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# 沙賓法 404 條及審計準則第 5 號是否會減少內 部控制揭露錯誤?

# Do Both SOX 404 and AS5 Reduce ICFR-Disclosure Errors?

邱献良/國立中正大學會計與資訊科技學系助理教授

Hsien-Lian Chiu, Assistant Professor, Department of Accounting and Information Technology, National Chung Cheng University

周段臺 / 國立政治大學會計學系教授

Ling-Tai Lynette Chou, Professor, Department of Accounting, National Chengchi University

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#### 摘要

本研究旨在研究沙賓法404 條及審計準則第5號對於內部控制揭露錯誤的影響。本 研究參考 Knechel and Vanstraelen (2007)的方法,將重編公司視為內部控制較不健全 之公司,這些公司理應較可能會收到內部控制否定意見,反之亦然。本研究假定若 重編公司報導內部控制系統為有效,此時意味犯型二錯誤的機率較高;若非重編公 司報導公司內部控制系統為無效,此時意味犯型一錯誤的機率較高。型二及型一錯 誤皆代表內部控制品質降低。本研究發現實施沙賓法404 條後可以使型二錯誤發生 機率降低,並不會使型一錯誤發生機率增加。此外本研究也發現較具彈性的審計準 則第5號可以使型一錯誤發生機率增加,損及內部控制揭露品質。

【 關鍵字】沙賓法 404 條、審計準則第 5 號、內部控制揭露錯誤、內部控制揭露品質、 內部控制查核

#### Abstract

The purpose of this study is to examine the effect of both SOX 404 and AS5 on ICFRdisclosure errors. We follow the rationale and method developed by Knechel and Vanstraelen (2007) and regard restatement companies (nonrestatement companies) as those with weak (effective) internal controls and greater (lower) likelihood to receive adverse ICFR opinions. We presume that deterioration in ICFR-disclosure quality is shown by an increase in the likelihood of Type II errors (a restatement company fails to conclude that its internal control system is ineffective for the restated period) or an increase in the likelihood of Type I errors (a nonrestatement company concludes that its internal control system is ineffective for the nonrestatement period). Our evidence indicates that the enactment of SOX 404 reduces the Type II errors of ICFR disclosures, without the side effect of increasing Type I errors. In addition, we find that even though the more flexible and less prescriptive AS5 can enhance the efficiency of ICFR audits by reducing Type I errors, it inadvertently lowers public ICFR-disclosure quality, measured as increased Type II errors.

[Keywords] SOX 404, AS5, ICFR-disclosure errors, quality of internal control disclosure, internal control audit

# 1. Introduction

The Sarbanes-Oxley Act (SOX) of 2002 was enacted to assuage investors' skepticism after numerous high-profile accounting scandals. One of its main goals was to improve the reliability of financial information quality by strengthening issuers' assessment and the reporting process of internal control over financial reporting (ICFR).<sup>1</sup> Section 404 of SOX (hereafter SOX 404) was considered very controversial because the implementation of its requirements, especially internal control audits, resulted in substantial increases in audit fees (Eldridge and Kealey, 2005; Ettredge, Chan, and Scholz, 2007; Kinney and Shepardson, 2011) and strong complaints by public companies to the Securities and Exchange Commission (SEC) and Public Company Accounting Oversight Board (PCAOB) (Johnson, 2005).

To mitigate the burdensome audit costs while preserving the benefits of internal control audits, the PCAOB replaced Auditing Standard 2 (AS2) (PCAOB, 2004) with Auditing Standard 5 (AS5) (PCAOB, 2007), and adopted a top-down, risk-based approach for auditors to focus on the most important areas and to eliminate unnecessary testing procedures. After the implementation of AS5, the number of material weakness disclosures declined significantly. The SEC and practitioners questioned whether the decline was due to failure to detect internal control weaknesses under AS5, because AS5 required less process-level testing than AS2 did (SEC, 2009a; Whitehouse, 2010). Although the effect of both SOX 404 and AS5 on audit costs has received attention in prior studies (e.g., Kinney and Shepardson, 2011; Wang and Zhou, 2012), our understanding of the influence of these regulations on ICFR-disclosure quality remains limited.

The purpose of this study is to provide systematic evidence of the effect of SOX 404 and AS5 on ICFR-disclosure quality. To overcome the difficulty that ICFR-disclosure quality can neither be observed nor directly gauged, we measure ICFR-disclosure quality by examining the likelihood that ICFR disclosures consist of reporting errors. We collect the data of accelerated filers and divide the sample into restatement and non-restatement companies. Because misstatements are indicative of ineffective internal control systems

<sup>1</sup> Section 302 of SOX, effective for the fiscal years ending on or after August 29, 2002, requires management to self-evaluate and conclude on the effectiveness of ICFR in periodic reports. Also, Section 404 of SOX, effective for the fiscal years ending on or after November 15, 2004, mandates that management prepare ICFR assessment in annual reports (Section 404a) and that the assessment be attested by external auditors (Section 404b).

(Kinney and McDaniel, 1989; DeFond and Jiambalvo, 1991; McMullen, Raghunandan, and Rama, 1996; Eilifsen and Messier, 2000; Leone, 2007; Rice and Weber, 2012), we regard restatement companies (non-restatement companies) as those that are more (less) likely to have material weaknesses and thus, are more (less) likely to receive adverse ICFR opinions. We presume that deterioration in ICFR-disclosure quality is shown by an increase in the likelihood of Type II errors (i.e., a restatement company fails to conclude that its internal control system is ineffective for the restated period) or an increase in the likelihood of Type I errors (i.e., a non-restatement company concludes that its internal control system is ineffective for the non-restatement period).

First, we focus our investigation on the effect of SOX 404. In comparison with SOX 302, additional management documentation and auditor scrutiny over ICFR required by SOX 404 might help detect and lead to disclosure of underlying internal control problems and thus, reduce Type II errors. However, required signatures of auditors on opinions regarding ICFR may make auditors unduly cautious in identifying material weaknesses. Their low thresholds for material weaknesses could result in many reported material weaknesses that do not lead to misstatements (Doyle, Ge, and McVay, 2007a), which in turn, may increase the likelihood of making Type I errors. The results of our study show that restatement companies subject to SOX 404 are less likely to conclude that their ICFR is effective than those subjected to SOX 302. In the non-restatement sample, we found no differences in the likelihood of concluding that the company's ICFR is ineffective between companies subjected to SOX 404 and those subjected to SOX 302. Therefore, the enactment of SOX 404 reduces Type II errors of ICFR disclosures without increasing Type I errors.

Next, we turn our focus to the effect of AS5 on ICFR-disclosure quality. As mentioned previously, the PCAOB amended AS2 and proposed AS5 for achieving an optimal balance between the costs and benefits of ICFR audits. By eliminating unnecessary procedures and testing in audits of internal controls, AS5 emphasizes reallocating resources to important and high-risk areas (SEC, 2007). We expect that AS5 has improved not only the efficiency but also the efficacy of audits of internal controls and thereby, has reduced ICFR-disclosure errors, including both Type I and Type II errors. However, concerns exist over the controversial risk-based audit approach adopted in AS5 because it might give auditors more latitude in their professional judgment. Risk-based audit approaches have been associated with some highly visible audit failures (e.g.,

HealthSouth and WorldCom) and have been criticized by the PCAOB (Bell, Doogar, and Solomon, 2008; Berkowitz and Rampell, 2002; Weil, 2004). The PCAOB has also documented that after AS5, 15 percent of the 309 audit engagements inspected by the Board failed to obtain sufficient audit evidence to support their ICFR-audit opinions (PCAOB, 2012). Thus, improper application of the risk-based approach may lead to under-auditing and increases in Type II errors. Whether public ICFR-disclosure errors have increased or decreased after the implementation of AS5 is an empirical issue, in addition to being the second research question in this study.

We find that non-restatement companies have become less likely to conclude that their ICFR is ineffective since the adoption of AS5. The reduction in Type I errors shows that AS5 can improve the efficiency of ICFR audits. However, restatement companies have been more likely to conclude that their ICFR is effective after the adoption of AS5, which suggests that even though the more flexible and less prescriptive auditing standard can enhance the efficiency of ICFR audits, it inadvertently lowers the public ICFR-disclosure quality measured as Type II errors. The results echo the concerns raised by investors and regulators about AS5.<sup>2</sup> Our results also shed light on the PCAOB public report of the 2010 inspection program, which identified several significant deficiencies in audits of internal controls under AS5 (PCAOB, 2012).

This study contributes to the literature in the following ways. First, it provides insights into the effect of SOX 404 on ICFR-disclosure quality. Prior studies indicate that in addition to enhancing overall quality of internal control systems and leading to lasting improvements in financial reporting quality,<sup>3</sup> SOX 404 also provides reliable information to bolster investor confidence that all internal control weaknesses are publicly reported (PCAOB, 2004). To our best knowledge, the closest antecedents to our study are Kinney and Shepardson (2011), Rice and Weber (2012), Myllymäki (2014), and Acito, Hogan, and Imdieke (2014), all of which have investigated the effect of SOX 404 on control weakness disclosures. Using the sample of small, accelerated filers, Kinney and Shepardson (2011) examined the disclosure rate of material weakness after the enactment of SOX 404 and

<sup>2</sup> According to John Morrissey, operating controller at General Electric and a member of the PCAOB's Standing Advisory Group, tolerance allowed by AS5 could open the door for laxer audits. Similarly, Ed Trott, a then member of the Financial Accounting Standards Board, questioned whether AS5 could achieve better efficiency at the cost of its effectiveness.

<sup>3</sup> Schroeder and Shepardson (2016), who use difference in quarterly accruals quality to measure internal control quality, show that internal control audits improve internal controls.

found substantial increases in the disclosure rate of material weakness for small-sized companies undergoing initial internal control audits. They report the change in disclosure rate of control weakness of small firms exactly as they appear. However, in our study, we assess ICFR-disclosure quality further by examining the respective likelihood of Type I or Type II errors for accelerated filers of all sizes.

Further, Rice and Weber (2012) have found that only a few restatement companies acknowledged control weaknesses during their misstatement periods. Myllymäki (2014) has found that compared to companies that never disclose material weaknesses, the likelihood of misstatements for companies with a history of material weaknesses continues to be higher for two years after their last material weakness reports. Acito et al. (2014) have indicated that compared with the AS2 period, auditors in the AS5 period are less likely to identify material weaknesses, possibly because auditors under AS5 may not focus their testing on certain risky areas. All of the studies suggest that ICFR reporting under SOX 404 or AS5 are noticeably prone to Type II errors. Our study differs from previous studies because we examine not only Type II but also Type I errors in ICFR reporting. The issue of Type I errors is noteworthy because there are negative wealth distribution implications for weak control reports issued by companies with effective internal controls. Additionally, we extend the preceding studies by investigating the incremental effects of SOX 404 from SOX 302 and the effect of AS5 relative to AS2 on ICFR-disclosure errors.

Second, prior research regarding AS5 mainly concentrates on its effect on audit fees (Jiang and Wu, 2009; Doogar, Sivadasan, and Solomon, 2010; Krishnan, Krishnan, and Song, 2011; Wang and Zhou, 2012). Wang and Zhou (2012) have also examined whether audit quality has changed following AS5 adoption and found no evidence of a decrease in audit quality. The main difference between Wang and Zhou (2012) from this study is that we examine the first-order effect of AS5 (i.e., the effect of AS5 on ICFR-disclosure quality) and therefore, we can provide direct and clear evidence of the effect of AS5 adoption.

Third, because compliance with the requirements of SOX 404 is costly, whether the burdensome mandatory internal control audits (Hartman, 2007; Eldridge and Kealey, 2005; Kinney and Shepardson, 2011) can improve the quality of public ICFR disclosures is a crucial research question that demands further empirical interrogation. Although AS5 prescribes a more flexible, top-down risk-based approach, concerns about auditors' misuse

of their professional judgments regarding risk of material misstatements have led to the promise made by the PCAOB and SEC to scrutinize the effect of AS5 (Olson, 2007; Cox, 2007). Our study reveals the effect of SOX 404 and AS5 on public ICFR disclosures and points out that the enactment of SOX 404 can enhance ICFR-disclosure quality by reducing the incidence of Type II errors. However, we also find that AS5 lowers ICFR-disclosure quality by showing the increased likelihood of Type II errors. The evidence provided in this study might help policymakers and standard setters to formulate future ICFR-audit-related rulings.

The remainder of this paper is organized as follows. The next section presents the related literature and our hypotheses. Section 3 describes our research design and sample selection. Our results are presented in Section 4. Section 5 reports the sensitivity and additional tests. Finally, Section 6 concludes our research.

# 2. Related Literature and Hypothesis Development

## 2.1 SOX 404 Regulation and Auditing Standards Regarding ICFR

Before the passage of SOX, public companies were required to disclose information about internal controls only when a Form 8-K was filed after an auditor change. Sections 302 and 404 of SOX are the first statutory legislation that requires public companies to disclose the effectiveness of internal controls. Section 302, effective for the fiscal years ending on or after August 29, 2002, requires managers of public companies to evaluate and conclude on the effectiveness of their internal control systems in periodic reports. Section 404, which became effective for the fiscal years ending on or after November 15, 2004, contains two subsections. Under Section 404(a), managers are mandated to prepare ICFR assessments in annual reports. Under Section 404(b), public accounting firms that audit the issuers' financial reports shall also attest to the management internal control assessments. Moreover, AS2: *An Audit of Internal Control over Financial Reporting Performed in Conjunction With an Audit of Financial Statements*, effective since November 15, 2004, has established requirements and has provided auditors guidance in performing ICFR audits (PCAOB, 2004).

While the implementation of SOX 404 increases the productivity of audit firms (Chang, Choy, Cooper, and Lin, 2015), internal control audits under the directions prescribed in AS2 have resulted in strong complaints from public companies to the SEC and PCAOB about substantial increases in audit fees (Johnson, 2005). To mitigate the burdensome compliance costs of internal control audits, the PCAOB replaced AS2 with

AS5: An Audit of Internal Control over Financial Reporting that Is Integrated with an Audit of Financial Statements (PCAOB, 2007). AS5 uses a principle-based, fraud-awareness focus and adopts a top-down, risk-based approach, which allows auditors to use their professional judgment and refer to the work of others, including management and internal auditors. By eliminating unnecessary and detailed procedures required by AS2, AS5 is less prescriptive and encourages auditors to focus on the critical risks of misstatements and related controls. The aim of AS5 is to alleviate the compliance burden while still preserving the benefits of ICFR audits.

#### 2.2 The Disclosure Quality of ICFR Reports

ICFR-disclosure quality cannot either be observed or directly measured. In this study, we develop an approach to measure ICFR-disclosure quality based on the likelihood of making Type I or Type II errors<sup>4</sup> in ICFR reports. Knechel and Vanstraelen (2007) have used a sample of stressed bankrupt companies and stressed nonbankrupt companies to measure audit quality as the likelihood of an auditor issuing a going concern opinion. An indicator of Type II errors is presumed as a decrease in the likelihood of issuing a going concern opinion when a firm subsequently goes bankrupt. Likewise, an indicator of Type I errors is presumed as an increase in the likelihood of issuing a going concern opinion when a firm subsequently does not go bankrupt.

We adapt the rationale and method developed by Knechel and Vanstraelen (2007) to our context of ICFR-disclosure errors. We presume that internal control weaknesses are more likely to exist in misstated periods of restatement companies. Prior literature has supported the notion that misstatements are indicative of internal control problems (Kinney and McDaniel, 1989; DeFond and Jiambalvo, 1991; McMullen et al., 1996; Eilifsen and Messier, 2000; Leone, 2007; Rice and Weber, 2012). Practitioners and the PCAOB also argue that a company's need to correct a misstatement can demonstrate a breach in its internal control system (Turner and Weirich, 2006; PCAOB, 2004). Therefore, restatement (non-restatement) companies in this study are viewed as those that are *more (less) likely* to have material weaknesses and *more (less) likely* to receive adverse

<sup>4</sup> According to the definition used in statistics, a Type I error is committed when a true null hypothesis is rejected. In addition, a Type II error is committed by failing to reject a false null hypothesis. The probabilities of committing either Type I or Type II errors are conditional.

ICFR opinions.<sup>5</sup> We presume that deterioration in ICFR-disclosure quality is shown by an increase in the likelihood of Type II errors (that a restatement company fails to conclude that its internal control system is ineffective for the restated period) or an increase in the likelihood of Type I errors (that a non-restatement company concludes that its internal control system is ineffective for the non-restatement period).

#### 2.3 SOX 404 and ICFR-Disclosure Errors

Conceptually, to conclude that ICFR is ineffective, three conditions must be met: there exist control deficiencies, control deficiencies are discovered, and managers decide to disclose those deficiencies (Ashbaugh-Skaife, Collins, and Kinney, 2007). Following this argument, both detection capability and disclosure incentives are important factors to high-quality ICFR reports. Control weaknesses may not be discovered if managers are not competent enough to apply adequate and sufficient assessment procedures in evaluating internal control systems. SOX 404(a) requires a formal management assessment of internal controls that must be prepared according to publicly recognized internal controls frameworks, such as the Committee of Sponsoring Organizations of the Treadway Commission (COSO) or Control Objectives for Information and Related Technology (COBIT) frameworks. Kinney and Shepardson (2011) have found substantial increases in material weakness disclosure rates for small companies undergoing the initial SOX 404(a) management self-assessment of ICFR. Thus, the requirement of Section 404(a) might enhance detection capability of top management and mitigate the problem of manager incompetence in examining internal control systems.

SOX 404(b) requires that issuers' internal control systems be evaluated by external auditors who have professional knowledge, training, and experience in examining internal control systems. Most internal control weaknesses are detected by auditors rather than by

<sup>5</sup> After excluding the firms with multiple restatements or without necessary data, Rice and Weber (2012) have shown that over 70% of their collected restatements are linked to internal-control weaknesses. Around 20% of restating companies do not explicitly report on the link between restatement and internal controls, and only 6% of restatement companies report that restatement is not attributable to ineffective internal controls. With their findings, we believe that it is justifiable to presume that internal-control weaknesses are more likely to exist in the misstated periods of restatement companies. Moreover, the strong but not absolute relation between restatements and internal-control weaknesses could weaken our statistical power. We also believe that the strong but not absolute relation does not invalidate our research design because we have found significant results, which will be discussed in the study's results section.

management, and material weaknesses are more likely to be disclosed at the fourth quarter, when auditors are on-site and have experience with internal control audits (Bedard and Graham, 2008; Hammersley, Myers, and Shakespeare, 2008).

Further, some studies indicate that the disclosure incentives of control systems are associated with firm size, corporate governance, ownership structure, and firm growth (Bronson, Carcello, and Raghunandan, 2006; Deumes and Knechel, 2008). Even if internal control weaknesses are actually discovered, some managers may lack incentives and be unwilling to report internal control problems. Auditors are regarded as an effective monitoring mechanism for corporate governance (Becker, DeFond, Jiambalvo, and Subramanyam, 1998). A survey conducted by the SEC indicates that investors regard auditor attestation of internal controls as an important measure in evaluation of internal control systems, given the auditors' expertise and independence (SEC, 2009b). We argue that managers may feel compelled to disclose truthful weaknesses in their internal control systems if their disclosures must be verified by external auditors under SOX 404. As a result, the requirements of auditors' involvement in public ICFR reporting might help both the discovery and disclosure of underlying internal control weaknesses.

In sum, the additional management documentation and auditor scrutiny over ICFR required by SOX 404 may help in the detection and disclosure of underlying internal control problems and thus reduce the incidence of Type II errors. This finding leads to our Hypothesis 1a.

# Hypothesis 1a: The implementation of SOX 404 reduces Type II errors, measured as the likelihood that a restatement company fails to conclude that its internal control system is ineffective for the restated period.

Doyle et al. (2007a) have found a negative relation between disclosed internal control weaknesses and accruals quality under the SOX 302 regime; however, they found no such relation under the SOX 404 regime. Beneish, Billings, and Hodder (2008) have found that unaudited SOX 302 weakness disclosures are associated with negative abnormal returns, whereas audited SOX 404 disclosures are not. Both of the studies suggest that the auditor attestation required by SOX 404 results in a lower threshold for disclosures under the SOX 404 regime compared with those under the SOX 302 regime. We argue that required signatures of auditors on opinions regarding ICFR may make auditors unduly cautious in identifying material weaknesses, and their low effectiveness thresholds for material

weaknesses could result in many reported material weaknesses that do not lead to misstatements (Doyle et al., 2007a), which in turn may increase the likelihood of making Type I errors. Thus, our Hypothesis 1b is as follows.

Hypothesis 1b: The implementation of SOX 404 increases Type I errors, measured as the likelihood that a non-restatement company concludes that its internal control system is ineffective for the non-restatement period.

## 2.4 AS5 and ICFR-Disclosure Errors

The PCAOB has noted that although audits of internal control under AS2 has improved audit committee oversight as well as the quality and transparency of the financial reporting process, AS2 has inevitably incurred several significant costs (PCAOB, 2006). For instance, some auditors retest items tested by management only to opine on management assessments or in some cases, auditors inappropriately dictated that management perform unnecessary evaluations (PCAOB, 2006). In response to concerns from the business community about the onerous and costly requirement of internal control audits, the PCAOB, on December 15, 2007, replaced AS2 with AS5, a newly simplified, less prescriptive standard for internal control audits. AS5 adopts a top-down, risk-based approach, which includes three key steps: (1) identifying significant financial reporting elements and associated risks of material misstatements, (2) determining appropriate entity- and/or transaction-level controls that can address these risks with sufficient precision, and (3) determining the nature, extent, and timing of audit evidence, which needs to be gathered to complete assessments of ICFR systems. By eliminating the unnecessary procedures and testing the audits of internal controls, AS5 is designed to reallocate limited corporate resources to notable, high-risk areas (SEC, 2007). Bell et al. (2008) have argued that a risk-based audit approach which AS5 has adopted might result in efficiency gains for auditees that are less risky, as well as improvement in audit efficacy for riskier auditees. Following this argument, AS5 is expected to improve not only the efficiency but also the efficacy of audits of internal controls and therefore, to reduce reporting errors of public ICFR disclosures (i.e., the aforementioned Type I and Type II errors).

Nevertheless, the audits of internal controls prescribed by AS5 involve more auditor professional judgment, which raises concerns that such leeway may allow auditors to make excuses to cut back on their work instead of improving the efficacy of internal control audits.<sup>6</sup> The PCAOB has documented that after AS5, 15 percent of the 309 audit engagements inspected by the Board failed to obtain sufficient audit evidence to support their ICFR-audit opinions (PCAOB, 2012). Moreover, risk-based audit approaches have been related with the high-profile audit failures (e.g., HealthSouth and WorldCom) and previously have been criticized by the PCAOB (Bell et al., 2008; Berkowitz and Rampell, 2002; Weil, 2004). Thus, the implementation of AS5 might lead to under-auditing and increased Type II errors if auditors misuse the risk-based approach.

Facing the two contradicting arguments, we are not sure whether the incidence of Type II errors of public ICFR disclosures has increased or decreased after the AS5 implementation, which is an empirical issue that is examined further in the study. In contrast, we expect that the efficiency of ICFR audits has improved, and the incidence of Type I errors has decreased after the implementation of AS5. Thus, our Hypothesis 2a and 2b are as follows.

- Hypothesis 2a: The substitution of AS5 for AS2 does not increase or decrease Type II errors, which are measured as the likelihood that a restatement company fails to conclude that its internal control system is ineffective for the restated period.
- Hypothesis 2b: The substitution of AS5 for AS2 decreases Type I errors, which are measured as the likelihood that a non-restatement company concludes that its internal control system is ineffective for the nonrestatement period.

# 3. Research Design

## 3.1 Sample

We begin with all the company-year observations available in the Audit Analytics' disclosure control (SOX302)<sup>7</sup> and internal control files (SOX404) for the period 2002–2010.<sup>8</sup> We then merge the data with Audit Analytics restatement files and Compustat

<sup>6</sup> Please refer to Footnote 2.

<sup>7</sup> SOX 302 requires management to conclude on the effectiveness of ICFR in periodic reports. In contrast, SOX 404 requires that management assessments and audit opinions of ICFR be disclosed in annual reports. To reconcile the inconsistency of reporting frequency, we consider only 302 disclosures made in annual reports.

<sup>8</sup> We identify two nonoverlapping groups of U.S. companies that are separately subject to the two levels of SOX regulations of ICFR: (1) SOX 302 regime, companies regulated before November 15, 2004, and (2) SOX 404 regime, companies regulated after November 15, 2004.

Annual files, resulting in 50,304 company-year observations. Next, we delete foreign companies, non-accelerated filers that are exempted from compliance with SOX 404, and companies without necessary data for our empirical analysis. Further, prior studies show that to circumvent compliance with SOX 404, companies may choose to stay small, go private, or "go dark" (Gao, Wu, and Zimmerman, 2009; Engel, Hayes, and Wang, 2007; Leuz, Triantis, and Wang, 2008). The incentives to circumvent the compliance of SOX 404 may have an effect on ICFR-disclosure quality; therefore, we drop companies which had failed to consistently meet the accelerated-filer criteria (companies whose public float is 75 million or more, as of six months before the fiscal year-end) during the period of 2004–2010. Finally, our sample covers 12,627 company-year observations. Table 1 shows our sample-selection procedures and the sample composition in detail.

Table 1	Sample	Selection	and	Composition
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Panel A: Sample Selection	
Initial sample of company-year observations covered by both Analytics and Compustat from the period 2002–2010	50,304
Less: Foreign-company observations	(1,220)
Less: Companies observations without necessary data for our empirical analyses	(7,381)
Less: Non-accelerated filers Less: Companies that did not continuously meet the accelerated-filer criteria from the period 2004–2010	(10,555) (18,521)
Final Sample	12,627
Panel B: Sample Composition	
Company-year observations under the SOX 302 regime	2,722
Company-year observations under the SOX 404 regime	9,905
Total	12,627
Company-year observations to which AS2 is applicable	4,245
Company-year observations to which AS5 is applicable	5,660
Total company observations undergoing ICFR audits in our sample	9,905

## **3.2 Estimation Models**

We use logistic regression to estimate the following models and the likelihood of a company concluding that its internal controls are effective:

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$$Prob(EFFECTIVE) = \beta_{0} + \beta_{1}SOX404 + \beta_{2}SIZE + \beta_{3}ROA + \beta_{4}LEV + \beta_{5}PE + \beta_{6}MB + \beta_{7}BIGN + \beta_{8}RCP + \beta_{9}FT + \beta_{10}AGLOSS + \beta_{11}MARKETCAP + \delta \cdot YEAR + \psi \cdot INDUSTRY + \varepsilon$$
(1)

$$Prob(EFFECTIVE) = \beta_{0} + \beta_{1}AS5 + \beta_{2}SIZE + \beta_{3}ROA + \beta_{4}LEV + \beta_{5}PE + \beta_{6}MB + \beta_{7}BIGN + \beta_{8}RCP + \beta_{9}FT + \beta_{10}AGLOSS + \beta_{11}MARKETCAP + \delta \cdot YEAR + \psi \cdot INDUSTRY + \varepsilon$$
(2)

where *EFFECTIVE* is coded 1 if a company concludes that its internal control system is effective in its 10-K filing and 0 if otherwise. Our experimental variables of interest are *SOX404* and *AS5*. *SOX404* is a dummy variable with a value of 1 if a company is subject to SOX 404 and 0 if a company is subject to SOX 302. *AS5* is also a dummy variable that is coded 1 if AS5 is applicable to the company and 0 if AS2 is applicable to the company.

We estimate Model 1 using the subsamples of restatement companies and nonrestatement companies, separately. For the subsample of restatement companies, based on H1a, we expect the coefficient on *SOX404* to be negative, which would suggest that the implementation of SOX 404 has reduced Type II errors in the sense that restatement companies are less likely to conclude that their ICFR systems are effective under the SOX 404 regime. For the subsample of non-restatement companies, based on H1b, it is expected that the coefficient on *SOX404* is negative, which would suggest that nonrestatement companies are less likely to conclude that their ICFR systems are effective under the SOX 404 regime, resulting in a higher Type I error rate.

To test H2a and H2b, we draw a sample covering only companies subjected to SOX 404 and estimate Model 2 in the same manner using the subsamples of restatement companies and non-restatement companies, separately. For the subsample of restatement companies, based on H2a, we do not have directional expectation of the coefficient on *AS5*. If the coefficient on *AS5* is positive (negative), it suggests that restatement companies adopting AS5 are more (less) likely to conclude that their ICFR systems are effective, and thus result in a higher (lower) Type II error rate. For the subsample of non-restatement companies, based on H2b, it is expected that the coefficient on *AS5* is positive, which would suggest that non-restatement companies are more likely to conclude that their ICFR systems are effective if they adopt AS5 and thereby result in a lower Type I error rate.

Prior studies indicate that the existence of internal control deficiencies is associated with company size, operating loss, business risk, company growth, the appointment of a Big-4 auditor, restructuring charges, and the incidence of foreign transactions (Ge and McVay, 2005; Ashbaugh-Skaife et al., 2007; Doyle, Ge, and McVay, 2007b). Also consistent with prior studies, we control for companies size with natural log of total assets (*SIZE*) and market capitalization (*MARKETCAP*). We proxy operating loss with return on assets (*ROA*) and aggregate loss (*AGLOSS*). We proxy business risk with leverage (*LEV*). Company growth is controlled with price-to-earnings (*PE*) and market-to-book (MB) ratios. The appointment of a Big-4 auditor (*BIGN*), restructuring charges (*RCP*), and the incidence of foreign transactions (*FT*) are also controlled in our models. *YEAR* is a set of dummy variables separately representing each of the fiscal years. Finally, we include a set of 13 industry-indicator variables (*INDUSTRY*) based on Frankel, Johnson, and Nelson (2002). To mitigate the effect of extreme values, we winsorize all of the continuous variables at the 0.01 and 0.99 percentiles. Table 2 shows our variable definitions.

EFFECTIVE	=	dummy variable coded 1 if a company concludes that its internal-
		controlinternal control system is effective in its 10-K filing and 0 otherwise
SOX404	=	dummy variable with a value of 1 if a company is subject to the SOX 404 $$
000000		regulation and 0 otherwise
AS5	=	dummy variable coded 1 if AS5 is applicable to a company and 0 otherwise
SIZE	=	natural log of total assets in the unit of million dollars
ROA	=	net income before extraordinary items divided by total assets
LEV	=	total liabilities divided by total assets
PE	=	year-end share price divided by earnings per share
MB	=	year-end market value divided by book value
BIGN	=	dummy variable coded 1 if the appointed auditor is a - auditor and 0 otherwise
RCP	=	aggregate restructuring charges
FT	_	indicator variable coded 1 if a company has a non-zero foreign currency
	_	translation and 0 otherwise
10055		dummy variable coded 1 if earnings before extraordinary items in years $t$ and
AGLOSS	_	t-1 sum to less than zero and 0 otherwise
MARKETCAP	=	natural log of share price multiplied by number of outstanding shares
YEAR	=	a set of year dummy variables
INDUSTRY	=	a set of 13 industry-indicator variables based on Frankel et al. (2002)

Table 2 Variable Definitions

# 4. Results

## 4.1 Descriptive Statistics

The descriptive statistics for all variables used in this study are presented in Table 3. We further divide the sample into two categories: restatement and non-restatement samples, which denote companies with deficient internal controls and companies with effective internal controls, respectively. As would be expected, restatement companies are less likely to conclude that their internal controls are effective, relative to non-restatement companies (84.8 percent versus 98 percent, respectively). The two groups are similar in PE ratios, restructuring charges, and the incidence of FT. On average, restatement companies are smaller in size and market capitalization, have poorer ROA, are more likely to report aggregate loss, use less leverage, and have lower MB ratios compared with their non-restatement companies are to appoint Big-4 auditors.<sup>9</sup>

<sup>9</sup> Compared with non-accelerated filers, large-sized accelerated filers are more likely to appoint Big-4 auditors. Because our sample covers only accelerated filers, we should be very cautious to infer that large auditors provide lower audit quality.

		Table 3	Descriptive Statistics			
Variables		Means (Median				
	Total Sample	Restatement Sample ( <i>n</i> = 1853) (1)	Non-restatement Sample ( <i>n</i> = 10774) (2)			
				(2) - (1)	Tests for D	ifferences
				Mean (Median)	Mean	Median
				Difference	p-value	p-value
EFFECTIVE	0.961	0.848 (1.000)	0.980 (1.000)	0.132 (0.000)	<0.001	<0.001
SIZE	7.256	7.048 (6.926)	7.292 (7.280)	0.244 (0.354)	<0.001	<0.001
ROA	0.183	0.004 (0.027)	0.021 (0.038)	0.017 (0.011)	<0.001	<0.001
ΓEV	0.572	0.560 (0.578)	0.575 (0.566)	0.015 (-0.012)	0.054	0.004
PE	14.825	14.402 (15.891)	14.898 (15.799)	0.496 (-0.092)	0.623	0.739
MB	2.775	2.594 (1.986)	2.806 (2.059)	0.212 (0.073)	0.044	0.003
BIGN	0.861	0.890 (1.000)	0.856 (1.000)	-0.034 (0.000)	<0.001	<0.001
RCP	8.636	7.980 (0.000)	8.749 (0.000)	0.769 (0.000)	0.269	0.020
FT	0.244	0.251 (0.000)	0.243 (0.000)	-0.008 (0.000)	0.416	0.417
<b>AGLOSS</b>	0.191	0.228 (0.000)	0.185 (0.000)	-0.043 (0.000)	<0.001	<0.001
MARKETCAP	4267.138	3074.847 (834.543)	4472.198 (1048.278)	1397.351 (213.735)	<0.001	<0.001
Note: Variables are c	lefined in Table 2	. P-values are based on tw	o-tailed tests.			

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Table 4 presents the contingency tables for the different regime samples. Panels A and B show that the Type II error rates are 97.6% (568/582) and 79.0% (1,004/1,271) for the SOX 302 and SOX 404 samples, respectively. The Type I error rates are 0.3% (7/2,140) and 2.4% (204/8,634), respectively. Moreover, Panels C and D reveal that the Type II error rates are 71.5% (512/716) and 88.6% (492/555) for the AS2 and AS5 samples, respectively. The Type I error rates are 3.7% (132/3,529) and 1.4% (72/5,105), respectively. Additional information about the ratios of effective ICFR disclosures among the restatement and non-restatement samples is provided in Table 5. Panel A reveals that restatement companies subject to SOX 404 are significantly less likely to conclude that their internal controls are effective, compared to restatement companies subjected to SOX 302 (79% versus 97.6%, p-value < 0.001). Non-restatement companies under the SOX 404 regime, however, are also less likely to conclude that their internal controls are effective, compared with non-restatement companies under the SOX 302 regime (97.6% versus 99.7%, p-value < 0.001). The results in Panel A support our H1a and H1b, indicating that the enactment of SOX 404 reduces the likelihood of Type II errors but increases the likelihood of Type I errors in public ICFR disclosures.

Panel B presents the ratios of effective ICFR disclosures among the restatement and non-restatement companies for AS2 and AS5 samples. Restatement companies are significantly more likely to conclude that their internal controls are effective in the AS5 period than in the AS2 period (88.6% versus 71.5%, p-value < 0.001). This result indicates that the implementation of AS5 results in higher Type II error rates of public ICFR disclosures. However, non-restatement companies are also significantly more likely to conclude that their internal controls are effective in the AS2 period (98.6% versus 96.3%, p-value < 0.001), which supports our H2b and indicates that the implementation of AS5 has resulted in a lower Type I error rate.

		LotoL L	וטומו	471	9,434	9,905			Totol	IOIAI	135	5,525	5,660	
		Restatement	Companies	267	1,004	1,271	(1)		Restatement	Companies	63	492	555	11)
Regime Samples	X 404 Regime	Non-restatement	Companies	204	8,430	8,634	χ <sup>2</sup> = 850.333, <i>p</i> < 0.00	5 Regime	Non-restatement	Companies	72	5,033	5,105	χ² = 212.470, <i>p</i> < 0.00
r the Different	Panel B: SO			Ineffective ICFR	Effective ICFR	Total	)	Panel D: AS			Ineffective ICFR	Effective ICFR	Total	)
Table 4 Contingency Tables for		Totol	IUIAI	21	2,701	2,722			Totol	וטומו	336	3,909	4,245	
		Restatement	Companies	14	568	582	(1		Restatement	Companies	204	512	716	)1)
	X 302 Regime	Non-restatement	Companies	7	2,133	2,140	$\chi^2 = 25.819,  p < 0.00$	2 Regime	Non-restatement	Companies	132	3,397	3,529	χ² = 500.299, <i>p</i> < 0.00
	Panel A: SO			Ineffective ICFR	Effective ICFR	Total	)	Panel C: AS			Ineffective ICFR	Effective ICFR	Total	)

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Panel A: SOX 302 and SOX	( 404			
	SOX 302 Sample	SOX 404 Sample	Diffe	rence
	(1)	(2)	(2) - (1)	p-value
Restatement Companies	0.976	0.790	-0.186	<0.001
Non-restatement	0.007	0.076	0.020	<0.001
Companies	0.997	0.970	-0.020	<0.001
Panel B: AS2 and AS5				
	AS2 Sample	AS5 Sample	Diffe	rence
	(1)	(2)	(2) - (1)	p-value
Restatement Companies	0.715	0.886	0.171	<0.001
Non-restatement Companies	0.963	0.986	0.023	<0.001

Table 5 Ratio of Effective ICFR Disclosures

Table 6 presents the Pearson correlation matrix for all variables used in the study. The strongest pairwise correlation is -0.484, and the largest variance inflation factors are less than 2.3. We have not found any multicollinearity problems in our sample.

				2	50-00								
	SIZE	ROA	LEV	PE	MB	BIGN	RCP	FT	AGLOSS	MARK- ETCAD	SOX404	AS5	VIF
SIZE	1.000												2.30
ROA	0.219	1.000											1.52
LEV	0.331	-0.246	1.000										1.43
PE	0.036	0.159	-0.058	1.000									1.08
MB	-0.124	0.095	-0.128	0.027	1.000								1.08
BIGN	0.112	0.013	-0.142	-0.010	0.002	1.000							1.07
RCP	0.334	-0.024	0.102	-0.027	0.008	0.105	1.000						1.24
FT	090.0	0.023	-0.099	0.005	-0.008	0.121	0.164	1.000					1.06
<b>AGLOSS</b>	-0.211	-0.484	0.082	-0.262	-0.025	0.023	0.059	0.045	1.000				1.46
MARKET	0.604	0.137	0.023	0.048	060.0	0.132	0.370	0.106	-0.147	1.000			1.85
CAP									,				
SOX404	0.099	0:030	0.016	0.006	0.003	0.030	0.012	0.079	0.105	0.048	1.000		1.31
AS5	0.099	-0.023	0.039	-0.040	-0.050	0.020	0.066	0.084	0.141	0.020	0.473	1.000	1.32
Note: Variables	are define	d in Table	2.										

Table 6 Pearson Correlation Matrix

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## 4.2 Logistic-Regression Results

We estimate Model 1 using the subsamples of restatement companies and nonrestatement companies separately, and the results are presented in Table 7. For the restatement sample, the coefficient on SOX404 is -0.932, with a p-value < 0.046, indicating that the odds of concluding that internal controls are effective for restatement companies subjected to SOX 404 decreased by 60.62%, as compared with their restatement counterparts subjected to SOX 302. It suggests that the enactment of SOX 404 reduces Type II errors of ICFR disclosures and is consistent with our H1a. For the nonrestatement sample, the coefficient on SOX404 is not significant, suggesting that there is no evidence that the enactment of SOX 404 results in a higher Type I error rate. Taken together, we conclude that the enactment of SOX 404 reduces Type II errors of ICFR disclosures without increasing Type I errors.

For the restatement sample, companies with few restructuring charges, without FT, or with low aggregate loss are more likely to conclude that their internal controls are effective. For the non-restatement sample, concluding that internal controls are effective is positively associated with MB ratios, the appointment of a Big-4 auditor, and market capitalization, and it is negatively associated with PE ratios, restructuring charges, the incidence of FT, and aggregate loss.

	Dradiated Sign	Restateme	nt Sample	Non-restatem	ent Sample	
	Predicted Sign -	Coefficient	p-value	Coefficient	p-value	
SOX404	?	-0.932	0.046	-0.682	0.204	
SIZE	+	0.075	0.306	0.008	0.918	
ROA	+	0.224	0.697	-0.466	0.351	
LEV	_	-0.225	0.395	-0.146	0.579	
PE	_	0.000	0.914	-0.003	0.077	
MB	_	0.010	0.565	0.046	0.013	
BIGN	?	0.283	0.259	0.592	0.003	
RCP	_	-0.006	0.062	-0.007	0.023	
FT	_	-0.356	0.051	-0.285	0.096	
AGLOSS	_	-0.503	0.010	-0.715	<0.001	
MARKETCAP	+	0.000	0.246	0.000	<0.001	
CONSTANT		2.689	0.034	18.164	0.982	
YEAR		(include)		(include)		
INDUSTRY		(include)		(inclu	ide)	
LR chi squared		271.78	<0.001	272.12	<0.001	
Pseudo R <sup>2</sup>		0.1	72	0.13	32	
Sample size		185	53	107	74	

Table	7	Logistic	Regression	for	Resta	tement	and	Ν	on-rest	atement	S	ampl	les
			(Depen	dent	t Varia	ble = EF	FEC	TI	VE)				

Note: Variables are defined in Table 2. P-values are based on two-tailed tests.

Table 8 presents the results of applying Model 2 to the subsample of the SOX 404 era. For the restatement sample, the coefficient on AS5 is 1.413, with a p-value < 0.001, indicating that the odds of concluding that internal controls are effective for restatement companies adopting AS5 increases by 411.16%, compared with their restatement counterparts adopting AS2. This result suggests that the implementation of AS5 has resulted in a higher Type II error rate. For the non-restatement sample, the coefficient on AS5 is 1.418, with a p-value < 0.001, indicating that the odds of concluding that internal controls are effective for non-restatement companies adopting AS2. This result companies adopting AS5 increased by 412.79%, compared with the odds of their non-restatement counterparts concluding the same while adopting AS2. This finding is consistent with our H2b, and it suggests that implementation of AS5 could improve ICFR-audit efficiency by reducing Type I errors. To sum up, our evidence shows that even though the more flexible and less prescriptive AS5 can enhance the efficiency of ICFR audits, it inadvertently lowers public ICFR-disclosure quality, measured as Type II errors.

The significance of the control variables in Model 2 is quite similar with that in Model 1, though there are some differences. For the restatement sample, whereas FT is significant in Model 1, it is insignificant in Model 2. On the contrary, whereas MARKETCAP is insignificant in Model 1, it is significant in Model 2. For the non-restatement companies, RCP and FT are insignificant in Model 2, but they are significant in Model 1.

	Due dista d Oisua	Restateme	nt Sample	Non-restatem	ent Sample
	Predicted Sign -	Coefficient	p-value	Coefficient	p-value
AS5	?	1.413	<0.001	1.418	<0.001
SIZE	+	0.095	0.217	-0.005	0.950
ROA	+	0.242	0.690	-0.565	0.285
LEV	—	-0.199	0.469	-0.183	0.500
PE	—	0.000	0.968	-0.003	0.094
MB	—	0.009	0.622	0.043	0.023
BIGN	?	0.327	0.198	0.578	0.004
RCP	—	-0.007	0.050	-0.006	0.101
FT	—	-0.300	0.115	-0.277	0.112
AGLOSS	—	-0.434	0.031	-0.752	<0.001
MARKETCAP	+	0.000	0.077	0.000	0.001
CONSTANT		-0.292	0.816	16.321	0.985
YEAR		(inclu	ude)	(inclu	ıde)
INDUSTRY		(inclu	ude)	(inclu	ıde)
LR chi squared		128.71	<0.001	213.85	<0.001
Pseudo R <sup>2</sup>		0.0	99	0.1	11
Sample size		12	71	863	34

Table 8 Logistic Regression for Restatement and Non-restatement Samples (Dependent Variable = *EFFECTIVE*)

Note: Variables are defined in Table 2. P-values are based on two-tailed tests.

# 5. Sensitivity and Additional Tests

## 5.1 Measurement Validity of Type I and Type II Errors

Because ICFR disclosure-quality cannot be easily observed or directly gauged, we regard restatement companies as more likely to have material internal control weaknesses and, therefore, to receive adverse ICFR-audit opinions. Although prior studies suggest that misstatements are indicative of ineffective internal control systems (Kinney and McDaniel, 1989; DeFond and Jiambalvo, 1991; McMullen et al., 1996; Eilifsen and Messier, 2000; Leone, 2007; Rice and Weber, 2012), some extenuating or unique situations in which a misstatement is not always parallel to ineffective internal controls (PCAOB, 2004) may still exist. Likewise, non-restatement companies cannot be guaranteed perfection in ICFR. That is, companies may conclude that their actual weak internal control systems are ineffective, but their financial reports are accurately stated. Therefore, those companies do not make Type I errors in ICFR disclosures, and our measurement of the Type I error likelihood may be overestimated in this study.

One benefit of ICFR audits is to identify and remediate control deficiencies or weaknesses, in turn leading to improvement of internal control systems. Schroeder and Shepardson (2016) have shown that the implementation of SOX 404 is associated with improved internal control system quality. Based on their results, we expect fewer non-restatement companies that conclude their actually weak internal control systems as ineffective after the implementation of SOX 404. If our measurement of the Type-I error likelihood is significantly overestimated because of the inclusion of those non-restatement companies, the overestimation is expected to lessen under the SOX 404 regime. However, we found no evidence that the enactment of SOX 404 affected the Type-I error rate. Thus, we believe that the possible lack of measurement validity does not drive our empirical results.

To further settle the concern on the measurement validity in the study, we try an alternative method to identify companies with ineffective ICFR. Ashbaugh-Skaife, Collins, Kinney, and LaFond (2006) and Doyle et al. (2007a) have suggested that internal control problems are associated with lower accrual quality, because companies with weak internal controls fail to detect intentionally biased accruals resulting from earnings management or unintentional accrual estimation errors more probably. As a result, low accrual quality could be viewed as a strong indicator of material weaknesses in internal control. We measured accrual-estimation error based on the method developed by Dechow

and Dichev (2002) and modified by McNichols (2002) and Francis, LaFond, Olsson, and Schipper (2005). We divided our sample into two categories: (1) a low-AQ sample, which covers observations with a residual above the median, and (2) a high-AQ sample, which covers observations with a residual below the median. Except for the different way that we identified companies with weak ICFR, we conducted the analyses with the same research procedures described in Section 3.2. The results are presented in Tables 9 and 10, and they are very similar to our main results. Moreover, our evidence is robust to different ways of identifying companies with weak internal controls.

	Dradiated Sign	Low-AQ	Sample	High-AQ	Sample
	Predicted Sign -	Coefficient	p-value	Coefficient	p-value
SOX404	?	-0.935	0.095	0.661	0.207
SIZE	+	0.070	0.388	-0.044	0.569
ROA	+	0.043	0.906	-0.622	0.293
LEV	—	-0.192	0.366	-0.387	0.173
PE	_	-0.001	0.444	0.001	0.554
MB	—	0.027	0.069	0.011	0.512
BIGN	?	0.370	0.106	0.540	0.039
RCP	—	-0.012	<0.001	-0.002	0.533
FT	_	-0.151	0.387	-0.556	0.001
AGLOSS	_	-0.309	0.137	137 -0.988 <0	
MARKETCAP	+	0.000	0.002	0.000	0.003
CONSTANT		17.383	0.982	18.451	0.984
YEAR		(inclu	ude)	(inclu	de)
INDUSTRY	STRY (include)		ude)	(inclu	de)
LR chi squared		234.42	<0.001	322.23	<0.001
Pseudo R <sup>2</sup>		0.1	43	0.16	62
Sample size		44	12	599	96

# Table 9 Logistic Regression for High-AQ and Low-AQ Samples (Dependent Variable = *EFFECTIVE*)

Note: Variables are defined in Table 2. P-values are based on two-tailed tests.

	Predicted Sign -	Low-AQ Sample		High-AQ Sample	
		Coefficient	p-value	Coefficient	p-value
AS5	?	1.205	0.001	2.395	<0.001
SIZE	+	0.024	0.790	-0.044	0.591
ROA	+	0.073	0.850	-0.615	0.312
LEV	—	-0.174	0.438	-0.400	0.169
PE	—	-0.001	0.579	0.000	0.831
MB	—	0.024	0.113	0.010	0.572
BIGN	?	0.347	0.137	0.550	0.036
RCP	—	-0.013	<0.001	-0.001	0.778
FT	—	-0.116	0.520	-0.574	0.001
AGLOSS	—	-0.288	0.174	-0.944	<0.001
MARKETCAP	+	0.000	0.001	0.000	0.002
CONSTANT		14.215	0.974	15.934	0.979
YEAR		(include)		(include)	
INDUSTRY		(include)		(include)	
LR chi squared		182.21	<0.001	267.99	<0.001
Pseudo R <sup>2</sup>		0.123		0.148	
Sample size		3375		4795	

# Table 10 Logistic Regression for High-AQ and Low-AQ Samples (Dependent Variable = *EFFECTIVE*)

Note: Variables are defined in Table 2. P-values are based on two-tailed tests.

## **5.2 Period of Financial Restatements**

Doyle et al. (2007a) have argued that, on average, material weaknesses exist for several years before they are reported. In other words, restatements announced in year t+1 might imply the existence of weaknesses not only in year t+1 but also in year t. Therefore, in this sensitivity test, we define restatement companies as companies that restate either their year t or year t+1 financial statements. We replicate the analyses using the alternative definition of restatement companies. The results are very similar to our main results, indicating that our main results are robust to the different choices regarding the periods of restatements. For brevity, the tables of the results are omitted.

# 6. Conclusion

In this study, we have examined the effect of both SOX 404 and AS5 on ICFRdisclosure errors. We have found that the enactment of SOX 404 has resulted in reduced incidence of Type II errors, without the side effect of increasing Type I errors. We have also documented that the more flexible and less prescriptive AS5 can enhance the efficiency of ICFR audits by reducing Type I errors. However, because under AS5, audit conclusions depend more on auditor judgments, auditors might misuse their professional judgment and cut back on necessary testing procedures in the audits of internal controls, which inadvertently, would result in lower public ICFR-disclosure quality measured as increased Type II errors. Our results echo the concerns raised by investors and regulators about AS5. A potential limitation of this study is sample size, which was restricted because only large companies (i.e., accelerated filers) are subject to SOX 404(b). The Dodd-Frank Wall Street Reform and Consumer Protection Act enacted in 2010 permanently exempts non-accelerated filers from SOX auditor-attestation requirement. It is unclear whether our evidence can be generalized to small companies.

Our work is among the pioneering studies to provide direct evidence of the relative effects of SOX 404 and AS5 on ICFR-disclosure quality. Further, in Taiwan, the local regulation on internal control reporting is quite similar to SOX 404 (a). Companies conducting initial public issuance of its stock or public companies are required to conduct and report annual management self-assessment of the design and operation effectiveness of their internal control systems. Although mandatory ICFR audits are not required now, our results, which demonstrate the benefits of ICFR audits and the effects of different ICFR auditing standards, could provide insights for Taiwanese regulators and standard setters to determine the feasibility of future ICFR-audit-related rulings.

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# 作者簡介

## \* 邱献良

國立政治大學會計系博士,現任國立中正大學會計與資訊科技學系助理教授。 主要研究興趣為內部控制揭露品質、關係人交易查核及會計資訊系統等。除研究 外,過去也曾參與撰寫中英文會計與管理教學個案,已於 Ivey Publishing Case Center 發行。

## 周玲臺

美國休士頓大學會計博士,現任國立政治大學會計系教授。主要研究領域包括 審計品質、關係人交易揭露查核、內部控制缺失報告、科研計畫經費核銷、國立大 學內控稽核制度與政府財務報導等。論文曾發表於臺大管理論叢、會計評論、中華 會計學刊、證券市場發展季刊、管理評論、教育政策論壇、會計研究、產業與管理 論壇、Abacus、Review of Business 等學術期刊及主計月刊、會計研究月刊、美國月 刊、The CPA Journal 等專業期刊。此外,曾撰寫多個中英文審計與會計教學個案, 分別在 Ivey Publishing Case Center、政大商管個案與臺灣管理個案等中心發行。

<sup>\*</sup> Email: E-mail: 96353504@nccu.edu.tw

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