might relate to the error in variables because I calculate the discretionary accrual using restated financial data rather than financial data firstly reported. In addition, my results show that earnings surprise is negatively associated with volatility skew. It is consistent with the notion that firm with positive earnings surprise have less negative information reflected in option market. Moreover, I find that implied volatility level is also positively associated with

volatility skew.

3.5.3.4. Volatility Skew and Stock Market Reaction to Restatement

In this section I test hypothesis 3 that whether volatility skew could predict stock market's reaction to restatement. To mitigate the concern that both stock market and option market are informed about misstatements before the announcement day, I further examine whether option market could predict stock market's abnormal returns before restatement announcement. The univariate regression result reported in Table 6 suggests that volatility skew before restatement is negatively correlated with cumulative abnormal returns three days surrounding the restatement announcement. The results confirm my conjectures that higher volatility skew implies more negative the stock market response to the misstatements. I also test my prediction using the multivariate regression model below:

$$\begin{aligned} XRET = \quad & \alpha + \beta_1 Skew + \beta_2 SUE + \beta_3 SIZE + \beta_4 LEVERAGE + \beta_5 BM \\ & + \beta_6 ROA + \beta_7 Momentum + \beta_8 Turnover \\ & + \beta_9 Idiosyncratic\ Volatility + \beta_{10} Implied\ Volatility + e \end{aligned}$$

In the multivariate regression model, I also consider several control variables that may affect stock market's reaction to restatement. First, if the restatement is bundled with firm's earnings announcement, then the abnormal returns could just reflect market's response to earnings surprise. I calculate earnings surprise as reported earnings minus previous matched quarter earnings scaled by market value, which is the total number of shares outstanding multiply with stock price at the end of prior fiscal quarter. If the

restatement is not bundled with earnings announcement, then I control for the earnings surprise of the most recent quarterly earnings announcement before restatement. Second, I also control for firm characteristics using financial variables: size, leverage book-to-market ratio, and ROA, which are measured for the prior fiscal quarter before restatements. Third, I also control for stock market's momentum, which is the buy-and-hold abnormal returns 120 days before restatement and stock market liquidity, which is the turnover ratio calculated as average trading volume of last 6 months over total number of shares outstanding. Fourth, I control for firm's idiosyncratic return volatility and implied volatility of 120 days before restatement. These variables may predict future negative returns because strong volatility represents more market uncertainty. Following Jin, Livnat and Zhang (2010), I also sort the sample into four quartiles according to skew level and get the rank measure *R_skew*. The results show that the coefficient of both *skew* and *R_skew* are negative and significant, supporting the argument that option market has information advantage over stock market.

As shown in Figure 1, the stock market returns start dropping before restatement announcement. It could be driven by information leakage to the stock market or short selling pressure (Desai et al. 2006). To mitigate the concern that both stock market and option market are informed about financial misstatements before restatement, I regress buy-and-hold abnormal returns over 90 days prior to restatement on *R_skew* which is rank of average skew of the period from 180 days before restatement to 90 days before

restatement. I report the results in Table 7. In both univariate and multivariate regressions, the coefficients on *SKEW* are negative and significant. The results provide additional evidence that option market has information advantage over stock market.

Karpoff et al. (2013) suggests that financial misreporting databases used in previous research differ in identifying initial revelation date of financial misconduct. As this is an event study, I check whether our results are sensitive to the event date. The biggest concern here is that the restatement date in the sample lags the earliest revelation date and therefore both option market and stock market are informed of restatement. Karpoff et al. (2013) hand collected and checked all the SEC enforcements associated with accounting fraud and identifies earliest revelation date. I use their data to test again whether option market could predict the earliest market reaction to misreporting announcement. Table 8 reports the results and the coefficient of *SKEW* remains negative. I also use *skew* measured on the period from 30 days before revelation date and ending 2 days before revelation date to test whether my results are sensitive to the window I select. Again the results are similar and support my hypothesis that option market could predict stock market's reaction to restatements.

3.6. Option Market and Short Selling

In this section I study the relationship between option market and short selling when informed traders want to trade on the financial misreporting information. Karpoff and Lou (2010) and Desai et al. (2006) provide evidence that short sellers target firms

with financial misreporting and accumulate significant short positions before revelation date. If the short selling and option trading are substitutes and market is complete, I would expect that short positions and implied volatility skew to be negatively correlated since informed traders may choose to trade in one rather than another. But this is not necessarily true because Ofek et al. (2004) suggests that higher short sales restrictions limit the arbitrage, leading to larger price deviation between option and stock markets. Figlewski and Webb (1993) also documents optioned stocks are associated with higher short interest. As higher implied volatility skew implies more arbitraging activities, I conjecture that short selling will also be higher.

Table 9 reports the empirical results that examine the relationship between short selling and implied volatility skew. Short interest is the total short positions reported in the month prior to restatement scaled by the total shares outstanding in month *t*. Change is short interest is the short interest in month *t* minus the short interest at month *t-6* scaled by total share outstanding in month *t*. Following Karpoff and Lou (2010), I controll for size, book-to-market ratio, momentum returns before restatement and institutional ownership in the multivariate regression model. The results show that implied volatility skew is strongly positively associated with short selling. Therefore, both short sellers and option traders could be informed of the financial misreporting.

3.7. Conclusion

Restatements, which are violations of general accounting practices, cause crucial

loss for company's equity holders. A series of financial reporting and auditing failures in the early 2000s lead to the passage of Sarbanes-Oxley Act (SOX), which was the most stringent accounting regulation in history. SOX clearly state that preventing accounting fraud ex ante from the following ways: enhance corporate internal control, more stringent auditing and so on. Nonetheless, investors are varied in their ability to predict the financial reporting risk based on the firm's financial statements and its accounting practices. This essay explores whether option traders are informative of financial misreporting and whether option market could anticipate stock market's reaction to the announcement of restatements. The financial misreporting risk affects the pricing of options since the underlying stocks are greatly affected by firm's restatement announcements. Therefore option traders' informativeness of financial misreporting should be reflected in option prices or implied volatility of options. Prior literature suggests that implied volatility skew, which is the difference in implied volatility between OTM put options and ATM call options, reflects option traders expectation of future returns movements. The higher volatility skew before the stock market reacts to the restatement announcements would imply that option traders have pessimistic information about the stock performance.

I find that implied volatility skew is higher in the pre-restatement period for the restatement firms than matched industry peer firms that do not have restatements. My results also suggest that the materiality of restatements is positively associated with

implied volatility skew. In addition, I find that the higher implied volatility skew the more negative stock market reaction to restatements. I further examine whether option traders' information advantage is correlated with the information held by short sellers who are also informed of financial misreporting. I found that both the level and change of short interest before restatements are strongly positively correlated with the implied volatility skew, suggesting that both option traders and short sellers could anticipate financial misreporting. My research provides further evidence that option traders have information advantage and informed option traders could anticipate financial misreporting risk.

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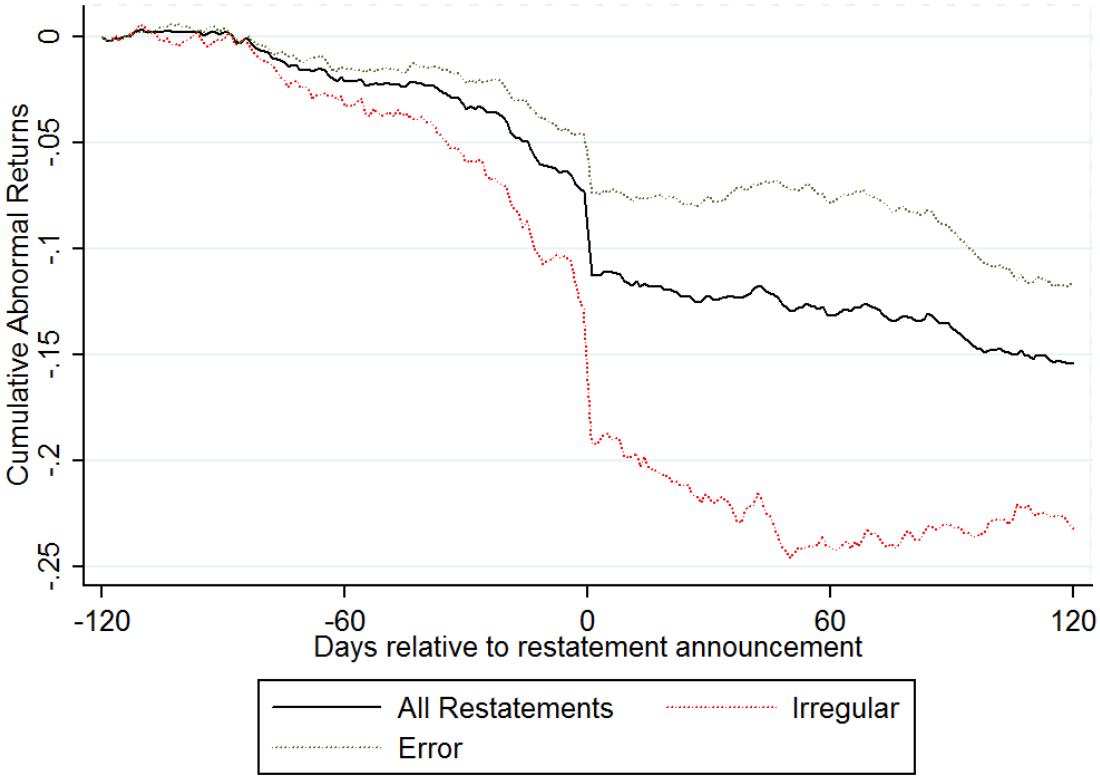
3.9 Appendix for Chapter 3 – Variable Definitions

Variable Name	Definition
SKEW	Volatility Skew = IV $_{\text{OTM put options}}$ – IV $_{\text{ATM call options}}$ Out-of-the-money (OTM) is defined as put options with delta in the range of (-0.15, -0.45). At-the-money (ATM) call option is defined as defined as call options with delta in the range of (0.4, 0.7). I use OTM put option with delta closest to -0.3 and ATM call option with delta closest to 0.5 when calculating skew. All the options used have non-zero open interest and the days to expiration are at least 10 days away but not exceed 60 days. I calculate the *SKEW* measure over each trading day with available data and average it over each window before and after the fraudulent financial reporting trigger day.
R_SKEW	Soring the skew measures into quarterlies, with -0.5 for the lowest group, 0 for the middle groups and +0.5 for the highest groups.
IMPLIED VOLATILITY (IV)	Option implied volatility from OptionMetrics database, which uses an industry-standard Cox-Ross-Rubinstein (CRR) binominal tree model and also accommodates the underlying stock's dividend payment pattern.
IRREGULAR	Dummy variable equals to 1 if the corresponding restatement is classified as irregular by Hennes et al. (2008), 0 otherwise.
SEC	Dummy variable equals to 1 if the restatement relates to subsequent SEC enforcement charged with accounting fraud, 0 otherwise.
TOTAL ACCRUAL	Total Accrual = (ΔWC - ΔNCO - ΔFIN)/TA Where the ΔWC is the change in net working capital, ΔNCO is change in net non-current operating assets and ΔFIN is change in net financial assets. Details see Richardson et al. (2005)
DA	Discretionary accruals measured using Jones Model: $$NDA_t = \alpha + \widehat{\beta_1}\frac{1}{TA_{t-1}} + \widehat{\beta_2}\frac{\Delta REV}{TA_{t-1}} + \widehat{\beta_3}\frac{PPE}{TA_{t-1}}$$ $$DA = TA - NDA$$ Where TA is total asset of previous fiscal year

	(COMPUSTAT item 6), ΔREV is change of sales (COMPUSTAT item 12) at fiscal year t from previous fiscal year, PPE is Property, plant and equipment (COMPUSTAT item 7).
SIZE	The natural logarithm of market value, which is measured as total common shares outstanding multiply with stock price at the end of previous fiscal year before restatement.
SUE	Standardized unexpected earnings. It is measures as quarterly net income before extraordinary items minus previous matched quarter, scaled by total market value at the end fiscal quarter.
ROA	Net income before extraordinary items / total assets
LEV	Leverage=Long term debt / total assets
BM	Book-to-market ratio = Total assets / (total liabilities + market value)
MOMENTUM	Buy and hold abnormal returns of respective window BHAR(-90, -2) and BHAR (-180, -90)
TURNOVER	Daily trading volume divided by total shares outstanding, averaged over respective window.
VOLATILITY	Underlying stock return volatility calculated using daily returns.
VOLUME	Natural log of mean daily stock trading volume over [-60, -2]
BETA	The market beta for the firm estimated over [-60. -2]
SI	Short interest, which is the total short positions reported in month t prior to restatement scaled by total shares outstanding in month t.
XSI	Change is short interest, which is the short interest in month t minus the short interest at month t-6 scaled by total share outstanding in month t.

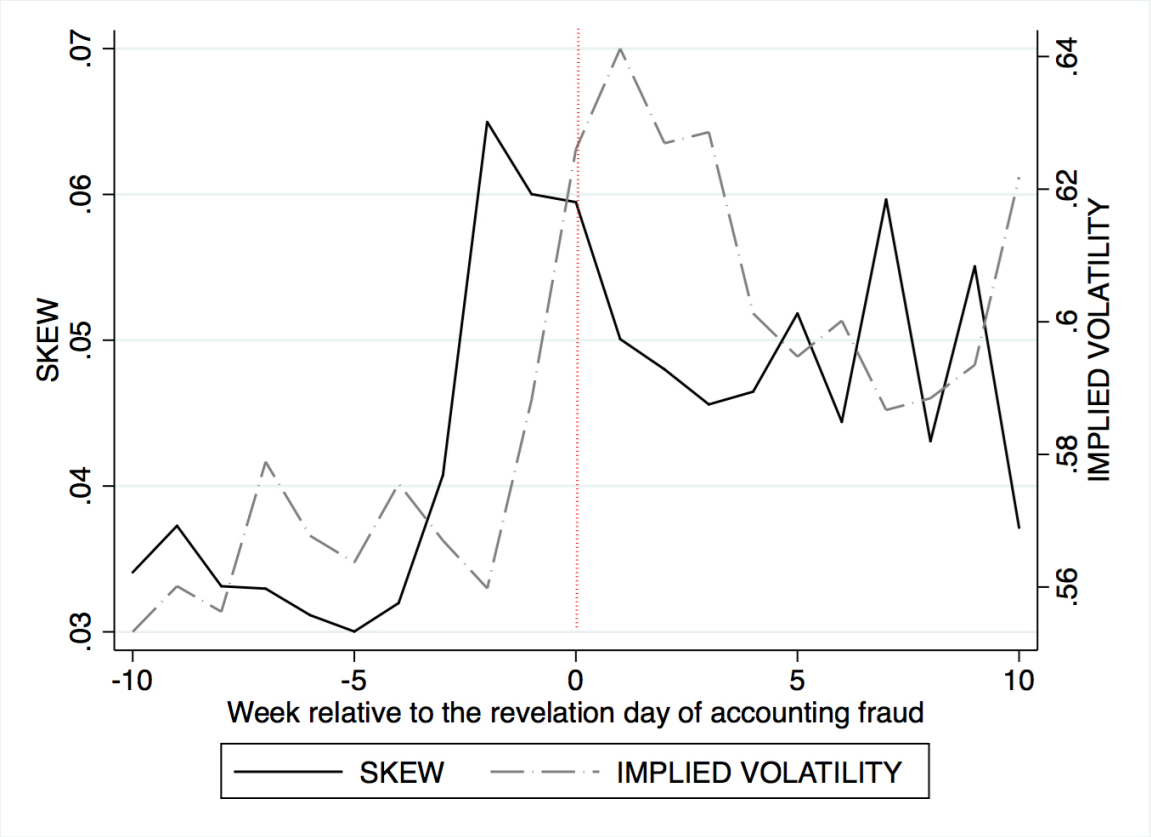
3.10 Figures for Chapter 3

Figure 3.1. Cumulative abnormal returns surrounding restatement announcements



This figure shows the cumulative abnormal returns from 120 days before restatements to 120 days after restatements. The sample is drawn from GAO database and requires a firm to have data in CRSP to calculate abnormal returns based on market model. A restatement is classified as irregularity vs. error according to Hennes et al. (2008)

Figure 3.2 Volatility Skew Surrounding Restatement Announcements

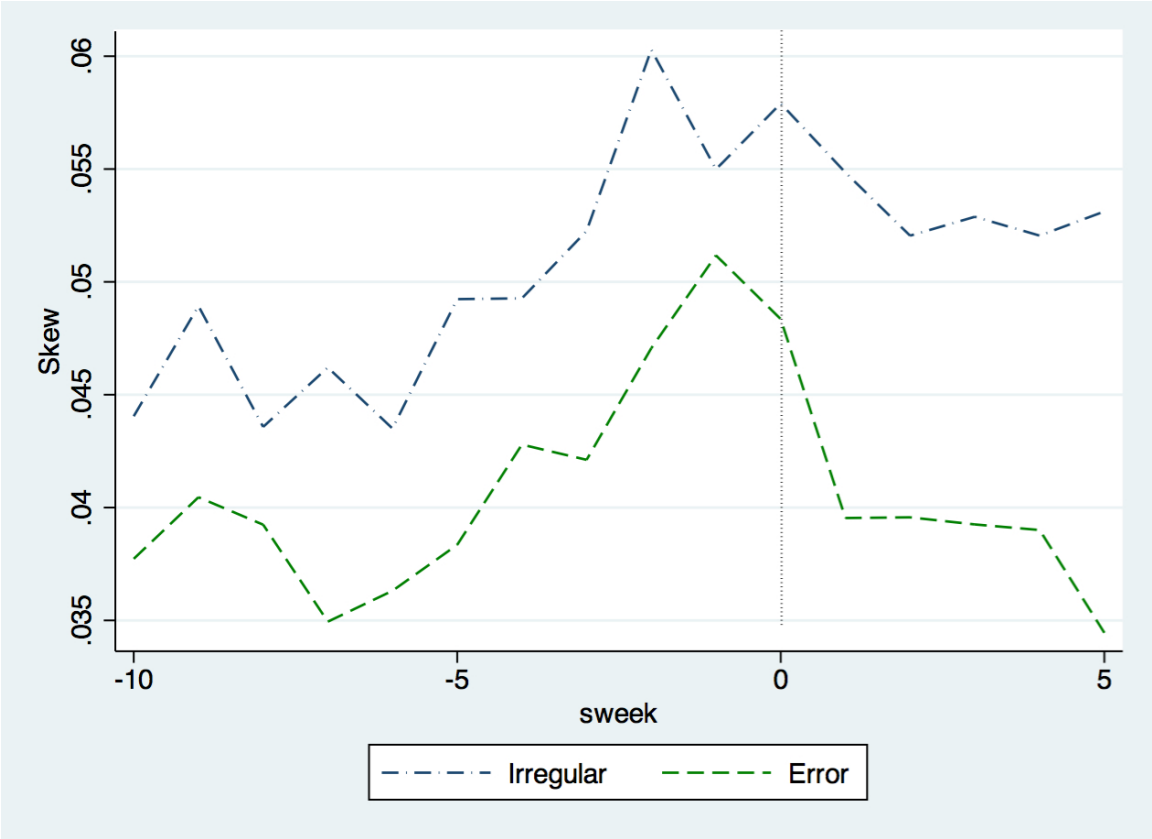


This figure shows the mean weekly volatility skew of firm with restatements from 10 weeks before restatements to 10 weeks after restatements.

SKEW = $IV_{\text{OTM put options}} - IV_{\text{ATM call options.}}$

IMPLIED VOLATILITY is the implied volatility of ATM call options.

Figure 3.3. Volatility *Skew* for Irregular vs. Error Restatements



This figure displays the weekly volatility skew before and after restatements portioned as irregularities vs. errors according to Hennes et al. (2008). *SKEW*= $IV_{\text{OTM put options}} - IV_{\text{ATM call options.}}$

3.11. Tables for Chapter 3

Table 3.1 Sample Selection

Description	*Less*	Total
Total restatement announcements: 30% percent (1997 – 2001) + 70% (2002-2006)		2496
Observations without Option listed or without option data to calculate volatility skew	-1375	
		= 1121
Duplicated restatements	-267	
Observations without CRSP data to compute abnormal returns	-22	= 833
Observations without financial data	-50	
Final Sample		= 783

Note: the sample is obtained from Professor Andrew Leone's website which collects all the restatements reported in the GAO database and classified the restatements as irregularities vs. errors. Option data is from OptionMetrics historical option price file. Duplicate restatement observations for the same accounting misreporting case are dropped.

Table 3.2 Summary Statistics

	N	mean	P25	median	P75	S.D.
CAR(-1, +1)	833	-0.0409	-0.0662	-0.0155	-0.0155	0.1223
BHAR(-90, -2)	833	-0.0727	-0.2221	-0.0716	0.0736	0.2870
SKEW(-60, -2)	833	0.05874	0.0315	0.0450	0.0727	0.0418
SKEW(-180, -60)	833	0.04297	0.0201	0.0318	0.0524	0.0511

Table 3.3 Stock Market's Reaction to Restatements

Dependent Variable	***CAR(-1, 1)***			
	(1)	***(2)***	***(3)***	***(4)***
MATERIALITY MEASURES:				
IRREGULAR	-0.0341***			
	(-0.0106)			
ENFORCEMENT		-0.0274**		
		(-0.0109)		
TOTAL ACCRUAL			-0.0332*	
			(-0.0187)	
DA				-0.00288**
				(-0.00138)
CONTROL VARIABLES:				
SUE	0.0254	0.0191	0.0190	0.0410
	(0.0286)	(0.0279)	(0.0240)	(0.0282)
SIZE	0.00144	0.00171	0.000407	-0.00312
	(0.00316)	(0.00313)	(0.00328)	(0.00467)
INST. OWNERSHIP	0.0518**	0.0470*	0.0359	0.0526
	(0.0235)	(0.0240)	(0.0248)	(0.0405)
ROA	-0.00474	-0.00459	0.00220	0.0164
	(0.0427)	(0.0426)	(0.0434)	(0.0692)
MOMENTUM	0.00887	0.0110	0.0101	-0.0206
	(0.0261)	(0.0262)	(0.0264)	(0.0390)
TURNOVER	-0.365	-0.378	-0.281	-1.623
	(0.618)	(0.631)	(0.656)	(1.194)
VOLATILITY	-0.972**	-1.073**	-1.077**	-1.432**
	(0.450)	(0.461)	(0.458)	(0.631)
INTERCEPT	-0.0462	-0.0470	-0.0240	0.0227
	(0.0501)	(0.0501)	(0.0539)	(0.0804)
N	736	736	714	353
Adjusted-R^2	0.073	0.067	0.054	0.114

This table reports the regression results that examine stock market's reaction to restatement by regression *CAR(-1, +1)* over different measures of restatement severity. The sample consists of all restatements with non-missing data to calculate the cumulative abnormal returns and other control variables. All the variables are as defined in Appendix. Robust standard errors are reported in brackets. Asterisks ***, **, and * indicate significance at the 1%, 5%, and 10%, respectively.

Table 3.4 Matching Sample Analysis

	Predicted Sign	*SKEW*
RESTATE	+	0.007**
		(0.003)
SIZE	−	-0.003**
		(0.002)
LEV	?	0.005
		(0.008)
BM	?	0.014**
		(0.006)
VOLATILITY	+	0.807***
		(0.096)
VOLUME	?	-0.002
		(0.002)
BETA	−	-0.005**
		(0.002)
CONSTANT		0.053***
		(0.019)
Observations		1,278
R-squared		0.086

This table reports the regression results that test the implied volatility skew difference between restating firms and matched non-restating firms by regressing mean volatility skew over days [-60, -2] on an indicator variable *RESTATE*. All the other variables are defined in Appendix. Asterisks ***, **, and * indicate significance at the 1%, 5%, and 10%, respectively.

Table 3.5 Volatility Skew and Materiality of Restatements

Dependent Variable	***SKEW (-60, -2)***			
	(1)	***(2)***	***(3)***	***(4)***
Materiality Measures:				
IRREGULAR	0.0113***			
	(0.00276)			
ENFORCEMENT		0.00724**		
		(0.00281)		
ACCRUAL			0.00280*	
			(0.00143)	
DA				0.000147
				(0.000480)
Control Variables:				
SUE	-0.0197***	-0.0180**	-0.0175**	-0.00695
	(0.00730)	(0.00787)	(0.00753)	(0.0113)
SIZE	-0.00479***	-0.00469***	-0.00525***	-0.00541***
	(0.00118)	(0.00118)	(0.00105)	(0.00158
LEVERAGE	0.00318	0.00412	0.00605	0.00805
	(0.00550)	(0.00545)	(0.00639)	(0.0120)
BM	0.00550	0.00672	0.00517	-0.00491
	(0.00479)	(0.00496)	(0.00502)	(0.00835)
ROA	0.00706*	0.00661	0.00587	0.00393
	(0.00415)	(0.00418)	(0.00515)	(0.00797)
MOMENTUM	0.00214	0.00214	0.00199	0.0107
	(0.00992)	(0.0101)	(0.00803)	(0.0123)
ATMVOL	0.0784***	0.0816***	0.0818***	0.0847***
	(0.00921)	(0.00948)	(0.00666)	(0.0106)
INTERCEPT	0.0444**	0.0428**	0.0487***	0.0484**
	(0.0206)	(0.0210)	(0.0141)	(0.0216)
N	779	779	776	376
Adjusted-R^2	0.30	0.291	0.287	0.262

The table reports the association between volatility skew and materiality of restatements. The materiality measures are as defined in appendix. Robust standard errors are reported in brackets. All the variables are

as defined in Appendix. Asterisks ***, **, and * indicate significance at the 1%, 5%, and 10%, respectively.

Table 3.6 Volatility Skew and Stock Market's Reaction to Restatements

Dependent Variable	***CAR(-1, +1)***			***CAR(0)***		
	(1)	***(2)***	***(3)***	***(1)***	***(2)***	***(3)***
SKEW	-0.353***	-0.306***		-0.174**	-0.127*	
	(0.106)	(0.102)				
R_SKEW			-0.0340***			-0.0191**
			(0.0117)			(0.00832)
SUE		0.0240	0.0290		-0.0278	-0.0261
		(0.0264)	(0.0258)		(0.0176)	(0.0291)
SIZE		-0.000245	0.000531		0.000979	0.000989
		(0.00319)	(0.00312)		(0.00214)	(0.00223)
LEVERAGE		0.0375*	0.0387*		0.0174	0.0180
		(0.0201)	(0.0201)		(0.0144)	(0.0148)
BM		0.0701***	0.0706***		0.0310***	0.0312**
		(0.0174)	(0.0173)		(0.0117)	(0.0128)
ROA		0.00180	0.00350		0.0355***	0.0356
		(0.0422)	(0.0415)		(0.0119)	(0.0399)
MOMENTUM		0.00656	0.00650		0.00191	0.00174
		(0.0244)	(0.0242)		(0.00922)	(0.0118)
TURNOVER		0.590	0.545		-0.0432	-0.0405
		(0.518)	(0.520)		(0.345)	(0.338)
IDIO VOL		-0.0192***	-0.0162**		0.000516	0.00191
		(0.00633)	(0.00631)		(0.00349)	(0.00463)
TOTAL VOL		-0.0189***	-0.0172***		-0.0092***	-0.00845**
		(0.00613)	(0.00628)		(0.00316)	(0.00417)
INTERCEPT	-0.0209**	-0.0861**	-0.110***		-0.0417*	-0.0493**
	(0.00605)	(0.0380)	(0.0366)		(0.0224)	(0.0236)
N	779	779	779	779	779	779
Adjusted-R^2	0.014	0.096	0.095	0.007	0.043	0.045

The table reports the estimates from regression results of abnormal returns on restatement window over corresponding implied volatility skew measures. *CAR(-1, +1)* is the three day cumulative abnormal returns over restatements. *CAR(0)* is the abnormal return on the restatement day. *SKEW* is measured over the window that is beginning 60 days before restatement and ending 2 days before restatement. *R_SKEW* is the implied volatility skew sorted into quarterlies, with -0.5 for the lowest group, 0 for the middle groups and +0.5 for the highest groups. The control variables are defined in appendix. Test statistics based on robust standard errors are reported in brackets. Asterisks ***, **, and * indicate significance at the 1%, 5%, and 10%, respectively.

Table 3.7 Robustness check using KLM database

Dependent Variable	***CAR(-1, +1)***	
	(1)	(2)
SKEW	-0.648**	
	(0.300)	
R_SKEW		-0.0778*
		(0.0437)
SUE	0.00535	0.00426
	(0.0209)	(0.0210)
SIZE	0.0111	0.0146
	(0.00948)	(0.00918)
LEV	-0.0610	-0.0408
	(0.101)	(0.102)
BM	0.149**	0.162***
	(0.0603)	(0.0605)
ROA	0.114***	0.114***
	(0.0413)	(0.0414)
MOMENTUM	-0.0197	-0.0259
	(0.0399)	(0.0399)
TURNOVER	0.0273	0.0285
	(0.0852)	(0.0857)
IDIOSYNCRATIC VOL	-0.0465***	-0.0378**
	(0.0171)	(0.0168)
TOTAL VOLATILITY	-0.00349	0.000425
	(0.0160)	(0.0160)
INTERCEPT	-0.280**	-0.344***
	(0.108)	(0.103)
N	196	196
Adjusted-R^2	0.172	0.165

The table reports the robustness check using accounting misreporting data from KLM database. Asterisks ***, **, and * indicate significance at the 1%, 5%, and 10%, respectively.

Table 3.8 Volatility Skew and Returns before Restatements

Dependent Variable	***BHAR(-90, -2)***	
	(1)	(2)
R_SKEW	-0.0916***	-0.0531*
	(0.0304)	(0.0308)
SUE		0.0138
		(0.0754)
SIZE		0.0124*
		(0.00684)
LEV		-0.0751
		(0.0498)
BM		0.230***
		(0.0485)
ROA		0.172***
		(0.0297)
MOMENTUM		-0.0877
		(0.101)
TURNOVER		0.861
		(1.264)
INTERCEPT	-0.0761***	-0.215*
	(0.0101)	(0.126)
N	750	750
Adjusted-R^2	0.012	0.086

BHAR(-90, -2) is the buy-and-hold abnormal return from 90 days before the restatement announcement to 2 days before the announcement. *R_SKEW* is the rank of average skew of the period from 180 days before restatement to 90 days before restatement The Asterisks ***, **, and * indicate significance at the 1%, 5%, and 10%, respectively.

Table 3.9 Volatility Skew and Short Selling

Dependent Variable	***SI***		***ASI***	
	Model 1	***Model 2***	***Model 3***	***Model 4***
SKEW	0.0409***	0.0164***	0.0127***	0.00791**
	(0.00893)	(0.00622)	(0.00429)	(0.00382)
SUE		-0.0131		-0.0138
		(0.0130)		(0.0103)
SIZE		-0.00883***		-0.0000462
		(0.00133)		(0.000880)
LEV		0.0256**		0.00747
		(0.0113)		(0.00705)
BM		0.00594		0.00379
		(0.0102)		(0.00701)
ROA		-0.0515*		0.0258
		(0.0300)		(0.0182)
MOMENTUM		-0.0247		-0.0212
		(0.0199)		(0.0199)
TURNOVER		4.976***		1.287***
		(0.531)		(0.373)
INTERCEPT	0.0606***	0.0853***	0.00652***	0.0208
	(0.00278)	(0.0284)	(0.00137)	(0.0207)
N	660	604	657	601
Adjusted-R^2	0.044	0.450	0.018	0.102

The table reports the estimates from the regression of short interest or change of short interests on implied volatility skew measures. Short interests (SI) is the total short positions reported in month t prior to restatement scaled by total shares outstanding in month t. Change in short interest (ASI) is the short interest in month t minus the short interest at month t-6 scaled by total share outstanding in month t. The control variables are defined in appendix. Test statistics based on robust standard errors are reported in brackets. Asterisks ***, **, and * indicate significance at the 1%, 5%, and 10%, respectively.