THE INTERNAL CONTROL PROVISIONS OF SARBANES-OXLEY ACT AND QUALITY OF INTERIM EARNINGS

by

LEI HAN

Presented to the Faculty of the Graduate School of

The University of Texas at Arlington in Partial Fulfillment

of the Requirements

for the Degree of

DOCTOR OF PHILOSOPHY

THE UNIVERSITY OF TEXAS AT ARLINGTON

August 2010

ACKNOWLEDGEMENTS

I owe my gratitude to all those people who have helped and supported me in making this dissertation possible. First, and foremost, I want to thank Dr. Li-chin Ho, my dissertation chair, for her continuous guidance and encouragement. I truly admire her patience in advising students and passion for research and feel extremely fortunate to have such an advisor by my side to guide me through the PhD program study and the entire dissertation process. I hope that one day I could ever become a good advisor to my students as she has been to me.

I also want to thank the other members of my committee for their insightful comments and constructive criticism. They are: Dr. Martin Taylor, Dr. Jap Efendi and Dr. Mary Whiteside. Special thanks go to Dr. Taylor, the coordinator of the PhD program, for he has always been there to listen and give advice.

My thanks also go to my colleagues and friends in the University of Texas at Arlington, for their support and belief in me.

Last, but not least, my deepest gratitude goes to my family. Although my parents, my sister and I are apart by thousands of miles, their continuous care and support make me feel they are always close by. I am deeply indebted to my husband and my son. Their unconditional love grants me strength and courage.

July 19, 2010

ABSTRACT

THE INTERNAL CONTROL PROVISIONS OF SARBANES-OXLEY ACT

AND QUALITY OF INTERIM EARNINGS

Lei Han, Ph.D.

The University of Texas at Arlington, 2010

Supervising Professor: Li-chin Jennifer Ho

This study examines the change in the quality of interim earnings around the enactment of Sarbanes-Oxley Act (SOX) and whether the change differs between interim and annual earnings by focusing on the impact of internal control provisions. In particular, two hypotheses are tested in this study. First, the quality of interim earnings improves after the SOX. Second, the gap in earnings quality between annual and interim reporting decreases after the SOX.

Prior research indicates that the quality of interim earnings is lower because managers have more discretion in interim reporting and interim earnings are only subject to review which involves limited auditors' work. This study is motivated by the argument that the internal control provisions of SOX (SOX 302 and SOX 404) are expected to dampen the major causes that have led to the lower quality of interim earnings. Specifically, (1) SOX 302 mandates the management's certification of internal

controls on a quarterly basis, and (2) SOX 404 increases the extent and amount of audit work during interim quarters.

In the empirical analysis, earnings quality is measured under two approaches: the earnings-management approach and the earnings-attribute approach. Under the earnings-management approach, discretionary accruals are used to measure earnings quality. Under the earnings-attribute approach, both accrual quality and the value-relevance of earnings are used to measure earnings quality.

The results of earnings management provide strong support to both hypotheses. Specifically, earnings management with interim quarters decreases after the passage of SOX, suggesting the improvement of interim earnings quality. Moreover, such improvement for interim earnings is higher than that for annual earnings. Both SOX 302 and SOX 404 appear to play a role in decreasing earnings management with interim quarters and in reducing the gap in earnings quality between interim quarters and annual periods.

The results of earnings attributes provide little support to both hypotheses. The tests based on accrual quality fail to support either hypothesis. The tests based on value relevance provide some evidence that the value relevance of interim earnings improves after SOX. However, the improvement with interim earnings is not different from that with annual earnings. In addition, only SOX 302 appears to play a role in improving the value relevance of interim earnings and in reducing the gap in value relevance between interim quarters and annual periods.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1

INTRODUCTION

1.1 Overview of the Study

The Public Company Accounting Reform and Investor Protection Act, or as commonly referred to, the Sarbanes-Oxley Act (hereafter SOX), was signed into law on July 30, 2002, with an aim to "protect investors by improving the accuracy and reliability of corporate disclosures made pursuant to the securities laws". Since its enactment, the effect of SOX on financial reporting has been a topic of interest in financial accounting research. Cohen et al. (2008) detect less earnings management in annual earnings from 2002 to 2005 than before. Lobo and Zhou (2006) document lower abnormal accruals and higher conservatism in financial reporting in the two years after SOX than the two years before. These studies suggest that there is less aggressive accounting after SOX.

Although the preceding evidence reflects improved earnings quality after SOX, the inferences are only made based on annual earnings[1]. One question of interest is whether SOX improves interim earnings as well. If the answer is positive, then the next question is whether SOX affects interim earnings in the same magnitude as it does for annual earnings. This study examines the change in the quality of interim earnings

[1] As the precedent of Cohen et al. (2008), a working paper by the same authors used quarterly data to examine earnings management from 1987 through 2003. Their study does not try to differentiate the interim quarters from the fourth quarters, nor does it intend to investigate the incremental change in earnings quality during interim quarters relative to the change during annual periods.

around the enactment of SOX and whether the change differs between interim earnings and annual earnings. Three measures of earnings quality are used in this dissertation: earnings management, accrual quality and value relevance of earnings.

This study is motivated by the prior research findings that the financial reporting process and/or earnings management pattern differs between interim and annual periods. As indicated by Brown and Pinello (2007), interim earnings are subject to less stringent financial accounting standards and therefore managers have much more discretion (particularly over expense recognition) in the quarterly reports. Also, interim earnings are only subject to review while annual earnings are subject to audit, which has a broader scope and involves more auditors' work than review. Following this argument, Brown and Pinello (2007) predict and find that the likelihood of income-increasing earnings management is higher in interim quarters. Consistent with the notion that managers have more discretion over cost estimates in interim quarters, Mendenhall and Nichols (1988) find that market reacts more negatively to bad news in the first three quarters than in the fourth quarter. Also, to rein in the misestimates in the first three quarters and to achieve reliable annual earnings, managers need to adjust the fourth-quarter earnings, which is likely to make the fourth-quarter earnings more difficult to forecast. In line with this notion, Das and Shroff (2002) document the reversal of earnings changes in the fourth quarter is a very common phenomenon from 1985 to 1998. Both Collins et al. (1984) and Basu et al. (2005) indicate that analysts' earnings forecasts for the fourth quarter are less accurate than for interim quarters.

In addition, Comprix et al. (2009) find that estimated effective tax rate (ETR) in the first, second, and third quarters are systematically higher than that at the year-end. The initial ETR increases are more likely to be reversed when firms would have missed their analysts' earnings forecasts without the reversal. The results are consistent with that managers use high ETR to create slacks initially and use them to manage net income upward later. Jeter and Shivakumar (1999) observe that squared abnormal returns are greater in the fourth quarter than in interim quarters. Due to the difficulty in differentiating the noise from earnings management, they suggest that the test of earnings management may be less powerful in the fourth quarter than in interim quarters. Given these prior research findings, the inferences regarding SOX and annual earnings quality cannot be immediately generalized to interim earnings.

This dissertation focuses on how the internal control provisions of SOX (i.e., Sections 302 and 404) affect the quality of interim earnings. Under Section 302 (SOX 302 hereafter), management is required to evaluate its company's internal controls over financial reporting, certify the validity on such evaluation, and disclose all the material weaknesses in internal controls. The management's assessment on internal controls is conducted on a quarterly basis. SOX 302 further stipulates that any non-compliance is subject to up to 20 years imprisonment and/or a fine of no more than $5,000,000. These new certification requirements and criminal penalties associated with noncompliance certainly increase the management's responsibility for and involvement in internal controls, which in turn, is likely to enhance the quality and credibility of internal controls systems.

Previous research shows that a higher-quality internal control system improves earnings quality. For example, Altamuor and Betty (2006) study the impact of FDIC improvement Act of 1992 (FDICIA), which requires large banks in the U.S. to report management's assessment of the effectiveness of internal controls over financial reporting, and find that the reforms lead to improvements in earnings quality of affected banks compared to unaffected banks. Brown et al. (2008) investigate the internal control regulation, 1998 German legislation on control and transparency (KTG)[2] and conclude that KTG increased earnings quality for German public companies through effective internal controls. Since Section 302 requires the management's evaluation on internal controls on each interim quarter, the quality of interim earnings will likely improve after SOX. This is the first hypothesis to be tested in this study.

Section 404 of SOX (SOX 404 hereafter) takes a step further. It requires the firm's auditor to independently evaluate the internal controls over financial reporting and sign off the evaluation. Moreover, the auditor is required to provide an opinion on the internal control assessment made by the management. Although the auditor's evaluation on management's assessment and his/her own assessment on internal controls are provided for annual reports only, the audit work has probably started during the interim quarters. According to Auditing Standard No. 2 (AS 2 hereafter), the auditor should perform some procedures quarterly to provide a basis for determining whether the disclosure about changes in internal control over financial reporting is accurate and in compliance with SOX 302 (PCAOB 2004). To obtain evidence on the

[2] The legislation, Gesetz zur Kontrolle und Transparenz im Unternehmensbereich, is widely referred to as KonTraG. Brown et al. (2008) use KTG for simplicity.

operating effectiveness of internal controls, auditors can perform specific tests for controls at an interim date period as long as the concerning guidance in AS 2 is met (PCAOB 2004). Thus, the increased auditor involvement in the interim financial reporting process as required by SOX 404 is also expected to improve the quality of interim earnings.

Previous research indicates that the quality of interim earnings is lower because managers have more discretion in expense recognition in interim reporting and interim earnings are only subject to review which is less rigorous than an independent audit. If SOX 302 increases the management's responsibility for establishing and maintaining internal controls on a quarterly basis and SOX 404 increases the auditor's involvement in interim reporting, then the gap in earnings quality between annual and interim reporting is expected to decrease after the passage of SOX. This is the second hypothesis to be tested in this study.

In this study, I divide the sample period into two parts: the period prior to the enactment of SOX (1998 through 2002), and the period after the enactment of SOX (2003 through 2007). Earnings quality is measured through two approaches: the earnings-management approach and the earnings-attribute approach. Under the earnings-management approach, the discretionary accruals generated from the modified Jones Model in Dechow et al. (1995) and adjusted by prior earnings performance as suggested in Kothari et al. (2005) are used to measure earnings quality. Under the earnings-attribute approach, both the accrual quality derived from the augmented model of Dechow and Dichev (2002) (DD hereafter) and the value-relevance of earnings from

Dechow (1994) are used to measure earnings quality respectively. Both univariate and multivariate analyses are employed to examine the research questions. In the univariate tests, the interim earnings quality after SOX is compared with that before SOX using the two-sample t test and the Mann-Whitney test. To examine whether the change in earnings quality due to SOX for interim quarters is greater than that for annual periods, the ANOVA analysis is employed. In the multivariate tests, multiple OLS regressions with control variables are employed. Under the earnings management approach, the control variables include implicit claims by stakeholders, a dummy variable for losses, leverage, growth, firm size, economic activities, auditor type and controls for industry/year effects. Under the earnings-attribute approach, the control variables include firm size, a dummy variable for consistent losses, intangibles intensity, absence of intangible, capital intensity, as well as controls for industry/year effects. These control variables have been identified by prior research to be either related to the managerial incentives to engage in earnings management or to the innate determinants of earnings attributes.

The results based on the earnings-management approach support both hypotheses. Specifically, discretionary accruals with interim quarters decrease after the passage of SOX and such improvement is greater for interim earnings than for annual earnings. Also, both SOX 302 and SOX 404 play a role in decreasing earnings management with interim quarters and in reducing the gap in earnings quality between interim quarters and annual periods.

The results based on the earnings-attribute approach provide little support to both hypotheses. The tests based on accrual quality fail to support either hypothesis. The tests based on value relevance provide some evidence that the value relevance of interim earnings improves after SOX. However, the improvement with interim earnings is not larger than that with annual earnings. Only SOX 302 appears to play a role in improving the value relevance of interim earnings and in reducing the gap in value relevance between interim quarters and annual periods.

1.2 Significance of the Study

This study contributes to existing literature in several ways. First, it provides empirical evidence on the impact of SOX on interim earnings. In particular, this study examines (1) whether the quality of interim earnings improves after the enactment of SOX, and (2) whether the impact differs between interim and annual earnings. While prior literature provides evidence on annual earnings quality around SOX, the results of this study can provide additional insights on whether SOX improves the quality and credibility of financial reporting, which may have important policy implications. Moreover, the results of this study may have important implications to market participants. Interim earnings are announced after the end of every fiscal quarter and interim financial reports are filed in 10-Qs to the SEC quarterly, while annual earnings are announced after the end of every fiscal year and are filed in 10-Ks to the SEC annually. Compared to annual earnings, interim earnings are announced and the interim reports are filed more frequently. Before the announcement of annual earnings, interim

earnings are indispensable components in estimating annual earnings. Therefore, the quality of interim earnings is of realistic relevance to market participants in their investment and valuation decisions.

Second, most of prior studies on SOX and earnings quality use the earnings-management approach only. As discussed earlier, this study uses both the earnings-attribute and the earnings-management approaches. The employment of both approaches ensures that this study grasps as many facets of earnings quality as possible. Although earnings management can be a good proxy for low earnings quality caused by managerial intentional manipulations and frauds, it may not be able to capture the effect of unintentional estimation errors on earnings quality. A common critique on the studies using earnings management as the sole proxy of earnings quality is that earnings management does not tell the whole story of earnings quality. By including measures other than earnings management, this study avoids such a critique and is likely to provide a relatively more complete picture of earnings quality.

Third, the availability of the latest data allows this study to test earnings quality around the implementation of SOX 404. The accelerated filers with a fiscal year ending on or after November 15, 2004 implemented SOX 404 initially. Most research on SOX, such as Cohen et al. (2008), runs on data as far as the year of 2005 and thus does not tap much on the effect of the adoption of SOX 404. In this study, the post-SOX regime extends from 2003 to 2007, which provides adequate data to analyze the effect of SOX 404 on earnings quality.

1.3 Organization of the Study

The remainder of this study is organized as follows.

Chapter 2 presents the institutional background and literature review of SOX. Section 2.1 generally discusses how SOX was brought into effect and some of its major provisions. Section 2.2 provides a detailed discussion of SOX 302 and SOX 404 and the related literature regarding the firm characteristics associated with the disclosure of internal control deficiencies required by the provisions. Section 2.3 reviews prior literature on the costs and benefits of SOX.

Chapter 3 presents the background and literature review of earnings quality. Section 3.1 provides a review of how to measure earnings quality and the factors that may affect earnings quality. Section 3.2 discusses how interim earnings are different from annual earnings and the impacts of such differences on market participants. Section 3.3 reviews the studies on earnings quality around SOX and other internal control reforms.

Chapter 4 presents the specific research hypotheses in this study. Section 4.1 formulates the hypothesis regarding the interim earnings quality around SOX. Section 4.2 formulates the hypothesis regarding the difference in earnings quality between interim and annual periods around SOX.

Chapter 5 presents the research methodology in this study. Section 5.1 describes the measures of earnings quality. Section 5.2 discusses the sample selection process. Section 5.3 addresses the empirical models and statistical tests.

Chapter 6 presents the empirical results and Chapter 7 summarizes the major findings, and concludes the entire study.

CHAPTER 2

BACKGROUND AND LITERATURE REVIEW: SOX

2.1 The Enactment of SOX

The Public Company Accounting Reform and Investor Protection Act was signed into law by President George W. Bush on July 30, 2002, after the exposure of a slew of high-profile corporate and accounting scandals since the beginning of the new century. The Act is designed to "protect investors by improving the accuracy and reliability of corporate disclosures made pursuant to the securities laws", and was claimed as "the most far-reaching reforms of American business practices since the time of Franklin D. Roosevelt." The Act is commonly called Sarbanes-Oxley or SOX, named after its sponsors, Senator Paul Sarbanes and Representative Michael Oxley.

SOX has pervasive impacts on the board of directors, management and auditors of all public companies listed in the United Sates. The affected aspects particularly include: corporate governance, disclosure control and procedure, internal control assessment, penalty of incompliance and auditor independence.

2.1.1 What Happened Before SOX

Before SOX, the only statutory regulation governing the internal controls of U.S. companies was the Foreign Corrupt Practices Act of 1977 (FCPA), and the only required disclosure of significant internal control deficiencies was about the change in auditors in 8-K (Ge and McVay 2005). After FCPA was passed in 1977, which requires

that registrants maintain cost-effective systems of internal accounting controls over transactions and assets, the call for additional internal control standards and guidance led to the creation of the Treadway Commission in 1985 (Kinney et al. 1990). In 1992, the Committee of Sponsoring Organizations (COSO) of the Treadway Commission released a report, entitled *Internal Control—Integrated Framework*. In the report, COSO presented a common definition of internal controls[3] and suggested a framework against which internal control systems can be assessed and improved. This framework has been widely adopted by many U.S. firms that are subject to SOX 404.

It is commonly believed that the corporate reforms brought about by SOX were triggered directly by the downfall of Enron in late 2001. People were outraged at the corrupted governance and dishonest accounting practices exposed in the fiasco. In January 2002, SEC chairman, Harvey L. Pitt announced a reform plan to create an independent regulatory organization. Republican Rep. Oxley's reform bill was introduced in the House on February 13. Democratic Sen. Sarbanes' reform bill passed in the Senate Banking Committee on June 18. The subsequently exposed scandals in WorldCom, Quest and Tyco, acted like catalysts in the securities rulemaking process. President Bush delivered a speech regarding accounting reforms on July 9. The Senate passed the bill on July 15. On July 19, the House and Senate started to merge the bills. The final rule was agreed upon on July 24, passed in Congress on July 25, and signed into law on July 30.

[3] In COSO (1992), internal control is broadly 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 in the following categories: (1) Effectiveness and efficiency of operations, (2) Reliability of financial reporting, and (3) Compliance with applicable laws and regulations.

2.1.2 The Provisions in SOX

SOX has eleven titles, which covers matters ranging from corporate responsibility to auditor independence, and imposes the penalty for violations.

Under the Act, a private-sector nonprofit corporation, Public Company Accounting Oversight Board (PCAOB), is created to "oversee the auditors of public companies in order to protect the interests of investors and further the public interest in preparation of informative, fair, and independent audit reports."

SOX amended the Securities Exchange Act of 1934 by adding the provision of prohibited non-audit services provided contemporaneously with the audit. For the first time, both the CEO and the CFO in a public company are required to certify the appropriateness of the disclosure in interim and annual reports. In each annual report, an assessment of the effectiveness of the internal control is required to be provided by the management. The public accounting firm that prepares or issues the audit report must attest to and report on the assessment. Also, SOX establishes the penalties for violations in certification for fines up to $5,000,000, or imprisonment for not more than 20 years, or both.

2.2 The Internal Control Provisions in SOX

In order to improve the accuracy and reliability of financial reporting and rebuild investors' trust, SOX prescribes a series of solutions, among which the internal control reforms represented mainly by SOX 302 and SOX 404 are deemed as the most important.

2.2.1 Institutional Background on SOX 302 and SOX 404

SOX 302 is listed under Title III of SOX, and pertains to "Corporate Responsibility". It became effective for all SEC registrants with fiscal year ending on or after August 29, 2002. The section mandates that the principal executive officer or officers and the principal financial officer or officers, or persons performing similar functions, certify in each annual or quarterly filing that the report fairly represents the financial condition and operation results in all material respects. Moreover, SOX 302 sets up new standards for disclosure controls and procedures[4]:

> (4) the signing officers—
>
> (A) are responsible for establishing and maintaining internal controls;
>
> (B) have designed such internal controls to ensure that material information relating to the issuer and its consolidated subsidiaries is made known to such officers by others within those entities, particularly during the period in which the periodic reports are being prepared;
>
> (C) have evaluated the effectiveness of the issuer's internal controls as of a date within 90 days prior to the report; and
>
> (D) have presented in the report their conclusions about the effectiveness of their internal controls based on their evaluation as of that date;
>
> (5) the signing officers have disclosed to the issuer's auditors and the audit committee of the board of directors (or persons fulfilling the equivalent function)—
>
> (A) all significant deficiencies in the design or operation of internal controls which could adversely affect the issuer's ability to record, process, summarize, and report financial data and have identified for the issuer's auditors any material weaknesses in internal controls; and
>
> (B) any fraud, whether or not material, that involves management or

[4] In the new rule 13a-15 of the Securities Exchange Act, disclosure controls and procedures means controls and other procedures of an issuer that are designed to ensure that information required to be disclosed by the issuer in the reports that it files or submits under the Act is recorded, processed, summarized and reported, within the time periods specified in the Commission's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by an issuer in the reports that it files or submits under the Act is accumulated and communicated to the issuer's management, including its principal executive and principal financial officers, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure.

other employees who have a significant role in the issuer's internal controls; and

(6) the signing officers have indicated in the report whether or not there were significant changes in internal controls or in other factors that could significantly affect internal controls subsequent to the date of their evaluation, including any corrective actions with regard to significant deficiencies and material weaknesses.

SOX 404 is listed under Title IV of SOX, and pertains to "Enhanced Financial Disclosures". It is designed to enforce internal control over financial reporting[5], by prescribing management's assessment of the effectiveness of the internal control and auditor's attestation and report of the assessment by management. Specifically, the requirement for auditor's attestation and report is as follows:

> …each registered public accounting firm that prepares or issues the audit report for the issuer shall attest to, and report on, the assessment made by the management of the issuer. An attestation made under this subsection shall be made in accordance with standards for attestation engagements issued or adopted by the Board. Any such attestation shall not be the subject of a separate engagement.

SOX 404 in itself didn't provide any guidance about how to implement the management assessment or on which framework the assessment should be based until June 5, 2003, when the SEC final rule 33-8238, *Management's Report Internal Control*

[5] The SEC final rule 33-8238 (http://sec.gov/rules/final/33-8238.htm) defines internal control over financial reporting as: A process designed by, or under the supervision of, the registrant's principal executive and principal financial officers, or persons performing similar functions, and effected by the registrant's board of directors, management and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles and includes those policies and procedures that: (1) Pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of the assets of the registrant; (2) Provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the registrant are being made only in accordance with authorizations of management and directors of the registrant; and (3) Provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the registrant's assets that could have a material effect on the financial statements.

over Financial Reporting and Certification of Disclosure in Exchange Act Periodic Reports, was approved.

In order to provide guidance on internal control audit, PCAOB proposed on March 9, 2004, Auditing Standard No. 2, *An Audit of Internal Control over Financial Reporting Performed in Conjunction with an Audit of Financial Statements*. The standard was approved by SEC on June 17, 2004. In face of the greater than expected audit costs brought about by the standard, PCAOB determined to amend AS 2, so as to focus auditors on the most important matters in the audit of internal control. The newly revised standard was adopted as Auditing Standard No. 5, *An Audit of Internal Control over Financial Reporting That Is Integrated with An Audit of Internal Control* (AS 5 hereafter), which superseded AS 2 on July 25, 2007 when the SEC approved it.

2.2.2 The Effective Dates of Implementing SOX 302 and SOX 404

SOX 302 became effective for all SEC registrants with fiscal year ending on or after August 29, 2002. Compared to the fast implementation of SOX 302, the process of the implementation of SOX 404 was full of twists and turns.

Since its adoption of the classification of accelerated filers vs. non-accelerated filers[6] in the first guidance on the implementation of SOX 404 in June 2003, the SEC has been maintaining different compliance dates for these two filer groups. According

[6] In September 2002, the SEC, in its efforts to improve financial disclosure and rebuild investors' trust, amended the Securities Exchange Act of 1934 by accelerating the filing of quarterly and annual reports by public companies that have a public float of at least $75 million, that have been subject to the Exchange Act's reporting requirements for at least 12 calendar months and that previously have filed at least one annual report. By the end of the proposed three-year phase-in period starting from fiscal year end on or after December 15, 2002, the accelerated filers were supposed to file annual reports within 60 days after the fiscal year end and to file quarterly reports within 35 days after the end of the fiscal quarter end.

to SEC final rule 33-8238, an accelerated filer, as of the end of its fiscal year ending on or after June 15, 2004, must begin to issue a management report on internal control over financial reporting and file the auditor's internal control attestation report with its annual report for that fiscal year, while a non-accelerated filer has almost one more year up to April 15, 2005 to comply with the requirement.

Due to the unforeseen obstacles in executing the mandate, the compliance dates for the implementation of SOX 404 have been extended for several times. In February 2004, SEC final rule 33-8392[7], *Management's Report on Internal Control over Financial Reporting and Certification of Disclosure in Exchange Act Periodic Reports*, extended the compliance date for accelerated filers to its fiscal year ending on or after November 15, 2004, and that for non-accelerated filers to its fiscal year ending on or after July 15, 2005.

In light of the extreme difficulty in small public companies' implementation, in March 2005, SEC final rule 33-8545[8], *Management's Report on Internal Control over Financial Reporting and Certification of Disclosure in Exchange Act Periodic Reports of Non-accelerated Filers and Foreign Private Issuers*, extended the compliance date for non-accelerated filers to its fiscal year ending on or after July 15, 2006. Shortly after that, in September 2005, non-accelerated filers were awarded another one-year extension to the fiscal year ending on or after July 15, 2007 by SEC final rule 33-8618[9]. Further extensions for non-accelerated filers kept coming one after another. The

[7] See, SEC final rule 33-8392, http://sec.gov/rules/final/33-8392.htm.
[8] See, SEC final rule 33-8545, http://sec.gov/rules/final/33-8545.htm.
[9] See, SEC final rule 33-8618, http://sec.gov/rules/final/finalarchive/finalarchive2005.shtml.

compliance date for management assessment was postponed to the fiscal year ending on or after December 15, 2007 and the compliance date for auditors' attestation report on internal control was not mandatory until fiscal year ending on or after December 15, 2008[10]. The latest compliance date for auditors' attestation report on internal control was set as fiscal year ending on or after June 15, 2010 by SEC[11] in the year of 2009.

2.2.3 Characteristics of Firms Disclosing Internal Control Deficiencies[12] under SOX 302 and SOX 404

SOX 302 mandates that the signing officers present in each quarterly and annual filing their conclusions about the effectiveness of internal controls based on their evaluation, and disclose to the auditor and audit committee all significant deficiencies [13] or any fraud. SOX 404 requires management's assessment of the effectiveness of the internal control, in which the "disclosure of material weaknesses is effectively mandatory, while the disclosure of 'significant deficiencies' is unambiguously voluntary" (Doyle et al. 2007a). Various settings have been employed to analyze the characteristics of firms disclosing internal control deficiencies. Different firms may have different mixtures of determinants, varying with the type and the reason

[10] See, SEC final rule 33-8760, Internal Control over Financial Reporting in Exchange Act Periodic Reports of Non-accelerated Filers and Newly Public Companies.

[11] See, SEC final rule 33-9072, Internal Control over Financial Reporting in Exchange Act Periodic Reports of Non-accelerated Filers.

[12] According to AS 2, a control deficiency exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent or detect misstatements on a timely basis.

[13] According to AS 2, a significant deficiency is **a control deficiency, or combination of control deficiencies**, that adversely affects the company's ability to initiate, authorize, record, process, or report external financial data reliably in accordance with generally accepted accounting principles such that there is more than a remote likelihood that a misstatement of the company's annual or interim financial statements that is more than inconsequential will not be prevented or detected.

of the disclosed material weaknesses. However, internal control deficiencies are mostly associated with unsettled operational environment, weak corporate governance and poor earnings quality.

Ashbaugh-Skaife et al. (2007) model the disclosure of internal control deficiencies under SOX 302 as a function of both internal control risk factors and management's incentives to discover and report control problems. They find that, relative to non-disclosing firms, disclosing ones have more complex operations, engage more in mergers and acquisitions, face greater accounting risks, experience more auditor resignations and possess fewer resources available for internal controls. Also, they are more involved into prior SEC enforcement actions and financial restatements, more likely to use a dominant audit firm and have more concentrated institutional ownership. A concurrent study by Doyle et al. (2007b), assuming a one-for-one correspondence between the existence and disclosure of material weaknesses, investigate the determinants of material weaknesses disclosures under SOX 302 and SOX 404 from 2002 to 2005. Their findings indicate that disclosing firms tend to be smaller, younger, financially weaker, more complex, growing rapidly, or undergoing restructuring.

Ge and McVay (2005) analyze a set of firms disclosing at least one material weakness from August 2002 to November 2004 under SOX 302 and present descriptive evidence on the types of material weaknesses disclosed and the disclosing firms' characteristics. The majority of material weaknesses disclosed is related to inadequate accounting resources. The accounts most subject to material weaknesses are the current

accrual accounts. The disclosing firms are smaller, less profitable and more likely to have complex business operations.

Naiker and Sharma (2009) investigate how the quality of internal controls over financial reporting is affected by the presence of former partners on the audit committee and find that with the existence of affiliated and unaffiliated former partners on the audit committee, the incidence of internal control deficiencies is lower.[14]

In their study on the association between the disclosure of material weaknesses and corporate governance in different internal control regimes of SOX 302 and SOX 404, Hoitash et al. (2009) find that a lower likelihood of disclosing SOX 404 material weaknesses is associated with relatively more audit committee members having accounting and supervisory experience and board strength, while these associations could not be detected for the sample of material weaknesses disclosure under SOX 302.

Chan et al. (2007) posit that intentional and unintentional errors from poor internal controls can cause earnings to be less likely to reflect firm performance and examine whether firms that report material weaknesses under SOX 404 have more earnings management. They find modest evidence that disclosing firms have more positive discretionary accruals and absolute discretionary accruals than non-disclosing firms.

Goh and Li (2008) examine whether material weakness disclosure is associated with accounting conservatism cross-sectionally and/or inter-temporally. They find that

[14] Baber et al. (2008) examine the benefit of affiliated hiring from the perspective of the stock market and find significant drops in earnings response coefficients after affiliated hiring and no declines in stock prices after unaffiliated hiring from 1993 to 2001.

disclosing firms exhibit less accounting conservatism than non-disclosing firms. Disclosing firms exhibit more conservative earnings after the disclosure. They partition the disclosing firms sample into two subsamples based on whether they remediate the internal control deficiencies after disclosures and document more accounting conservatism in the remediation sample than the non-remediation sample.

2.3 The Costs and Benefits of SOX

Since the enactment of SOX, the debate on the costs and benefits[15] of this regulation has never stopped, nor is there a finite conclusion.

Rittenberg and Miller (2005) list the reasons for high compliance costs associated with SOX from the surveyed results as: learning curve, time pressure and fees, uncertainty, attestation requirement and compliance (not improvement) effort.

According to Mallory Factor, chairman of the Free Enterprise Fund which is the organization that filed a lawsuit to claim SOX as unconstitutional,

> The PCAOB and the Sarbanes-Oxley Act raise unconstitutional barriers to needed liquidity, discourage entrepreneurship and innovation, and hinder U.S. competitiveness by denying access to needed capital. The high cost of compliance that disproportionately affects smaller public companies is having long-term exponential negative implications for our economy.[16]

[15] The costs and benefits in this context refer to the compliance costs assumed by and the consequential benefits enjoyed by the complying companies, which in the end will be most likely to affect the firm value, the wealth of shareholders, etc. Therefore, the burden and welfare of companies and their shareholders brought about by SOX is the subject matter in this section. The reason for such qualification is that for groups with different interests, one's costs can be the other's benefits. For example, DeFond et al. (2008) explore the impact of SOX on bond values and find a significant decline in bond price among bonds issued by firms that are expected to experience relatively large governance changes under SOX. They conclude that the bond market expect SOX to make managers taking actions that benefit stockholders at the expense of bondholders.

[16] See CFO.com, on Feb. 9, 2006.

However, according to a survey by KPMG, 68% of the senior executives said they believe the Act has boosted investor confidence in corporate America (KPMG 2004).

Quite a few professional reports and academic studies document a huge upswing in audit fees since SOX. The Controller's Report (2005) documents a huge climb-up in audit fees for all Big 4 accounting firms in 2004, ranging from 78 percent to 134 percent. The Foley & Lardner report finds that the audit fees increased significantly for companies of all sizes between the year 2001 and 2006 (Foley & Lardner 2007). For example, the average audit fees for S&P Small-Cap companies during that period have increased 311%. In a survey of ninety Fortune 1,000 companies by Charles River Associates (CRA 2004), the companies in the sample were estimated to have spent a total $7.8 million each to implement Section 404, of which $1.9 million were audit fees. A substantial cross-sectional increase in audit fees with the initial enactment of SOX is also documented by Beneish et al. (2008) and Hogan and Wilkins (2006).

Although the initial compliance costs can be staggering, people anticipate and see the trend of subsequent costs dropping. Rittenberg and Miller (2005)'s survey finds that during the first year of implementation, only 14% of the total respondents felt benefits exceeded cost. When asked to look ahead and ignore the one-time costs, 39% believed benefits would exceed costs, while another 25% perceived that cost and benefits would equal out. In the survey on SOX 404 costs by Finance Executive International (FEI 2007), the compliance costs to revenues ratio kept decreasing since 2004 and reached as low as 0.036% in the year of 2007. The Foley & Lardner report

examines the overall compliance costs associated with SOX and documents that the costs began to decrease for the first time in 2006 (Foley & Lardner 2007).

The decline of compliance costs over time usually is attributed to the fact that the initial compliance costs may consist of a large amount of start-up outlays and remediation expenses. The survey by CRA International (2005) shows that a major compliance cost for the first year was related to the remediation of internal control weaknesses. As the ex-chairman of SEC Christopher Cox mentioned at the *Roundtable Discussion on Implementation of Internal Control Reporting Provisions* held on May 10, 2006, 16 percent of 3,900 reporting companies disclosed that their internal controls were not effective and 1,500 companies reported material weaknesses in internal controls over financial reporting in the first year. But in the second year, only 7 percent of the 3,000 reported ineffective internal controls and 400 companies disclosed material weaknesses.

Some studies try to infer the impact of SOX from the stock market reaction to SOX related events, but arrive at mixed conclusions. Zhang (2007) performs an event study on a series of major events leading up to the enactment of SOX and documents significantly negative cumulative abnormal returns. The results are stronger for complying firms with non-audit services and complex business operations. She also finds that deferring SOX 404 results in significant cost savings for non-accelerated filers. Overall, her evidence is consistent with that the market anticipates SOX to impose significant net private costs to firms. In contrast, Li et al. (2006) detect an initial negative stock reaction to the WorldCom fraud announcement but significant positive

abnormal stock returns associated with subsequent SOX events, which is consistent with investors expect a favorable impact of SOX. The market reactions to SOX events are related to firms' earnings management positively. Li et al. (2006) interpret the evidence as investors anticipate that SOX would constrain earnings management and enhance the quality of financial reporting.

The following studies examine the impact of a specific SOX section. Due to the lack of a control group of publicly traded firms unaffected by SOX in the U.S., the researchers often limit the time frame of interest to the period just before the passage of SOX. By analyzing the merits or shortcomings of specific practices in the pre-SOX era, which were prohibited or modified by certain provisions in SOX afterwards, they attempt to infer about the costs and benefits of SOX.

The findings of non-audit service research corroborates SOX Section 201 (SOX 201 hereafter), a provision on auditor independence that prohibits auditors from providing to their clients any outsourcing services that relate to the clients' internal controls or financial reporting. Kinney et al. (2004) investigate the non-audit fees for restating firms and similar non-restating firms between 1995 and 2000, and find no relation between fees (for either financial information systems design and implementation or internal audit services) and restatements. However, there is a significantly negative relation between tax services fees and restatements. Through their examination of outsourcing activities of Fortune 1,000 companies for the year of 1999, Abbott et al. (2007) find that firms with effective audit committees are less likely to outsource routine internal auditing activities to external auditors. They conclude that,

depending on the effectiveness of the audit committee, SOX 201 may have different implications for public companies.

Due to the concern that self-regulated peer review lacks credibility, PCAOB is charged to conduct independent inspections of public accounting firms following SOX Section 104. Hilary and Lennox (2005) examine the peer review program before SOX and find audit firms gain clients after receiving clean opinions from their reviewers and lose clients after receiving modified or adverse opinions, which suggests that peer review opinions provide credible information about quality differences between audit firms.

In January 2003, SEC adopted Regulation G per SOX Section 401 (b), which requires enhanced disclosure when any public disclosure is made of material information that includes a non-GAAP measure[17]. Helfin and Hsu (2008) assess the consequences of the SEC's non-GAAP disclosure rules resulted from SOX and suggest that the regulations have reduced the opportunistic use of non-GAAP earnings disclosures. Kolev et al. (2008) address the impact of such SOX mandate directly by

[17] According to Regulation D, a non-GAAP financial measure is a numerical measure of a registrant's historical or future financial performance, financial position or cash flows that: i. Excludes amounts, or is subject to adjustments that have the effect of excluding amounts, that are included in the most directly comparable measure calculated and presented in accordance with GAAP in the statement of income, balance sheet or statement of cash flows (or equivalent statements) of the issuer; or ii. Includes amounts, or is subject to adjustments that have the effect of including amounts, that are excluded from the most directly comparable measure so calculated and presented.

investigating the quality of exclusion from non-GAAP earnings around the SEC intervention and find that $1 of exclusion from non-GAAP earnings is associated with only 24 cents of expenses over the next four quarters after the intervention, compared to 55 cents of expenses over the next four quarters before the intervention. Bhattacharya et al. (2007) examine the transactions around earnings announcements containing pro forma earnings information between 1998 and 2003. Their analysis suggests that the market reaction to pro forma earnings information is almost exclusively attributable to the less sophisticated investors.

SOX Section 407 mandates the disclosure of financial expert in audit committee. DeFond et al. (2005) perform an event study on a sample of announcements of newly appointed outside directors to audit committees from 1993 to 2002, and find a significantly positive market reaction to the announcement only when the newly appointed directors have accounting financial expertise. Also, the significant reaction clusters in the firms with strong corporate governance before the appointment. The study suggests that whether an outside director brought into the audit committee is deemed as beneficial to a firm is highly contextual.

For some firms, the net costs incurred due to SOX are so huge that they'd rather opt out of disclosure requirements under SOX by staying small, going private, going dark or selecting listing exchange wisely.

Some firms use various methods to lower their public float to stay small. Gao et al. (2009) present the unintended consequences of exempting small firms from certain filing requirements under SOX. Those firms undertook less investment, made more

cash payouts to shareholders, made more bad news disclosure and reported lower earnings than control firms, in order to stay small. Iliev (2007) documents that firms that fail to comply with SOX 404 report lower increases in audit fees and higher discretionary accruals relative to firms that fail to qualify for the SOX exemptions. The market reacted positively on the news of delay of SOX implementations and negatively to the news of the regulator's determination to carry on the implementation process. Nondorf et al. (2007) find that firms around the threshold appear to take actions to reduce the market value of equity in the period when the compliance threshold is measured by dampening stock returns primarily. They also examine the characteristics of the firms successfully avoiding SOX 404: they are less likely to use a Big 4 auditor, more likely to be a part of an industry that has experienced internal control problems, associated with lower sales growth and more likely to be an avoider previously.

Engel et al. (2007) study firms that went private from 1998 to May 2005 and document a higher going-private frequency after SOX. The market response to going-private announcements is higher in the post-SOX period for small firms with highly concentrated ownership structures, indicating that SOX-induced net benefits are smaller for these firms.

Leuz et al. (2008) examine a sample of going-dark[18] firms who ceased SEC reporting but continued to trade publicly from 1998 to 2004 and find that, following the enactment of SOX, a large part of going-dark transactions can be attributed to SOX.

[18] According to Leuz et al. (2008), public companies can file for deregistration if they have fewer than 300 shareholders of record, or fewer than 500 holders of record and less than $10 million of assets in each of the prior three years. A company may deregister its stock for various reasons. Once deregistered,

Foreign companies may change their listing preferences after SOX. Piotroski and Srinivasan (2008) analyze foreign companies' listing behavior before and after SOX. They find that the listing preferences of large foreign firms (between U.S. exchanges and the London Stock Exchange (LSE)'s Main Market) do not change following the enactment of SOX. However, after SOX, smaller foreign firms are less likely to select NASDAQ over LSE's Alternative Investment Market[19]. Those findings suggest that smaller firms may face greater costs of SOX and that SOX has influenced the listing behavior of foreign firms. However, after surveying the development of securities law in the U.S., Mahoney (2009) points out that many non-U.S. firms view the litigation system, not SOX itself, as the largest cost of a U.S. listing.

To examine whether the internal control disclosure has information content and whether it facilitates investment decision making, researchers endeavor to seek evidence from the stock price and/or cost of equity perspective. Lopez et al. (2006) employ an experiment study to investigate the value-relevance of the audit opinion on management's assessment on internal controls and the value-relevance of the audit report on internal control over financial reporting, because such a methodology can isolate the effects of these two concurrent disclosures from each other[20]. According to their results, the audit report on internal controls over financial reporting is value-

a firm is no longer required to file with the SEC or subject to requirements imposed by the commission and the stock exchange. If the deregistered firms continue to trade in OTC markets, then they are "going-dark". Some other deregistered firms may choose to go private and not to trade any more.

[19] Alternative Investment Market (AIM) is promoted by London Stock Exchange as an international market for smaller growing companies.

[20] After AS 5 was adopted for audits of fiscal year ending on or after November 15, 2007, auditors are not required to issue an opinion on management's assessment any more.

relevant. According to the analysis by Lord & Benoit (2006), stock performance is associated with the effectiveness of internal controls presented in auditor's assessment. In particular, companies that either have no material weaknesses in their internal control, or are able to identify and correct material weaknesses in a timely manner experience much greater increases in share prices than companies that do not. Beneish et al. (2008) examine the market reactions to material weaknesses disclosures under SOX 302 and those under SOX 404 respectively. They document significantly negative abnormal stock returns and an increase of cost of capital upon disclosures under SOX 302 only. For the sample of disclosures under SOX 302, the market reactions for non-accelerated filers are significantly stronger than those for accelerated filers, suggesting that material weaknesses disclosures are more informative for smaller firms that likely have higher pre-disclosure information uncertainty. Ashbaugh-Skaife et al. (2009) document that auditor-confirmed changes in internal controls are followed by an increase in cost of equity by 50 to 150 basis points.[21]

Patterson and Smith (2007) propose a theoretical model to investigate the effects of SOX on internal control strength designed by managers and internal control testing by auditors. They find that as a result of SOX, internal control strength increases and the amount of fraud decreases, while the amount of internal control testing can either increase or decrease. They also suggest that extremely high standards for internal control testing may induce firms to choose weaker internal control systems.

[21] Ogneva et al. (2007) investigate the relation between cost of equity and first-time disclosure of internal control weaknesses under Section 404. When they control for primitive firm characteristics and for analysts forecast bias, such association disappears.

Hart (2009) tries to identify the principles behind SOX from all the previous arguments for regulation. He comments that SOX is more likely a political consequence than a regulation based on sound principles:

> The good news is that the intervention does not seem to have been a disaster; in fact, it may even have been a mild success (see, e.g., Coates [2007], Leuz [2007], Hochberg, Sapienza, and Vissing-Jørgensen [2009]). At the same time, as Ball [2009] points out, we still do not know definitively whether the 1933 to 1934 Securities Acts were a good thing 75 years after the event! Thus, we will not have the final word on SOX for a while.

CHAPTER 3

BACKGROUND AND LITERATURE REIVEW: EARNINGS QUALITY

3.1 Earnings Quality

Earnings are a summary measure of firm performance under the accrual basis of accounting. Empirical research shows that investors rely on earnings more than any other alternative measures of performance, such as cash flows, earnings before interest, taxes, depreciation and amortization (EBITDA), or sales (Biddle et al. 1995; Francis et al. 2003; Liu et al. 2002).

Earnings numbers are incorporated into the decisions of investment strategy, valuation, performance evaluation, compensation, etc. Graham et al. (2005) indicate that CFOs believe that earnings are the key metric watched by investors and other outsiders. Francis et al. (2004) and their successive research[22] provide pervasive evidence that earnings attributes affect cost of equity strongly. Lui et al. (2007) document that earnings quality, a measure of information risk, is incorporated by

[22] Francis et al. (2005) further distinguish between accruals quality driven by economic fundamentals (innate accruals) versus management choices (discretionary accruals) and find both have significant effects on cost of capital, but innate accruals effects are significantly larger than discretionary accruals effects. Francis et al. (2008) find that the association between voluntary disclosure and cost of capital is substantially reduced or disappears completely once earnings quality is controlled for and that firms with good earnings quality have more comprehensive voluntary disclosure than firms with poor earnings quality.

analysts in their assessments of investment risk. Therefore, earnings quality is an important research question.

3.1.1 How to Measure Earnings Quality

There is no universal proxy for earnings quality. Indeed, prior literature provides a resourceful pool of proxies for earnings quality, in which the most employed ones are earnings attributes and earnings management.

Francis et al. (2004) provide a good summary of earnings attributes and characterize them as either accounting-based or market-based attributes depending on how they are measured. Although each earnings attribute may reflect a different facet of earnings quality, they are not independent from each other; rather, some of them are highly related to each other. The seven most important earnings attributes identified in prior literature are discussed below.

Accrual quality. Based on the intuition that accruals are temporary adjustments that resolve timing problems in the underlying cash flows, DD define accrual quality as the extent to which accruals map into cash flow realizations. They measure accruals quality by the extent to which current accruals map into past, current and future cash flows and argue that the accrual and earnings quality is decreasing in the magnitude of the estimation errors in accruals. McNichols (2002) modifies the model by adding in two variables from the Jones model: the current year change in sales and the current year level of property, plant and equipment.

In testing for the usefulness of this approach, they find that earnings volatility and accruals volatility are good proxies for the proposed measure of accrual and

earnings quality, and that there is a positive association between accrual quality and earnings persistence.

Francis et al. (2004) examine the relation between cost of equity and seven attributes of earnings and find that accrual quality is the dominant attribute in terms of the effect on cost of equity.

Persistence. The time-series persistence of earnings reflects the autocorrelation in earnings, and it is measured by the slope of the regression of future earnings on current earnings (Lev 1983; Lipe 1990). Different components of earnings have different persistence in future earnings. Sloan (1996) indicates that earnings performance attributable to the accruals component of earnings exhibits lower persistence than that attributable to the cash flow component of earnings. Xie (2001) decomposes the total accruals in Sloan (1996) into normal accruals and abnormal accruals, and examine whether the market rationally prices abnormal accruals. The results suggest that the low persistence and overpricing of total accruals is due largely to abnormal accruals. Collins and Hribar (1999) investigate whether the accrual pricing anomaly documented by Sloan (1996) for annual data holds for quarterly data, and find that the market appears to overestimate (underestimate) the persistence of the accrual (cash flow) component of quarterly earnings and, therefore, tends to overprice (underprice) accruals (cash flows).

Lower persistence of the accrual component of earnings can be caused by earnings management. Dechow et al. (1995) examine a sample of earnings manipulations subject to the SEC enforcement actions and find that total accruals are

abnormally high in the years leading up to the year when SEC alleges that earnings are overstated and are abnormally low thereafter.

Predictability. The prediction of earnings is very important for valuation and investment purposes. Graham and Dodd (1951) suggest the idea that current earnings can be used as a starting point for future earnings prediction. “In the absence of indications to the contrary we accept the past records as at least the starting basis for judging the future.” The predictability of earnings is a function of the average absolute magnitude of the annual earnings shocks in the regression of future earnings on current earnings (Lipe 1990).

Smoothness. Smoothness of earnings is usually measured by the volatility of earnings relative to some benchmark, such as cash flows (Leuz et al. 2003; Lang et al. 2006; Barth et al. 2008). According to Lang et al. (2003), firms in many jurisdictions tend to use discretion in accounting to smooth the reported earnings stream. All else equal, a smaller variance of the residual suggests earnings smoothing. Another measure they used is the negative correlation between accruals and cash flows, based on the argument that the more negative the correlation between accruals and cash flows, the more likely firms use accruals to smooth variability in cash flows so as to smooth earnings.

Graham et al. (2005)’s survey indicates that earnings volatility reduces earnings predictability. Dichev and Tang (2009) test this notion and find the empirical support.

Value-relevance. The value relevance of earnings pertains to “whether accounting earnings measurements are consistent with the underlying events and

information set reflected in stock prices". A commonly seen metric of value-relevance of earnings is the power of accounting earnings in explaining the change of stock price, i.e. the R^2 from the regression of returns on earnings[23]. Another frequently used metric of value-relevance of earnings is the association between reported earnings and change in market prices[24] (Dechow 1994; Ewert and Wagenhofer 2005), or as called, earnings response coefficient (ERC).

According to Easton et al. (1992), ERC and R^2 of the return-earnings regression over a longer horizon are much higher than their counterparts from the annual estimation. However, Hayn (1995) argues that the results are primarily attributed to the effect of losses because longer accumulation periods mean a lower likelihood that the aggregated earnings variable is negative. Lipe (1990) documents that ERC is an increasing function of both the predictability of the earnings series and the time-series persistence of earnings.

Timeliness. According to Ball et al. (2000), timeliness is defined as the extent to which current period accounting income incorporates current period economic income. R^2 from the reverse regressions of earnings on returns is used to measure the timeliness of earnings (Bushman et al. 2004; Ball et al. 2000)

Conservatism. Conservatism or asymmetric timeliness is defined in Basu (1997) as the extent to which current period accounting income asymmetrically incorporates economic losses (bad news) relative to economic gains (good news). Basu interprets

[23] See, for example, Lev (1989), Hayn (1995), Collins et al. (1997), Francis and Schipper (1999) and Barth et al. (2008).
[24] See, for example, Dechow (1994) and Ewert and Wagnhofer (2005).

conservatism as the result of the accountants' tendency to require a higher degree of verification to recognize good news as gains than to recognize bad news as losses. The ratio of the reverse regression coefficient on negative returns to the coefficient on positive returns is often used to measure conservatism (Basu 1997; Pope and Walker 1999).

Basu (1997) examines the sensitivity of reported earnings to good or bad news between 1963 and 1990, and documents that the contemporaneous sensitivity of earnings to negative returns is two to six times that of earnings to positive returns.

If we agree that the above attributes are to measure earnings quality without asking the causes (by estimation errors or management manipulations), then earnings management[25] flags low quality earnings due to the managers' intention of misleading stakeholders. Prior research interprets high quality earnings as earnings that exhibit less earnings management (e.g. Barth et al. 2008) and suggests several measures of earnings management, which are discussed below.

Accruals measures have been used extensively in prior research that explores the relation between earnings management and accruals, and/or earnings quality and accruals. In the early studies like Healy (1985) and DeAngelo (1986), total accruals or the change of total accruals are used mostly as a measure of management discretion.

[25] Healy and Wahlen (1999) define earnings management as: "Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers."

Later, the discretionary accruals estimated from the Jones Model (Jones 1991) and its augmented versions (Dechow et al. 1995; Kothari et al. 2005; Larcker et al. 2007) are widely accepted as a proxy for earnings management (e.g., Becker et al. 1998; Bédard 2006). In some studies (e.g. Ashbaugh-Skaife et al. 2008), accruals measures are used as alternatives to accrual quality in measuring earnings quality.

Another proxy for earnings management is the loss avoidance, measured by the frequency of small positive earnings as in Barth et al. (2008) and Lang et al. (2003; 2006). In addition, some studies use either incidence or magnitude of restatements to measure earnings management (Lee et al. 2006). Hribar and Jenkins (2004) provide the evidence that accounting restatements lead to both decreases in expected future earnings and increases in the firm's cost of equity capital.

Apart from the above two approaches to evaluating earnings quality, some recent studies adopt a risk perspective in measuring earnings quality. Ecker et al. (2006) view earnings quality as a measure of information risk and analyze a returns-based measure of earnings quality—e-loading, the slope coefficient from a regression of a firm's daily excess return in a year (or a quarter) on a factor-mimicking portfolio capturing earning quality. After all dimensions are examined, they conclude that e-loadings perform well in capturing earnings quality.

3.1.2 Factors Related to Earnings Quality

Prior research documents a number of firm-specific operating characteristics that affect firms' accrual quality. DD posit that larger firms have more stable and predictable operations and therefore are less susceptible to accrual estimation errors,

and that the greater the frequency of reporting negative earnings, the lower the accrual quality because losses are indicative of unusual operating environment. Collins et al. (1997) investigate systematic changes in the value-relevance of earnings and book values over time and document a shift in value-relevance from earnings to book values, which is claimed to be associated with the increasing significance of one-time items, the increased frequency of negative earnings, and changes in average firm size and intangible intensity across time.

If a firm reports negative earnings or earnings with a greater accruals component, then the quality of earnings is expected to be lower. Hayn (1995) documents a lower value-relevance for losses than for gains and interpret it as that reported losses are perceived by investors as temporary. Sloan (1996) points out that while both cash flows from operations and accruals contribute to current earnings, current earnings performance is less likely to persist if it is primarily attributable to the accrual component of earnings as opposed to the cash flow component.

Managers may have different incentives to manage earnings. The compensation contracts are likely to affect the managers' manipulation in attempt to maximize bonus awards (Healy 1985; Holthausen et al. 1995; Guidry et al. 1999). The job security and expected tenure of the CEO also have a play in the change of frequency of earnings management (DeAngelo 1988; Dechow and Sloan 1991). Teoh et al. (1998) find that, as compared to non-IPO firms, IPO firms are more likely to have income-increasing depreciation policies and bad debt allowances in the IPO year and for several subsequent years. Firms facing financial distress are likely to report large absolute

abnormal accruals (Dechow et al. 1995; DeAngelo et al. 1994; McNichols 2000; Kothari et al. 2005).

A system with good checks and monitoring can usually enhance earnings quality. Myers et al. (2003) document a positive relation between auditor tenure and earnings quality, measured by current accruals and discretionary accruals. Using different measures of earnings quality[26], Ghosh and Moon (2005) and Gul et al. (2009) each independently document a positive relation between earnings quality and auditor tenure. Gul et al. further point out that such association is weaker for firms audited by industry specialists compared to non-specialists. In their study on family firms in S&P 500, Ali et al. (2007) find that family firms, compared to non-family firms, exhibit lower discretionary accruals, higher predictability of earnings components to cash flows, and larger earnings response coefficient. Wang (2006) presents evidence that founding family ownership is associated with lower abnormal accruals, greater earnings informativeness, and less persistence of transitory loss components in earnings. Leuz et al. (2003) provide evidence that the extent of earnings smoothing appears to be highly associated with investor protection. Compared to the firms from the countries with low investor protection, firms in the U.S. exhibit lower levels of smoothing. However, Larcker et al. (2007) finds a weak association between abnormal accruals and fourteen governance factors.

[26] Ghosh and Moon (2005) use earnings response coefficient from contemporaneous returns-earnings regressions to measure investor perception of earnings quality ; Gul et al. (2009) use the discretionary accruals generated from the model by Ball and Shivakumar (2006) to measure earnings quality.

The quality of earnings is also affected by the financial reporting process. As documented in Brown and Pinello (2007), the fourth quarter earnings involve less earnings management than the first three quarters. Following this, in the research of earnings quality, due to the distinctions between annual and interim earnings, it is inappropriate to generalize about both types of earnings from either result. Therefore, to be rigorous, it is essential to clarify which type of earnings is the focal point. I discuss this in the next section.

3.2 Interim vs. Annual Earnings

Interim earnings are less precise (Mendenhall and Nichols 1988) and more subject to managers' discretion than annual earnings (Palepu 1988). The differences in financial accounting standards and auditor involvement are two primary contributing factors, which are discussed below.

3.2.1 Differences in interim and annual financial reporting/audit processes

Earnings in the fourth quarter are very different from those in the first three interim quarters because the fourth-quarter earnings are closely tied to the annual report, which is subject to more stringent financial accounting rules and more rigorous annual audits[27].

Financial accounting standards are more lenient on interim reporting. Accounting Principles Board Opinion No. 28, *Interim Financial Reporting*, adopts an

[27] Mendenhall and Nichols (1988) mentioned another financial reporting process factor that contributes to the less precise estimate of interim cost than would be expected at fiscal year-end: the timelier announcement of interim financial information.

integral approach for interim reporting and views each interim period primarily as an integral part of the fiscal year period (AICPA 1973). Under such an approach, managers exert more professional judgment in arriving at interim earnings than annual earnings, due to the fact that all the allocations in each quarter depend on managers' anticipation for the rest of the fiscal year (AICPA 1972). Indeed, Elliott and Shaw (1988) find that a majority of write-offs take place at the end of the fiscal year rather than during interim quarters, which is consistent with managers having more discretion in expense recognition in interim quarters.

The integral approach also implies that, at the end of a fiscal year, the managers need to adjust the fourth quarter earnings to reverse the misestimates in the first three quarters so as to achieve a reliable annual earnings number. Das and Shroff (2002) show that reversal of earnings changes in the fourth quarter is a common phenomenon from 1985 to 1998. Such a phenomenon is consistent with the hypothesis of "settling up"[28] effect in the fourth quarter mentioned in Collins et al. (1984).

Besides the fact that the fourth quarter is subject to more stringent accounting rules than the first three interim quarters, the differences between them are also attributable to the different treatments by public accountants. All annual reports from SEC registrants must be audited by independent auditors, while the interim financial information needs to be reviewed only. Moreover, not until March 2000, the SEC began to mandate the timely review. That is, before March 2000, firms could choose to

[28] The settling up effect in the fourth quarter refers to the situation that the fourth quarter reported earnings is the sum of the earnings of fourth quarter plus any corrections for estimates of interim quarters.

postpone the review of their interim financial reports to the end of the fiscal year (Manry et al. 2003). Compared to an independent audit, an interim review has a totally different objective and involves much less amount of auditors' work (Frankel et al. 2002). The objective of an audit is to provide reasonable assurance for expressing the opinion that financial reports are in conformity to GAAP, while an interim review doesn't provide such assurance and review procedures are limited principally to analytical procedures and inquiries (AICPA 2002). Mendenhall and Nichols (1988) note that management has more opportunities to manipulate interim earnings when the earnings reports are unaudited.

3.2.2 Differential Impacts of Interim vs. Annual Financial Reporting

In light of the differences discussed in the preceding section, previous research has documented that annual and interim earnings are associated with different earnings management behavior, earnings forecast properties, and capital market reactions.

Dhaliwal et al. (2004) find that firms decrease their annual effective tax rate (ETR) from the third to the fourth quarter as earnings absent tax expense management fall short of the consensus forecast. Comprix et al. (2009) find that estimated effective tax rate (ETR) in the first, second, and third quarters are systematically higher than that at the year-end. The initial ETR increases are more likely to be reversed when firms would have missed their analysts' earnings forecasts without the reversal. The results are consistent with that managers use high ETR to create slacks initially and use them to manage net income upward later. For a sample of firms beating analysts' forecasts over the period 1993-2005, Brown and Pinello (2007) document lower income-increasing

earnings management in the fourth quarter than in the interim quarters. They conclude that annual reporting curbs the earnings management more effectively than interim reporting. In addition, In light of the difficulty in differentiating the noise from earnings management in the fourth quarter, Jeter and Shivakumar (1999) suggest that the test of earnings management may be less powerful in the fourth quarter than in interim quarters.

Consistent with the hypothesis of a "settling up" effect in the fourth quarter, Collins et al. (1984) document a very strong pattern of higher forecast errors associated with analysts and time-series models in the fourth quarter than interim quarters. Basu et al. (2005) replicate and extend Collins et al. (1984) and find that, during 1994-2004, analysts' earnings forecasts for the fourth quarter are less accurate than for interim quarters. Both the larger forecast errors for losses in the fourth quarter and the higher frequency of fourth-quarter loss seem to explain the result.

Some studies document the fourth-quarter seasonality in market reaction to earnings. Kross and Schroeder (1990) find that, for smaller firms, the magnitude of the abnormal return around earnings announcements in the fourth quarter is lower than that in interim quarters. Salamon and Stober (1994) document smaller earnings response coefficients in the fourth quarter than in the interim quarters for both large and small firms. If the earnings announcement contains bad news, then according to Mendenhall and Nichols (1988), market reacts more negatively to bad news in the first three quarters than in the fourth quarter, because investors perceive managers having more discretion over cost estimates in interim quarters.

3.3 Earnings Quality around SOX and Other Regulatory Reforms

Don Nicholaisen, the ex-chief accountant at the SEC, talked about whether SOX is likely to promote earnings quality,

> I suspect that the costs are not easy to estimate, but I know that it is even tougher to quantify the benefits. However, given the massive financial scandals, decline in market capitalization, and resulting loss of investor confidence in our markets, I believe that, of all of the recent reforms, the internal control requirements have the greatest potential to improve the reliability of financial reporting.

There are both direct and indirect evidences that the implementation of SOX improves earnings quality. For example, based on annual earnings data, Cohen et al. (2008) document a steady increase in accrual-based earnings management up to just before the passage of SOX over the period from 1987 to 2005 and a sharp decline after SOX. The evidence from a subsample of firms that just achieve the earnings benchmarks suggest they use less accruals management and more real earnings management after SOX. This notion has been mentioned in the survey by Graham et al. (2005): SOX may have changed the mix of earnings management mechanisms employed by managers. Lobo and Zhou (2006) investigate whether SOX changes the conservatism in financial reporting and find that firms report lower discretionary accruals and financial reporting is more conservative after SOX. Durney et al. (2009) explore the quality of financial reporting of firms that operate in offshore financial centers between 1998 and 2007 and find that the enactment of SOX significantly decreases accrual management of offshore firms.

Some other studies examine the impact of similar internal control reforms that took place in the U.S. history or in a jurisdiction outside of U.S. Overall, those studies

show that internal control reforms improve the earnings quality of affected firms. Altamuor and Betty (2006) study the FDIC improvement Act of 1992 (FDICIA), which requires large banks in the U.S. to report annually management's assessment of the effectiveness of their internal controls over financial reporting. The evidence is consistent with FDICIA reforms leading to improvements in earnings quality of affected banks compared to unaffected banks. Brown et al. (2008) use a set of European firms as a control sample, to investigate whether the internal control regulation, 1998 German legislation on control and transparency (KTG) leads to improvements in earnings quality for German public companies. They conclude that KTG increases earnings quality through effective internal control. In their analytical work, Ewert and Wagenhofer (2005) demonstrate that tighter standards, which makes it more costly for the manager to achieve a desirable level of earnings management, increase earnings quality, as measured by the variability of reported earnings and the association between reported earnings and the market price reaction.

The internal control deficiency disclosure mandated by SOX makes it possible to employ a matched-sample setting to empirically test the relation between internal control deficiencies and earnings quality in the post-SOX era. Ashbaugh-Skaife et al. (2008) provide cross-sectional and inter-temporal evidence that differences in internal control effectiveness have a significant impact on accrual quality. Specifically, firms that disclose internal control deficiencies exhibit greater noise in accruals and larger abnormal accruals than the firms without internal control deficiencies disclosures. Overtime, the improvements in accruals quality for firms that disclose internal control

deficiencies and remediate the problem afterwards are more significant than the firms that only disclose but not remediate the deficiencies. Doyle et al. (2007a) examine the relation between accruals quality and internal control between 2002 and 2005 and document a relation between weaknesses in internal controls over financial reporting and poor accrual quality. They further find that such an association is mostly driven by the weaknesses related to overall company-level controls, which are generally difficult to detect. Bédard (2006) investigates whether SOX 302 and 404 internal control requirements improve the earnings quality of SEC registrants and find the evidence that managers reverse prior extreme large accruals in the disclosure year. For companies with effective internal controls based on their SOX 404 report, the absolute unexpected accruals decrease significantly in the year of their first internal control disclosure from the year before. Overall, the results suggest that SOX internal control requirements result in an improvement in earnings quality.

CHAPTER 4

HYPOTHESIS DEVELOPMENT

4.1 Interim Earnings Quality around SOX

This section develops testable hypotheses on the interim earnings quality around the enactment of SOX.

As discussed in Chapter 2, SOX was signed into law in 2002 with the aim of restoring the public trust in financial reporting. To achieve the mission, the Act emphasizes internal controls for ensuring the accuracy of financial reports and disclosures, among all the provisions, by mandating internal checks and balances, clarifying the responsibility of the top management, and requiring intensive auditor involvement. All these requirements are expected to beef up the internal control system in firms, which is designed to identify unintentional errors and impede intentional manipulations and frauds. With reduced unintentional estimation errors and curbed intentional managerial manipulations, the quality of reported earnings can be improved (Manry et al. 2003). Accordingly, it is reasonable to expect increased earnings quality after SOX. Indeed, Cohen et al. (2008) document a decline in accrual-based earnings management after SOX using the annual data. In this study, I focus on interim earnings and hypothesize that SOX improves the quality of interim earnings as well. The arguments are presented in the following paragraphs.

First, SOX internal control provisions increase management's responsibility for and involvement in establishing and maintaining internal controls over financial reporting. SOX 302 requires a company's management to certify quarterly and annually regarding the company's internal controls over financial reporting. Specifically, management is required to evaluate the effectiveness of the internal controls on a quarterly basis (i.e., within 90 days prior to the quarterly report) and disclose (1) any significant deficiencies in the design or operation of internal controls over financial reporting, (2) any fraud that involves employees who are related to internal control activities, and (3) any significant changes in internal controls or other factors that could have a significant impact on the internal controls. Moreover, any failure to comply with SOX 302 is accompanied with the fine of no more than $5,000,000 or the imprisonment of no more than 20 years or both. These new certification requirements and significant criminal penalties are likely to motivate top managers to strive for a better and more efficient internal control system. Under SOX 302, deficiencies in internal controls are more likely to be identified and corrected in a timely manner. An improved and periodically monitored internal control system is thus more likely to discover unintentional errors and curb intentional manipulations, which in turn, will improve the quality of interim earnings.

Second, SOX 404 further requires auditors to provide an opinion on the management's assessment on internal controls over financial reporting, which is likely to increase the extent and amount of audit work that needs to be performed during interim periods. According to AS 2, the auditor should perform some procedures on a

quarterly basis to provide a basis for determining whether the disclosure about changes in internal control over financial reporting is accurate and in compliance with SOX 302 (PCAOB 2004). To fulfill this responsibility, auditors are required to perform a list of procedures on a quarterly basis, which includes inquiring of management about significant changes in the design or operation of internal control over financial reporting, evaluating the implications of misstatements as it relates to effective internal control over financial reporting, and determining on any material change in internal control over financial reporting. Under AS 2, auditors are also responsible for communicating with appropriate parties in case of noncompliance. Moreover, to obtain evidence about the operating effectiveness of internal controls, auditors are likely to perform specific tests during interim periods. A common example is the tests for IT system, which mostly take place in interim periods. In this regard, AS 2 provides guidance on how to report on the effectiveness of internal controls as of the year end using the evidence collected at an interim date. In particular, auditors can perform the tests at an interim date as long as the tested controls are not those over (1) significant non-routine transactions, (2) accounts or processes with a high degree of subjectivity or judgment in measurement, or (3) the recording of period-end adjustments (PCAOB 2004).

According to the Blue Ribbon Committee, commissioned by the SEC to improve the oversight of the financial reporting process, increased involvement by the outside auditors and audit committee in the interim financial reporting process should result in more accurate interim reporting (BRC 1999). Manry et al. (2003) find that timely-reviewed interim earnings are of higher quality, and Ettredge et al. (2000) show

that firms with timely reviews record fewer fourth-quarter adjustments than do firms with retrospective reviews, both of which are consistent with the BRC's claim. Therefore, the increased auditor involvement in interim reporting due to SOX 404 is expected to improve interim earnings quality.

The above discussion suggests the first hypothesis in this study:

H1: The quality of interim earnings improves after the enactment of SOX.

4.2 Change in Earnings Quality around SOX (Interim versus Annual)

This section discusses the second hypothesis which predicts that the gap between annual and interim earnings quality decreases in the post-SOX era. As discussed in Chapter 3, previous research indicates that the quality of interim earnings is lower because managers have more discretion in expense recognition in interim reporting and interim earnings are only subject to review which is less rigorous than an independent audit. If SOX 302 increases the management's responsibility for establishing and maintaining internal controls on a quarterly basis and SOX 404 increases the auditor's involvement in interim reporting (as discussed in the preceding section), then the gap in earnings quality between annual and interim reporting is expected to decrease after the passage of SOX. Thus, the second hypothesis is formulated as follows:

H2: The gap in earnings quality between annual and interim reporting decreases after the enactment of SOX.

CHAPTER 5

METHODOLOGY

5.1 Measures of Earnings Quality

Following prior research, I use two approaches to measuring earnings quality: the earnings-management approach (Cohen et al. 2008) and the earnings-attribute approach (Francis et al. 2004; Dechow and Dichev 2002; Manry et al. 2003). Under the earnings-management approach, I use the discretionary accruals to measure earnings quality. Under the earnings-attribute approach, both the accounting-based (i.e. accrual quality) and the market-based (i.e. the value-relevance of earnings) attributes are used.

5.1.1 Earnings Management

As a proxy for earnings management, I use the abnormal accruals estimated from the modified Jones Model as described in Dechow et al. (1995), controlling for performance as in Kothari et al. (2005). For annual data, the regression model is as follows:

$$\frac{TA_{i,t}}{Asset_{i,t-1}} = \delta_0 \frac{1}{Asset_{i,t-1}} + \delta_1 \frac{\Delta REV_{i,t} - \Delta AR_{i,t}}{Asset_{i,t-1}} + \delta_2 \frac{PPE_{i,t}}{Asset_{i,t-1}} + \delta_3 \frac{EBEIT_{i,t}}{Asset_{i,t-1}} + \varepsilon_{i,t} \quad (1)$$

where:

$TA_{i,t}$ = total accruals for firm i in year t, computed as earnings before extraordinary items (annual Compustat data item IB) minus cash flow from operations (annual

Compustat data item OANCF), adjusted for extraordinary items and discontinued items[29](annual Compustat data item XIDOC);

Assets $_{i, t-1}$ = total assets (annual Compustat data item AT) for firm i at the end of year t-1;

$\Delta REV_{i,t}$ = change in revenues (annual Compustat data item SALE) for firm i from year t-1;

$\Delta AR_{i,t}$ = change in accounts receivable (annual Compustat data item RECT) for firm i from year t-1;

$PPE_{i,t}$ = gross value of property, plant and equipment (annual Compustat data item PPEGT) at the end of year t;

$EBEIT_{i,t}$ = earnings before extraordinary items (annual Compustat data item IB) for firm i in year t.

For each firm-year observation, all the other firm-year observations from same year and the same industry (based on the two-digit SIC code) are used to estimate the model. The estimation procedure requires at least 10 firm-year observations within an industry-year group. Accordingly, there is a unique set of estimated coefficients for each firm-year observation.

To derive the firm-year specific discretionary accruals ($\hat{DA}_{i,q}$), the firm-year specific coefficient estimates from Equation (1) are used as follows:

$$\hat{DA}_{i,t} = \frac{TA_{i,t}}{Asset_{i,t-1}} - \hat{\delta}_0 \frac{1}{Asset_{i,t-1}} + \hat{\delta}_1 \frac{\Delta REV_{i,t} - \Delta AR_{i,t}}{Asset_{i,t-1}} + \hat{\delta}_2 \frac{PPE_{i,t}}{Asset_{i,t-1}} + \hat{\delta}_3 \frac{EBEIT_{i,t}}{Asset_{i,t-1}} \quad (2)$$

For quarterly data, the regression model is as follows:

[29] Same as in Koh et al. (2008), this study computes total accruals as earnings before extraordinary items less cash flows from operations (data item OANCFY) plus extraordinary items and discontinued items (data item XIDOC).

$$\frac{TA_{i,q}}{Asset_{i,q-1}} = \delta_0 \frac{1}{Asset_{i,q-1}} + \delta_1 \frac{\Delta REV_{i,q} - \Delta AR_{i,q}}{Asset_{i,q-1}} + \delta_2 \frac{PPE_{i,q}}{Asset_{i,q-1}} + \delta_3 \frac{EBEIT_{i,q}}{Asset_{i,q-1}} + \varepsilon_{i,q} \quad (3)$$

where:

$TA_{i,q}$ = total accruals for firm i in quarter q, computed as earnings before extraordinary items (quarterly Compustat data item IBQ) minus cash flow from operations (quarterly Compustat data item OANCFQ[30]), adjusted for extraordinary items and discontinued items (quarterly Compustat data item XIDOCQ);

$Assets_{i, q-1}$ = total assets (quarterly Compustat data item ATQ) for firm i at the end of quarter q-1;

$\Delta REV_{i,q}$ = change in revenues (quarterly Compustat data item SALEQ) for firm i from quarter q-1;

$\Delta AR_{i,q}$ = change in accounts receivable (quarterly Compustat data item RECTQ) for firm i from quarter q-1;

$PPE_{i,q}$ = gross value of property, plant and equipment (quarterly Compustat data item PPEGTQ) at the end of quarter q;

$EBEIT_{i,q}$ = earnings before extraordinary items (quarterly Compustat data item IBQ) for firm i in quarter q.

For each firm-quarter observation, all the other firm-quarter observations from the same quarter and the same industry (based on the two-digit SIC code) are used to estimate the model. The estimation procedure requires at least 10 firm-quarter observations within an industry-quarter group. Accordingly, there is a unique set of estimated coefficients for each firm-quarter observation.

[30] In the quarterly Compustat database, although there is a term for quarterly cash flow from operations (OANCFQ), the value of quarterly OANCFQ is not provided. Only the year-to-date cash flow from operations (OANCFY) is available. Therefore, except for the first fiscal quarter, in which OANCFQ is the same as OANCFY by construct, in order to obtain OANCFQ for the current quarter, I subtract OANCFY for the last quarter from OANCFY for current quarter. The amount of extraordinary items and discontinued items on the quarterly cash flow statement (XIDOCQ) is obtained through the similar approach. That is, I subtract XIDOCY for the last quarter from XIDOCY for current quarter to obtain the XIDOCQ for the current quarter.

To derive firm-quarter specific discretionary accruals ($\hat{DA}_{i,q}$), the firm-quarter specific coefficient estimates from Equation (3) are used as follows:

$$\hat{DA}_{i,q} = \frac{TA_{i,q}}{Asset_{i,q-1}} - \hat{\delta}_0 \frac{1}{Asset_{i,q-1}} + \hat{\delta}_1 \frac{\Delta REV_{i,q} - \Delta AR_{i,q}}{Asset_{i,q-1}} + \hat{\delta}_2 \frac{PPE_{i,q}}{Asset_{i,q-1}} + \hat{\delta}_3 \frac{EBEIT_{i,q}}{Asset_{i,q-1}} \quad (4)$$

Both signed discretionary accruals and absolute value of discretionary accruals from Equation (2) or (4) are used to measure earnings management. A higher positive discretionary accruals (*PDA*) value implies more income-increasing earnings management. To facilitate interpretation, I use the absolute value of negative discretionary accruals (|*NDA*|) to indicate the magnitude of income-decreasing earnings management. A higher absolute value of negative discretionary accruals (|*NDA*|) value implies more income-decreasing earnings management. For the absolute value of discretionary accruals (*ABSDA*), the higher the value, the more earnings management is implied.

5.1.2 Accrual Quality

I use the model proposed by DD and augmented by McNichols (2002) to measure accrual quality. In the DD model, accrual quality is measured by the extent to which current accruals map into cash flow realizations. In light that the change in sales revenue and property, plant and equipment (PPE) are important in forming expectations about current accruals, McNichols (2002) proposes controlling for these two factors in the DD model. For annual data, the model is as follows (all variables are scaled by the total assets at the end of the preceding year):

$$\frac{TACC_{j,t}}{Assets_{j,t-1}} = \phi_{0,j} + \phi_{1,j}\frac{CFO_{j,t-1}}{Assets_{j,t-2}} + \phi_{2,j}\frac{CFO_{j,t}}{Assets_{j,t-1}} + \phi_{3,j}\frac{CFO_{j,t+1}}{Assets_{j,t}}$$
$$+ \phi_{4,j}\frac{\Delta Rev_{j,t}}{Assets_{j,t-1}} + \phi_{5,j}\frac{PPE_{j,t}}{Assets_{j,t-1}} + \upsilon_{j,t} \quad (5)$$

where:

$TACC_{j,t}$ = total accruals for firm j in year t. Total accruals is defined as income before extraordinary items (annual Compustat data item IB) minus cash flow from operations (annual Compustat data item OANCF), adjusted for extraordinary items and discontinued items (annual Compustat data item XIDOC);

$CFO_{j,t}$ = cash flow from operations for firm j in year t;

$CFO_{j,t-1}$ = cash flow from operations for firm j in year t-1;

$CFO_{j,t+1}$ = cash flow from operations for firm j in year t+1;

$\Delta Rev_{j,t}$ = change in revenues (annual Compustat data item SALE) for firm j from preceding year;

$PPE_{j,t}$ = gross value of property, plant and equipment (annual Compustat data item PPEGT) for firm j at the end of year t;

For each firm-year observation, all the other firm-year observations in the same year and the same industry (based on the two-digit SIC code) are used to estimate the model. The sample requires at least 10 firm-year observations within an industry-year group. As a result, there is a unique set of estimated coefficients for each firm-year observation. The estimation of Equation (5) yields firm-year specific residuals, $\hat{\upsilon}_{j,t}$, which reflect the accruals that are unrelated to cash flow realizations and form the basis of the accrual quality metric.

After adapted for quarterly data, the model is operationalized as follows (all variables are scaled by the total assets at the end of the preceding quarter):

$$\frac{TACC_{j,q}}{Assets_{j,q-1}} = \phi_{0,j} + \phi_{1,j}\frac{CFO_{j,q-4}}{Assets_{j,q-5}} + \phi_{2,j}\frac{CFO_{j,q}}{Assets_{j,q-1}} + \phi_{3,j}\frac{CFO_{j,q+4}}{Assets_{j,q+3}}$$
$$+ \phi_{4,j}\frac{\Delta \mathrm{Re}v_{j,q}}{Assets_{j,q-1}} + \phi_{5,j}\frac{PPE_{j,q}}{Assets_{j,q-1}} + \upsilon_{j,q} \quad (6)$$

where:

$TACC_{j,q}$ = total accruals for firm j in quarter q. Total accruals is defined as income before extraordinary items (quarterly Compustat data item IBQ) minus cash flow from operations (quarterly Compustat data item OANCFQ), adjusted for extraordinary items and discontinued items (quarterly Compustat data item XIDOCQ);

$CFO_{j,q}$ = cash flow from operations for firm j in quarter q;

$CFO_{j,q-4}$ = cash flow from operations for firm j in quarter q-4;

$CFO_{j,q+4}$ = cash flow from operations for firm j in quarter q+4;

$\Delta Rev_{j,q}$ = change in revenues (quarterly Compustat data item SALE) for firm j from preceding quarter;

$PPE_{j,q}$ = gross value of property, plant and equipment (quarterly Compustat data item PPEGT) for firm j at the end of quarter q;

For each firm-quarter observation, all the other firm-quarter observations in the same quarter and the same industry (based on the two-digit SIC code) are used to estimate the model. The sample requires at least 10 firm-quarter observations within an industry-quarter group. As a result, there is a unique set of estimated coefficients for each firm-quarter observation. The estimation of (6) yields firm-quarter specific residuals, $\hat{\upsilon}_{j,q}$, which reflect the accruals that are unrelated to cash flow realizations and form the basis of the accrual quality metric.

After the residuals from the DD model are obtained, the standard deviation of residuals usually is used to measure accrual quality. There are two approaches to

computing the standard deviation of residuals, the details of which are provided in the following paragraphs.

Francis et al. (2005) use a time-series approach and compute the firm-specific measure of accrual quality by taking the standard deviation of firm-specific time-series residuals from the DD model over five consecutive years up to the current year. Their approach, however, is not a good fit for this study. To examine the change of accrual quality over time, the research design needs to make sure that the measures of accrual quality for the pre-SOX and post-SOX periods do not have overlapping components. If I follow their approach, my testable post-SOX sample will be very limited[31].

To overcome the concerns over applying Francis et al. (2005)'s approach to this study, I follow Barth et al. (2008) and construct the metric of accrual quality using a cross-sectional approach. Within each industry-quarter (or industry-year) group, all the firm residuals are pooled together to generate one standard deviation. To facilitate the interpretation, I use the inverse of the standard deviation as the actual metric of accrual quality (*AQ*) because higher standard deviation signifies lower accrual quality. For example, the accrual quality of industry i in year t ($AQ_{i,t}$) is the inverse standard deviation of all firm-specific residuals from year t within industry i, i.e.,

$$AQ_{i,t} = 1/STDEV(\upsilon_t)_i \tag{7}$$

Similarly, the accrual quality of industry i in quarter q ($AQ_{i,q}$) is the inverse standard deviation of all firm-specific residuals from quarter q within industry i, i.e.,

[31] In the computation of accrual quality for the years after SOX, to avoid using residuals from pre-SOX period, the earliest post-SOX year to be used is the year of 2007. To calculate accrual quality through this method for any years before 2006, residuals from pre-SOX periods would be used.

$$AQ_{i,q} = 1/STDEV(\upsilon_q)_i \quad (8)$$

The cross-sectional approach has two advantages. First, it allows this study to retain the data from 2003 through 2006 in the post-SOX sample. Second, the sample selection criterion requires at least 10 observations within each industry-quarter or industry-year group, providing adequate observations to calculate the standard deviation of residuals cross-sectionally. However, the tradeoff is that the accrual quality metric is computed at the industry level rather than at the firm level. As a result, in the following multivariate tests, some adjustments need to be made to control variables to make sure that they also represent the data at industry level.

As a supplemental test, I also construct the accrual quality metric using the Francis et al. (2005) approach. The accrual quality is calculated for each firm-year or firm-quarter based on the firm-specific time-series residuals from the DD model. Specifically, the accrual quality of firm j in year t ($AQ_{j,t}$) is the inverse of the standard deviation of five consecutive annual residuals starting from t-4 to t,

$$AQ_{j,t} = 1/STDEV(\upsilon_j)_t \quad (9)$$

where t equals t-4, t-3, t-2, t-1 and t.

Similarly, the accrual quality of firm j in quarter q ($AQ_{j,q}$) is the inverse standard deviation *(STDEV)* of residuals from the same quarters across five consecutive years,

$$AQ_{j,q} = 1/STDEV(\upsilon_j)_q \quad (10)$$

where q equals q-16, q-12, q-8, q-4 and q.

Similarly, a higher standard deviation of residuals (*STDEV*) implies lower accrual quality. Due to the aforementioned data limitation, my post-SOX sample for this supplemental test is restricted to the firm-quarters in the year of 2007, the fifth year of the post-SOX period.

5.1.3 Value Relevance

Consistent with Dechow (1994) and Manry et al. (2003), the value relevance of earnings in this study is measured as how the variability of stock returns is explained by the variability of contemporaneous earnings. I use the adjusted R^2 from the regression of stock return on accounting earnings to measure the value relevance (*VR*) of earnings. A higher adjusted R^2 implies higher value relevance of earnings. For annual data, the model is as follows:

$$RET_{j,t} = \alpha_0 + \alpha_1 NI_{j,t} + \varepsilon_{j,t} \tag{11}$$

where:

$RET_{j,t}$ = raw stock returns (CRSP data item RET) cumulated for firm j during year t;

$NI_{j,t}$ = net income before extraordinary items (annual Compustat data item IB) for firm j in year t, scaled by market value of equity at the beginning of year t. The market value of equity is a product of common shares outstanding (annual Compustat data item CSHO) and stock price (annual Compustat data item PRCC_F).

For quarterly data, the model is as follows:

$$RET_{j,q} = \alpha_0 + \alpha_1 NI_{j,q} + \varepsilon_{j,q} \tag{12}$$

where:

$RET_{j,q}$ = raw stock returns (CRSP data item RET) cumulated for firm j during quarter q;

$NI_{j,q}$ = net income before extraordinary items (quarterly Compustat data item IBQ) for firm j in quarter q, scaled by market value of equity at the beginning of quarter q. The market value of equity is a product of common shares outstanding (quarterly Compustat data item CSHOQ) and stock price (quarterly Compustat data item PRCCQ).

Prior literature provides two approaches to estimating the regression of stock return on earnings so as to measure the contemporaneous association between return and earnings, i.e. value relevance. Using a time-series approach, Francis et al. (2004) generate the value-relevance metric of adjusted R^2 for a specific firm-year by estimating the regression of stock return on earnings over ten-year rolling windows. However, their approach is not a good fit for this study. To examine the change of value-relevance over time, the research design needs to make sure that the measures of it for the pre-SOX and post-SOX do not have overlapping components. However, if I generate adjusted R^2 following Francis et al. (2004)'s method, a direct consequence is that there will be no usable value-relevance data in the post-SOX period in my sample.

To overcome the issue over applying Francis et al. (2004) approach to this study, I follow Barth et al. (2008) and estimate each regression cross-sectionally. For each year or quarter, Equation (11) or (12) is estimated within an industry group (with at least 10 firms). By that, I presume the constant relation between contemporaneous stock return and earnings within a specific industry-quarter (industry-year). Such a procedure generates a specific adjusted R^2 for each industry-quarter (industry-year) group. However, the disadvantage of the cross-sectional approach is that the value-relevance metric is computed at industry level rather than at firm level. Accordingly, in the following multivariate tests, some adjustments need to be made to control variables to make sure that they also represent the data at industry level.

5.2 Sample Selection

The sample is drawn from the quarterly Compustat industrial and research files, annual Compustat industrial and research files and CRSP over a ten-year period from 1998 to 2007. Because firms in regulated industries likely have different characteristics from non-regulated industries (Barton and Simko 2002), I exclude utilities and financial service firms with 2-digit SIC codes of 49 and 60-67. The sample is therefore restricted to all non-regulated firms with available data. Each firm-quarter (firm-year) observation should have adequate data to calculate at least one of the three measures of earnings quality, and corresponding control variables for the multivariate tests. The final sample consists of the observations from interim quarters and annual periods.

I basically follow Koh et al. (2008) to identify sub-periods. As mentioned earlier, SOX was enacted on July 30, 2002. SOX 302 became effective for firms with fiscal year ending on or after August 29, 2002 and SOX 404 became mandatory for accelerated-filers with fiscal year ending on or after November 15, 2004. Given this time line, the beginning of 2003 appears to be a reasonable starting point to examine the effects of SOX and its internal control provisions. Moreover, the beginning of 2005 can be used to classify the period before the implementation of SOX 404 and the period after. [32] Accordingly, as depicted in Figure 1, the period starting from the beginning of 1998 to the end of 2002 is the pre-SOX period, and the one starting from the beginning

[32] On June 5, 2003, final rule 33-8238 mandated Sec. 404 to be effective for all registrants with fiscal year ending on or after June 15, 2004. However, it became mandatory only for big registrants with fiscal year ending on or after Nov. 15, 2004 and was extended several times for small firms.

of 2003 to the end of 2007 is the post-SOX period. Further, the post-SOX period is divided into the SOX302 period (2003-2004) and the SOX404 period (2005-2007).

5.3 Statistical Analysis

Both univariate and multivariate tests are employed to examine the hypotheses formulated in Chapter 4.

5.3.1 Univariate Tests of Hypothesis 1

In the univariate test for interim earnings quality around the enactment of SOX, all the interim-quarter observations are partitioned into two groups: the pre-SOX period and the post-SOX period. A two-sample t test is used to test whether the mean earnings quality is different between these two groups, while the Mann-Whitney test is used to test whether the median earnings quality is different.

5.3.2 Univariate Tests of Hypothesis 2

An ANOVA analysis is employed to perform the univariate test of H2. I use two dummy variables *SOX* and *Q123* to classify the observations. *SOX* equals 1 if the observation is from the post-SOX period, and zero otherwise. *Q123* equals 1 if the observation belongs to an interim quarter, and zero otherwise. To compare the change in earnings quality for interim quarters with that for annual periods due to SOX, we test whether the interaction term *SOX*Q123* can explain a significant part of variance in the predicted variable of earnings quality.

5.3.3 Multivariate Tests of Hypothesis 1

In the multivariate tests of Hypothesis 1, OLS regressions are employed with the independent variables including a dummy variable indicating the pre-SOX and post-SOX periods and a set of control variables proposed by prior literature.

When earnings quality is measured by earnings management metrics (*ABSDA*, *PDA* and |*NDA*|), I include the following control variables to test H1:

Implicit claims by stakeholders: Bowen et al. (1995) argue that a healthy financial image may lead to more favorable terms of trades with stakeholders and therefore managers of firms that heavily rely on implicit claims with their stakeholders have stronger incentives to choose income-increasing accounting methods. Graham et al. (2005) find that CFOs consistently rank stakeholder concerns as an important motivation underlying financial reporting decisions. Therefore, I expect a positive relation between earnings management and implicit claims. Following Matsumoto (2002), I use three measures to gauge implicit claims by stakeholders: (1) Membership in a durable goods industry (*DUR*)[33]; (2) Research and development expenditures scaled by sales (*RD*) and (3) Labor intensity (*LABOR*), equal to 1 minus the ratio of gross property, plant and equipment to total gross assets[34]. The factor analysis is implemented to reduce the three variables to a single proxy, *ICLAIM*, with an eigenvalue greater than one.

[33] Following Matsumoto (2002), durable goods industry refers to the three-digit SIC industry group: 150-179, 245, 250-259, 283, 301, and 324-399.

[34] Total gross assets is computed as the sum of total assets (quarterly Compustat data item ATQ; annual Compustat data item AT) and accumulated depletion, depreciation and amortization (quarterly Compustat data item DPACTQ; annual Compustat data item DPACT)

Loss: Managers likely have lower incentives to manage earnings for loss firms. Hayn (1995) documents lower market reactions to negative than to positive earnings. Degeorge et al. (1999) suggest that meeting or beating analysts' expectations is not the top priority for loss firms. According to Brown (2001), analysts' forecasts are more optimistic for loss firms. Following Matsumoto (2002), I identify the loss firms as those with consistent negative net income before extraordinary items during the last four quarters (q-5 to q-1)[35]. Degeorge et al. (1999) suggest that meeting or beating analysts' expectations is less important for firms that incur losses. For loss firms, it is likely that the managers have lower incentives to manage earnings, which is a very important mechanism employed to meet or beat expectations. Therefore, I expect a negative relation between the dummy variable indicating loss firms (*LOSS*) and the earnings management measures.

Leverage: Leverage has been found to be positively associated with management's choice of income-increasing accounting methods in order to avoid covenant violations or to prevent adverse effects on debt ratings (e.g., Bowen et al. 1981, DeFond and Jiambalvo 1994, Minton and Schrand 1999). However, Jelinek (2007) find that leverage is negatively associated with earnings management. Therefore, I do not predict the sign of the relation between earnings management and leverage. Leverage (*LEV*) is computed as the ratio of long-term debt to total assets.

Growth: Managers of high-growth firms likely have greater incentives to manage earnings. According to Collins and Kothari (1989), market reaction to earnings

[35] For annual data, I classify any firm with consistent negative income before extraordinary items during the last four years (t-5 up to t-1) as loss firm.

announcements is greater for firms with high-growth opportunities. Skinner and Sloan (2002) find that market severely penalize growth firms for negative earnings surprises. Growth is measured by market-to-book ratio (*MB*). A higher *MB* signifies higher growth potential. I expect a positive relation between earnings management and *MB*.

Firm size: Firm size has been found to be negatively associated with management's choice of income-increasing accounting methods (e.g. Hagerman and Zmijewski 1979). According to Watts and Zimmerman (1990), because large firms face more political costs, they have stronger incentives to exercise accounting discretion to reduce unwanted political visibility. The natural logarithm of market value of equity is used to measure firm size (*SIZE*). I expect a negative relation between earnings management and *SIZE*.

Economic activity: Following Cohen et al. (2008), I include a proxy for real economic activity as another control variable. The percentage change in real gross domestic product (ΔGDP)[36] relative to the previous period is used to measure economic activity. Following Cohen et al.'s results, I expect a negative relation between earnings management and ΔGDP.

Big auditor: The prior literature suggests that large audit firms tend to exert more conservatism and to limit extreme accruals (Becker et al. 1998; Francis and Krishnan 1999). Myers et al. (2003) document lower discretionary accruals for companies with Big 4/5 auditors. Cohen et al. (2008) provide evidence of a negative association between Big 4/5 auditors and earnings management. I include a dummy

[36] The percent change of GDP from preceding quarter or year data are available at the website of U.S. Department of Commerce, Bureau of Economic Analysis, http://www.bea.gov/national/#gdp.

variable *BIG* to classify the auditor type and expect a negative relation between earnings management and *BIG*.

Control for industry and year effects: Industry dummies based on two-digit SIC codes are included to account for industry effect. The control for trend effect (*Trend*) is created by subtracting 1998 from the current year, following Cohen et al. (2008).

I pool all firm-quarter observations for interim quarters and run model (13), using the absolute value of discretionary accruals (*ABSDA*) as the dependent variable. Then, for the set of firms with positive discretionary accruals only, I run the model with positive discretionary accruals (*PDA*) as the dependent variable. Finally, for the set with negative discretionary accrual only, I run the model with the absolute value of negative discretionary accruals (|*NDA*|) as the dependent variable.

$$\begin{aligned} EM_{jq} &= \alpha_0 + \alpha_1 SOX \\ &+ \alpha_2 ICLAIM_{jq} + \alpha_3 LOSS_{jq} + \alpha_4 LEV_{jq} + \alpha_5 SIZE_{jq} + \alpha_6 MB_{jq} \\ &+ \alpha_7 \Delta GDP_q + \alpha_8 BIG_{jq} + \alpha_9 Trend + \sum_{k=1}^{K-1} \alpha_{9+k} Industry_k + \varepsilon_{jq} \end{aligned} \quad (13)$$

where:

EM_{jq} = the measure of earnings management for firm j in quarter q: *ABSDA, PDA* or |*NDA*|;

SOX= a dummy variable equal to 1 if the year of observation is in 2003-2007;

$ICLAIM_{jq}$ = implicit claims by stakeholders, which is the factor analysis result based on variables *DUR*, *RD* and *LABOR*. *DUR* is a dummy variable equals 1 if the firm j belongs to a durable goods industry[37]. *RD* is research and development expenditures (quarterly Compustat data item XRDQ) scaled by total assets (quarterly Compustat data item ATQ). *LABOR* equals 1 minus the ratio of gross property, plant and equipment (quarterly Compustat data item PPEGTQ) to total gross assets, computed as the sum of

[37] The durable goods industry firms are defined as those with SIC codes 150-179, 245, 250-259, 283, 301, and 324-399, following Matsumoto (2002).

total assets (quarterly Compustat data item ATQ) and accumulated depletion, depreciation and amortization (quarterly Compustat data item DPACTQ);

LOSS $_{jq}$ = a dummy variable equal to 1 if firm j has negative net income before extraordinary items (quarterly Compustat data item IBQ) consistently from quarter q-5 to quarter q-1;

LEV $_{jq}$ = leverage ratio, calculated as long-term liabilities (quarterly Compustat data item DLTTQ) over total assets;

SIZE $_{jq}$ = firm size, calculated as the natural logarithm of market value of equity, where market value of equity equals the product of number of common shares outstanding and closing price;

MB $_{jq}$ = market-to-book ratio, calculated as market value of equity at the end of quarter q over book value of equity (quarterly Compustat data item CEQQ), where market value of equity equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ) and closing price (quarterly Compustat data item PRCCQ) at the end of quarter q;

ΔGDP_q = the percent change in the real gross domestic product from the preceding quarter multiplied by 100;

BIG $_{jq}$ = a dummy variable equal to 1 if the auditor is a big 5 audit firm;

Trend = a trend variable equal to the difference between the current year of observation and 1998;

Industry$_k$ = a dummy variable equal to 1 if the firm belongs to industry k. The subscript k equals 1, 2 … or K-1, where K represents the number of unique industries based on two-digit SIC code.

The predictions on the coefficients are as follow: $\hat{\alpha}_1 < 0$, $\hat{\alpha}_2 > 0$, $\hat{\alpha}_3 < 0$, $\hat{\alpha}_5 < 0$, $\hat{\alpha}_6 > 0$, $\hat{\alpha}_7 < 0$ and $\hat{\alpha}_8 < 0$.

When earnings quality is measured by earnings attributes including accrual quality (*AQ*) and value relevance (*VR*), I control for five innate determinants of earnings

attributes[38] suggested by Francis et al. (2004). They are firm size, incidence of negative earnings, intangibles intensity, absence of intangibles and capital intensity.

Firm size: DD expect and find that there is a positive relation between accrual quality and firm size. Large firms have more stable and predictable operations and more diversified business activities and therefore fewer and smaller estimation errors. And smaller firms likely are young firms whose value is driven by their potential growth than by current earnings. Consistent with this notion, Collins et al. (1997) find that change in average firm size can partly explain the temporal decrease of value-relevance of earnings from 1953 through 1993. Firm size (*SIZE*) is measured by the natural logarithm of market value of equity.

Losses: DD expect and find that there is a negative relation between accrual quality and incidence of negative earnings. This is because high frequency of losses indicates severe negative operating environment and accruals made in response to such shocks are likely to involve substantial estimation errors. Consistent with this notion, Hayn (1995) documents a lower value-relevance for negative than for positive earnings. Following Matsumoto (2002), I identify the loss firms (*LOSS*) as those with consistent negative net income before extraordinary items during the last four periods.

Intangible intensity: Francis et al. (2004) suggest that expenditures on research and development and/or advertising lead to differences in some of the earnings attributes based on prior literature (e.g. Francis and Schipper 1999; Baginski et al. 1999).

[38] Francis et al. (2004) identify eight innate determinants of earnings attributes. Besides the five factors used in this study, the other three are cash flow variability, sales variability and length of operating cycle. Due to the data constraints in obtaining these three factors, they are not considered in this study.

Penman and Zhang (2002) suggest that the expensing of R&D and advertising is an important determinant of conservatism, which is one of earnings attributes. Lev and Sougiannis (1996) suggest that R&D expenditures are value relevant. Therefore, I expect a positive relation between intangible intensity (*INTAN*) and earnings quality. The R&D expense[39] scaled by sales is used to measure (*INTAN*).

Absence of intangibles: Following Francis et al. (2004), I use the dummy variable (*DINT*) to measure the absence of intangibles. *DINT* equals 1 for firms with *INTAN* equal to zero, and zero otherwise. That is, when a firm doesn't report any research and development or advertising expenses, the firm is intangible-absent. This variable can be treated as a categorical version of the negative intangible intensity variable *INTAN*. Therefore, the relation between earnings quality and *DINT* should be the opposite of that between earnings quality and intangible intensity. I expect a negative relation between *INTAN* and earnings quality.

Capital intensity: Lev (1983) and Baginski et al. (1999) find that capital-intensive firms have less persistent earnings. According to Lev (1983), capital-intensive firms have relatively high earnings volatility, which may be due to the high operating leverage[40]. Based on these prior research findings, I expect a negative relation between capital intensity (*CAP*) and earnings quality. As in Francis et al. (2004), *CAP* in this

[39] In Compustat, there is no data of quarterly advertising expenses provided. Therefore, only R&D expense is included.

[40] Operating leverage measures how growth in sales changes growth in operating income. It is calculated as contribution over operating income, where operating income is computed as contribution minus fixed costs. Accordingly, ceteris paribus, higher fixed costs lead to a higher operating leverage. Usually, a capital-intensive company has relatively high fixed costs.

study is measured by the ratio of net book value of property, plant and equipment to total assets.

Control for industry and year effects: Industry dummies based on two-digit SIC codes are included to account for industry effect. The control for trend effect (*Trend*) is created by subtracting 1998 from the current year, following Cohen et al. (2008).

As mentioned in Section 5.1, the accrual quality (*AQ*) and value relevance (*VR*) are industry-level measures. Therefore, when I pool all industry-quarter observations for interim quarters from both pre- and post-SOX periods to run regression (14), all control variables are also measured at the industry level.

$$\begin{aligned} EQ_{iq} &= \beta_0 + \beta_1 SOX + \beta_2 AVE\_SIZE_{iq} + \beta_3 AVE\_LOSS_{iq} \\ &+ \beta_4 AVE\_INTAN_{iq} + \beta_5 AVE\_DINT_{iq} + \beta_6 AVE\_CAP_{iq} \\ &+ \beta_7 Trend + \sum_{k=1}^{K-1} \beta_{7+k} Industry_k + \varepsilon_{iq} \end{aligned} \tag{14}$$

where:

EQ_{iq} = the measure of earnings quality for industry i in quarter q: accrual quality (AQ) or value relevance of earnings (VR);

SOX= a dummy equal to1 if the year of the industry-quarter group is in 2003-2007;

AVE_SIZE_{iq} = average firm size (logarithm of market value) for industry i in quarter q, where market value equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ) and closing price (quarterly Compustat data item PRCCQ);

AVE_LOSS_{iq} = percent of loss firms within industry i for quarter q. A loss firm is defined to have consistent negative net incomes before extraordinary items (quarterly Compustat data item IBQ) during the last four quarters;

AVE_INTAN_{iq} = average level of intangible intensity for industry i in quarter q, where intangible intensity equals research and development expenditures (quarterly Compustat data item XRDQ) expenses scaled by total assets (quarterly Compustat data item ATQ);

AVE_DINT $_{iq}$ = percent of firms without intangibles within industry i for quarter q. A firm without intangibles is defined to have zero amount of research and development expenditures;

AVE_CAP $_{iq}$ = average capital intensity for industry i in quarter q, where capital intensity equals the ratio of net book value of property, plant and equipment (quarterly Compustat data item PPENTQ) to total assets;

Trend = a control for calendar year, equal to the current year minus 1998;

Industry$_k$ = a dummy variable equal to 1 if the group of firms belong to industry k. The subscript k equals 1, 2 … or K-1, where K represents the number of unique industries based on 2-digit SIC code.

The predictions on the coefficients are as follows: $\hat{\beta}_1 > 0$, $\hat{\beta}_2 > 0$, $\hat{\beta}_3 < 0$, $\hat{\beta}_4 > 0$, $\hat{\beta}_5 < 0$ and $\hat{\beta}_6 < 0$.

To provide additional evidence for H1, I run regression (15) based on all available firm-quarter observations for interim quarters, with the dependent variable measured by the accrual quality metric constructed from firm-specific time-series residuals as in Equation (10). As mentioned earlier, there is only one year of data in the post-SOX period (i.e., 2007) for the time-series test of accrual quality and all variables are measured at firm-quarter level.

$$EQ_{jq} = \beta_0 + \beta_1 SOX + \beta_2 SIZE_{jq} + \beta_3 LOSS_{jq} + \beta_4 INTAN_{jq} + \beta_5 DINT_{jq} + \beta_6 CAP_{jq} + \beta_7 Trend + \sum_{k=1}^{K-1} \beta_{7+k} Industry_k + \varepsilon_{jq} \quad (15)$$

where:

EQ $_{jq}$ = the measure of earnings quality for firm j in quarter q, which is the inverse of standard deviation of firm-specific time-series residual accruals;

SOX= a dummy variable equal to 1 if the year of observation is in 2003-2007, and zero otherwise;

$SIZE_{jq}$ = the natural logarithm of market value, where market value equals the product of number of common shares outstanding (Compustat quarterly data item CSHOQ) and closing price (Compustat quarterly data item PRCCQ) for firm j at the end of the quarter q;

$LOSS_{jq}$ = a dummy variable equal to 1 if firm j has consistent negative net incomes before extraordinary items (quarterly Compustat data item IBQ) during the last four quarters;

$INTAN_{jq}$ = intangible intensity, equal to research and development expenditures (quarterly Compustat data item XRDQ) scaled by total assets (quarterly Compustat data item ATQ; annual Compustat data item AT) for firm j at the end of the quarter q;

$DINT_{jq}$ = absence of intangibles, a dummy for zero intangible intensity, equal to1 if the firm j has zero amount of research and development expenditures for firm j at the end of the quarter q;

CAP_{jq} = capital intensity for firm j at the end of quarter q, where capital intensity computed as the ratio of net book value of property, plant and equipment (Compustat quarterly data item PPENTQ) to total assets;

Trend = a control for calendar year, equal to the current year minus 1998;

$Industry_k$ = a dummy variable equal to 1 if the firm belongs to industry k. The subscript k equals 1, 2 … or K-1, where K represents the number of unique industries based on two-digit SIC code.

The predictions on the coefficients are as the same as for the cross-sectional test of accrual quality.

5.3.4 Multivariate Tests of Hypothesis 2

To test H2 (i.e., the gap in earnings quality between annual and interim periods around the enactment of SOX), the regressions are very similar to (13) and (14) with two more variables: the dummy variable indicating interim quarters (*Q123*) and its interaction with the dummy variable *SOX*. The regressions are executed on the entire sample with observations from both interim quarters and annual periods. The specifications of the regressions are as Equation (16) when the dependent variable is

earnings management and as Equation (17) when the dependent variable is either accrual quality or value relevance.

$$EM_{jq} = \varphi_0 + \varphi_1 Q123 + \varphi_2 SOX + \varphi_3 Q123 * SOX + \varphi_4 ICLAIM_{jq} + \varphi_5 LOSS_{jq} + \varphi_6 LEV_{jq} + \varphi_7 SIZE_{jq} + \varphi_8 MB_{jq} + \varphi_9 \Delta GDP_q + \varphi_{10} BIG_{jq} + \varphi_{11} Trend + \sum_{k=1}^{K-1} \varphi_{11+k} Industry_k + \varepsilon_{jq} \quad (16)$$

$$EQ_{iq} = \gamma_0 + \gamma_1 Q123 + \gamma_2 SOX + \gamma_3 Q123 * SOX + \gamma_4 AVE\_SIZE_{iq} + \gamma_5 AVE\_LOSS_{iq} + \gamma_6 AVE\_INTAN_{iq} + \gamma_7 AVE\_DINT_{iq} + \gamma_8 AVE\_CAP_{iq} + \gamma_9 Trend + \sum_{k=1}^{K-1} \gamma_{9+k} Industry_k + \varepsilon_{iq} \quad (17)$$

Where:

Q123 = a dummy variable equal to 1 if the observation belongs to an interim quarter, and zero otherwise;

*Q123*SOX* = the interaction term of *Q123* and *SOX*, equal to 1 if the observation is from an interim quarter during 2003-2007, and zero otherwise;

In Equation (16), all other variables are defined in the same way as in Equation (13), while in Equation (17), all other variables are defined in the same way as in Equation (14).

Figure 2 is provided to help identify the coefficients of interest in testing H2. Take Equation (17) as an example. Without considering control variables, the mean annual earnings quality before SOX is γ_0, obtained by setting dummies *SOX* and *Q123* as zero, while the mean annual earnings quality after SOX is $\gamma_0 + \gamma_2$, obtained by setting dummy *Q123* as zero. Therefore, the change in annual earnings quality due to SOX is $(\gamma_0 + \gamma_2) - \gamma_0 = \gamma_2$. Similarly, the mean interim earnings quality before SOX is $\gamma_0 + \gamma_1$, obtained by setting dummy *SOX* as zero, while the mean interim earnings quality after SOX is $\gamma_0 + \gamma_1 + \gamma_0 + \gamma_2$. Therefore, the change in interim earnings quality due to SOX is

$(\gamma_0 + \gamma_1 + \gamma_0 + \gamma_2) - (\gamma_0 + \gamma_1) = \gamma_2 + \gamma_3$. Therefore, to check whether the change in interim earnings quality due to SOX is more than the change in annual earnings quality is to see whether $\gamma_2 + \gamma_3 > \gamma_2$, or whether $\gamma_3 > 0$. The coefficient on the interaction term of *Q123*SOX* is the coefficient of interest in this test. According to H2, the predication of coefficient on the interaction term is $\hat{\varphi}_3 < 0$ in (16) and $\hat{\gamma}_3 > 0$ in (17)[41].

[41] Similar prediction is made for the interaction term of *Q123*SOX* in the time-series test of accrual quality, with the accrual quality measured by the inverse of standard deviation of firm-specific time-series residual accruals.

CHAPTER 6

RESULTS

6.1 Earnings Management

This section reports the empirical results based on the earnings management approach.

6.1.1 Sample Selection and Descriptive Statistics

Table 1 summarizes the sample selection process to collect testable observations from 1998 to 2007. The initial sample includes 463,257 firm-quarter observations and 116,686 firm-year observations from Compustat between January 1998 and December 2007. I exclude the firms in the financial service industry or utilities industry (with 2-digit SIC codes of 49 and 60-67)[42] or not publicly listed in the U.S. After this step, there are 217,781 firm-quarters and 55,172 firm-years left in the sample. The sample is further reduced to 115,971 firm-quarters and 47,976 firm-years because only the observations with available data to generate discretionary accruals under the Modified Jones Model (Dechow 1995; Kothari et al. 2005) are retained. Due to the sample selection criterion of at least 10 firm-quarter (firm-years) observations within an industry-quarter (industry-year) group, if an industry-quarter (industry-year) consists of less than 10 firms, then all observations within that group will be deleted. After applying this restriction, 112,079 firm-quarters and 47,375 firm-years remain in the

[42] According to Barton and Simko (2002), firms in regulated industries likely have different characteristics from non-regulated industries.

sample, out of which only 50,131 firm-quarter and 22,380 firm-year observations have available data to generate the control variables (*ICLAIM*, *LOSS*, *LEV*, *SIZE*, *MB*, *ΔGDP* and *BIG*). All 26,748 observations from interim quarters are combined with the firm-year data, leading to 49,128 observations in total. The combined sample is trimmed at the top and bottom 2% of all the continuous variables including discretionary accruals, *ICLAIM*, *LEV*, *SIZE* and *MB*. The final sample has 41,595 observations, with 23,338 firm-quarters and 18,257 firm-years.

Table 2 presents the distribution and descriptive statistics of the final sample. According to Panel A, the sample includes more data from the pre-SOX period (56%) than the post-SOX periods (44%) and more quarterly data (56%) than annual data (44%).

Panel B breaks down the sample by calendar years across the sample period. The number of annual observations does not vary much over years. The number of quarterly observations each year from 1998 through 2000 represents about 9% of total observations in the sample. There is a big drop (down to 3.69%) in 2001[43] and then it maintains the approximately same percentage through 2007.

Panel C lists all industry categories based on the 2-digit SIC codes and the number of unique firms in each industry for the sample. The most dominant industry is business service (SIC code=73) with 812 unique firms. Other main industries include chemicals and allied products (SIC code=28), electronic and other electric equipment

[43] The reason for the big drop in the number of interim observations since 2001 is: A lot of firms do not provide the gross value of PP&E (data item: PPEGTQ) or the value of accumulated depreciations and amortizations (data item: DPATQ) during interim quarters in the quarterly Compustat database. The phenomenon became even more pervasive since 2001.

(SIC code=36), instruments and related products (SIC code=38) and industrial machinery and equipment (SIC code=35).

Panel D displays the descriptive statistics of the variables for the sample. The average discretionary accruals (*DA*) is -0.016 with a standard deviation of 0.130. Over half of the sample (24,145 out of 41,595 observations) has negative discretionary accruals (*NDA*). The magnitude of mean *NDA* (-0.087) is comparable to that of mean *PDA* (0.081). Mean *DUR* indicates that over half of the sample (57%) is in the durable goods industry defined by Matsumoto (2002). The average R&D expenditure to sales revenue ratio (*RD*) is 0.049 and the average labor intensity (*LABOR*) is 0.689. Mean *LOSS* indicates that about 19% of the sample has consistent losses for previous periods. The average leverage ratio is 0.10. The sample has the average logarithmical market capitalization (*SIZE*) and market-to-book ratio (*MB*) of 5.610 and 3.848. The average percentage change of gross domestic products (ΔGDP) relative to the last period is 5.492%. Mean *BIG* indicates that over 80% of the sample is audited by Big 4/5 auditors.

Panel E presents the correlation matrix of the variables for the entire sample. Each cell above (below) the diagonal displays the Spearman (Pearson) correlation coefficient and the corresponding significance level. The main correlation of interest is the one between *ABSDA* and *Q123*SOX*. The negative and significant correlation (-0.173, Spearman; -0.150, Pearson) between these two variables is consistent with H2 that the decrease of earnings managements with interim quarters due to SOX is more than that with annual periods.

The correlation between *ABSDA* and *ICLAIM* is positive and significant, consistent with the positive association between earnings management and implicit claims in Matsumoto (2002). The correlation between *ABSDA* and *LOSS* is positive and significant, indicating that loss firms engage in more earnings management, which is inconsistent with the prediction. The correlation between *ABSDA* and *LEV* is negative and significant, consistent with Jelinek (2007). Also, *ABSDA* is negatively correlated with *SIZE* and ΔGDP, and positively associated with *MB*. The correlation between *SIZE* and *BIG* is positive and significant, indicating a positive association between firm size and the auditor being a Big 4/5 firm.

Figure 3 displays the average discretionary accruals by calendar years for each year during 1998-2007.

6.1.2 Tests of Hypothesis 1

The first hypothesis predicts that earnings management with interim quarters decreases after the passage of SOX.

Table 3 reports the univariate tests of interim earnings quality measured in terms of discretionary accruals. As mentioned in Chapter 5, I use three measures of discretionary accruals: *ABSDA*, *PDA* and |*NDA*|. *ABSDA* represents the overall level of earnings management, *PDA* the proxy for income-increasing earnings management and |*NDA*| the proxy for the magnitude of income-decreasing earnings management.

In Panel A, the two-sample t-test (Mann-Whitney test) is used to check whether the mean (median) of discretionary accruals is different before and after SOX for interim quarters. The mean (median) *ABSDA* for interim quarters is 0.058 (0.035)

before SOX and 0.055 (0.032) after SOX. The difference in mean (median) *ABSDA* before SOX and after SOX is significant at the 1% level. A lower *ABSDA* after SOX indicates lower earnings management and higher earnings quality for interim quarters after SOX. The mean (median) *PDA* for interim quarters is 0.060 (0.034) before SOX and 0.056 (0.030) after SOX. The difference in mean (median) *PDA* before SOX and after SOX is significant at the 5% (1%) level. A lower *PDA* after SOX indicates lower income-increasing earnings management and therefore higher earnings quality for interim quarters after SOX. The mean (median) |*NDA*| for interim quarters is 0.056 (0.036) before SOX and 0.055 (0.034) after SOX. The difference in mean |*NDA*| before SOX and after SOX is insignificant in the t-test while the difference in median |*NDA*| is significant at 5% level in the Mann-Whitney test. Overall, the univariate tests provide support to H1.

Panel B of Table 3 presents the results of multivariate tests of H1. The metrics of earnings management are regressed on the dummy variable *SOX*, the control variables that may influence earnings management.

For *ABSDA*, the coefficient on the dummy variable *SOX* is -0.010 and significant at the 1% level, indicating that overall earnings management with interim quarters decreases after SOX. For *PDA* and |*NDA*|, the coefficients on *SOX* are both significantly negative, indicating that both the income-increasing and income-decreasing earnings management with interim quarters declines after SOX. The above results are consistent with H1 that interim earnings quality improves after SOX.

The coefficients on *ICLAIM* do not exhibit the same sign across the three regressions. For *ABSDA*, the coefficient is not significant. While the positive association between reliance on implicit claims and the likelihood of positive discretionary accruals has been documented by Matsumoto (2002), little has been said about negative discretionary accruals. Our results appear to suggest that a firm exhibiting a higher reliance on implicit claims will engage in more income-increasing and less income-decreasing earnings management. The coefficient on *LOSS* is significantly positive for *ABSDA* and *PDA*, but insignificant for |*NDA*|, suggesting that firms with consistent losses engage more in income-increasing earnings management but not in income-decreasing earnings management with interim quarters. The coefficient on *LEV* is significantly negative for *ABSDA* and |*NDA*|, consistent with Jelinek (2007). The coefficient on *SIZE* is -0.004 and significant at the 1% level for *ABSDA* (-0.005, *PDA*; -0.003, |*NDA*|; both are significant at the 1% level), consistent with larger firms engaging in less earnings management due to the concern of political costs. The coefficient on *MB* is 0.002 and significant at the 1% level for *ABSDA* (0.003, *PDA*; 0.002, |*NDA*|; both are significant at the 1% level), consistent with firms with higher growth potentials employing more earnings management. Better economic conditions are associated with less earnings management, as shown by the negative and significant coefficient on *ΔGDP* across three regressions. The negative and significant coefficient on *BIG* suggests that firms with big 4/5 auditors have a lower degree of earnings management. The coefficient on the trend variable *TREND* is positively significant in

all three regressions, suggesting that there is a positive trend in the level of earnings management over the sample period, consistent with Cohen et al. (2008).

As an additional analysis, the post-SOX period is further split into the SOX302 and SOX404 periods. In Panel C of Table 3, the dummy variable of *SOX* is replaced by two other dummy variables *S302* and *S404*. Both coefficients on *S302* and *S404* are significantly negative across three regressions, indicating the discretionary accruals for interim quarters after the implementation of SOX 302 or SOX 404 are lower than the level before SOX. The coefficient estimates of control variables in Panel C are highly consistent with those in Panel B. By replacing the variable *SOX* by *S302* and *S404*, the explanatory power of the regressions increases slightly.

In summary, the test results for the interim sample in Table 3 show that interim earnings exhibit lower earning management after SOX, suggesting that interim earnings quality is higher after the passage of SOX. The additional multivariate tests indicate that both SOX 302 and SOX 404 contribute to the improvement in interim earnings quality.

6.1.3 Tests of Hypothesis 2

The second hypothesis predicts that the decrease in earnings management with interim quarters due to SOX is greater than that with annual periods. In other words, the gap in discretionary accruals between interim and annual reporting periods decreases after the passage of SOX.

Panel A of Table 4 reports the results from the univariate tests of this hypothesis. An ANOVA[44] analysis is employed since there are two factors (*SOX* and *Q123*) involved. To test H2, I specifically examine whether there is an interaction effect between *SOX* and *Q123*. The left section of Panel A reports the output from the general linear model (GLM) procedure. The main test statistics of interest is the F value on the interaction term *SOX*Q123*. For *ABSDA*, the F value on the interaction term of *SOX*Q123* is 68.02 and significant at the 1% level, indicating that there is an interaction effect between the factors *SOX* and *Q123*. Therefore, the change in earnings management with interim quarters due to SOX is different from that with annual periods. The two dummy variables *SOX* and *Q123* break the final sample into four categories. The mean discretionary accruals for each category is listed in the right section of Panel A. To determine the sign of the interaction effect, there is a need to examine the means. The mean *ABSDA* for interim quarters is 0.058 before SOX and 0.055 after SOX, while the mean *ABSDA* for annual periods is 0.112 before SOX and 0.125 after SOX. Therefore, the sign on the interaction term is negative, indicating that the decrease in earning management with interim quarters due to SOX is larger than that with annual periods. The test result is consistent with H2. Similar results are found for both *PDA* and |*NDA*|. Therefore, the univariate tests support H2 that the decrease in earnings management with interim quarters due to SOX is larger than that with annual periods.

[44] In light that the sample is unbalanced, the procedure of general linear model (GLM) is used and Type III sum of squares is reported.

Panel B of Table 4 reports the empirical results for the multivariate tests of H2. The metrics of earnings management are regressed on the dummy variable *Q123*, the dummy variable *SOX*, the interaction term of *Q123* and *SOX*, and the control variables that may influence earnings management. Note that the regressions with such specifications are executed based on the full sample, including earnings of both interim quarters and annual periods.

As discussed earlier, the coefficient on *SOX* in this set of regressions represents the change of discretionary accruals with annual earnings around the enactment of SOX, and the coefficient on the interaction term *Q123*SOX* indicates whether the gap in discretionary accruals between interim and annual reporting periods decreases after the passage of SOX. In all three regressions, none of the coefficients on *SOX* is significant, suggesting little change in annual earnings quality around SOX. Note that Table 3 shows that earnings management with interim earnings decreases after SOX. Furthermore, the coefficient on *Q123*SOX* is negative and highly significant ($p<0.0001$), suggesting that the decrease in earnings management after SOX is greater for interim earnings than for annual earnings. The result is consistent with H2 that the improvement in earnings quality after SOX is more pronounced for interim earnings.

The coefficient on dummy variable *Q123* across *ABSDA*, *PDA* and |*NDA*| is significantly negative, suggesting that before SOX, the magnitude of discretionary accruals for interim quarters is lower than that for annual periods. Most of the coefficient estimates on control variables across *ABSDA*, *PDA* and |*NDA*| have a similar sign and statistical significance to what is reported in Table 3. Something worth to be

pointed out is although the coefficient on *ΔGDP* is negative in sign, it is not as statistically significant as observed in Table 3. The coefficient on *LOSS* becomes significantly negative for |*NDA*|, indicating that firms with consistent losses engage less in income-decreasing earnings management.

In Panel C of Table 4, the dummy variable of *SOX* is replaced by two other dummy variables *S302* and *S404*. As a result, the interaction term between *SOX* and *Q123* is replaced by two other interaction terms: *Q123*S302* and *Q123*S404*. The coefficient on *S302* is significantly negative for *ABSDA* but not significant for *PDA* or |*NDA*|. The coefficients on *S404* are significantly negative across three regressions, indicating the annual discretionary accruals after the implementation of SOX 404 are lower than those of the pre-SOX regime. The coefficient on *Q123*S302* is negative and significant beyond the 5% level in all three regressions, indicating that the level of the decrease in earnings management with interim quarters around SOX 302 is larger than the level of decrease in earnings management with annual periods. The coefficient on *Q123*S404* is negative and significant beyond the 1% level across all cases, indicating that the level of the decrease in earnings management with interim quarters after SOX 404 is larger than the level of decrease with annual periods. The coefficient estimates of control variables in Panel C of Table 4 are highly consistent with those in Panel C of Table 3.

In summary, the test results in Table 4 show that the decrease of earnings management with interim quarters due to SOX is greater than that with annual periods, suggesting that the improvement in interim earnings quality is more pronounced after

SOX than that in annual earnings quality. The additional multivariate tests indicate that SOX 302 and SOX 404 each plays a role in alleviating the gap in earnings quality between interim quarters and annual periods.

6.2 Earnings Attributes-Accrual Quality

This section reports the empirical results based on accrual quality under the earnings attribute approach.

6.2.1 Sample Selection and Descriptive Statistics

As mentioned in Chapter 5, I follow Barth et al. (2008)'s cross-sectional approach and construct the accrual quality based on the residual accruals within each industry-quarter (or industry-year). For simplicity, I name the accrual quality measure generated under such an approach the cross-sectional accrual quality and the related tests the cross-sectional tests of accrual quality.

As a supplemental test, I also follow Francis et al. (2005)'s approach and construct an accrual quality measure by taking the inverse of standard deviation of firm-specific time-series of residual accruals. I name the measure under such an approach the time-series accrual quality and the related tests the time-series tests of accrual quality.

Due to the difference in sample selection procedures, I collect different samples for the two measures of accrual quality.

6.2.1.1 The Sample for the Cross-sectional Tests on Accrual Quality

Table 5 summarizes the sample selection process to collect testable observations from 1998 to 2007 for the cross-sectional test of accrual quality. The initial sample

includes 463,257 firm-quarter observations and 116,686 firm-year observations from Compustat between January 1998 and December 2007. I exclude the firms in the financial service industry or utilities industry (with 2-digit SIC codes of 49 and 60-67) and those not publicly listed in the U.S. After this step, there are 217,781 firm-quarters and 55,172 firm-years left in the sample. The sample is further reduced to 100,928 firm-quarters and 42,290 firm-years because only the observations with available data to generate residual accruals under the augmented Dechow and Dichev (2002) Model are retained. Due to the sample selection criterion of at least 10 firm-quarter (firm-years) observations within an industry-quarter (industry-year) group, if an industry-quarter (industry-year) consists of less than 10 firms, then all observations within that group will be deleted. After applying this restriction, 97,220 firm-quarters and 41,651 firm-years remain in the sample, out of which there are 49,728 firm-quarter and 22,466 firm-year observations with available data to generate the control variables (*SIZE*, *LOSS*, *INTAN*, *DINT* and *CAP*). All 27,031 observations from interim quarters are combined with the firm-year data, leading to 49,497 observations in total. The combined sample is trimmed at the top and bottom 2% of all the continuous variables including residual accruals, *SIZE*, *INTAN* and *CAP*. The final sample has 43,636 observations, with 24,460 firm-quarters and 19,176 firm years.

Table 6 presents the distribution and descriptive statistics of the final sample. According to Panel A, the sample includes more data from the pre-SOX period (56%) than the post-SOX period (44%) and more quarterly data (56%) than annual data (44%).

Panel B breaks down the sample by calendar years across the sample period. The number of annual observations does not vary much over years. The number of quarterly observations each year from 1998 through 2000 represents about 9% of total observations in the sample. There is a big drop (3.92%) in 2001 and then it maintains the approximately same percentage through 2007.

Panel C lists all industry categories based on the 2-digit SIC codes and the number of unique firms in each industry. The most dominant industry is business service (SIC code=73) with 748 unique firms. Other main industries include chemicals and allied products (SIC code=28), electronic and other electric equipment (SIC code=36), instruments and related products (SIC code=38) and industrial machinery and equipment (SIC code=35). The least represented industries include transportation by air (SIC code=47), social services (SIC code=83), general building contractors (SIC code=15), special trade contractors (SIC code=17) and water transportation (SIC code=44), each with only one or two unique firms.

Panel D displays the descriptive statistics of the variables for the sample. The average residual accrual (*V*) from the augmented DD's model is 0.013 with a standard deviation of 0.283. The average logarithmic market value (*SIZE*) of the sample is 5.469 with a standard deviation of 2.145. Mean *LOSS* indicates that about 20% of the sample has consistent losses in previous periods. The average intangible intensity (*INTAN*) is 0.053 with a standard deviation of 0.079. Mean *DINT* indicates that about 17% of the sample does not invest in R&D. On average, about 20% of the total assets are fixed assets as PP&E according to the mean capital intensity (*CAP*).

Panel E presents the correlation matrix of the variables. As mentioned in Chapter 5, the control variables for the cross-sectional test of accrual quality are industry level data. Therefore, I add the prefix of "*AVE_*" before the name of each control variable. Each cell above (below) the diagonal displays the Spearman (Pearson) correlation coefficient between two variables and the significance level of the correlation. Note that all the variables are computed at the industry level. The main correlation of interest is the one between *AQ* and *Q123*SOX*. The positive and significant correlation (0.1214, Spearman; 0.1552, Pearson) between these two variables is consistent with H2 that the improvement of accrual quality of interim earnings due to SOX is more than that of annual periods.

AQ is positively correlated with *AVE_SIZE* and *AVE_DINT*, and negatively correlated with *AVE_INTAN* and *AVE_LOSS*. All of the correlations are significant and consistent with the predictions. However, the correlation between *AQ* and *AVE_CAP* is positive and significant, which is inconsistent with the prediction. The correlation between *AVE_SIZE* and *AVE_LOSS* is negative and significant, indicating there is a moderate negative association between average industry firm size and average industry percentage of consistently losing firms. *AVE_INTAN* and *AVE_DINT* are negatively associated with each other, because by definition whenever the ratio of intangible intensity (*INTAN*) is zero, absence of intangibles (*DINT*) equals one. Accordingly, at industry level, *AVE_INTAN* and *AVE_DINT* are negatively associated. *AVE_INTAN* and *AVE_CAP* are negatively associated with each other, which is consistent with common observations. For example, a high-tech company usually does not have a large

investment in PP&E but have a large R&D to sales ratio. The negative correlation may also reflect that firms usually have cash flow constraints in their investment decision making. A firm prioritizing the investments on fixed assets probably has to limit the investments on R&D.

Figure 4 displays the average cross-sectional accrual quality by calendar years for each year during 1998-2007.

6.2.1.2 The Sample for the Time-series Tests on Accrual Quality

Due to the limitation on available quarters (years) of data to calculate the measure of accrual quality, the time-series sample is much smaller than the cross-sectional one. Table 7 summarizes the sample selection process. The final sample in this test contains 16,308 observations, including 7,118 firm-quarters and 9,190 firm-years.

Table 8 presents the distribution and descriptive statistics of the final sample. According to Panel A, the sample includes much more data from the pre-SOX period (84%) than the post-SOX period (16%). This is mainly due to the exclusion of data from 2003 through 2006 for the post-SOX period. There are more quarterly data (56%) than annual data (44%) in the sample.

Panel B breaks down the sample by calendar years across the sample period. The number of annual observations accounts for about 8-10% of the sample. The number of quarterly observations each year from 1999 through 2000 represents about 9% of total observations of the sample. There is a big drop (down to 6.89%) in 2001 and then it maintains the approximately same percentage in 2002 and 2007.

Panel C lists all industry categories based on the 2-digit SIC codes and the number of unique firms in each industry. The most dominant industry is chemicals and allied products (SIC code=28) with 424 unique firms. Other main industries include electronic and other electric equipment (SIC code=36), business service (SIC code=73), instruments and related products (SIC code=38) and industrial machinery and equipment (SIC code=35). The least represented industries include transportation by air (SIC code=47), educational services (SIC code=82), social services (SIC code=83), coal mining (SIC code=13), general building contractors (SIC code=15) and auto repair, services and parking (SIC code=75), each with only one or two unique firms.

Panel D displays the descriptive statistics of the variables for the sample. The average residual accrual (*V*) from the augmented DD's model is 0.019 with a standard deviation of 0.284. The average inverse of standard deviation (*AQ*) is 25.678 with a standard deviation of 41.713. The average logarithmic market value (*SIZE*) of the sample is 5.550 with a standard deviation of 2.290. Mean *LOSS* indicates that about 14% of the sample has consistent losses in previous periods. The average intangible intensity (*INTAN*) is 0.055 with a standard deviation of 0.083. Mean *DINT* indicates that about 17% of the sample does not invest in R&D. On average, about 22% of the total assets are fixed assets as PP&E according to the mean capital intensity (*CAP*).

Panel E presents the correlation matrix of the variables. Each cell above (below) the diagonal displays the Spearman (Pearson) correlation coefficient and the significance level of the correlation. The main correlation of interest is the one between *AQ* and *Q123*SOX*. Neither of the correlation coefficients between these two variables

is significant, which is not consistent with H2 that the improvement of accrual quality of interim earnings due to SOX is more than that of annual periods. All other correlation coefficients are qualitatively the same as those in Panel E of Table 6.

Figure 5 displays the average time-series accrual quality by calendar years for each year during 1998-2007.

6.2.2 Tests of Hypothesis 1

The first hypothesis predicts that the accrual quality of interim earnings improves after the passage of SOX. The following paragraphs present two groups of tests: cross-sectional test of accrual quality and time-series test of accrual quality.

6.2.2.1 Cross-sectional Tests of Accrual Quality

Panel A of Table 9 reports the univariate tests of cross-sectional accrual quality. The two-sample t-test (Mann-Whitney test) is used to check whether the mean (median) of accrual quality (*AQ*) is different before and after SOX for interim quarters. The mean *AQ* for interim quarters is 31.43 before SOX and 33.32 after SOX. The difference in mean *AQ* before SOX and after SOX is insignificant in the t-test. The difference in median *AQ* is negative and significant in the Mann-Whitney test, indicating that accrual quality of interim earnings is lower after SOX. Therefore, the univariate results on accrual quality fail to support H1.

Panel B presents the empirical results of multivariate tests of H1. The measure of accrual quality is regressed on the dummy variable *SOX* and the control variables that may influence accrual quality. As mentioned in Chapter 5, since *AQ* is calculated at

industry level for each interim quarter, all the control variables are computed in a similar way.

The coefficient on the dummy variable *SOX* is 0.630 and insignificant, indicating that the accrual quality for interim quarters does not improve after SOX. The coefficient on *AVE_SIZE* is 6.922 and significant at 1% level, indicating that larger firms have higher accrual quality. The coefficient on *AVE_LOSS* is -27.878 and significant at 5% level, indicating that the incidence of incurring consecutive losses is negatively associated with accrual quality. The result is consistent with DD (2002)'s notion that a high frequency of losses indicates severe negative operating environment and accruals made in response to such shocks are likely to involve substantial estimation errors, leading to low accrual quality. The coefficient on *AVE_INTAN* is negative but insignificant. Both coefficients on *AVE_DINT* and *AVE_CAP* are positive but insignificant. The coefficient on the trend variable *TREND* is insignificant, suggesting that there is no clear trend in accrual quality over the sample period.

As an additional analysis, the post-SOX period is further split into the SOX302 and SOX404 periods. In Panel C, the dummy variable of *SOX* is replaced by two other dummy variables *S302* and *S404*. Both coefficients on *S302* and on *S404* are negative but insignificant. Therefore, compared to the pre-SOX period, the accrual quality during either the SOX302 or the SOX404 period does not improve. The coefficient estimates of the control variables in Panel C are highly consistent with those in Panel B.

In summary, the cross-sectional test results in Table 8 fail to support H1 that the accrual quality of interim earnings improves after the passage of SOX.

6.2.2.2 Time-series Tests of Accrual Quality

Panel A of Table 10 reports the univariate tests of time-series accrual quality. The two-sample t-test (Mann-Whitney test) is used to check whether the mean (median) of accrual quality (*AQ*) is different before and after SOX for interim quarters. The mean (median) *AQ* for interim quarters is 43.947 (27.641) before SOX and 27.444 (12.626) after SOX. The difference in means (medians) is significant at the 1% level, indicating lower accrual quality for interim quarters after SOX, which is not consistent with the first hypothesis.

Panel B presents the results of multivariate tests of H1. Similarly, the measure of accrual quality is regressed on the dummy variable SOX and the control variables that may influence accrual quality. The measure of accrual quality in this test is calculated based on the time-series residual accruals of a specific firm. Accordingly, all the control variables are firm-level data.

The coefficient on the dummy variable *SOX* is 12.689 and significant at the 1% level, indicating that the accrual quality for interim quarters improves after SOX. The coefficient on *SIZE* is 3.031 and significant at the 1% level, suggesting that larger firms have higher accrual quality. The coefficient on *LOSS* is -3.158 and significant at the 10% level, indicating that loss firms are associated with lower accrual quality. The coefficient on *INTAN* is negative and significant at the 1% level, indicating that intangible intensity is negatively associated with accrual quality. The coefficient on *DINT* is positive and significant at the 10% level, which is expected considering the negative association between *INTAN* and *DINT* by construction. The coefficient *CAP* is

positive and significant, indicating that capital intensity is positively associated with accrual quality, which is inconsistent with the prediction. The coefficient on the trend variable *TREND* is negative and significant at the 1% level, suggesting that the overall accrual quality worsened over the sample period[45].

In summary, the time-series test results in Table 9 support H1 that the accrual quality of interim earnings improves after the passage of SOX.

6.2.3 Tests of Hypothesis 2

The second hypothesis predicts that the improvement in accrual quality of interim earnings due to SOX is greater than that of annual earnings. The following paragraphs present two groups of tests: cross-sectional test of accrual quality and time-series test of accrual quality.

6.2.3.1 Cross-sectional Tests of Accrual Quality

Panel A of Table 11 reports the results from the univariate tests of H2 based on the cross-sectional accrual quality. An ANOVA analysis is employed since there are two factors (*SOX* and *Q123*) involved. To test H2, I specifically examine whether there is an interaction effect between *SOX* and *Q123*. The left section of Panel A reports output from the general linear model (GLM) procedure. The main test statistics of interest is the F value on the interaction term *SOX*Q123*. The F value is insignificant, indicating that there is no interaction effect between the factor *SOX* and *Q123*.

[45] Considering there is only one year (2007) from the post-SOX period in the multivariate test based on the time-series measure of accrual quality, the trend pattern of accrual quality for the sample period is largely determined by the pattern of the years before SOX.

Therefore, the change in accrual quality due to SOX for interim quarters is not different from that for annual periods.

Panel B reports the empirical results for the multivariate tests of H2. The measure of accrual quality is regressed on the dummy variables *Q123* and *SOX*, the interaction term of *SOX* and *Q123*, and the control variables that may influence earnings management. Note that the regressions with such specifications are executed based on the full sample, including both interim sample data and annual sample data.

The coefficient on dummy variable *SOX* in this regression shows the change of accrual quality for annual periods around the enactment of SOX. The positive yet insignificant coefficient indicates the annual accrual quality does not change after SOX. The coefficient on the dummy variable *Q123*SOX* is positive but insignificant, reflecting that the gap in accrual quality between interim and annual earnings does not change in the post-SOX period. The above results do not support H2.

The coefficient on dummy variable *Q123* is significantly positive, suggesting that before SOX, the accrual quality for interim quarters is higher than that for annual periods. The coefficient on *AVE_SIZE* is 4.246 and significant at the 1% level, indicating that larger firms have higher accrual quality. The coefficient on *AVE_LOSS* is -35.973 and significant at the 1% level, indicating that the incidence of incurring consecutive losses is negatively associated with accrual quality, which is consistent with DD (2002). The coefficient on *AVE_INTAN* is positive and significant, consistent with the prediction. Both coefficients on *AVE_DINT* and *AVE_CAP* are positive but insignificant. The coefficient on the trend variable *TREND* is insignificant.

In Panel C of Table 11, dummy variable of *SOX* is replaced by two other dummy variables *S302* and *S404*. Accordingly, the interaction term between *SOX* and *Q123* is replaced by two other interaction terms: *Q123*S302* and *Q123*S404*. Both coefficients on *S302* and *S404* are negative but insignificant, suggesting that the annual accrual quality during either the SOX302 or the SOX404 period does not change much after SOX. The coefficients on *Q123*S302* and *Q123*S404* are positive but insignificant, indicating the level of the improvement in accrual quality of interim earnings due to either SOX 302 or SOX 404 is not larger than that of annual earnings. The coefficient estimates of control variables in Panel C are highly consistent with those in Panel B.

In summary, the cross-sectional test results in Table 9 fail to support H2 that the improvement of accrual quality of interim earnings after SOX is higher than that of annual earnings.

6.2.3.2 Time-series Tests of Accrual Quality

Panel A Table 12 reports the results from the univariate tests of H2 based on the time-series measure of accrual quality. An ANOVA analysis is employed since there are two factors (*SOX* and *Q123*) involved. To test H2, I specifically examine whether there is an interaction effect between *SOX* and *Q123*. The left section of Panel A reports output from the general linear model (GLM) procedure. The main test statistics of interest is the F value on the interaction term *SOX*Q123*. The F value is 41.27 and significant at the 1% level, indicating that there is an interaction effect between the factor *SOX* and *Q123*. Therefore, the change in accrual quality due to SOX for interim

quarters is different from that for annual periods. The two dummy variables *SOX* and *Q123* break the final sample into four categories. The mean discretionary accruals for each category is listed in the right section of Panel A. To determine the sign of the interaction effect, there is a need to examine the means. The mean *AQ* for interim quarters is 43.974 before SOX and 27.444 after SOX, while the mean *AQ* for annual periods is 14.364 before SOX and 8.773 after SOX. Therefore, the sign on the interaction term is negative, indicating that the decrease in accrual quality of interim earnings due to SOX is larger than that with annual earnings. This is inconsistent with H2.

Panel B of Table 12 reports the results of the multivariate test of H2. The measure of accrual quality is regressed on the dummy variables *SOX* and *Q123*, the interaction term of *SOX* and *Q123*, and the control variables that may influence earnings management.

The coefficient on dummy variable *SOX* in this regression shows the change of accrual quality for annual periods around the enactment of SOX. The positive and significant coefficient indicates the annual accrual quality improves after SOX. The coefficient on the dummy variable *Q123*SOX* is negative and significant, reflecting that the improvement in accrual quality for interim quarters due to SOX is smaller than that for annual periods.

The coefficient on dummy variable *Q123* is positive and significantly, suggesting that before SOX, the accrual quality for interim quarters is higher than that for annual periods. The coefficient on *SIZE* is 2.158 and significant at the 1% level,

indicating that larger firms have higher accrual quality. The coefficient on *LOSS* is -5.337 and significant at the 1% level, indicating that the incidence of loss firms is negatively associated with accrual quality, which is consistent with DD (2002). The coefficient on *INTAN* is positive and significant, suggesting that intangible intensity is positively associated with accrual quality, consistent with the prediction. Both coefficient on *DINT* and *CAP* are positive and significant, inconsistent with the predictions. The negative and significant *TREND* suggests a downward pattern of accrual quality over the sample period.

In summary, the tests in Table 12 based on the time-series accrual quality fail to support H2 that the improvement of accrual quality of interim earnings due to SOX is higher than that of annual earnings.

6.3 Earnings Attributes-Value Relevance

This section reports the empirical results based on value relevance under the earnings attribute approach.

6.3.1 Sample Selection and Descriptive Statistics

Table 13 summarizes the sample selection process to collect testable observations from 1998 to 2007. The initial sample includes 463,257 firm-quarter observations and 116,686 firm-year observations from Compustat between January 1998 and December 2007. I exclude the firms in the financial service industry or utilities industry (with 2-digit SIC codes of 49 and 60-67) and those not publicly listed in the U.S. After this step, there are 217,781 firm-quarters and 55,172 firm-years left in

the sample. The sample is further reduced to 144,022 firm-quarters and 35,271 firm-years because only the observations with available data to generate R^2 through the Dechow (1994) Model are retained. Due to the sample selection criterion of at least 10 firm-quarter (firm-years) observations within an industry-quarter (industry-year) group, if an industry-quarter (industry-year) consists of less than 10 firms, then all observations within that group will be deleted. After applying this restriction, 141,355 firm-quarters and 34,583 firm-years remain in the sample, out of which there are 74,794 firm-quarter and 20,019 firm-year observations with available data to generate the control variables (*SIZE*, *LOSS*, *INTAN*, *DINT* and *CAP*). All 52,639 observations from interim quarters are combined with the firm-year data, leading to 72,658 observations. The combined sample is trimmed at the top and bottom 2% of all the continuous variables including measure of value relevance, *SIZE*, *INTAN* and *CAP*. The final sample has 63,085 observations, with 46,858 firm-quarters and 16,227 firm-years.

Table 14 presents the distribution and descriptive statistics of the final sample. According to Panel A, the sample includes almost the same number of observations from the pre-SOX period (50%) than the post-SOX period (50%) and more quarterly data (74%) than annual data (26%). The number of observations from interim quarters is almost three times of that from annual periods, suggesting the sample is relatively balanced.

Panel B breaks down the sample by calendar years across the sample period. In every year, the number of annual observations accounts for 2-3% of the sample and the number of quarterly observations represents 7-8% of the sample.

Panel C lists all industry categories based on the 2-digit SIC codes and the number of unique firms in each industry. The most dominant industry is business service (SIC code=73) with 806 unique firms. Other main industries include chemicals and allied products (SIC code=28), electronic and other electric equipment (SIC code=36), instruments and related products (SIC code=38) and industrial machinery and equipment (SIC code=35). The least represented industries include special trade contractors (SIC code=17), social services (SIC code=83), heavy construction (SIC code=16) and educational services (SIC code=82), each with only one or two unique firms.

Panel D displays the descriptive statistics of the variables for the sample. The average logarithmic market value (*SIZE*) of the sample is 5.722 with a standard deviation of 1.838. Mean *LOSS* indicates that about 22% of the sample has consistent losses in previous periods. The average intangible intensity (*INTAN*) is 0.041 with a standard deviation of 0.051. Mean *DINT* indicates that about 14% of the sample does not invest in R&D. On average, about 18% of the total assets are fixed assets as PP&E according to the mean capital intensity (*CAP*).

Panel E presents the correlation matrix of the variables. Similarly, I add the prefix of "*AVE_*" before the name of each control variable to indicate that all variables are at industry-level. Each cell above (below) the diagonal displays the Spearman (Pearson) correlation coefficient and the significance level of the correlation. The main correlation of interest is the one between *VR* and *Q123*SOX*. The positive and significant correlation (-0.058, Spearman; -0.061, Pearson) between these two variables

is inconsistent with H2 that the improvement of value relevance of interim earnings due to SOX is more than that of annual earnings.

VR is positively correlated with *AVE_SIZE* and negatively correlated with *AVE_LOSS*. Both correlations are significant and consistent with the predictions. The correlation between *VR* and *AVE_CAP* is positive and significant, which is inconsistent with the prediction. The correlation between *VR* and *AVE_INTAN* is not significant in both cases. There is no significant correlation between *VR* and *AVE_DINT*. *AVE_INTAN* and *AVE_LOSS* are positively associated with each other, indicating that an industry with lower level of intangible intensity has a higher frequency of loss firms during the sample period. Again, *INTAN* and *DINT* are negatively associated with each other by construct. Accordingly, at the industrial average level, *AVE_INTAN* is expected to be negatively associated with a higher *AVE_DINT*. *AVE_INTAN* and *AVE_CAP* are negatively associated with each other, which again may be due to the industrial operational characteristics and/or cash constraints in investment decision markings.

Figure 6 displays the average value relevance of earnings for every year during 1998-2007.

6.3.2 Tests of Hypothesis 1

The first hypothesis predicts that the value relevance of interim earnings improves after the passage of SOX.

Table 15 reports the univariate tests of value relevance measured by the adjusted R^2. The two-sample t-test (Mann-Whitney test) is used to check whether the mean (median) value relevance of earnings (*VR*) is different before and after SOX for interim

quarters. The mean (median) *VR* for interim quarters is 0.041(0.041) before SOX and 0.050 (0.050) after SOX. The difference in means (medians) is significant at the 5% (10%) level, meaning the value relevance of interim earnings improves after SOX, which is consistent with the first hypothesis.

Panel B of Table 15 presents the results of multivariate tests of H1. The measure of value relevance is regressed on the dummy variable SOX and the control variables that may influence value relevance. As mentioned in Chapter 5, since value relevance is calculated at the industry level for each interim quarter, all the control variables are computed in a similar way.

The coefficient on the dummy variable *SOX* is 0.020 and significant at the 5% level, indicating that the value relevance for interim earnings improves after SOX. The coefficient on *AVE_CAP* is positive and significant, indicating that capital intensity is positively associated with value-relevance of earnings, which is inconsistent with the prediction. All other coefficients on control variables are insignificant.

As an additional analysis, the post-SOX period is further split into the SOX302 and SOX404 periods. In Panel C, the dummy variable of *SOX* is replaced by two other dummy variables *S302* and *S404*. The coefficient on *S302* is 0.018 and significant at the 5% level, meaning that the value relevance of interim earnings during the SOX302 period is higher than that before SOX. The coefficient on *S404* is positive but not significant, which indicates that the value relevance of interim earnings during the SOX404 period is not higher than that before SOX. The coefficient estimates of control variables in Panel C are highly consistent with those in Panel B.

In summary, the test results in Table 15 show that interim earnings exhibit higher value relevance after SOX, suggesting that interim earnings quality is higher after the passage of SOX. The additional multivariate test indicates that SOX 302 not SOX 404 improves the value-relevance of interim earnings.

6.3.3 Tests of Hypothesis 2

The second hypothesis predicts that the improvement in value relevance of interim earnings due to SOX is greater than that of annual earnings. Panel A of Table 16 reports the results from the univariate tests of this hypothesis. An ANOVA analysis is employed since there are two factors (*SOX* and *Q123*) involved. To test H2, I specifically examine whether there is an interaction effect between *SOX* and *Q123*. The left section of Panel A reports output from the general linear model (GLM) procedure. The main test statistics of interest is the F value on the interaction term *SOX *Q123*. The F value is insignificant, indicating that there is no interaction effect between the factor *SOX* and *Q123*. Therefore, the change in value relevance due to SOX for interim quarters is not different from that for annual periods.

Panel B of Table 16 reports the empirical results for the multivariate tests of H2. The measure of value relevance is regressed on the dummy variables *Q123* and *SOX*, the interaction term of *SOX* and *Q123*, and the control variables that may influence value relevance.

The coefficient on dummy variable *SOX* in this regression represents the change of value relevance for annual earnings around the enactment of SOX. The coefficient on *SOX* is insignificant, suggesting that the value relevance of annual earnings does not

change around SOX. The coefficient on the dummy variable *Q123*SOX* is positive but insignificant, meaning that the change in value relevance of interim earnings around SOX is basically the same as that of annual earnings. The above results fail to support H2.

The coefficient on dummy variable *Q123* is significantly negative, suggesting that before SOX, the value relevance of interim earnings is lower than that for annual earnings. The coefficient on *AVE_INTAN* is negative and marginally significant, which is not consistent with the prediction. Prior literature has documented that market valuation takes intangibles like R&D into consideration (Lev and Sougiannis 1996). However, the model used in this study to estimate value relevance does not include R&D. This mechanical issue could have led to the underestimate of value relevance for R&D intensive firms, and thus contribute to the documented negative association between value relevance and intangible intensity. The coefficient on *AVE_DINT* is negative and marginally significant, indicating that the industry with high frequency of absence of intangibles is associated with lower value of relevance of earnings. All remaining coefficients are insignificant.

In Panel C of Table 19, the dummy variable of *SOX* is replaced by two other dummy variables *S302* and *S404*. Accordingly, the interaction term between *SOX* and *Q123* is replaced by two other interaction terms: *Q123*S302* and *Q123*S404*. The coefficient on *S302* (*S404*) is insignificant, suggesting that the value relevance of annual earnings during the (SOX302) SOX404 period does not change much compared to the level before SOX. The coefficient on *Q123*S302* is positive and significant at the 1%

level, indicating that improvement in value relevance of interim earnings due to SOX 302 is higher than that of annual earnings. However, the coefficient on *Q123*S404* is insignificant, meaning that improvement in value relevance of interim earnings due to SOX 404 is not different from that of annual earnings. The coefficient estimates of control variables in Panel C of are highly consistent with those in Panel B.

In summary, the test results in Table 16 fail to support H2 that the improvement of value relevance of interim earnings during the entire SOX period is greater than that of annual earnings. However, there is some evidence that the improvement of value relevance of interim earnings during the SOX302 period is greater than that of annual earnings, suggesting that SOX 302 likely played a role in reducing the gap between the value-relevance of interim earnings and that of annual earnings.

CHAPTER 7

SUMMARY AND CONCLUSIONS

7.1 Summary of Research Questions, Hypotheses and Major Findings

This study examines the change in the quality of interim earnings around the enactment of Sarbanes-Oxley Act and whether the change differs between interim and annual earnings, by focusing on the impact of internal control provisions.

SOX 302 and SOX 404 are the most important internal control provisions within the framework of SOX. SOX 302 introduced new certification requirements and criminal penalties associated with noncompliance in aim to increase the management's responsibility for and involvement in establishing credible internal controls during interim quarters, which in turn, is likely to enhance the quality and credibility of internal controls systems. A strengthened internal control system is very likely to improve interim earnings quality. SOX 404 increased auditor involvement in the interim financial reporting process, which is also expected to improve the quality of interim earnings.

Previous research indicates that the quality of interim earnings is lower because managers have more discretion in expense recognition in interim reporting and interim earnings are only subject to review which is less rigorous than an independent audit. If SOX 302 increases the management's responsibility for establishing and maintaining internal controls on a quarterly basis and SOX 404 increases the auditor's involvement

in interim reporting, then the improvement of earnings quality after SOX for interim quarters is likely to be higher than that for annual periods.

The above two arguments lead to the empirical investigation of the interim earnings quality over the enactment of SOX. The empirical analyses are conducted on all the public firms (excluding those in the financial services and utilities industries) from 1998 through 2007. The end of year 2002 divides the sample period into the pre-SOX and post-SOX periods. Both univariate and multivariate tests are employed to examine the difference in the quality of interim earnings between the pre-SOX and post-SOX periods, and whether the change in earnings quality for interim quarters is in the same magnitude as the change for annual periods. Two approaches are followed to measure earnings quality: the earnings-management approach and the earnings-attribute approach. Under the earnings-management approach, the discretionary accruals (both signed and unsigned) based on the Modified Jones Model are used to measure earnings quality. Under the earnings-attribute approach, both the accrual quality and the value-relevance of earnings are used to measure earnings quality respectively. Accrual quality is derived from the inverse of standard deviation of residuals from the augmented DD's model. The value relevance of earnings is derived from the adjusted R^2 of the regression of stock returns on contemporaneous accounting earnings.

The first hypothesis tested in the empirical analysis is that the quality of interim earnings improves after SOX. The results under the earnings-management approach provide strong support to the hypothesis. In both two-sample t test and the Mann-Whitney test, the difference in absolute discretionary accruals (positive discretionary

accruals) for interim quarters between the pre-SOX and post-SOX periods is positive and significant at the 1% level. However, for negative discretionary accruals for interim quarters, the difference in its magnitude between pre-SOX and post-SOX is positive but insignificant in the two-sample t test. In the multivariate tests, after controlling for the factors associated with earnings management as suggested by prior literature, all three forms of discretionary accruals are shown to have decreased in magnitude since the enactment of SOX. As a step further, the post-SOX period is divided into the SOX302 and SOX404 periods. The regression results show that earnings management decreases in each of these two shorter windows. Therefore, both SOX 302 and SOX 404 appear to play a role in dampening earnings management with interim quarters.

The results under the earnings-attribute approach provide little support to the first hypothesis. The tests based on accrual quality do not provide evidence for the improvement of interim accrual quality after SOX. The interim accrual quality based on the inverse of cross-sectional standard deviation of residual accruals does not improve after SOX in both the univariate tests and multivariate tests. In the supplemental test, I compute accrual quality based on the inverse of standard deviation of firm-specific time-series residual accruals. Due to the limitation of data availability, only the data of 2007 is included in the post-SOX period. Only the multivariate tests document that the accrual quality for interim quarters improves after SOX. Both univariate and multivariate tests document an improved value relevance of interim earnings after SOX. However, the improvement seems to be driven by SOX 302 only.

The second hypothesis predicts that the improvement of interim earnings quality is higher than that of its annual counterpart. The results under the earnings-management approach provide strong support for this hypothesis. For all three forms of discretionary accruals, the univariate test based on the ANOVA procedure documents that there is an interaction effect on the *SOX* dummy and the *Q123* dummy, meaning that the effect of SOX on earnings management depends on whether the earnings are from an interim quarter or an annual period. In the multivariate tests by regression models, all coefficients on the interaction term of *SOX*Q123* are negative and significant at the 1% level, which is consistent with the prediction that the decrease of earnings management with interim quarters after SOX is larger than that with annual periods. In the analysis on the shorter windows of the SOX302 and SOX404 periods, the results are consistent with that both SOX302 and SOX404 improve interim earnings quality to a greater extent.

The results under the earnings-attribute approach provide little support for the second hypothesis. From the result of ANOVA procedure, the effect of SOX on accrual quality is independent of whether the observation is from an interim quarter or an annual period. The univariate test result is confirmed by the regression results, suggesting that the change of accrual quality of interim earnings due to SOX is no different from that of annual earnings. In the supplemental test for accrual quality based on the firm-specific time-series residual accruals, both the ANOVA procedure and multiple regressions document a significantly negative interaction effect between *SOX* and *Q123*, suggesting that the deterioration of accrual quality of interim earnings is

more serious than that for annual periods, which is inconsistent with H2. Note that due to the limitation of the construct of this measure for accrual quality, there is only one year of 2007 in the post-SOX period. The tests based on the value relevance of earnings provide no evidence to support H2, except that SOX 302 appears to have reduced the gap in value relevance between interim quarters and annual periods.

7.2 Implications and Contributions

This study is similar in spirit to the recent research by Cohen et al. (2008) and Lobo and Zhou (2006) with a focus on the effect of SOX on financial reporting quality. Cohen et al. (2008) detect less earnings management in annual earnings from 2002 to 2005 than before. Lobo and Zhou (2006) document lower abnormal accruals and higher conservatism in financial reporting in the two years after SOX than the two years before. Although the preceding evidence reflects improved earnings quality after SOX, the inferences are only made based on annual earnings. In light of the documented differences between the quarterly and annual financial reporting processes (Brown and Pinello 2007), the present study extends prior research by taking a look at the interim earnings quality around SOX. The results of this study based on earnings management provide strong support to the predictions that (1) the interim earnings quality improves after SOX and (2) the magnitude of the improvement in earnings quality for interim quarters is higher than that for annual periods. Therefore, the study provides further evidence on the improvement of interim earnings quality after SOX and on the differential impact of SOX on the quality of earnings from different types of periods.

The results of this study may have important implications to market participants. In the interim investment and valuation decisions after SOX, the less managed interim earnings are of realistic relevance to market participants. Interim earnings are more promptly and frequently accessible than annual earnings. Before the announcement of annual earnings, interim earnings provide the baseline information in estimating annual earnings. Therefore, the relative change in earnings management during interim quarters versus annual period after SOX should be factored in when market participants try to forecast the annual earnings.

As discussed earlier, this study uses both the earnings-attribute and the earnings-management approaches, which is not very common in most of prior studies on SOX and earnings quality. The employment of more than one approach ensures that the research grasps as many facets of earnings quality as possible. Earnings management, as it can be a good proxy for low earnings quality caused by managerial intentional manipulations and frauds, cannot capture the effect of unintentional estimation errors on earnings quality. The present study makes an attempt to view the impact of SOX on earnings quality from a different angle. More research on other aspect of earnings quality around the enactment of SOX is called for.

The availability of the latest data allows this study to test earnings quality around the implementation of SOX 404. The earning management with interim quarters decreases during both the SOX302 and SOX404 periods. Both SOX 302 and SOX 404 appear to contribute to the convergence of earnings quality between interim quarters

and annual periods. Therefore, the study provides additional evidence on the effect of SOX 302 and SOX 404.

7.3 Extensions for Future Research

A major part of this study is to examine the magnitude of earnings management measured by discretionary accruals. Another way of exploring earnings management around SOX is to look at the likelihood of engaging in earnings management. Such tests can be conducted in a conditional or unconditional setting. The unconditional setting identifies earnings management when a firm has positive discretionary accruals while the conditional setting identifies earnings management when a firm not only has positive discretionary accruals but also meets or beats the analysts' forecast.

APPENDIX A

FIGURES

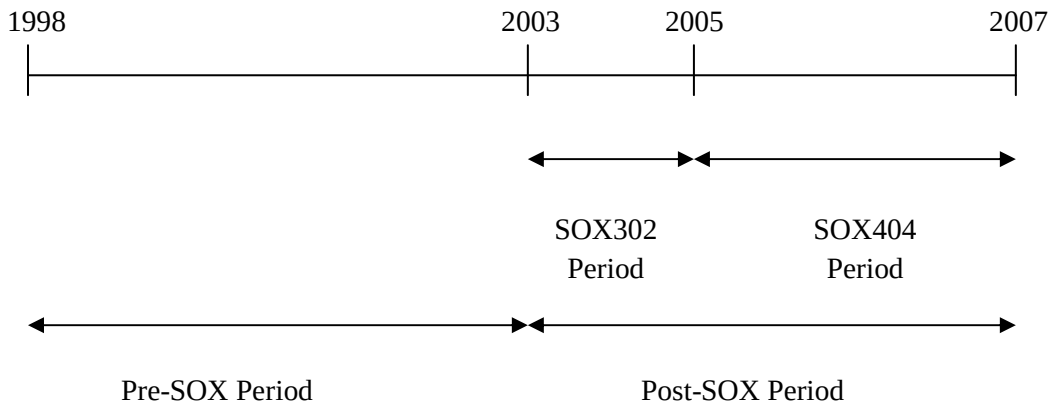


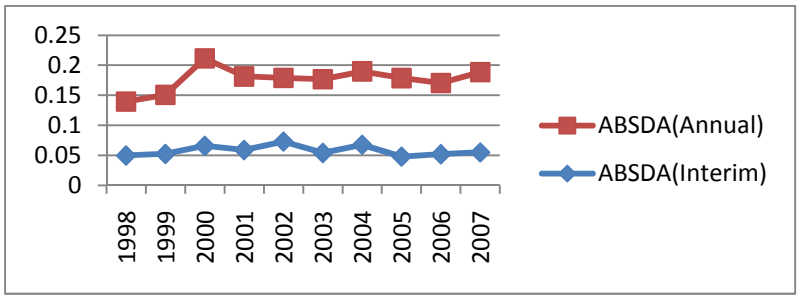
Figure 1 Timeline of the Study

This figure depicts the different time periods analyzed. The pre-SOX period extends from 1998 through 2002, and the post-SOX period extends from 2003 through 2007. Within the post-SOX period, I classify the period from 2003 through 2004 as the SOX302 period, and the period from 2005 through 2007 as the SOX404 period.

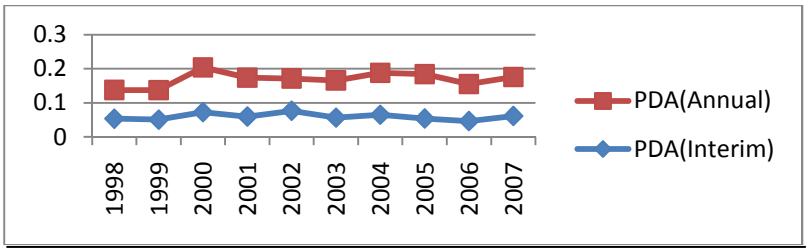
	Annual (*Q123*=0)	**Interim** (*Q123*=1)	**Difference**
Pre-SOX (*SOX*=0)	γ_0	$\gamma_0 + \gamma_1$	γ_1
Post-SOX (*SOX*=1)	$\gamma_0 + \gamma_2$	$\gamma_0 + \gamma_1 + \gamma_2 + \gamma_3$	$\gamma_1 + \gamma_3$
Difference	γ_2	$\gamma_2 + \gamma_3$	γ_3

Figure 2 Analysis of Regression Coefficients in Equation (17)

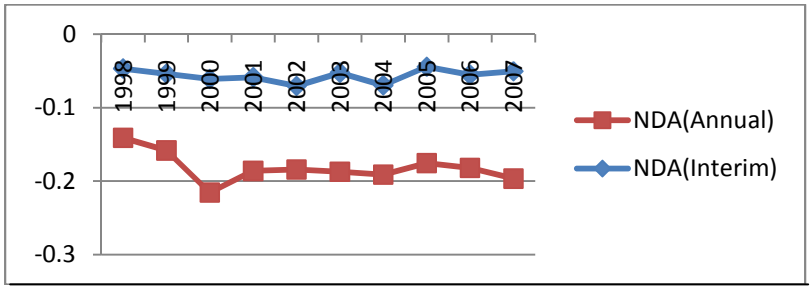
This figure displays the process of arriving at the coefficient of interest in testing H2.



(a)



(b)



(c)

Figure 3 Average Discretionary Accruals over Time, 1998-2007

This figure plots the average discretionary accruals from 1998 through 2007. (a) Figure of absolute value of discretionary accruals (*ABSDA*); (b) Figure of positive discretionary accruals (*PDA*); (c) Figure of negative discretionary accruals (*NDA*).

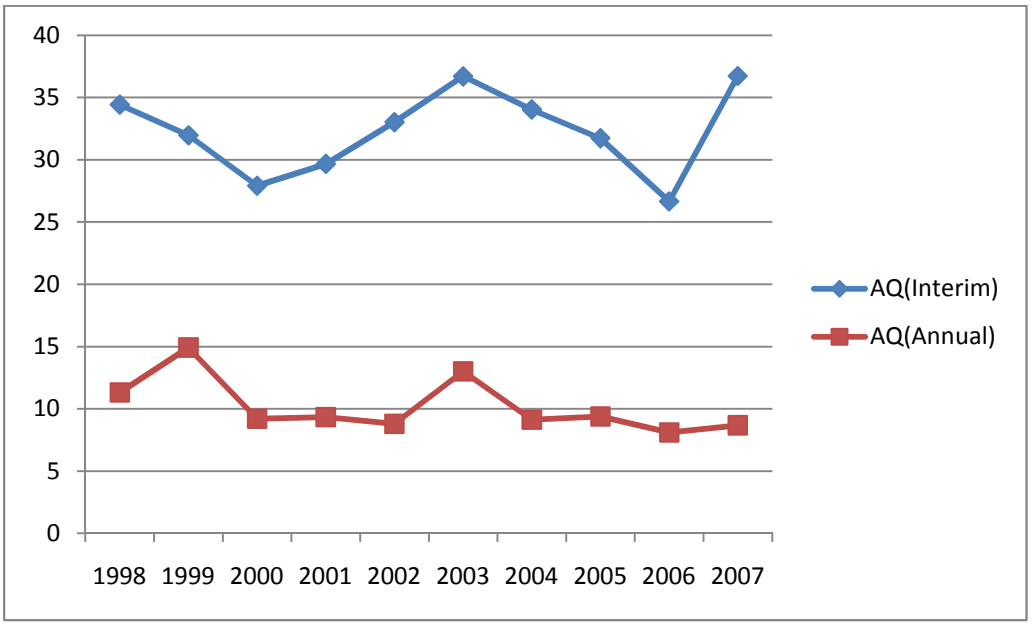


Figure 4 Average Cross-sectional Accrual Quality over Time, 1998-2007

This figure plots the cross-sectional accrual quality (*AQ*) over the sample period. Accrual quality is measured by the inverse of standard deviation of the residual accruals within an industry-quarter (industry-year).

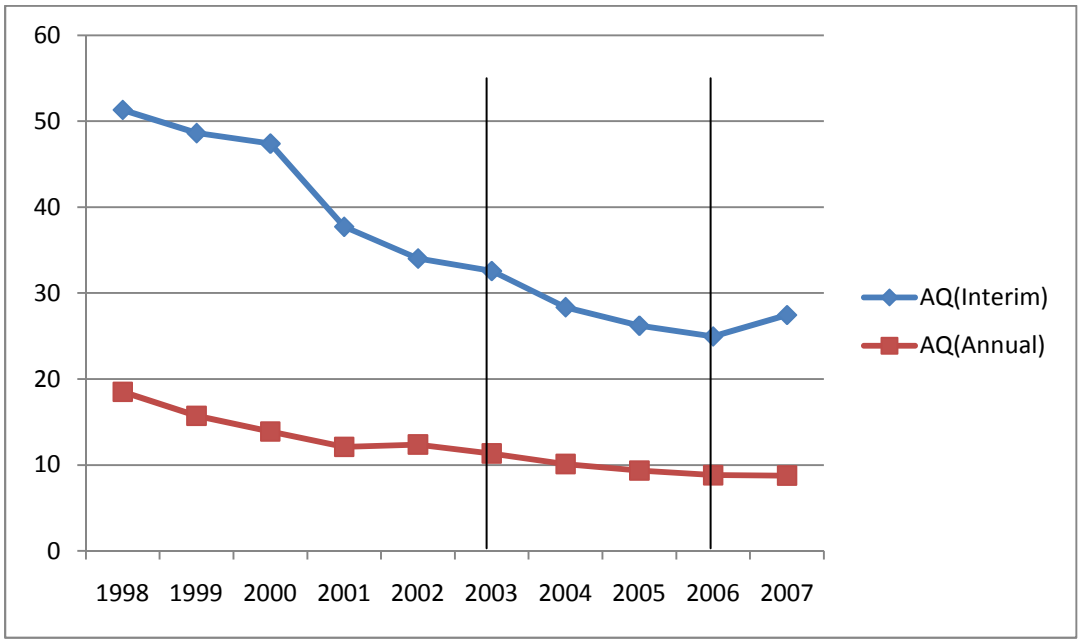


Figure 5 Average Time-series Accrual Quality over Time, 1998-2007

This figure plots the time-series accrual quality (*AQ*) over the sample period. Accrual quality is measured by the inverse of standard deviation of the firm-specific time-series residual accruals. The part of the graph between 2003 and 2006 ("contaminated" years) is for presentation only. The data from this period are not included in the statistical tests.

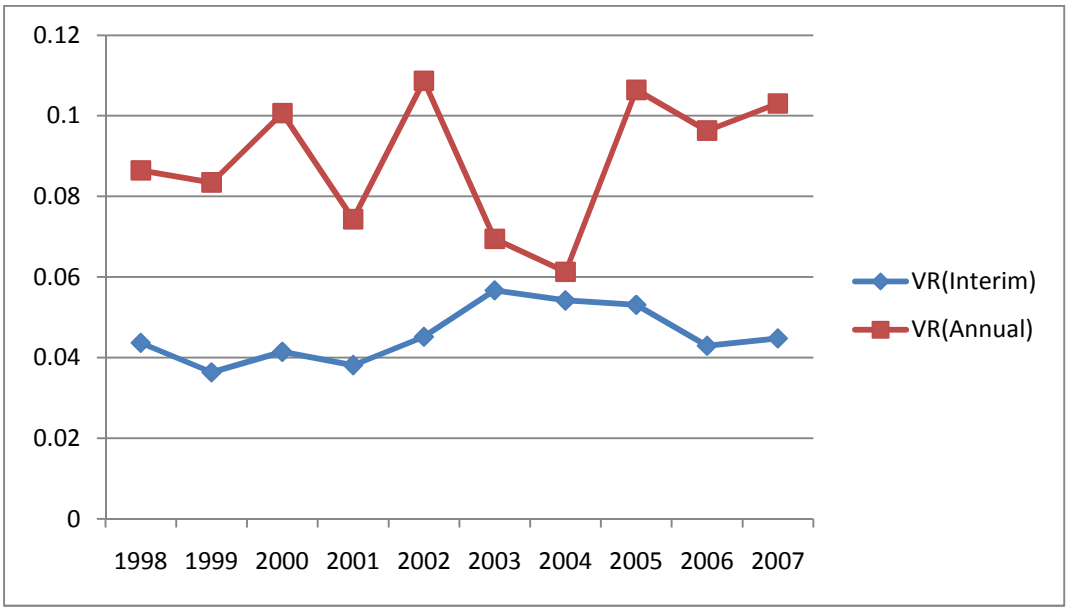


Figure 6 Average Value Relevance of Earnings over Time, 1998-2007

This figure plots the value relevance of earnings (*VR*) over the sample period. Value relevance is measured by the adjusted R^2 of the regression of stock returns on earnings.

APPENDIX B

TABLES

Table 1 Sample Selection Process-Earnings Management

Description		Quarterly Sample		Annual Sample	Combined Sample
Firm-quarters (firm-years) between Jan. 1998 and Dec. 2007 in the database of Compustat		463,257		116,686	
Less: Firm-quarters (firm-years) in the financial service industry and the utilities industry (with SIC code of 60-67 and 49)	(127,182)	336,075	(31,798)	84,888	
Less: Firm-quarters (firm-years) not listed publicly in the US	(118,294)	217,781	(29,716)	55,172	
Less: Firm-quarters (firm-years) with missing Compustat data for Modified Jones Model	(101,810)	115,971	(7,196)	47,976	
Less: Firm-quarters (firm-years) with less than 10 observations in the same industry-quarter (industry-year) group	(3,892)	112,079	(601)	47,375	
Less: Firm-quarters (firm-years) with missing Compustat data to generate control variables	(61,948)	50,131	(24,995)	22,380	
Firm-quarters (4^{th} fiscal quarters)		23,383			
Firm-quarters (interim quarters)		26,748			
Firm-years				22,380	
Combined sample with both interim and annual data					49,128
Less: Observations trimmed at the top and bottom 2% of all the continuous variables		(7,533)			41,595
Final Sample					41,595
Firm-quarters (Interim)					23,338
Firm-years					18,257

Table 2 Sample Description-Earnings Management

Panel A: Sample Distribution

	Annual Earnings	Interim Earnings	Total
Pre-SOX	8,811	14,582	23,393
	(21%)	(35%)	(56%)
Post-SOX	9,446	8,756	18,202
	(23%)	(21%)	(44%)
Total	18,257	23,338	41,595
	(44%)	(56%)	(100%)

Panel B: Distribution by Years

	Annual Earnings	Interim Earnings	Total
1998	1,751	3,988	5,739
	(4.21%)	(9.58%)	(13.79 %)
1999	1,732	3,850	5,582
	(4.16%)	(9.26%)	(13.42%)
2000	1,740	3,714	5,454
	(4.18%)	(8.93%)	(13.12%)
2001	1,814	1,536	3,350
	(4.36%)	(3.69%)	(8.05%)
2002	1,774	1,494	3,268
	(4.26%)	(3.59%)	(7.85%)
2003	1,727	1,497	3,224
	(4.15%)	(3.60%)	(7.75%)
2004	1,862	1,682	3,544
	(4.48%)	(4.04%)	(8.52%)
2005	2,017	1,814	3,831
	(4.85%)	(4.36%)	(9.21%)
2006	1,997	1,860	3,857
	(4.80%)	(4.47%)	(9.27%)
2007	1,843	1,903	3,746
	(4.43%)	(4.57%)	(9.01%)
1998-2007	18,257	23,338	41,595
	(43.89%)	(56.11%)	(100%)

Panel C: Distribution by Industry

Table 2 – *Continued*

Industry category	*Unique Firms*	*Percent*
01 - - AGRICULTURAL PRODUCTION - CROPS	8	0.19
10 - - METAL MINING	10	0.24
12 - - COAL MINING	3	0.07
13 - - OIL AND GAS EXTRACTION	22	0.53
14 - - NONMETALLIC MINERALS, EXCEPT FUELS	8	0.19
15 - - GENERAL BUILDLING CONTRACTORS	2	0.05
16 - - HEAVY CONSTRUCTION, EXCEPT BUILDING	4	0.10
17 - - SPECIAL TRADE CONTRACTORS	3	0.07
20 - - FOOD AND KINDRED PRODUCTS	49	1.18
21 - - TOBACCO PRODUCTS	1	0.02
22 - - TEXTILE MILL PRODUCTS	11	0.26
23 - - APPAREL AND OTHER TEXTILE PRODUCTS	10	0.24
24 - - LUMBER AND WOOD PRODUCTS	9	0.22
25 - - FURNITURE AND FIXTURES	18	0.43
26 - - PAPER AND ALLIED PRODUCTS	34	0.82
27 - - PRINTING AND PUBLISHING	17	0.41
28 - - CHEMICALS AND ALLIED PRODUCTS	590	14.21
29 - - PETROLEUM AND COAL PRODUCTS	21	0.51
30 - - RUBBER AND MISC. PLASTICS PRODUCTS	46	1.11
31 - - LEATHER AND LEATHER PRODUCTS	8	0.19
32 - - STONE, CLAY, AND GLASS PRODUCTS	28	0.67
33 - - PRIMARY METAL INDUSTRIES	37	0.89
34 - - FABRICATED METAL PRODUCTS	55	1.32
35 - - INDUSTRIAL MACHINERY AND EQUIPMENT	376	9.06
36 - - ELECTRONIC & OTHER ELECTRIC EQUIPMENT	576	13.87
37 - - TRANSPORTATION EQUIPMENT	101	2.43
38 - - INSTRUMENTS AND RELATED PRODUCTS	491	11.83
39 - - MISC. MANUFACTURING INDUSTRIES	31	0.75
44 - - WATER TRANSPORTATION	3	0.07
45 - - TRANSPORTATION BY AIR	1	0.02
47 - - TRANSPORTATION SERVICES	5	0.12
48 - - COMMUNICATION	70	1.69
50 - - WHOLESALE TRADE - DURABLE GOODS	80	1.93
51 - - WHOLESALE TRADE - NONDURABLE GOODS	47	1.13
53 - - GENERAL MERCHANDISE STORES	29	0.70
54 - - FOOD STORES	26	0.63
55 - - AUTOMOTIVE DEALERS & SERVICE STATIONS	18	0.43
56 - - APPAREL AND ACCESSORY STORES	51	1.23
57 - - FURNITURE AND HOMEFURNISHINGS STORES	22	0.53

Table 2 – *Continued*

58 - - EATING AND DRINKING PLACES	65	1.57
59 - - MISCELLANEOUS RETAIL	101	2.43
70 - - HOTELS AND OTHER LODGING PLACES	22	0.53
72 - - PERSONAL SERVICES	3	0.07
73 - - BUSINESS SERVICES	812	19.56
75 - - AUTO REPAIR, SERVICES, AND PARKING	4	0.10
78 - - MOTION PICTURES	8	0.19
79 - - AMUSEMENT & RECREATION SERVICES	33	0.79
80 - - HEALTH SERVICES	85	2.05
82 - - EDUCATIONAL SERVICES	3	0.07
83 - - SOCIAL SERVICES	2	0.05
87 - - ENGINEERING & MANAGEMENT SERVICES	71	1.71
99 - - NONCLASSIFIABLE ESTABLISHMENTS	22	0.53
Total	4,152	100.00

Panel D: Descriptive Statistics

Variables	**N**	**Mean**	**25 Percentile**	**Median**	**75 Percentile**	**Standard Deviation**
DA	41,595	-0.0162	-0.0616	-0.0117	0.0324	0.1297
ABSDA	41,595	0.0840	0.0198	0.0478	0.1071	0.1000
PDA	17,450	0.0811	0.0175	0.0442	0.1033	0.0996
NDA	24,145	-0.0865	-0.1103	-0.0503	-0.0215	0.1001
DUR	41,595	0.5743	0	1	1	0.4944
RD	41,595	0.0491	0.0062	0.0235	0.0603	0.0725
LABOR	41,595	0.6887	0.5636	0.7176	0.8377	0.1861
ICLAIM	41,595	0.0193	-0.4617	0.0671	0.6511	0.8014
LOSS	41,595	0.1877	0	0	0	0.3905
LEV	41,595	0.1011	0	0.0261	0.1764	0.1337
SIZE	41,595	5.6100	4.0743	5.5334	7.0047	2.0480
MB	41,595	3.8483	1.5329	2.5592	4.4829	3.9754
ΔGDP	41,595	5.4925	4.5	5.5	6.5	1.7380
BIG	41,595	0.8251	1	1	1	0.3799

Panel E: Correlation Matrix-Earnings Management

Table 2 – *Continued*

		Spearman Correlation Coefficients, N = 41,595										
		ABSDA	*Q123*	*SOX*	*Q123*SOX*	*ICLAIM*	*LOSS*	*LEV*	*SIZE*	*MB*	*ΔGDP*	*BIG*
Pearson Correlation Coefficients, N = 41,595			-0.3360	0.0478	-0.1731	0.0994	0.0797	-0.0985	-0.0739	0.1111	-0.0100	-0.0741
	ABSDA	1.0000	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0413	<.0001
		-0.3085		-0.1423	0.4567	0.0524	0.1066	-0.0839	-0.0679	0.1041	-0.0306	-0.0028
	Q123	<.0001	1.0000	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.5720
		0.0656	-0.1423		0.5854	0.0080	-0.0161	-0.0314	0.1430	0.0399	0.2485	-0.1755
	SOX	<.0001	<.0001	1.0000	<.0001	0.1051	0.0010	<.0001	<.0001	<.0001	<.0001	<.0001
		-0.1497	0.4567	0.5854		0.0321	0.0192	-0.0477	0.0649	0.0576	0.1173	-0.1366
	*Q123*SOX*	<.0001	<.0001	<.0001	1.0000	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
		0.1115	0.0515	-0.0003	0.0226		0.2247	-0.2678	-0.1050	0.1274	0.0004	-0.0158
	ICLAIM	<.0001	<.0001	0.9564	<.0001	1.0000	<.0001	<.0001	<.0001	<.0001	0.9303	0.0013
		0.0882	0.1066	-0.0161	0.0192	0.2292		-0.1539	-0.2186	0.1746	-0.0168	-0.0549
	LOSS	<.0001	<.0001	0.0010	<.0001	<.0001	1.0000	<.0001	<.0001	<.0001	0.0006	<.0001
		-0.0779	-0.0758	-0.0168	-0.0317	-0.2625	-0.1462		0.2236	-0.0798	-0.0006	0.0914
	LEV	<.0001	<.0001	0.0006	<.0001	<.0001	<.0001	1.0000	<.0001	<.0001	0.9113	<.0001
		-0.0551	-0.0662	0.1414	0.0655	-0.1197	-0.2158	0.2052		0.3377	0.0156	0.3804
	SIZE	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	1.0000	<.0001	0.0015	<.0001
		0.1113	0.1075	-0.0325	0.0141	0.1166	0.2118	-0.0414	0.1865		0.0400	0.0043
	MB	<.0001	<.0001	<.0001	0.0041	<.0001	<.0001	<.0001	<.0001	1.0000	<.0001	0.3765
		-0.0249	0.0373	0.1952	0.1416	0.0053	-0.0065	-0.0020	0.0157	0.0436		-0.0362
	ΔGDP	<.0001	<.0001	<.0001	<.0001	0.2763	0.1848	0.6844	0.0013	<.0001	1.0000	<.0001
		-0.0751	-0.0028	-0.1755	-0.1366	-0.0225	-0.0549	0.0946	0.3740	-0.0366	-0.0271	
	BIG	<.0001	0.5720	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	1.0000

Variable Definitions:

DA = discretionary accruals from the Modified Jones Model as in Dechow (1995), augmented by Kothari et al. (2005) by adding the control for performance;

ABSDA = the absolute value of discretionary accruals;

PDA = the value of discretionary accruals for firms reporting positive discretionary accruals;

NDA = the value of discretionary accruals for firms reporting negative discretionary accruals;

DUR = a dummy variable equal to 1 if the firm is in the durable goods industry, following Matsumoto (2002); The durable goods industry refers to the industries with the following three-digit SIC codes: 150-179, 245, 250-259, 283, 301, and 324-399;

RD = research and development expenditures (quarterly Compustat data item XRDQ; annual Compustat data item XRD) scaled by total assets (quarterly Compustat data item ATQ; annual Compustat data item AT);

LABOR = labor intensity, equal to 1 minus the ratio of gross property, plant and equipment (quarterly Compustat data item PPEGTQ; annual Compustat data item PPEGT) to total gross assets, computed as the sum of total assets and accumulated depletion, depreciation and amortization (quarterly Compustat data item DPACTQ; annual Compustat data item DPACT);

Table 2 – *Continued*

ICLAIM	=	implicit claim, resulted from the factor analysis of the three variables: *DUR*, *RD* and *LABOR*;
LOSS	=	a dummy variable equal to 1 if the firm has consistent negative net income before extraordinary items (quarterly Compustat data item IBQ; annual Compustat data item IB) during the last four periods ;
LEV	=	leverage ratio, equal to long-term liabilities (quarterly Compustat data item DLTTQ; annual Compustat data item DLTT) over total assets;
SIZE	=	logarithm of market value at the beginning of the period; market value equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ; annual Compustat data item CSHO) and closing price (quarterly Compustat data item PRCCQ; annual Compustat data item PRCC_F);
MB	=	market-to-book ratio, calculated as market value of equity over book value of equity (quarterly Compustat data item CEQQ; annual Compustat data item CEQ) ;
ΔGDP	=	percentage change of GDP since last period multiplied by100;
BIG	=	a dummy variable equal to 1 if the auditor is a big 5 audit firm.
Q123	=	a dummy variable equal to 1 if the observation belongs to an interim quarter;
SOX	=	a dummy variable equal to 1 if the year of the observation is in 2003-2007;
*Q123*SOX*	=	the interaction term of *Q123* and *SOX*, equal to 1 if the observation is from an interim quarter during 2003-2007;

Table 3 Results for H1-Earnings Management

Panel A: Univariate Tests

	Period	N	Mean	t-statistic (p-value)	Median	Z-statistic (p-value)
ABSDA	Pre-SOX	14,582	0.058	2.72	0.035	5.03
	Post-SOX	8,756	0.055	(0.0066)	0.032	(<.0001)
PDA	Pre-SOX	6,401	0.060	2.25	0.034	5.05
	Post-SOX	3,500	0.056	(0.0250)	0.030	(<.0001)
|NDA|	Pre-SOX	8,181	0.056	1.43	0.036	2.45
	Post-SOX	5,256	0.055	(0.1513)	0.034	(0.0142)

Panel B: Multivariate Tests (Based on SOX)

$$EM_{jq} = \alpha_0 + \alpha_1 SOX + \alpha_2 ICLAIM_{jq} + \alpha_3 LOSS_{jq} + \alpha_4 LEV_{jq} + \alpha_5 SIZE_{jq} + \alpha_6 MB_{jq}$$
$$+ \alpha_7 \Delta GDP_q + \alpha_8 BIG_{jq} + \alpha_9 Trend + \sum_{k=1}^{K-1} \alpha_{9+k} Industry_k + \varepsilon_{jq}$$

	Predicted Sign	ABSDA		PDA		|NDA|	
		Coefficient	t –statistic (p-value)	Coefficient	t –statistic (p-value)	Coefficient	t –statistic (p-value)
Intercept	?	0.154	20.58 (<.0001)	0.164	15.14 (<.0001)	0.150	14.40 (<.0001)
SOX	-	-0.010	-4.48 (<.0001)	-0.014	-3.72 (0.0002)	-0.007	-2.32 (0.0203)
ICLAIM	+	0.000	-0.31 (0.7580)	0.008	5.33 (<.0001)	-0.005	-3.93 (<.0001)
LOSS	-	0.007	5.55 (<.0001)	0.014	7.42 (<.0001)	-0.001	-0.64 (0.5245)
LEV	?	-0.016	-4.08 (<.0001)	-0.010	-1.58 (0.1147)	-0.019	-3.85 (0.0001)
SIZE	-	-0.004	-12.86 (<.0001)	-0.005	-11.49 (<.0001)	-0.003	-7.26 (<.0001)
MB	+	0.002	19.51 (<.0001)	0.003	16.84 (<.0001)	0.002	9.92 (<.0001)
ΔGDP	-	-0.001	-5.04 (<.0001)	-0.001	-3.60 (0.0003)	-0.001	-3.81 (0.0001)
BIG	-	-0.007	-4.75 (<.0001)	-0.008	-3.58 (0.0003)	-0.005	-2.65 (0.0082)
Trend	?	0.002	5.66 (<.0001)	0.003	4.62 (<.0001)	0.001	2.97 (0.0030)

Table 3 – *Continued*

Adjusted-R^2	0.098	0.122	0.094
F-value (Pr>F)	47.27 (<.0001)	26.86 (<0.0001)	27.30 (<0.0001)

Panel C: Multivariate Tests (Based on SOX 302 and SOX 404)

$$EM_{jq} = \alpha_0 + \alpha_1 S302 + \alpha_2 S404 + \alpha_3 ICLAIM_{jq} + \alpha_4 LOSS_{jq} + \alpha_5 LEV_{jq} + \alpha_6 SIZE_{jq}$$
$$+ \alpha_7 MB_{jq} + \alpha_8 \Delta GDP_q + \alpha_9 BIG_{jq} + \alpha_{10} Trend + \sum_{k=1}^{K-1} \alpha_{10+k} Industry_k + \varepsilon_{jq}$$

	Predicted Sign	ABSDA		PDA		|NDA|	
		Coefficient	t –statistic (p-value)	Coefficient	t –statistic (p-value)	Coefficient	t –statistic (p-value)
Intercept	?	0.147	19.72 (<.0001)	0.158	14.62 (<.0001)	0.142	13.72 (<.0001)
S302	-	-0.013	-5.59 (<.0001)	-0.016	-4.27 (<.0001)	-0.010	-3.32 (0.0009)
S404	-	-0.036	-11.52 (<.0001)	-0.037	-7.37 (<.0001)	-0.033	-8.40 (<.0001)
ICLAIM	+	0.000	0.41 (0.6523)	0.009	5.49 (<.0001)	-0.004	-3.14 (0.0017)
LOSS	-	0.006	4.85 (<.0001)	0.013	7.02 (<.0001)	-0.002	-1.19 (0.2349)
LEV	?	-0.016	-3.98 (<.0001)	-0.010	-1.57 (0.1171)	-0.018	-3.74 (0.0002)
SIZE	-	-0.004	-12.86 (<.0001)	-0.005	-11.45 (<.0001)	-0.003	-7.29 (<.0001)
MB	+	0.002	19.67 (<.0001)	0.003	16.99 (<.0001)	0.002	9.96 (<.0001)
ΔGDP	-	-0.001	-3.53 (0.0004)	-0.001	-2.72 (0.0066)	-0.001	-2.61 (0.0090)
BIG	-	-0.007	-5.08 (<.0001)	-0.008	-3.84 (0.0001)	-0.005	-2.86 (0.0042)
Trend	?	0.005	11.50 (<.0001)	0.005	7.63 (<.0001)	0.005	8.04 (<.0001)
Adjusted-R^2		0.104		0.126		0.101	
F-value (Pr>F)		49.36 (<0.0001)		27.34 (<0.0001)		28.80 (<0.0001)	

Variable Definitions:

ABSDA = the absolute value of discretionary accruals from the Modified Jones Model as in Dechow (1995), augmented by Kothari et al. (2005) by adding the control for performance
PDA = the value of discretionary accruals for firms reporting positive discretionary accruals
|*NDA*| = the absolute value of discretionary accruals for firms reporting negative discretionary accruals
EM = the measure of earnings management: *ABSDA*, *PDA* or |*NDA*|;
SOX = a dummy variable equal to 1 if the year of the observation is in 2003-2007;

Table 3 – *Continued*

S302	=	a dummy variable equal to 1 if the year of the observation is in 2003-2004;
S404	=	a dummy variable equal to 1 if the year of the observation is in 2005-2007;
ICLAIM	=	implicit claim by stakeholders, which is the factor analysis result based on variables *DUR*, *RD* and *LABOR*. *DUR* is a dummy variable equals 1 if the firm belongs to a durable goods industry, defined by Matsumoto (2002). The durable goods industry refers to the industries with the following three-digit SIC codes: 150-179, 245, 250-259, 283, 301, and 324-399. *RD* is research and development expenditures (quarterly Compustat data item XRDQ) scaled by total assets (quarterly Compustat data item ATQ). *LABOR* equals 1 minus the ratio of gross property, plant and equipment (quarterly Compustat data item PPEGTQ) to total gross assets, computed as the sum of total assets (quarterly Compustat data item ATQ) and accumulated depletion, depreciation and amortization (quarterly Compustat data item DPACTQ);
LOSS	=	a dummy variable equal to 1 if the firm has negative net income before extraordinary items (quarterly Compustat data item IBQ) consistently from last four quarters;
LEV	=	leverage ratio, calculated as long-term liabilities (quarterly Compustat data item DLTTQ) over total assets;
SIZE	=	firm size, calculated as the natural logarithm of market value of equity, where market value of equity equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ) and closing price (quarterly Compustat data item PRCCQ) at the end of the quarter;
MB	=	market-to-book ratio, calculated as market value of equity at the end of quarter q over book value of equity (quarterly Compustat data item CEQQ);
ΔGDP	=	the percent change in the real gross domestic product from the preceding quarter multiplied by 100;
BIG	=	1 if the auditor is a big 5 audit firm, and zero otherwise;
Trend	=	a trend variable equal to the difference between the current year of observation and 1998;
Industry	=	a dummy variable equal to 1 if the firm belongs to industry k. The subscript k equals 1, 2 … or K-1, where K represents the number of unique industries based on 2-digit SIC code.

Table 4 Results for H2-Earnings Management

Panel A: Univariate Tests

	Source	DF	Type III SS	Mean Square	F Value	Pr > F		LSMEAN	
ABSDA	SOX	1	0.27	0.27	29.57	<.0001		**Q123=0**	**Q123=1**
	Q123	1	38.49	38.49	4271.9	<.0001	**SOX=0**	0.112	0.058
	SOX*Q123	1	0.62	0.61	68.86	<.0001	**SOX=1**	0.125	0.055
PDA	SOX	1	0.14	0.14	14.77	0.0001		**Q123=0**	**Q123=1**
	Q123	1	10.8	10.8	1169	<.0001	**SOX=0**	0.102	0.060
	SOX*Q123	1	0.37	0.37	40.11	<.0001	**SOX=1**	0.117	0.056
|NDA|	SOX	1	0.17	0.17	19.69	<.0001		**Q123=0**	**Q123=1**
	Q123	1	28.46	28.46	3234.2	<.0001	**SOX=0**	0.119	0.056
	SOX*Q123	1	0.31	0.31	34.78	<.0001	**SOX=1**	0.132	0.055

Panel B: Multivariate Tests (Based on SOX)

$$EM_{jq} = \varphi_0 + \varphi_1 Q123 + \varphi_2 SOX + \varphi_3 Q123 * SOX + \varphi_4 ICLAIM_{jq} + \varphi_5 LOSS_{jq} + \varphi_6 LEV_{jq}$$
$$+ \varphi_7 SIZE_{jq} + \varphi_8 MB_{jq} + \varphi_9 \Delta GDP_q + \varphi_{10} BIG_{jq} + \varphi_{11} Trend + \sum_{k=1}^{K-1} \varphi_{11+k} Industry_k + \varepsilon_{jq}$$

	Predicted Sign	ABSDA		PDA		|NDA|	
		Coefficient	t –statistic (p-value)	Coefficient	t –statistic (p-value)	Coefficient	t –statistic (p-value)
Intercept	?	0.227	27.30 (<.0001)	0.225	18.39 (<.0001)	0.232	20.65 (<.0001)
Q123	?	-0.063	-50.56 (<.0001)	-0.053	-27.14 (<.0001)	-0.068	-42.35 (<.0001)
SOX	-	0.000	0.18 (0.8581)	0.004	1.08 (0.3274)	0.003	0.98 (0.3262)
*Q123*SOX*	-	-0.014	-7.76 (<.0001)	-0.015	-5.40 (<.0001)	-0.016	-6.83 (<.0001)
ICLAIM	+	0.003	3.11 (0.0019)	0.017	11.29 (<.0001)	-0.003	-2.89 (0.0038)
LOSS	-	0.004	3.29 (0.0010)	0.018	9.94 (<.0001)	-0.009	-4.56 (<.0001)
LEV	?	-0.029	-7.73 (<.0001)	-0.023	-3.88 (0.0001)	-0.029	-6.10 (<.0001)
SIZE	-	-0.003	-11.87 (<.0001)	-0.005	-12.73 (<.0001)	-0.002	-6.87 (<.0001)

Table 4 – *Continued*

MB	+	0.003	24.83 (<.0001)	0.003	16.64 (<.0001)	0.003	17.51 (<.0001)
ΔGDP	-	-0.001	-2.28 (0.0225)	-0.001	-1.58 (0.1137)	-0.001	-1.89 (0.0590)
BIG	-	-0.006	-4.64 (<.0001)	-0.009	-4.56 (<.0001)	-0.003	-1.77 (0.0775)
Trend	?	0.003	7.5 (<.0001)	0.002	4.15 (<.0001)	0.002	5.43 (<.0001)
Adjusted-R^2		0.185		0.181		0.209	
F-value (Pr>F)		153.68 (<0.0001)		64.02 (<0.0001)		107.30 (<0.0001)	

Panel C: Multivariate Tests (Based on SOX 302 and SOX 404)

$$EM_{jq} = \varphi_0 + \varphi_1 Q123 + \varphi_2 S302 + \varphi_3 S404 + \varphi_4 Q123 * S302 + \varphi_5 Q123 * S404$$
$$+ \varphi_6 ICLAIM_{jq} + \varphi_7 LOSS_{jq} + \varphi_8 LEV_{jq} + \varphi_9 SIZE_{jq} + \varphi_{10} MB_{jq} + \varphi_{11} \Delta GDP_q$$
$$+ \varphi_{12} BIG_{jq} + \varphi_{13} Trend + \sum_{k=1}^{K-1} \varphi_{13+k} Industry_k + \varepsilon_{jq}$$

	Predicted Sign	**ABSDA**		**PDA**		**|NDA|**	
		Coefficient	**t –statistic (p-value)**	**Coefficient**	**t –statistic (p-value)**	**Coefficient**	**t –statistic (p-value)**
Intercept	?	0.220	26.28 (<.0001)	0.219	17.81 (<.0001)	0.224	19.89 (<.0001)
Q123	?	-0.062	-49.43 (<.0001)	-0.052	-26.56 (<.0001)	-0.067	-41.49 (<.0001)
S302	-	-0.006	-2.46 (0.0141)	-0.000	-0.12 (0.9018)	-0.005	-1.48 (0.1398)
S404	-	-0.017	-5.44 (<.0001)	-0.011	-2.31 (0.0208)	-0.013	-3.22 (0.0013)
*Q123*S302*	-	-0.008	-3.02 (0.0025)	-0.012	-3.10 (0.0019)	-0.007	-2.08 (0.0371)
*Q123*S404*	-	-0.020	-9.49 (<.0001)	-0.019	-5.85 (<.0001)	-0.023	-8.53 (<.0001)
ICLAIM	+	0.003	3.53 (0.0004)	0.017	11.34 (<.0001)	-0.003	-2.43 (0.0150)
LOSS	-	0.004	2.82 (0.0048)	0.017	9.64 (<.0001)	-0.009	-4.88 (<.0001)
LEV	?	-0.028	-7.67 (<.0001)	-0.023	-3.89 (0.0001)	-0.028	-6.02 (<.0001)
SIZE	-	-0.003	-11.72 (<.0001)	-0.005	-12.59 (<.0001)	-0.002	-6.79 (<.0001)
MB	+	0.003	24.99 (<.0001)	0.003	16.71 (<.0001)	0.003	17.61 (<.0001)
ΔGDP	-	-0.000	-0.41 (0.6854)	-0.000	-0.50 (0.6173)	-0.000	-0.58 (0.5637)
BIG	-	-0.007	-5.07 (<.0001)	-0.010	-4.86 (<.0001)	-0.004	-2.03 (0.0421)

Table 4 – *Continued*

Trend	11.68		6.36		8.61	
?	0.005	(<.0001)	0.004	(<.0001)	0.005	(<.0001)
Adjusted-R^2	0.188		0.182		0.211	
F-value (Pr>F)	151.04 (<0.0001)		62.53 (<0.0001)		105.33 (<0.0001)	

Variable Definitions:

EM = the measure of earnings management: *ABSDA*, *PDA* or |*NDA*|;

ABSDA = the absolute value of discretionary accruals from the Modified Jones Model as in Dechow (1995), augmented by Kothari et al. (2005) by adding the control for performance;

PDA = the value of discretionary accruals for firms reporting positive discretionary accruals

|*NDA*| = the absolute value of discretionary accruals for firms reporting negative discretionary accruals;

Q123 = a dummy variable equal to 1 if the observation belongs to an interim quarter;

SOX = a dummy variable equal to 1 if the year of the observation is in 2003-2007;

*Q123*SOX* = the interaction term of *Q123* and *SOX*, equal to 1 if the observation is from an interim quarter during 2003-2007;

S302 = a dummy variable equal to 1 if the year of the observation is in 2003-2004;

S404 = a dummy variable equal to 1 if the year of the observation is in 2005- 2007;

*Q123*S302* = the interaction term of *Q123* and *S302*, equal to 1 if the observation is from an interim quarter during 2003-2004;

*Q123*S404* = the interaction term of *Q123* and *S404*, equal to 1 if the observation is from an interim quarter during 2005-2007;

ICLAIM = implicit claim by stakeholders, which is the factor analysis result based on variables *DUR*, *RD* and *LABOR*. *DUR* is a dummy variable equals 1 if the firm belongs to a durable goods industry, defined by Matsumoto (2002). The durable goods industry refers to the industries with the following three-digit SIC codes: 150-179, 245, 250-259, 283, 301, and 324-399. *RD* is research and development expenditures (quarterly Compustat data item XRDQ; annual Compustat data item XRD) scaled by total assets (quarterly Compustat data item ATQ; annual Compustat data item AT). *LABOR* equals 1 minus the ratio of gross property, plant and equipment (quarterly Compustat data item PPEGTQ; annual Compustat data item PPEGT) to total gross assets, computed as the sum of total assets and accumulated depletion, depreciation and amortization (quarterly Compustat data item DPACTQ; annual Compustat data item DPACT);

LOSS = a dummy variable equal to 1 if the firm has negative net income before extraordinary items (quarterly Compustat data item IBQ; annual Compustat data item IB) consistently during the last four periods;

LEV = leverage ratio, calculated as long-term liabilities (quarterly Compustat data item DLTTQ; annual Compustat data item DLTT) over total assets;

SIZE = firm size, calculated as the natural logarithm of market value of equity, where market value of equity equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ; annual Compustat data item CSHO) and closing price (quarterly Compustat data item PRCCQ; annual Compustat data item PRCC_F) at the end of the period;

MB = market-to-book ratio, calculated as market value of equity at the end of the period over book value of equity (quarterly Compustat data item CEQQ; annual Compustat data item CEQ),;

ΔGDP = the percent change in the real gross domestic product from the preceding period nultiplied by 100;

BIG = a dummy variable equal to 1 if the auditor is a big 5 audit firm;

Trend = a trend variable equal to the difference between the current year of observation and 1998;

Industry = a dummy variable equal to 1 if the firm belongs to industry k. The subscript k equals 1, 2 … or K-1, where K represents the number of unique industries based on 2-digit SIC code.

Table 5 Sample Selection Process for the Cross-sectional Test of Accrual Quality

Description		Quarterly Sample		Annual Sample	Combined Sample
Firm-quarters (firm-years) between Jan. 1998 and Dec. 2007 in the database of Compustat		463,257		116,686	
Less: Firm-quarters (firm-years) in the financial service industry and the utilities industry (with SIC code of 60-67 and 49)	(127,182)	336,075	(31,798)	84,888	
Less: Firm-quarters (firm-years) not listed publicly in the US	(116,853)	217,781	(29,716)	55,172	
Less: Firm-quarters (firm-years) with missing Compustat data for Modified DD Model	(116,853)	100,928	(13,053)	42,290	
Less: Firm-quarters (firm-years) with less than 10 observations in the same industry-quarter (industry-year) group	(3,708)	97,220	(495)	41,651	
Less: Firm-quarters (firm-years) with missing Compustat data to generate control variables	(47,492)	49,728	(19,122)	22,466	
Firm-quarters (4th fiscal quarters)		22,697			
Firm-quarters (interim quarters)		27,031			
Firm-years				22,466	
Combined sample with both interim and annual data					49,497
Less: Observations trimmed at the top and bottom 2% of all the continuous variables		(5,861)			43,636
Final Sample					43,636
Firm-quarters (Interim)					24,460
Firm-years					19,176

Table 6 Sample Description- Accrual Quality (Cross-sectional)

Panel A: Sample Distribution

	Annual Earnings	Interim Earnings	Total
Pre-SOX	9,274	15,236	24,510
	(21%)	(35%)	(56%)
Post-SOX	9,902	9,224	19,126
	(23%)	(21%)	(44%)
Total	19,176	24,460	43,636
	(44%)	(56%)	(100%)

Panel B: Distribution by Years

	Annual Earnings	Interim Earnings	Total
1998	1,723	4,044	5,767
	(3.95%)	(9.27%)	(13.22 %)
1999	1,706	3,969	5,675
	(3.91%)	(9.10%)	(13.01%)
2000	1,885	3,831	5,716
	(4.19%)	(8.93%)	(13.10%)
2001	1,979	1,710	3,689
	(4.54%)	(3.92%)	(8.45%)
2002	1,981	1,682	3,663
	(4.54%)	(3.85%)	(8.39%)
2003	1,989	1,687	3,676
	(4.56%)	(3.87%)	(8.42%)
2004	1,969	1,782	3,751
	(4.51%)	(4.08%)	(8.60%)
2005	2,125	1,900	4,025
	(4.87%)	(4.35%)	(9.22%)
2006	2,094	1,904	3,998
	(4.8%)	(4.36%)	(9.16%)
2007	1,725	1,951	3,676
	(3.95%)	(4.47%)	(8.42%)
1998-2007	19,176	24,460	43,636
	(43.95%)	(56.05%)	(100%)

Table 6 – *Continued*

Panel C: Distribution by Industry

Industry category	***Unique Firms***	***Percent***
01 - - AGRICULTURAL PRODUCTION - CROPS	5	0.12
10 - - METAL MINING	13	0.32
12 - - COAL MINING	3	0.07
13 - - OIL AND GAS EXTRACTION	23	0.57
14 - - NONMETALLIC MINERALS, EXCEPT FUELS	8	0.20
15 - - GENERAL BUILDLING CONTRACTORS	2	0.05
16 - - HEAVY CONSTRUCTION, EXCEPT BUILDING	3	0.07
17 - - SPECIAL TRADE CONTRACTORS	2	0.05
20 - - FOOD AND KINDRED PRODUCTS	50	1.24
22 - - TEXTILE MILL PRODUCTS	8	0.20
23 - - APPAREL AND OTHER TEXTILE PRODUCTS	10	0.25
24 - - LUMBER AND WOOD PRODUCTS	7	0.17
25 - - FURNITURE AND FIXTURES	18	0.45
26 - - PAPER AND ALLIED PRODUCTS	33	0.82
27 - - PRINTING AND PUBLISHING	16	0.40
28 - - CHEMICALS AND ALLIED PRODUCTS	611	15.13
29 - - PETROLEUM AND COAL PRODUCTS	22	0.54
30 - - RUBBER AND MISC. PLASTICS PRODUCTS	42	1.04
31 - - LEATHER AND LEATHER PRODUCTS	8	0.20
32 - - STONE, CLAY, AND GLASS PRODUCTS	26	0.64
33 - - PRIMARY METAL INDUSTRIES	39	0.97
34 - - FABRICATED METAL PRODUCTS	49	1.21
35 - - INDUSTRIAL MACHINERY AND EQUIPMENT	355	8.79
36 - - ELECTRONIC & OTHER ELECTRIC EQUIPMENT	560	13.86
37 - - TRANSPORTATION EQUIPMENT	100	2.48
38 - - INSTRUMENTS AND RELATED PRODUCTS	473	11.71
39 - - MISC. MANUFACTURING INDUSTRIES	34	0.84
44 - - WATER TRANSPORTATION	2	0.05
45 - - TRANSPORTATION BY AIR	1	0.02
47 - - TRANSPORTATION SERVICES	3	0.07
48 - - COMMUNICATION	77	1.91
50 - - WHOLESALE TRADE - DURABLE GOODS	75	1.86
51 - - WHOLESALE TRADE - NONDURABLE GOODS	46	1.14
53 - - GENERAL MERCHANDISE STORES	28	0.69
54 - - FOOD STORES	25	0.62
55 - - AUTOMOTIVE DEALERS & SERVICE STATIONS	19	0.47
56 - - APPAREL AND ACCESSORY STORES	52	1.29
57 - - FURNITURE AND HOMEFURNISHINGS STORES	21	0.52

Table 6 – *Continued*

58 - - EATING AND DRINKING PLACES	72	1.78
59 - - MISCELLANEOUS RETAIL	98	2.43
70 - - HOTELS AND OTHER LODGING PLACES	22	0.54
72 - - PERSONAL SERVICES	3	0.07
73 - - BUSINESS SERVICES	748	18.52
75 - - AUTO REPAIR, SERVICES, AND PARKING	4	0.10
78 - - MOTION PICTURES	7	0.17
79 - - AMUSEMENT & RECREATION SERVICES	35	0.87
80 - - HEALTH SERVICES	87	2.15
82 - - EDUCATIONAL SERVICES	2	0.05
83 - - SOCIAL SERVICES	1	0.02
87 - - ENGINEERING & MANAGEMENT SERVICES	66	1.63
99 - - NONCLASSIFIABLE ESTABLISHMENTS	25	0.62
Total	4,039	100.00

Panel D: Descriptive Statistics

Variables	N	Mean	25 Percentile	Median	75 Percentile	Standard Deviation
V	43,636	0.0129	-0.0494	0.0058	0.0655	0.2830
SIZE	43,636	5.4693	3.8701	5.4046	6.9469	2.1450
LOSS	43,636	0.2074	0	0	0	0.4055
INTAN	43,636	0.0532	0.0058	0.0240	0.0648	0.0788
DINT	43,636	0.1656	0	0	0	0.3717
CAP	43,636	0.1997	0.0747	0.1526	0.2811	0.1625

Panel E: Correlation Matrix for All Variables Used in the Cross-sectional Test of Accrual Quality

Spearman Correlation Coefficients, N = 1,225

Pearson Correlation Coefficients, N = 1,225

	AQ	*Q123*	*SOX*	*Q123*SOX*	*AVE_SIZE*	*AVE_LOSS*	*AVE_INTAN*	*AVE_DINT*	*AVE_CAP*
AQ	1.0000	0.3861 <.0001	0.0991 0.0005	0.1214 <.0001	0.1284 <.0001	-0.4334 <.0001	-0.5889 <.0001	0.2517 <.0001	0.2245 <.0001
Q123	0.2900 <.0001	1.0000	0.0475 0.0966	0.4707 <.0001	-0.1885 <.0001	0.1959 <.0001	-0.1670 <.0001	0.0109 0.7031	-0.1166 <.0001
SOX	-0.0017 0.9516	0.0475 0.0966	1.0000	0.6920 <.0001	0.3527 <.0001	0.0577 0.0434	0.0186 0.5164	-0.0246 0.3894	-0.1471 <.0001
*Q123*SOX*	0.1552 <.0001	0.4707 <.0001	0.6920 <.0001	1.0000	0.1697 <.0001	0.1206 <.0001	-0.0675 0.0182	-0.0183 0.5227	-0.1583 <.0001
AVE_SIZE	0.1190 <.0001	0.1903 <.0001	0.3255 <.0001	0.1534 <.0001	1.0000	-0.3517 <.0001	-0.2378 <.0001	-0.0127 0.6580	0.1966 <.0001
AVE_LOSS	-0.2548 <.0001	0.2130 <.0001	0.0484 0.0907	0.1233 <.0001	-0.3695 <.0001	1.0000	0.5351 <.0001	-0.1959 <.0001	-0.2509 <.0001

Table 6 – *Continued*

AVE_INTAN	-0.2888	0.2296	0.0020	-0.1202	-0.2316	0.4386		-0.6665	-0.4430
	<.0001	<.0001	0.9454	<.0001	<.0001	<.0001	1.0000	<.0001	<.0001
AVE_DINT	0.1958	0.0430	0.0455	-0.0249	0.0093	-0.3105	-0.4631		0.1963
	<.0001	0.1323	0.1119	0.3845	0.7460	<.0001	<.0001	1.0000	<.0001
AVE_CAP	0.0997	0.1174	0.1166	-0.1335	0.1627	-0.1950	-0.3593	0.2906	
	0.0005	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	1.0000

The variables in Panel E are based on industry-quarter (industry-year) observations.

Variable Definitions:

V = the residual accrual from the Dechow and Dichev (2002) model, augmented by McNichols (2002);

SIZE = logarithm of market value at the beginning of the period, where market value equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ; annual Compustat data item CSHO) and closing price (quarterly Compustat data item PRCCQ; annual Compustat data item PRCC_F);

LOSS = 1 if the firm has consistent negative net income before extraordinary items (quarterly Compustat data item IBQ; annual Compustat data item IB) during the last four periods, and zero otherwise;

INTAN = intangible intensity, equal to research and development expenditures (quarterly Compustat data item XRDQ; annual Compustat data item XRD) scaled by total assets (quarterly Compustat data item ATQ; annual Compustat data item AT);

DINT = absence of intangibles, a dummy for zero intangible intensity, equal to1 if the firm has zero amount of research and development expenditures;

CAP = capital intensity, equal to the ratio of net book value of property, plant and equipment (quarterly Compustat data item PPENTQ; annual Compustat data item PPENT) to total assets (quarterly Compustat data item ATQ; annual Compustat data item AT).

AQ = accrual quality, equals to the inverse of the standard deviation of all firm-specific residual accruals within an industry-quarter (industry-year) group, where residual accruals are computed following the Dechow and Dichev (2002) model, augmented by McNichols (2002);

Q123 = a dummy variable equal to 1 if the observation belongs to an interim quarter;

SOX = a dummy equal to1 if the year of the industry-quarter (industry-year) group is in 2003-2007;

*Q123*SOX* = the interaction term of *Q123* and *SOX*, equal to 1 if the observation is from an interim quarter during 2003-2007;

AVE_SIZE = average firm size (logarithm of market value) for the industry-quarter (industry-year) group at the beginning of the period, where market value equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ; annual Compustat data item CSHO) and closing price (quarterly Compustat data item PRCCQ; annual Compustat data item PRCC_F);

AVE_LOSS = percent of loss firms within the industry-quarter (industry-year) group. A loss firm is defined to have consistent negative net incomes before extraordinary items (quarterly Compustat data item IBQ; annual Compustat data item IB) during the last four periods;

AVE_INTAN = average level of intangible intensity for the industry-quarter (industry-year) group, where intangible intensity for a firm equals research and development expenditures (quarterly Compustat data item XRDQ; annual Compustat data item XRD) scaled by total assets (quarterly Compustat data item ATQ; annual Compustat data item AT);

AVE_DINT = percent of firms without intangibles within the industry-quarter (industry-year) group. A firm without intangibles is defined to have zero amount of research and development expenditures;

AVE_CAP = average level of capital intensity for the industry-quarter(industry-year) group, where capital intensity equals the ratio of net book value of property, plant and equipment (quarterly Compustat data item PPENTQ; annual Compustat data item PPENT) to total assets ;

Table 7 Sample Selection Process for the Time-series Tests of Accrual Quality

Description		***Quarterly Sample***		***Annual Sample***	***Combined Sample***
Firm-quarters between Jan. 1998 and Dec. 2007 in the database of Compustat		463,257		116,686	
Less: Firm-quarters (firm-years) in the financial service industry and the utilities industry (with SIC code of 60-67 and 49)	(127,182)	336,075	(31,798)	84,888	
Less: Firm-quarters (firm-years) not listed publicly in the US	(116,853)	217,781	(29,716)	55,172	
Less: Firm-quarters (firm-years) with missing Compustat data for Modified DD Model	(116,853)	100,928	(12,882)	42,290	
Less: Firm-quarters (firm-years) with less than 10 observations in the same industry-quarter (industry-year) group	(3,708)	97,220	(639)	41,651	
Less: Firm-quarters (firm-years) with missing data from q-4 , q-8 , q-12 or q-16 to generate standard deviation of time-series residuals from DD	(56,650)	40,547	(11,548)	30,103	
Less: Firm-quarters (firm-years) with missing Compustat data to generate control variables	(21,355)	19,192	(19,122)	18,989	
Firm-quarters (4th fiscal quarters)		6,480			
Firm-quarters (interim quarters)		12,712			
Firm-year				18,989	
Combined sample with interim and annual data					31,701
Less: Observations trimmed at the top and bottom 2% of all the continuous variables		(3,768)			27,933
Less: Firm-quarters (firm-years) in the “contaminated” calendar years of 2003-2006		(11,625)			16,308
Final Sample					16,308
Firm-quarters (Interim)					7,118
Firm-years					9,190

Table 8 Sample Description- Accrual Quality (Time-series)

Panel A: Sample Distribution

	Annual Earnings	Interim Earnings	Total
Pre-SOX	7,621	6,070	13,691
	(47%)	(37%)	(84%)
Post-SOX	1,569	1,048	2,617
	(10%)	(6%)	(16%)
Total	9,190	7,118	16,308
	(56%)	(44%)	(100%)

Panel B: Distribution by Years

	Annual Earnings	Interim Earnings	Total
1998	1,411	879	2,290
	(8.65%)	(5.39%)	(14.04 %)
1999	1,401	1,326	2,727
	(8.59%)	(8.13%)	(16.71%)
2000	1,444	1,612	3,056
	(8.85%)	(9.88%)	(18.74%)
2001	1,633	1,123	2,767
	(10.08%)	(6.89%)	(16.97%)
2002	1,721	1,130	2,851
	(10.55%)	(6.93%)	(17.48%)
2007	1,569	1,048	2,617
	(9.62%)	(6.43%)	(16.05%)
Total	9,190	7,118	16,308
	(56.35%)	(43.65%)	(100%)

Panel C: Distribution by Industry

Industry category	*Unique Firms*	*Percent*
10 - - METAL MINING	8	0.29
12 - - COAL MINING	2	0.07
13 - - OIL AND GAS EXTRACTION	17	0.61
14 - - NONMETALLIC MINERALS, EXCEPT FUELS	6	0.21
15 - - GENERAL BUILDLING CONTRACTORS	2	0.07
16 - - HEAVY CONSTRUCTION, EXCEPT BUILDING	3	0.11
20 - - FOOD AND KINDRED PRODUCTS	39	1.39

Table 8 – *Continued*

22 - - TEXTILE MILL PRODUCTS	6	0.21
23 - - APPAREL AND OTHER TEXTILE PRODUCTS	10	0.36
24 - - LUMBER AND WOOD PRODUCTS	7	0.25
25 - - FURNITURE AND FIXTURES	16	0.57
26 - - PAPER AND ALLIED PRODUCTS	30	1.07
27 - - PRINTING AND PUBLISHING	10	0.36
28 - - CHEMICALS AND ALLIED PRODUCTS	424	15.16
29 - - PETROLEUM AND COAL PRODUCTS	18	0.64
30 - - RUBBER AND MISC. PLASTICS PRODUCTS	35	1.25
31 - - LEATHER AND LEATHER PRODUCTS	7	0.25
32 - - STONE, CLAY, AND GLASS PRODUCTS	22	0.79
33 - - PRIMARY METAL INDUSTRIES	33	1.18
34 - - FABRICATED METAL PRODUCTS	44	1.57
35 - - INDUSTRIAL MACHINERY AND EQUIPMENT	271	9.69
36 - - ELECTRONIC & OTHER ELECTRIC EQUIPMENT	409	14.63
37 - - TRANSPORTATION EQUIPMENT	86	3.08
38 - - INSTRUMENTS AND RELATED PRODUCTS	326	11.66
39 - - MISC. MANUFACTURING INDUSTRIES	23	0.82
45 - - TRANSPORTATION BY AIR	1	0.04
47 - - TRANSPORTATION SERVICES	3	0.11
48 - - COMMUNICATION	48	1.72
50 - - WHOLESALE TRADE - DURABLE GOODS	53	1.90
51 - - WHOLESALE TRADE - NONDURABLE GOODS	34	1.22
53 - - GENERAL MERCHANDISE STORES	26	0.93
54 - - FOOD STORES	24	0.86
55 - - AUTOMOTIVE DEALERS & SERVICE STATIONS	17	0.61
56 - - APPAREL AND ACCESSORY STORES	45	1.61
57 - - FURNITURE AND HOMEFURNISHINGS STORES	18	0.64
58 - - EATING AND DRINKING PLACES	44	1.57
59 - - MISCELLANEOUS RETAIL	62	2.22
70 - - HOTELS AND OTHER LODGING PLACES	12	0.43
72 - - PERSONAL SERVICES	3	0.11
73 - - BUSINESS SERVICES	398	14.23
75 - - AUTO REPAIR, SERVICES, AND PARKING	2	0.07
78 - - MOTION PICTURES	4	0.14
79 - - AMUSEMENT & RECREATION SERVICES	27	0.97
80 - - HEALTH SERVICES	67	2.40
82 - - EDUCATIONAL SERVICES	1	0.04
83 - - SOCIAL SERVICES	1	0.04
87 - - ENGINEERING & MANAGEMENT SERVICES	38	1.36
99 - - NONCLASSIFIABLE ESTABLISHMENTS	14	0.50
Total	2,796	100.00

Panel D: Descriptive Statistics

Variables	**N**	**Mean**	**25 Percentile**	**Median**	**75 Percentile**	**Standard Deviation**
V	16,308	0.0194	-0.0494	0.0070	0.0658	0.2843

Table 8 – *Continued*

AQ	16,308	25.6778	5.4586	12.5027	30.1021	41.7125
SIZE	16,308	5.5501	3.7920	5.4700	7.1570	2.2896
LOSS	16,308	0.1377	0	0	0	0.3446
INTAN	16,308	0.0546	0.0056	0.0233	0.0663	0.0828
DINT	16,308	0.1695	0	0	0	0.3752
CAP	16,308	0.2210	0.0946	0.1807	0.3077	0.1624

Panel E: Correlation Matrix for All Variables Used in the Time-series Test of Accrual Quality

		Spearman Correlation Coefficients, N =16,308								
		AQ	*Q123*	*SOX*	*Q123*SOX*	*AVE_ SIZE*	*AVE_ LOSS*	*AVE_ INTAN*	*AVE_ DINT*	*AVE_ CAP*
Pearson Correlation Coefficients, N = 16,308	*AQ*		0.4321	-0.2167	-0.0044	0.2129	-0.2081	-0.4533	0.2839	0.2824
		1.0000	<.0001	<.0001	0.5716	<.0001	<.0001	<.0001	<.0001	<.0001
	Q123	0.3342		-0.0318	0.2978	-0.0268	0.0657	-0.2560	0.0167	-0.0008
		<.0001	1.0000	<.0001	<.0001	0.0006	<.0001	<.0001	0.0333	0.9152
	SOX	-0.0988	-0.0318		0.5994	0.1154	0.0270	-0.0255	0.0051	-0.1041
		<.0001	<.0001	1.0000	<.0001	<.0001	0.0006	0.0011	0.5150	<.0001
	*Q123*SOX*	0.0111	0.2978	0.5994		0.0569	0.0216	-0.1033	0.0069	-0.0601
		0.1564	<.0001	<.0001	1.0000	<.0001	0.0059	<.0001	0.3771	<.0001
	AVE_SIZE	0.1517	-0.0243	0.1157	0.0578		-0.2253	-0.1432	0.0023	0.1887
		<.0001	0.0020	<.0001	<.0001	1.0000	<.0001	<.0001	0.7690	<.0001
	AVE_LOSS	-0.1212	0.0657	0.0270	0.0216	-0.2219		0.2940	-0.1264	-0.1929
		<.0001	<.0001	0.0006	0.0059	<.0001	1.0000	<.0001	<.0001	<.0001
	AVE_INTAN	-0.2357	-0.2877	-0.0003	-0.0966	-0.1706	0.3479		-0.6514	-0.3691
		<.0001	<.0001	0.9739	<.0001	<.0001	<.0001	1.0000	<.0001	<.0001
	AVE_DINT	0.2743	0.0167	0.0051	0.0069	-0.0085	-0.1264	-0.2982		0.2100
		<.0001	0.0333	0.5150	0.3771	0.2792	<.0001	<.0001	1.0000	<.0001
	AVE_CAP	0.1789	-0.0065	-0.0863	-0.0533	0.1553	-0.1516	-0.2648	0.2427	
		<.0001	0.4045	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	1.0000

Variable Definitions:

V = the residual accrual from the Dechow and Dichev (2002) model, augmented by McNichols (2002);
AQ = the inverse of the standard deviation of firm-specific time-series residual accruals

Table 8 – *Continued*

SIZE	=	logarithm of market value at the beginning of the period, where market value equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ; annual Compustat data item CSHO) and closing price (quarterly Compustat data item PRCCQ; annual Compustat data item PRCC_F);
LOSS	=	1 if the firm has consistent negative net income before extraordinary items (quarterly Compustat data item IBQ; annual Compustat data item IB) during the last four periods, and zero otherwise;
INTAN	=	intangible intensity, equal to research and development expenditures (quarterly Compustat data item XRDQ; annual Compustat data item XRD) scaled by total assets (quarterly Compustat data item ATQ; annual Compustat data item AT);
DINT	=	absence of intangibles, a dummy for zero intangible intensity, equal to1 if the firm has zero amount of research and development expenditures;
CAP	=	capital intensity, equal to the ratio of net book value of property, plant and equipment (quarterly Compustat data item PPENTQ; annual Compustat data item PPENT) to total assets (quarterly Compustat data item ATQ; annual Compustat data item AT).
Q123	=	a dummy variable equal to 1 if the observation belongs to an interim quarter;
SOX	=	a dummy variable equal to1 if the year of the observation is in 2003-2007;
*Q123*SOX*	=	the interaction term of *Q123* and *SOX*, equal to 1 if the observation is from an interim quarter during 2003-2007;

Table 9 Results for H1- Accrual Quality (Cross-sectional)

Panel A: Univariate Tests

	Period	N (Industry-quarters)	Mean	t-statistic (p-value)	Median	z-statistic (p-value)
AQ	Pre-SOX	440	31.428	-0.62	19.509	1.95
	Post-SOX	367	33.32	(0.5374)	17.726	(0.051)

Panel B: Multivariate Test (Based on SOX)

$$AQ_{iq} = \beta_0 + \beta_1 SOX + \beta_2 AVE\_SIZE_{iq} + \beta_3 AVE\_LOSS_{iq} + \beta_4 AVE\_INTAN_{iq}$$
$$+ \beta_5 AVE\_DINT_{iq} + \beta_6 AVE\_CAP_{iq} + \beta_7 Trend + \sum_{k=1}^{K-1} \beta_{7+k} Industry_k + \varepsilon_{iq}$$

	Predicted Sign	AQ	
		Coefficient	t –statistic (p-value)
Intercept	?	-3.462	-0.24 (0.8089)
SOX	+	0.630	0.12 (0.9071)
AVE_SIZE	+	6.922	2.92 (0.0036)
AVE_LOSS	-	-27.878	-2.39 (0.0171)
AVE_INTAN	+	-80.114	-0.62 (0.5357)
AVE_DINT	-	1.419	0.07 (0.9423)
AVE_CAP	-	20.404	0.79 (0.4301)
Trend	?	-0.398	-0.42 (0.6742)
Adjusted-R^2		0.280	
F-value (Pr>F)		8.66 (<0.0001)	

Table 9 – *Continued*

Panel C: Multivariate Test (Based on SOX 302 and SOX 404)

$$AQ_{iq} = \beta_0 + \beta_1 S302 + \beta_2 S404 + \beta_3 AVE\_SIZE_{iq} + \beta_4 AVE\_LOSS_{iq} + \beta_5 AVE\_INTAN_{iq}$$
$$+ \beta_6 AVE\_DINT_{iq} + \beta_7 AVE\_CAP_{iq} + \beta_8 Trend + \sum_{k=1}^{K-1} \beta_{8+k} Industry_k + \varepsilon_{iq}$$

	Predicted Sign	**AQ**	
		Coefficient	**t –statistic (p-value)**
Intercept	?	-7.582	-0.53 (0.5981)
S302	+	-1.047	-0.19 (0.847)
S404	+	-12.557	-1.61 (0.1072)
AVE_SIZE	+	7.975	3.32 (0.001)
AVE_LOSS	-	-29.629	-2.54 (0.0112)
AVE_INTAN	+	-69.867	-0.54 (0.5882)
AVE_DINT	+	1.329	0.07 (0.9458)
AVE_CAP	-	9.754	0.37 (0.7095)
Trend	?	1.110	0.97 (0.3319)
Adjusted-R^2		0.285	
F-value (Pr>F)		8.63 (<0.0001)	

Variable Definitions:

AQ = accrual quality, equals to the inverse of the standard deviation of all firm-specific residual accruals within an industry-quarter group, where residual accruals are computed following the Dechow and Dichev (2002) model, augmented by McNichols (2002);
SOX = a dummy equal to1 if the year of the industry-quarter group is in 2003-2007;
S302 = a dummy equal to1 if the year of the industry-quarter group is in 2003-2004;
S404 = a dummy equal to1 if the year of the industry-quarter group is in 2005-2007;

Table 9 – *Continued*

AVE_SIZE	=	average firm size (logarithm of market value) for the industry-quarter group at the beginning of the quarter, where market value equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ) and closing price (quarterly Compustat data item PRCCQ);
AVE_LOSS	=	percent of loss firms within the industry-quarter group. A loss firm is defined to have consistent negative net incomes before extraordinary items (quarterly Compustat data item IBQ) during the last four quarters;
AVE_INTAN	=	average level of intangible intensity for the industry-quarter group, where intangible intensity for a firm equals research and development expenditures (quarterly Compustat data item XRDQ) scaled by total assets (quarterly Compustat data item ATQ);
AVE_DINT	=	percent of firms without intangibles within the industry-quarter group. A firm without intangibles is defined to have zero amount of research and development expenditures;
AVE_CAP	=	average level of capital intensity for the industry-quarter group, where capital intensity equals the ratio of net book value of property, plant and equipment (quarterly Compustat data item PPENTQ) to total assets ;
Trend	=	a trend variable equal to the difference between the current year of observation and 1998;
Industry	=	a dummy variable equal to 1 if the firm belongs to industry k. The subscript k equals 1, 2 … or K-1, where K represents the number of unique industries based on 2-digit SIC code.

Table 10 Results for H1- Accrual Quality (Time-series)

Panel A: Univariate Tests

	Period	N	Mean	t-statistic (p-value)	Median	z-statistic (p-value)
AQ	Pre-SOX	6,067	43.947	11.27	27.641	16.40
	Post-SOX	1,048	27.444	(<.0001)	12.626	(<.0001)

Panel B: Multivariate Test (Based on SOX)

$$AQ_{jq} = \beta_0 + \beta_1 SOX + \beta_2 SIZE_{jq} + \beta_3 LOSS_{jq} + \beta_4 INTAN_{jq} + \beta_5 DINT_{jq} + \beta_6 CAP_{jq} + \beta_7 Trend + \sum_{k=1}^{K-1} \beta_{7+k} Industry_k + \varepsilon_{jq}$$

	Predicted Sign	AQ	
		Coefficient	t –statistic (p-value)
Intercept	?	8.227	0.94 (0.3465)
SOX	+	12.689	3.52 (0.0004)
SIZE	+	3.031	11.18 (<.0001)
LOSS	-	-3.158	-1.82 (0.0692)
INTAN	+	-56.896	-3.85 (0.0001)
DINT	-	7.367	1.67 (0.0946)
CAP	-	10.464	2.49 (0.0128)
Trend	?	-1.094	-9.38 (<.0001)
Adjusted-R^2		0.298	
F-value (Pr>F)		76.58 (<0.0001)	

Table 10 – *Continued*

Variable Definitions:

AQ	=	accrual quality, the inverse of the standard deviation of residual accruals from the Dechow and Dichev (2002) model, augmented by McNichols (2002);
SOX	=	a dummy variable equal to1 if the year of the observation is in 2003-2007;
SIZE	=	logarithm of market value at the beginning of the period, where market value equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ) and closing price (quarterly Compustat data item PRCCQ);
LOSS	=	a dummy variable equal to 1 if the firm has consistent negative net incomes before extraordinary items (quarterly Compustat data item IBQ) during the last four periods;
INTAN	=	intangible intensity, equal to research and development expenditures (quarterly Compustat data item XRDQ) scaled by total assets (quarterly Compustat data item ATQ);
DINT	=	absence of intangibles, a dummy for zero intangible intensity, equal to1 if the firm has zero amount of research and development expenditures;
CAP	=	capital intensity, equal to the ratio of net book value of property, plant and equipment (quarterly Compustat data item PPENTQ) to total assets;
Trend	=	a trend variable equal to the difference between the current year of observation and 1998;
Industry	=	a dummy variable equal to 1 if the firm belongs to industry k. The subscript k equals 1, 2 … or K-1, where K represents the number of unique industries based on 2-digit SIC code.

Table 11 Results for H2- Accrual Quality (Cross-sectional)

Panel A: Univariate Tests

	Source	DF	Type III SS	Mean Square	F Value	Pr > F	LSMEAN		
AQ	SOX	1	45.641	45.641	0.04	0.845		**Q123=0**	**Q123=1**
	Q123	1	1.351E8	1.351E8	112.71	<.0001	**SOX=0**	10.732	31.428
	SOX*Q123	1	604.504	604.504	0.5	0.478	**SOX=1**	9.655	33.320

Panel B: Multivariate Test (Based on SOX)

$$AQ_{iq} = \gamma_0 + \gamma_1 Q123 + \gamma_2 SOX + \gamma_3 Q123 * SOX + \gamma_4 AVE\_SIZE_{iq} + \gamma_5 AVE\_LOSS_{iq}$$
$$+ \gamma_6 AVE\_INTAN_{iq} + \gamma_7 AVE\_DINT_{iq} + \gamma_8 AVE\_CAP_{iq} + \gamma_9 Trend + \sum_{k=1}^{K-1} \gamma_{9+k} Industry_k + \varepsilon_{iq}$$

	Predicted Sign	AQ	
		Coefficient	t –statistic (p-value)
Intercept	?	-28.189	-2.63 (0.0086)
Q123	?	31.296	10.42 (<.0001)
SOX	+	0.494	0.11 (0.9106)
*Q123*SOX*	+	3.411	0.91 (0.3655)
AVE_SIZE	+	4.246	2.84 (0.0046)
AVE_LOSS	-	-35.973	-4.18 (<.0001)
AVE_INTAN	+	155.059	3.00 (0.0028)
AVE_DINT	-	6.982	0.61 (0.5438)
AVE_CAP	-	9.846	0.55 (0.5835)
Trend	?	-0.606	-0.95 (0.3448)
Adjusted-R^2		0.289	
F-value (Pr>F)		10.06 (<0.0001)	

Table 11 – *Continued*

Panel C: Multivariate Test (Based on SOX 302 and SOX 404)

$$AQ_{iq} = \gamma_0 + \gamma_1 Q123 + \gamma_2 S302 + \gamma_3 S404 + \gamma_4 Q123 * S302 + \gamma_5 Q123 * S404$$
$$+ \gamma_6 AVE\_SIZE_{iq} + \gamma_7 AVE\_LOSS_{iq} + \gamma_8 AVE\_INTAN_{iq} + \gamma_9 AVE\_DINT_{iq}$$
$$+ \gamma_{10} AVE\_CAP_{iq} + \gamma_{11} Trend + \sum_{k=1}^{K-1} \gamma_{11+k} Industry_k + \varepsilon_{iq}$$

	Predicted Sign	**AQ**	
		Coefficient	**t –statistic (p-value)**
Intercept	?	-30.546	-2.84 (0.0046)
Q123	?	31.663	10.53 (<.0001)
S302	+	-1.889	-0.39 (0.7002)
S404	+	-5.466	-0.91 (0.3624)
*Q123*S302*	+	5.657	1.14 (0.256)
*Q123*S404*	+	1.843	0.42 (0.6734)
AVE_SIZE	+	4.626	3.07 (0.0022)
AVE_LOSS	-	-36.643	-4.25 (<.0001)
AVE_INTAN	+	158.438	3.06 (0.0022)
AVE_DINT	-	6.863	0.60 (0.5505)
AVE_CAP	-	4.932	0.27 (0.7858)
Trend	?	0.217	0.28 (0.7828)
Adjusted-R^2		0.290	
F-value (Pr>F)		9.79 (<0.0001)	

Variable Definitions:

Table 11 – *Continued*

AQ	=	accrual quality, equals to the inverse of the standard deviation of all firm-specific residual accruals within an industry-quarter (industry-year) group, where residual accruals are computed following the Dechow and Dichev (2002) model, augmented by McNichols (2002);
Q123	=	a dummy variable equal to 1 if the observation belongs to an interim quarter;
SOX	=	a dummy equal to1 if the year of the industry-quarter (industry-year) group is in 2003-2007;
*Q123*SOX*	=	the interaction term of *Q123* and *SOX*, equal to 1 if the observation is from an interim quarter during 2003-2007;
S302	=	a dummy equal to1 if the year of the industry-quarter (industry-year) group is in 2003-2004;
S404	=	a dummy equal to1 if the year of the industry-quarter (industry-year) group is in 2005-2007;
*Q123*S302*	=	the interaction term of *Q123* and *S302*, equal to 1 if the observation is from an interim quarter during 2003-2004;
*Q123*S404*	=	the interaction term of *Q123* and *S404*, equal to 1 if the observation is from an interim quarter during 2005-2007;
AVE_SIZE	=	average firm size (logarithm of market value) for the industry-quarter (industry-year) group at the beginning of the period, where market value equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ; annual Compustat data item CSHO) and closing price (quarterly Compustat data item PRCCQ; annual Compustat data item PRCC_F);
AVE_LOSS	=	percent of loss firms within the industry-quarter (industry-year) group. A loss firm is defined to have consistent negative net incomes before extraordinary items (quarterly Compustat data item IBQ; annual Compustat data item IB) during the last four periods;
AVE_INTAN	=	average level of intangible intensity for the industry-quarter (industry-year) group, where intangible intensity for a firm equals research and development expenditures (quarterly Compustat data item XRDQ; annual Compustat data item XRD) scaled by total assets (quarterly Compustat data item ATQ; annual Compustat data item AT);
AVE_DINT	=	percent of firms without intangibles within the industry-quarter (industry-year) group. A firm without intangibles is defined to have zero amount of research and development expenditures;
AVE_CAP	=	average level of capital intensity for the industry-quarter(industry-year) group, where capital intensity equals the ratio of net book value of property, plant and equipment (quarterly Compustat data item PPENTQ; annual Compustat data item PPENT) to total assets ;
Trend	=	a trend variable equal to the difference between the current year of observation and 1998;
Industry	=	a dummy variable equal to 1 if the firm belongs to industry k. The subscript k equals 1, 2 … or K-1, where K represents the number of unique industries based on 2-digit SIC code.

Table 12 Results for H2- Accrual Quality (Time-series)

Panel A: Univariate Tests

	Source	Type III SS	Mean Square	F Value	Pr > F		LSMEAN	
AQ	SOX	2.586E6	2.586E6	169.2	<.0001		**Q123=0**	**Q123=1**
	Q123	1.234E6	1.234E6	807.11	<.0001	**SOX=0**	14.364	43.947
	SOX*Q123	6.309E6	6.309E6	41.27	<.0001	**SOX=1**	8.773	27.444

Panel B: Multivariate Test (Based on SOX)

$$AQ_{jq} = \gamma_0 + \gamma_1 Q123 + \gamma_2 SOX + \gamma_3 Q123 * SOX + \gamma_4 SIZE_{jq} + \gamma_5 LOSS_{jq} + \gamma_6 INTAN_{jq} + \gamma_7 DINT_{jq} + \gamma_8 CAP_{jq} + \gamma_9 Trend + \sum_{k=1}^{K-1} \gamma_{9+k} Industry_k + \varepsilon_{iq}$$

	Predicted Sign	AQ	
		Coefficient	t –statistic (p-value)
Intercept	?	-15.673	-3.40 (0.0007)
Q123	?	31.332	48.16 (<.0001)
SOX	+	9.223	5.27 (<.0001)
*Q123*SOX*	+	-9.557	-6.33 (<.0001)
SIZE	+	2.158	16.68 (<.0001)
LOSS	-	-5.337	-5.97 (<.0001)
INTAN	+	19.424	4.74 (<.0001)
DINT	-	6.255	3.55 (0.0004)
CAP	-	9.136	4.40 (<.0001)
Trend	?	-0.606	-11.42 (<.0001)
Adjusted-R^2		0.311	
F-value (Pr>F)		132.74 (<0.0001)	

Table 12 – *Continued*

Variable Definitions:

AQ	=	accrual quality, the inverse of the standard deviation of residual accruals from the Dechow and Dichev (2002) model, augmented by McNichols (2002);
Q123	=	a dummy variable equal to 1 if the observation belongs to an interim quarter;
SOX	=	a dummy variable equal to1 if the year of the observation is in 2003-2007;
*Q123*SOX*	=	the interaction term of *Q123* and *SOX*, equal to 1 if the observation is from an interim quarter during 2003-2007;
SIZE	=	logarithm of market value at the beginning of the period, where market value equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ; annual Compustat data item CSHO) and closing price (quarterly Compustat data item PRCCQ; annual Compustat data item PRCC_F);
LOSS	=	a dummy variable equal to 1 if the firm has consistent negative net incomes before extraordinary items (quarterly Compustat data item IBQ; annual Compustat data item IB) during the last four periods;
INTAN	=	intangible intensity, equal to research and development expenditures (quarterly Compustat data item XRDQ; annual Compustat data item XRD) scaled by total assets (quarterly Compustat data item ATQ; annual Compustat data item AT);
DINT	=	absence of intangibles, a dummy for zero intangible intensity, equal to1 if the firm has zero amount of research and development expenditures;
CAP	=	capital intensity, equal to the ratio of net book value of property, plant and equipment (quarterly Compustat data item PPENTQ; annual Compustat data item PPENT) to total assets (quarterly Compustat data item ATQ; annual Compustat data item AT).
Trend	=	a trend variable equal to the difference between the current year of observation and 1998;
Industry	=	a dummy variable equal to 1 if the firm belongs to industry k. The subscript k equals 1, 2 … or K-1, where K represents the number of unique industries based on 2-digit SIC code.

Table 13 Sample Selection Process-Value Relevance

Description		*Quarterly Sample*		*Annual Sample*	*Combined Sample*
Firm-quarters between Jan. 1998 and Dec. 2007 in the database of Compustat		463,257		116,686	
Less: Firm-quarters (firm-years) in the financial service industry and the utilities industry (with SIC code of 60-67 and 49)	(127,182)	336,075	(31,798)	84,888	
Less: Firm-quarters (firm-years) not listed publicly in the US	(116,853)	217,781	(29,716)	55,172	
Less: Firm-quarters (firm-years) with missing Compustat or CRSP data for Dechow Model	(73,759)	144,022	(20,589)	35,271	
Less: Firm-quarters (firm-years) with less than 10 observations in the same industry-quarter (industry-year) group	(2,677)	141,355	(688)	34,583	
Less: Firm-quarters (firm-years) with missing Compustat data to generate control variables	(66,561)	74,794	(14,564)	20,019	
Firm-quarters (4th fiscal quarters)		22,155			
Firm-quarters (interim quarters)		52,639			
Firm-year				20,019	
Combined sample with interim and annual data					72,658
Less: Observations trimmed at the top and bottom 2% of all the continuous variables		(9,573)			63,085
Final Sample					63,085
Firm-quarters (Interim)					46,858
Firm-years					16,227

Table 14 Sample Description- Value Relevance

Panel A: Sample Distribution

	Annual Earnings	Interim Earnings	Total
Pre-SOX	7,765	24,082	31,847
	(12%)	(38%)	(50%)
Post-SOX	8,462	22,776	31,238
	(14%)	(36%)	(50%)
Total	16,227	46,858	63,085
	(26%)	(74%)	(100%)

Panel B: Distribution by Years

	Annual Earnings	Interim Earnings	Total
1998	1,605	5,044	6,649
	(2.54%)	(8.00%)	(10.54 %)
1999	1,537	4,622	6,159
	(2.44%)	(7.33%)	(9.76%)
2000	1,548	4,906	6,454
	(2.45%)	(7.78%)	(10.23%)
2001	1,570	4,875	6,445
	(2.49%)	(7.73%)	(10.22%)
2002	1,505	4,635	6,140
	(2.39%)	(7.35%)	(9.73%)
2003	1,706	4,572	6,278
	(2.70%)	(7.25%)	(9.95%)
2004	1,735	4,500	6,235
	(2.75%)	(7.13%)	(9.88%)
2005	1,693	4,577	6,270
	(2.68%)	(7.26%)	(9.94%)
2006	1,666	4,596	6,262
	(2.64%)	(7.29%)	(9.93%)
2007	1,662	4,531	6,193
	(2.63%)	(7.18%)	(9.82%)
1998-2007	16,227	46,858	63,085
	(25.72%)	(74.28%)	(100%)

Table 14 – *Continued*

Panel C: Distribution by Industry

Industry category	***Unique Firms***	***Percent***
10 - - METAL MINING	7	0.18
12 - - COAL MINING	3	0.08
13 - - OIL AND GAS EXTRACTION	15	0.38
14 - - NONMETALLIC MINERALS, EXCEPT FUELS	7	0.18
16 - - HEAVY CONSTRUCTION, EXCEPT BUILDING	2	0.05
17 - - SPECIAL TRADE CONTRACTORS	1	0.03
20 - - FOOD AND KINDRED PRODUCTS	46	1.15
22 - - TEXTILE MILL PRODUCTS	4	0.10
23 - - APPAREL AND OTHER TEXTILE PRODUCTS	8	0.20
24 - - LUMBER AND WOOD PRODUCTS	8	0.20
25 - - FURNITURE AND FIXTURES	17	0.43
26 - - PAPER AND ALLIED PRODUCTS	33	0.83
27 - - PRINTING AND PUBLISHING	16	0.40
28 - - CHEMICALS AND ALLIED PRODUCTS	576	14.46
29 - - PETROLEUM AND COAL PRODUCTS	14	0.35
30 - - RUBBER AND MISC. PLASTICS PRODUCTS	44	1.10
31 - - LEATHER AND LEATHER PRODUCTS	8	0.20
32 - - STONE, CLAY, AND GLASS PRODUCTS	24	0.60
33 - - PRIMARY METAL INDUSTRIES	36	0.90
34 - - FABRICATED METAL PRODUCTS	50	1.26
35 - - INDUSTRIAL MACHINERY AND EQUIPMENT	365	9.16
36 - - ELECTRONIC & OTHER ELECTRIC EQUIPMENT	551	13.83
37 - - TRANSPORTATION EQUIPMENT	97	2.44
38 - - INSTRUMENTS AND RELATED PRODUCTS	475	11.93
39 - - MISC. MANUFACTURING INDUSTRIES	29	0.73
47 - - TRANSPORTATION SERVICES	7	0.18
48 - - COMMUNICATION	64	1.61
50 - - WHOLESALE TRADE - DURABLE GOODS	74	1.86
51 - - WHOLESALE TRADE - NONDURABLE GOODS	47	1.18
53 - - GENERAL MERCHANDISE STORES	30	0.75
54 - - FOOD STORES	28	0.70
55 - - AUTOMOTIVE DEALERS & SERVICE STATIONS	22	0.55
56 - - APPAREL AND ACCESSORY STORES	51	1.28
57 - - FURNITURE AND HOMEFURNISHINGS STORES	21	0.53
58 - - EATING AND DRINKING PLACES	68	1.71
59 - - MISCELLANEOUS RETAIL	107	2.69

Table 14 – *Continued*

70 - - HOTELS AND OTHER LODGING PLACES	21	0.53
72 - - PERSONAL SERVICES	3	0.08
73 - - BUSINESS SERVICES	806	20.24
75 - - AUTO REPAIR, SERVICES, AND PARKING	3	0.08
78 - - MOTION PICTURES	8	0.20
79 - - AMUSEMENT & RECREATION SERVICES	35	0.88
80 - - HEALTH SERVICES	85	2.13
82 - - EDUCATIONAL SERVICES	2	0.05
83 - - SOCIAL SERVICES	1	0.03
87 - - ENGINEERING & MANAGEMENT SERVICES	59	1.48
99 - - NONCLASSIFIABLE ESTABLISHMENTS	5	0.13
Total	3,983	100.00

Panel D: Descriptive Statistics

Variables	N	Mean	25 Percentile	Median	75 Percentile	Standard Deviation
SIZE	63,085	5.7218	4.3400	5.6700	6.9500	1.8375
LOSS	63,085	0.2215	0	0	0	0.4153
INTAN	63,085	0.0408	0.0074	0.0236	0.0516	0.0514
DINT	63,085	0.1399	0	0	0	0.3469
CAP	63,085	0.1803	0.0644	0.1319	0.2492	0.1537

Panel E: Correlation Matrix-Value Relevance

	Spearman Correlation Coefficients, N = 1,243								
Pearson Correlation Coefficients, N = 1,243	*VR*	*Q123*	*SOX*	*Q123*SOX*	*AVE_SIZE*	*AVE_LOSS*	*AVE_INTAN*	*AVE_DINT*	*AVE_CAP*
VR	1.0000	-0.2392 <.0001	0.0335 0.2377	-0.0580 0.0408	0.0859 0.0024	-0.1775 <.0001	-0.0392 0.1675	0.0340 0.2310	0.0782 0.0058
Q123	-0.2466 <.0001	1.0000	0.0090 0.7525	0.4363 <.0001	-0.1048 0.0002	0.1388 <.0001	-0.2237 <.0001	-0.0287 0.3120	-0.0370 0.1928
SOX	0.0394 0.1652	0.0090 0.7525	1.0000	0.7840 <.0001	0.3974 <.0001	-0.0216 0.4469	-0.0193 0.4972	-0.0230 0.4176	-0.1305 <.0001
*Q123*SOX*	-0.0606 0.0327	0.4363 <.0001	0.7840 <.0001	1.0000	0.2716 <.0001	0.0175 0.5386	-0.1197 <.0001	-0.0392 0.1675	-0.1029 0.0003
AVE_SIZE	0.0673 0.0176	-0.0656 0.0208	0.3412 <.0001	0.2408 <.0001	1.0000	-0.3483 <.0001	-0.2038 <.0001	-0.0989 0.0005	0.2773 <.0001
AVE_LOSS	-0.1274 <.0001	0.1620 <.0001	0.0413 0.1453	0.0170 0.5484	-0.3136 <.0001	1.0000	0.5196 <.0001	-0.0861 0.0024	-0.3494 <.0001
AVE_INTAN	-0.0897 0.0015	-0.2986 <.0001	0.0071 0.8040	-0.1447 <.0001	-0.1818 <.0001	0.4025 <.0001	1.0000	-0.6073 <.0001	-0.5170 <.0001
AVE_DINT	0.0301 0.2885	0.0353 0.2135	0.0155 0.5847	-0.0026 0.9262	-0.1096 0.0001	-0.2594 <.0001	-0.4604 <.0001	1.0000	0.1320 <.0001
AVE_CAP	0.0843 0.0029	-0.0325 0.2525	0.1159 <.0001	-0.0893 0.0016	0.3077 <.0001	-0.2459 <.0001	-0.4331 <.0001	0.1829 <.0001	1.0000

The variables in Panel E are based on industry-quarter (industry-year) observations.

Table 14 – *Continued*

Variable Definitions:

SIZE = logarithm of market value at the beginning of the period, where market value equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ; annual Compustat data item CSHO) and closing price (quarterly Compustat data item PRCCQ; annual Compustat data item PRCC_F);

LOSS = 1 if the firm has consistent negative net income before extraordinary items (quarterly Compustat data item IBQ; annual Compustat data item IB) during the last four periods, and zero otherwise;

INTAN = intangible intensity, equal to research and development expenditures (quarterly Compustat data item XRDQ; annual Compustat data item XRD) scaled by total assets (quarterly Compustat data item ATQ; annual Compustat data item AT);

DINT = absence of intangibles, a dummy for zero intangible intensity, equal to1 if the firm has zero amount of research and development expenditures;

CAP = capital intensity, equal to the ratio of net book value of property, plant and equipment (quarterly Compustat data item PPENTQ; annual Compustat data item PPENT) to total assets (quarterly Compustat data item ATQ; annual Compustat data item AT).

VR = value relevance of earnings for an industry-quarter (industry-year) group, equal to the adjusted-R^2 from the regression of raw stock returns (CRSP data item RET) cumulated during the quarter (or year) on net income before extraordinary items (quarterly Compustat data item IBQ; annual Compustat data item IB) scaled by the market value of equity at the beginning of the period, where market value equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ; annual Compustat data item CSHO) and closing price (quarterly Compustat data item PRCCQ; annual Compustat data item PRCC_F);

Q123 = a dummy variable equal to 1 if the observation belongs to an interim quarter;

SOX = a dummy equal to1 if the year of the industry-quarter (industry-year) group is in 2003-2007;

*Q123*SOX* = the interaction term of *Q123* and *SOX*, equal to 1 if the observation is from an interim quarter during 2003-2007;

AVE_SIZE = average firm size (logarithm of market value) for the industry-quarter (industry-year) group at the beginning of the period, where market value equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ; annual Compustat data item CSHO) and closing price (quarterly Compustat data item PRCCQ; annual Compustat data item PRCC_F);

AVE_LOSS = percent of loss firms within the industry-quarter (industry-year) group. A loss firm is defined to have consistent negative net incomes before extraordinary items (quarterly Compustat data item IBQ; annual Compustat data item IB) during the last four periods;

AVE_INTAN = average level of intangible intensity for the industry-quarter (industry-year) group, where intangible intensity for a firm equals research and development expenditures (quarterly Compustat data item XRDQ; annual Compustat data item XRD) scaled by total assets (quarterly Compustat data item ATQ; annual Compustat data item AT);

AVE_DINT = percent of firms without intangibles within the industry-quarter (industry-year) group. A firm without intangibles is defined to have zero amount of research and development expenditures;

AVE_CAP = average level of capital intensity for the industry-quarter(industry-year) group, where capital intensity equals the ratio of net book value of property, plant and equipment (quarterly Compustat data item PPENTQ; annual Compustat data item PPENT) to total assets ;

Table 15 Results for H1- Value Relevance

Panel A: Univariate Tests

	Period	N (Industry-quarters)	Mean	t-statistic (p-value)	Median	z-statistic (p-value)
VR	Pre-SOX	480	0.0411	-2.03	0.041	-1.80
	Post-SOX	454	0.0502	(0.0428)	0.050	(0.0718)

Panel B: Multivariate Test (Based on SOX)

$$VR_{iq} = \beta_0 + \beta_1 SOX + \beta_2 AVE\_SIZE_{iq} + \beta_3 AVE\_LOSS_{iq} + \beta_4 AVE\_INTAN_{iq}$$
$$+ \beta_5 AVE\_DINT_{iq} + \beta_6 AVE\_CAP_{iq} + \beta_7 Trend + \sum_{k=1}^{K-1} \beta_{7+k} Industry_k + \varepsilon_{iq}$$

	Predicted Sign	VR	
		Coefficient	t –statistic (p-value)
Intercept	?	0.034	0.93 (0.3545)
SOX	+	0.020	2.21 (0.0271)
AVE_SIZE	+	0.004	1.01 (0.3128)
AVE_LOSS	-	0.005	0.23 (0.8199)
AVE_INTAN	+	-0.087	-0.13 (0.8957)
AVE_DINT	-	0.003	0.11 (0.9155)
AVE_CAP	-	0.122	2.35 (0.0190)
Trend	?	-0.002	-1.00 (0.3158)
Adjusted-R^2		0.107	
F-value (Pr>F)		3.15 (<0.0001)	

Panel C: Multivariate Test (Based on SOX 302 and SOX 404)

$$VR_{iq} = \beta_0 + \beta_1 S302 + \beta_2 S404 + \beta_3 AVE\_SIZE_{iq} + \beta_4 AVE\_LOSS_{iq} + \beta_5 AVE\_INTAN_{iq}$$
$$+ \beta_6 AVE\_DINT_{iq} + \beta_7 AVE\_CAP_{iq} + \beta_8 Trend + \sum_{k=1}^{K-1} \beta_{8+k} Industry_k + \varepsilon_{iq}$$

Table 15 – *Continued*

	Predicted Sign	VR	
		Coefficient	t –statistic (p-value)
Intercept	?	0.028	0.78 (0.4372)
S302	+	0.018	2.01 (0.0447)
S404	+	0.007	0.54 (0.5924)
AVE_SIZE	+	0.005	1.18 (0.2388)
AVE_LOSS	-	0.003	0.15 (0.8805)
AVE_INTAN	+	-0.101	-0.15 (0.8787)
AVE_DINT	-	0.007	0.22 (0.8282)
AVE_CAP	-	0.111	2.12 (0.0340)
Trend	?	-0.000	-0.07 (0.9426)
Adjusted-R^2		0.108	
F-value (Pr>F)		3.13 (<0.0001)	

Variable Definitions:

VR = value relevance of earnings for an industry-quarter group, equal to the adjusted-R^2 from the regression of raw stock returns (CRSP data item RET) cumulated during the quarter on net income before extraordinary items (quarterly Compustat data item IBQ) scaled by the market value of equity at the beginning of the period, where market value equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ) and closing price (quarterly Compustat data item PRCCQ);

SOX = a dummy equal to1 if the year of the industry-quarter group is in 2003-2007;

S302 = a dummy equal to1 if the year of the industry-quarter group is in 2003-2004;

S404 = a dummy equal to1 if the year of the industry-quarter group is in 2005-2007;

AVE_SIZE = average firm size (logarithm of market value) for the industry-quarter group at the beginning of the quarter, where market value equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ) and closing price (quarterly Compustat data item PRCCQ);

AVE_LOSS = percent of loss firms within the industry-quarter group. A loss firm is defined to have consistent negative net incomes before extraordinary items (quarterly Compustat data item IBQ) during the last four quarters;

Table 15 – *Continued*

AVE_INTAN	=	average level of intangible intensity for the industry-quarter group, where intangible intensity for a firm equals research and development expenditures (quarterly Compustat data item XRDQ) scaled by total assets (quarterly Compustat data item ATQ);
AVE_DINT	=	percent of firms without intangibles within the industry-quarter group. A firm without intangibles is defined to have zero amount of research and development expenditures;
AVE_CAP	=	average level of capital intensity for the industry-quarter group, where capital intensity equals the ratio of net book value of property, plant and equipment (quarterly Compustat data item PPENTQ) to total assets ;
Trend	=	a trend variable equal to the difference between the current year of observation and 1998;
Industry	=	a dummy variable equal to 1 if the firm belongs to industry k. The subscript k equals 1, 2 … or K-1, where K represents the number of unique industries based on 2-digit SIC code.

Table 16 Results for H2- Value Relevance

Panel A: Univariate Tests

	Source	DF	Type III SS	Mean Square	F Value	Pr > F		LSMEAN	
VR	SOX	1	0.003	0.003	0.51	0.4766		**Q123=0**	**Q123=1**
	Q123	1	0.433	0.433	79.63	<.0001	**SOX=0**	0.090	0.041
	SOX*Q123	1	0.008	0.008	1.4	0.2373	**SOX=1**	0.088	0.050

Panel B: Multivariate Test (Based on SOX)

$$VR_{iq} = \gamma_0 + \gamma_1 Q123 + \gamma_2 SOX + \gamma_3 Q123 * SOX + \gamma_4 AVE\_SIZE_{iq} + \gamma_5 AVE\_LOSS_{iq}$$
$$+ \gamma_6 AVE\_INTAN_{iq} + \gamma_7 AVE\_DINT_{iq} + \gamma_8 AVE\_CAP_{iq} + \gamma_9 Trend + \sum_{k=1}^{K-1} \gamma_{9+k} Industry_k + \varepsilon_{iq}$$

	Predicted Sign	VR	
		Coefficient	t –statistic (p-value)
Intercept	?	0.115	3.49 (0.0005)
Q123	-	-0.051	-6.79 (<0.0001)
SOX	-	-0.000	-0.02 (0.9805)
*Q123*SOX*	+	0.010	1.05 (0.2951)
AVE_SIZE	+	0.000	0.10 (0.9203)
AVE_LOSS	-	-0.003	-0.16 (0.8708)
AVE_INTAN	+	-0.335	-1.69 (0.0904)
AVE_DINT	-	-0.039	-1.73 (0.0839)
AVE_CAP	-	0.057	1.25 (0.2104)
Trend	?	0.000	0.27 (0.7844)
Adjusted-R^2		0.154	
F-value (Pr>F)		5.20 (<0.0001)	

Panel C: Multivariate Test (Based on SOX 302 and SOX 404)

Table 16 – *Continued*

$$VR_{iq} = \gamma_0 + \gamma_1 Q123 + \gamma_2 S302 + \gamma_3 S404 + \gamma_4 Q123 * S302 + \gamma_5 Q123 * S404$$
$$+ \gamma_6 AVE\_SIZE_{iq} + \gamma_7 AVE\_LOSS_{iq} + \gamma_8 AVE\_INTAN_{iq} + \gamma_9 AVE\_DINT_{iq}$$
$$+ \gamma_{10} AVE\_CAP_{iq} + \gamma_{11} Trend + \sum_{k=1}^{K-1} \gamma_{11+k} Industry_k + \varepsilon_{iq}$$

	Predicted Sign	VR	
		Coefficient	t –statistic (p-value)
Intercept	?	0.112	3.40 (0.0007)
Q123	-	-0.051	-6.83 (<0.0001)
S302	-	-0.021	-1.61 (0.1085)
S404	-	0.010	0.70 (0.4819)
*Q123*S302*	+	0.036	2.87 (0.0041)
*Q123*S404*	+	-0.007	-0.61 (0.5410)
AVE_SIZE	+	0.001	0.23 (0.8172)
AVE_LOSS	-	-0.002	-0.12 (0.9025)
AVE_INTAN	+	-0.349	-1.77 (0.0773)
AVE_DINT	-	-0.040	-1.78 (0.0757)
AVE_CAP	-	0.055	1.20 (0.2322)
Trend	?	0.001	0.30 (0.7638)
Adjusted-R^2		0.159	
F-value (Pr>F)		5.13 (<0.0001)	

Variable Definitions:

VR = value relevance of earnings for an industry-quarter (industry-year) group, equal to the adjusted-R^2 from the regression of raw stock returns (CRSP data item RET) cumulated during the quarter (or year) on net income before extraordinary items (quarterly Compustat data item IBQ; annual Compustat data item IB) scaled by the market value of equity at the beginning of the period, where market value equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ; annual Compustat data item CSHO) and closing price (quarterly Compustat data item PRCCQ; annual Compustat data item PRCC_F);

Table 16 – *Continued*

Q123	=	a dummy variable equal to 1 if the observation belongs to an interim quarter;
SOX	=	a dummy equal to1 if the year of the industry-quarter (industry-year) group is in 2003-2007;
*Q123*SOX*	=	the interaction term of *Q123* and *SOX*, equal to 1 if the observation is from an interim quarter during 2003-2007;
S302	=	a dummy equal to1 if the year of the industry-quarter (industry-year) group is in 2003-2004;
S404	=	a dummy equal to1 if the year of the industry-quarter (industry-year) group is in 2005-2007;
*Q123*S302*	=	the interaction term of *Q123* and *S302*, equal to 1 if the observation is from an interim quarter during 2003-2004;
*Q123*S404*	=	the interaction term of *Q123* and *S404*, equal to 1 if the observation is from an interim quarter during 2005-2007;
AVE_SIZE	=	average firm size (logarithm of market value) for the industry-quarter (industry-year) group at the beginning of the period, where market value equals the product of number of common shares outstanding (quarterly Compustat data item CSHOQ; annual Compustat data item CSHO) and closing price (quarterly Compustat data item PRCCQ; annual Compustat data item PRCC_F);
AVE_LOSS	=	percent of loss firms within the industry-quarter (industry-year) group. A loss firm is defined to have consistent negative net incomes before extraordinary items (quarterly Compustat data item IBQ; annual Compustat data item IB) during the last four periods;
AVE_INTAN	=	average level of intangible intensity for the industry-quarter (industry-year) group, where intangible intensity for a firm equals research and development expenditures (quarterly Compustat data item XRDQ; annual Compustat data item XRD) scaled by total assets (quarterly Compustat data item ATQ; annual Compustat data item AT);
AVE_DINT	=	percent of firms without intangibles within the industry-quarter (industry-year) group. A firm without intangibles is defined to have zero amount of research and development expenditures;
AVE_CAP	=	average level of capital intensity for the industry-quarter(industry-year) group, where capital intensity equals the ratio of net book value of property, plant and equipment (quarterly Compustat data item PPENTQ; annual Compustat data item PPENT) to total assets ;
Trend	=	a trend variable equal to the difference between the current year of observation and 1998;
Industry	=	a dummy variable equal to 1 if the firm belongs to industry k. The subscript k equals 1, 2 … or K-1, where K represents the number of unique industries based on 2-digit SIC code.

REFERENCES

Abbott, L. J., S. Parker, G. F. Peters, and D. V. Rama. 2007. Corporate governance, audit quality, and the Sarbanes-Oxley Act: Evidence from internal audit outsourcing. *The Accounting Review* 82 (4): 803-835.

Ali, A., T. Chen, S. Radhakrishnan. 2007. Corporate disclosures by family firms. *Journal of Accounting and Economics* 44: 238-286.

Altamuro, J., and A. Beatty. 2006. Do internal control reforms improve earnings quality? Working paper, The Ohio State University.

American Institute of Certified Public Accountants (AICPA). 1972. *Interim Financial Information.* Statement on Auditing Standards No. 100. New York, NY: AICPA.

_____. 1973. *Interim Financial Information.* Accounting Principles Board Opinion No. 28. New York, NY: AICPA.

_____. 2002. *Interim Financial Information.* Statement on Auditing Standards No. 71. New York, NY: AICPA.

Ashbaugh-Skaife, H., D. W. Collins, and W. R. Kinney, Jr. 2007. The discovery and reporting of internal control deficiencies prior to SOX-mandated audits. *Journal of Accounting and Economics* 44: 166-192.

_____, _____, _____, and R. LaFond. 2008. The effect of SOX internal control deficiencies and their remediation on accrual quality. *The Accounting Review* 83 (1): 217-250.

_____, _____, _____, and _____. 2009. The effect of SOX internal control deficiencies on firm risk and cost of equity. *Journal of Accounting Research* 47 (1): 1-43.

Baginski, S., K. Lorek, G. L. Willinger, and B. Branson. 1999. The relationship between economic characteristics and alternative annual earnings persistence measures. *The Accounting Review* 74: 105-120.

Ball, R., S. P. Kothari, and A. Robin. 2000. The effect of international institutional factors on properties of accounting earnings. *Journal of Accounting and Economics* 29: 1-51.

_____, and L. Shivakumar. 2006. The role of accruals in asymmetrically timely gain and loss recognition. Journal of Accounting Research 44 (2): 207-242.

_____. 2009. Market and political/regulatory perspectives on the recent accounting scandals. *Journal of Accounting Research* 47 (Supplement): 277-323.

Barth, M. E., W. R. Landsman, and M. H. Lang. 2008. International accounting standards and accounting quality. *Journal of Accounting Research* 46 (3): 467-498.

Barton, J., and P. J. Simko. 2002. The balance sheet as an earnings management constraint. *The Accounting Review* 77 (Supplement): 1-27.

Basu, S. 1997. The conservatism principle and the asymmetric timeliness of earnings. *Journal of Accounting and Economics* 24: 3-37.

_____, L. S. Hwang, and C. Jan. 2005. Auditor conservatism and analysts' fourth quarter earnings forecasts. *Journal of Accounting and Finance Research* 13 (5): 211-235.

Becker, C. L., M. L. DeFond, J. Jiambalvo, and K. R. Subramanyam. 1998. The effect of audit quality on earnings management. *Contemporary Accounting Research* 15 (1): 1-24.

Bédard, J. 2006. Sarbanes Oxley internal control requirements and earnings quality. Working paper, Université Laval.

Beneish, M. D., M. B. Billings, and L. D. Hodder. 2008. Internal control weaknesses and information uncertainty. *The Accounting Review* 83 (3): 665-703.

Benoit, Robert. 2006. *Share price movements during the implementation period of Section 404 requirements of the Sarbanes-Oxley Act-An empirical study.* Worcester, MA. Lord & Benoit, LLC.

Bhattacharya, N., E. L. Black, T. E. Christensen, and R. D. Mergenthaler. 2007. Who trades on pro forma earnings information? *The Accounting Review* 82 (3): 581-619.

Biddle, G. C., G. S. Seow, and A. F. Siegel. 1995. Relative versus incremental information content. *Contemporary Accounting Research* 12 (1): 1-23.

Blue Ribbon Committee on Improving the Effectiveness of Corporate Audit Committees (BRC). 1999. *Report and Recommendations of the Blue Ribbon*

Committee on Improving the Effectiveness of Corporate Audit Committees. New York, NY: New York Stock Exchange.

Bowen, R., E. Noreen, and J. Lacey. 1981. Determinants of the corporate decision to capitalize Interest. *Journal of Accounting and Economics* 3(3): 154-179.

_____, L. DuCharme, and D. Shores. 1995. Stakeholders' implicit claims and accounting method choice. *Journal of Accounting and Economics* 20(3): 255-295.

Brown, L. 2001. A temporal analysis of earnings surprises: Profits vs. losses. *Journal of Accounting Research* 39 (2): 221-241.

_____, and A. S. Pinello. 2007. To what extent does the financial reporting process curb earnings surprise games? *Journal of Accounting Research* 45 (5): 947-981.

Brown, N. C., C. Pott, and A. Wömpener. 2008. The effect of internal control regulation on earnings quality: Evidence from Germany. Working paper, University of Southern California and University of Münster.

Bushman, R., Q. Chen, E. Engel, and A. Smith. 2004. Financial accounting information, organizational complexity and corporate governance systems. *Journal of Accounting and Economics* 37 (2): 167-201.

Chan, K. C., B. R. Farrell, and P. Lee. 2007. Earnings management of firms reporting material internal control weaknesses under Section 404 of the Sarbanes-Oxley Act. Working paper, Pace Univeristy.

Charles River Associates (CRA). 2005. *Sarbanes-Oxley Section 404 Costs and Remediation of Differences: Estimates from a Sample of Fortune 1000 Companies.* Washington, DC: CRA.

Coates, J. 2007. The goals and promise of the Sarbanes-Oxley Act. *Journal of Economic Perspectives* 21 (1): 91–116.

Cohen, D. A., A. Dey, and T. Z. Lys. 2005. Earnings management and informativeness of earnings announcements in the pre- and post-Sarbanes-Oxley periods. Working paper, New York University, University of Chicago and Northwestern University.

Cohen, D. A., A. Dey, and T. Z. Lys. 2008. Real and accrual-based earnings management in the pre- and post-Sarbanes-Oxley periods. *The Accounting Review* 83 (3): 757-787.

Collins, W. A., W. S. Hopwood, and J. C. McKeown. 1984. The predictability of interim earnings over alternative quarters. *Journal of Accounting Research* 22 (2): 467-479.

Collins, D. W., and S. P. Kothari. 1989. An analysis of intertemporal and cross-sectional determinants of earnings response coefficients. *Journal of Accounting and Economics* 11: 143-181.

_____, E. L. Maydew, and I. S. Weiss. 1997. Changes in the value-relevance of earnings and book values over the past forty years. *Journal of Accounting and Economics* 24: 39-67.

_____, and P. Hribar. 1999. Earnings-based and accrual-based market anomalies: one effect or two? Working paper, University of Iowa.

Committee of Sponsoring Organizations (COSO). 1992. *Internal control—Integrated Framework.* AICPA.

Comprix, J., L. Mills, and A. Schmidt. 2009. Bias in quarterly estimates of annual effective tax rates and earnings management. Working paper, Syracuse University, University of Texas and Columbia University.

Controller's Report. 2005. *2005 SOX fees to Hit 60% or More of Audit Costs for Most Companies. April.* New York, NY: Institute of Management & Administration, Inc.

CRA, International. 2005. *Sarbanes-Oxley Section 404 Costs and Implementation Issues: Survey Update.* Washington, D.C.: Charles River Associates International.

Cummings, J. 2002. Bush to seek tougher penalties in assault on corporate fraud. Wall Street Journal, July 9.

Das, S., and P. K. Shroff. 2002. Fourth quarter reversals in earnings changes and earnings management. Working paper, University of Illinois at Chicago and University of Minnesota.

DeAngelo, L. E. 1986. Accounting numbers as market valuation substitutes: A study of management buyouts of public stockholders. *The Accounting Review* 61 (3): 400-420.

_____. 1988. Managerial competition, information costs, and corporate governance: The use of accounting performance measures in proxy contests. *Journal of Accounting and Economics* 10: 3-36.

DeAngelo, H., L. DeAngelo, and D. Skinner. 1994. Accounting choice in troubled companies. *Journal of Accounting and Economics* 17: 193–225.

Dechow, P. M., and R. G. Sloan. 1991. Executive incentives and the horizon problem: An empirical investigation. *Journal of Accounting and Economics* 14: 51—89.

_____. 1994. Accounting earnings and cash flows as measures of firm performance: the role of accounting accruals. *Journal of Accounting and Economics* 18: 3-42.

_____, R. G. Sloan, and A. P. Sweeney. 1995. Detecting earnings management. *The Accounting Review* 70 (2): 193-225.

_____, and I. Dichev. 2002. The quality of accruals and earnings: the role of accrual estimation errors. *The Accounting Review* 77 (Supplement): 35-79.

DeFond, M. L., and J. Jiambalvo. 1994. Debt covenant violation and manipulation of accruals. *Journal of Accounting and Economics* 17(1-2): 145-76.

DeFond, M. L., R. N. Hann, and X Hu. 2005. Does the market value financial expertise on audit committees of boards of directors? *Journal of Accounting Research* 43 (2): 153-193.

_____, M. Hung, E. Karaoglu, and J. Zhang. 2008. Was the Sarbanes-Oxley Act good news for corporate bondholders? Working paper, University of Southern California.

Degeorge, F., J. Patel, and R. Zeckhauser. 1999. Earnings management to exceed thresholds. *Journal of Business* 72 (1): 1-33.

Dhaliwal, D. S., C. A. Gleason, and L. F. Mills. 2004. Last-Chance Earnings Management: Using the Tax Expense to Meet Analysts' Forecast. *Contemporary Accounting Research* 21 (2): 431-459.

Dhaliwal, D., M. Erickson, and S. Heitzman. 2009. Taxes and the backdating of stock option exercise dates. *Journal of Accounting and Economics* 47: 27-49.

Dichev, I. D., and V. W. Tang. 2009. Earnings volatility and earnings predictability. *Journal of Accounting and Economics* 47: 160-181.

Doyle, J. T., W. Ge, and S. McVay. 2007a. Accruals quality and internal control over financial reporting. *Journal of Accounting and Economics* 44: 193-223.

_____,_____, and _____. 2007b. Determinants of weaknesses in internal control over financial reporting. *The Accounting Review* 82 (5): 1141-1170.

Durney, A., T. Li and M. Magnan. 2009. The governance of offshore firms: Implications for financial reporting. Working paper, McGill University and Concordia University.

Easton, P. D., T. S. Harris, and J. A. Ohlson. 1992. Accounting earnings can explain most of securities returns: The case of long event windows. *Journal of Accounting and Economics* 15: 119-142.

Ecker, F., J. Francis, I. Kim, P. M. Olsson, and K. Schipper. 2006. A returns-based representation of earnings quality. *The Accounting Review* 81 (4): 749-780.

Elliott, J., and W. Shaw. 1988. Write-offs as accounting procedures to manage perceptions. *Journal of Accounting Research* 26 (Supplement): 91-119.

Engel, E., R. M. Hayes, and X. Wang. 2007. The Sarbanes-Oxley Act and firms' going-private decisions. *Journal of Accounting and Economics* 44: 116-145.

Ettredge, M., D. Simon, D. Smith, and M. Stone. 2000. The effect of the external accountant's review on the timing of adjustments to quarterly earnings. *Journal of Accounting Research* 38 (1): 195–207.

Ewert, R., and A. Wagenhofer. 2005. Economic effects of tightening accounting standards to restrict earnings management. *The Accounting Review* 80 (4): 1101-1124.

Finance Executive International (FEI). 2007. FEI Survey: Average 2007 SOX Compliance Cost $ 1.7 Million. Available at: http://fei.mediaroom.com/index.php?s=43&item=204

Financial Accounting Standards Board (FASB). 1997. *Statement of Cash Flows.* Statement of Financial Accounting Standards No. 95. Norwalk, CT: FASB.

Foley & Lardner LLP. 2007. *The Cost of Being Public in the Era of Sarbanes-Oxley.* Washington, D.C.: Foley & Lardner LLP.

Francis, J., and K. Schipper. 1999. Have financial statements lost their relevance? *Journal of Accounting Research* 37 (2): 319-352.

_____, _____, and L. Vincent. 2003. The relative and incremental explanatory power of earnings and alternative (to earnings) performance measures for returns. *Contemporary Accounting Research* 20 (1): 121-164.

_____, R. LaFond, P. M. Olsson, and K. Schipper. 2004. Cost of equity and earnings attributes. *The Accounting Review* 79 (4): 967-1010.

_____, _____, _____, and _____. 2005. Cost of equity and earnings attributes. *Journal of Accounting and Economics* 39: 295-327.

_____, D. Nanda, and P. Olsson. 2008. Voluntary disclosure, earnings quality, and cost of capital. *Journal of Accounting Research* 46 (1): 53-99.

Frankel, R. M., M. F. Johnson, and K. K. Nelson. 2002. The relation between auditors' fees for nonaudit services and earnings management. *The Accounting Review* 77 (Supplement): 71–105.

Gao, F., J. S. Wu, and J. Zimmerman. 2009. Unintended consequences of granting small firms exemptions from securities regulation: Evidence from the Sarbanes-Oxley Act. *Journal of Accounting Research* 47 (2): 459-506.

Ge, W., and S. McVay. 2005. The disclosure of material weaknesses in internal control after the Sarbanes-Oxley Act. *Accounting Horizons* 19 (3): 137-158.

Ghosh, A., and D. Moon. 2005. Auditor tenure and perception of audit quality. *The Accounting Review* 80 (2): 585-612.

Givoly, D., and J. Ronen. 1981. ''Smoothing'' manifestations in fourth-quarter results of operations: Some empirical evidence. *Abacus* 17 (2): 174–193.

Goh, B. W., and D. Li. 2008. Internal control reporting and accounting conservatism. Working paper, Singapore Management University and TsingHua University.

Graham, B., and D. Dodd. 1951. *Security Analysis: Principles and Technique.* New York, NY: McGraw-Hill Companies.

Graham, J. R., C. R. Harvey, and S. Rajgopal. 2005. The economic implications of corporate financial reporting. *Journal of Accounting and Economics* 40: 3–73.

Guidry, F., A. Leone, and S. Rock. 1999. Earnings-based bonus plans and earnings management by business unit managers. *Journal of Accounting and Economics* 26: 113-142.

Gul, F. A., S. Y. K. Fund, and B. Jaggi. 2009. Earnings quality: Some evidence on the role of auditor tenure and auditors' industry expertise. *Journal of Accounting and Economics* 47: 265-287.

Hagerman, R., and M. Zmijewski. 1979. Some economic determinants of accounting policy choice. *Journal of Accounting and Economics*: 141-161.

Hart, O. 2009. Regulation and Sarbanes-Oxley. *Journal of Accounting Research* 47 (2): 437-445.

Hayn, C. 1995. The information content of losses. *Journal of Accounting and Economics* 20: 125-153.

Healy, P. M. 1985. The effect of bonus schemes on accounting decisions. *Journal of Accounting and Economic*s 7 (April): 85-107.

_____, and J. M. Wahlen. 1999. A review of the earnings management literature and its implications for standard setting. *Accounting Horizons* 13(4): 365-383.

Heflin, F., and C. Hsu. 2008. The impact of the SEC's regulations of non-GAAP disclosures. *Journal of Accounting and Economics* 46: 349-365.

Hilary, G., and C. Lennox. 2005. The credibility of self-regulation: Evidence form the accounting profession's peer review program. *Journal of Accounting and Economics* 40: 211-229.

Hochberg, Y., P. Sapienza, and A.Vissing-Jørgensen. 2009. A lobbying approach to evaluating the Sarbanes-Oxley Act of 2002. *Journal of Accounting Research* 47 (2): 519-583.

Hogan, C. E., and M. S. Wilkins. 2006. Evidence on the audit risk model: Does auditors increase audit effort in the presence of internal control weaknesses. *Contemporary Accounting Research* 25 (1): 219-242.

Hoitash, U., R. Hoitash, and J. C. Bedard. 2009. Corporate governance and internal control over financial reporting: A comparison of regulatory regimes. *Accounting Review* 84 (3): 839-867.

Holthausen, R., and R. Leftwich. 1983. The economic consequences of accounting choice: Implications of costly contracting and monitoring. *Journal of Accounting and Economics* 5: 77-117.

Hribar, P., and N. T. Jenkins. 2004. The effect of accounting restatements on earnings revisions and the estimated cost of capital. *Review of Accounting Studies* 9: 337-356.

Iliev, P. 2007. The effect of SOX Section 404 compliance on audit fees, earnings quality and stock prices. Working paper, Brown University.

Jelinek, K. 2007. The effect of leverage increases on earnings management. *Journal of Business & Economic Studies* 13 (2): 24-46.

Jeter, D. C., and L. Shivakumar. 1999. Cross-sectional estimation of abnormal accruals using quarterly and annual data: Effectiveness in detecting event-specific earnings management. *Accounting and Business Research* 29 (4): 299-319.

Jones, J. J. 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 29 (Autumn): 193-228.

Kinney Jr., W. R., M. Maher, and D. Wright. 1990. Assertions-based standards for integrated internal control. *Accounting Horizons* 4 (4): 1-8.

_____, Z-V. Palmrose, and S. Scholz. 2004. Auditor independence, non-audit services, and restatements: Was the U.S. government right? *Journal of Accounting Research* 42 (3): 561-588.

Koh, K., D. A. Matsumoto, and S. Rajgopal. 2008. Meeting or beating analyst expectations in the post-scandal world: Changes in stock market rewards and managerial actions. *Contemporary Accounting Research* 25(4): 1067-1098.

Kolev, K., C. A. Marquardt, and S. E. McVay. 2008. SEC scrutiny and the evolution of non-GAAP reporting. *The Accounting Review* 83 (1): 157-184.

Kothari, S. P., A. J. Leone, and C. E. Wasley. 2005. Performance matched discretionary accrual measures. *Journal of Accounting and Economics* 39: 163-197.

KPMG. 2004. Sarbanes-Oxley Section 404: An overview of the PCAOB's requirements. KPMG LLP.

Kross, W., and D. Schroeder. 1990. An investigation of seasonality stock price responses to quarterly earnings announcements. *Journal of Business Finance & Accounting* 17 (5): 649-675.

Lang, M., J. S., Raedy, and M. H. Yetman. 2003. How representative are firms that are cross-listed in the United States? An analysis of accounting quality. *Journal of Accounting Research* 41 (2): 363-386.

_____,_____, and W. Wilson. 2006. Earnings management and cross listing: Are reconciled earnings comparable to US earnings? *Journal of Accounting and Economics* 42: 255-283.

Larcker, D. F., S. A. Richardson, and I. Tuna. 2007. Corporate governance, accounting outcomes, and organizational performance. *The Accounting Review* 82 (4): 963-1008.

Lee, C, J., L. Y. Li, and H. Yue. 2006. Performance, growth and earnings management. *Review of Accounting Studies* 11: 305-334.

Leuz, C., D. Nanda, and P. D. Wysocki. 2003. Earnings management and investor protection: An international comparison. *Journal of Financial Economics* 69: 505-527.

_____. 2007. Was the Sarbanes-Oxley Act of 2002 really this costly? A discussion of evidence from event returns and going-private decisions. *Journal of Accounting and Economics* 44: 146–165.

_____, A. Triantis, and T. Y. Wang. 2008. Why do firms go dark? Causes and economic consequences of voluntary SEC deregistrations. *Journal of Accounting and Economics* 45: 181–208.

Lev, B. 1983. Some economic determinants of time-series properties of earnings. *Journal of Accounting and Economics* 5: 31-48.

_____. 1989. On the Usefulness of Earnings and Earnings Research: Lessons and directions from Two Decades of Empirical Research. *Journal of Accounting and Research* 27(supplement): 153-192.

_____, and T. Sougiannis. 1996. The Capitalization, Amortization, and Value-relevance of R&D. *Journal of Accounting and Economics* 21: 107-138.

Li, H., M. Pincus, and S. O. Rego. 2006. Market reaction to events surrounding the Sarbanes-Oxley Act of 2002 and earnings management. Working paper, University of California, Irvine and University of Iowa.

Lipe, R. 1990. The relation between stock returns and accounting earnings given alternative information. *The Accounting Review* 65 (1): 49-71.

Liu, J., D. Nissim, and J. Thomas. 2002. Equity valuation using multiples. *Journal of Accounting Research* 40 (1): 135-172.

Lobo, G. J., and J. Zhou. 2006. Did conservatism in financial reporting increase after the Sarbanes-Oxley Act? Initial evidence. *Accounting Horizons* 20 (1): 57-73.

Lopez, T. J., S. D. Vandervelde, and Y. Wu. 2006. The auditor's internal control opinions: An experimental investigation of relevance. Working paper, University of South Carolina.

Lord & Benoit, LLC. (Lord & Benoit). 2006. Do the Benefits of 404 Exceed the Cost? Worcester, MA: Lord & Benoit, LLC. Available at: http://www.section404.org/news.php?id=9&news=Do-Benefits-Exceed-Costs

Lui, D., S, Markov, and A. Tamayo. 2007. What makes a stock risky? Evidence from sell-side analysts' risk ratings. *Journal of Accounting Research* 45 (3): 629-665.

Mahoney, P. G. 2009. The development of securities law in the United States. *Journal of Accounting Research* 47 (2): 325-347.

Manry D., S. L. Tiras, and C. M. Wheatley. 2003. The influence of interim auditor reviews on the association of returns with earnings. *The Accounting Review* 78 (1): 251-274.

Matsumoto, D. 2002. Management's incentives to avoid negative earnings surprises. *The Accounting Review* 77 (3): 483-514.

McNichols, M. 2000. Research design issues in earnings management studies. *Journal of Accounting and Public Policy* 19: 313–345.

_____. 2002. Discussion of the quality of accruals and earnings: The role of accrual estimation errors? *The Accounting Review* 77 (Supplement): 61-69.

Mendenhall, R., and W. Nichols. 1988. Bad news and differential market reactions to announcements of earlier-quarters versus fourth-quarter earnings. *Journal of Accounting Research* 26 (Supplement): 63–86.

Minton, B., C. Schrand, and B. Walther. 1999. The role of volatility in forecasting. *Review of Accounting Studies* 7 (2-3): 195-215.

Myers, J. N., L. A. Myers, and T. C. Omer. 2003. Exploring the term of the auditor-client relationship and the quality of earnings: A case for mandatory auditor rotation? *The Accounting Review* 78 (3): 779-799.

Naiker, V., and D. S. Sharma. 2009. Former audit partners on the audit committee and internal control deficiencies. *The Accounting Review* 84 (2): 559-587.

Nicolaisen, D. T. 2004. Keynote Speech at 11th Annual Midwestern Financial Reporting Symposium. Available at: http://www.sec.gov/news/speech/spch100704dtn.htm

Nondorf, M., Z. Singer, and H. You. 2007. A Study of forms surrounding the threshold of Sarbanes-Oxley Section 404 compliance. Working paper, University of California, Berkeley.

Ogneva, M., K. R. Sburamanyam, and K, Raghunandan. 2007. Internal control weakness and cost of equity: Evidence from SOX Section 404 disclosures. *The Accounting Review* 82 (5): 1255-1297.

Palepu, K. G. 1988. Discussion of bad news and differential market reactions to announcements of earlier-quarters versus fourth-quarter earnings. *Journal of Accounting Research* 26 (Supplement): 87–90.

Patterson, E. R., and J. R. Smith. 2007. The effects of Sarbanes-Oxley on auditing and internal control strength. *The Accounting Review* 82 (2): 427-455.

Penman, S., and X. J. Zhang. 2002. Accounting conservatism, the quality of earnings and stock returns. *The Accounting Review* 77: 237-264.

Piotroski, J. D., and S. Srinivasan. 2008. Regulation and bonding: The Sarbanes-Oxley Act and the flow of international listings. *Journal of Accounting Research* 46 (2): 383-426.

Pope, P. F., and M. Walker. 1999. International differences in the timeliness, conservatism, and classification of earnings. *Journal of Accounting Research* 37 (3): 53-87.

Public Company Accounting Oversight Board (PCAOB). 2004. *An Audit of Internal Control Over Financial Reporting Performed in Conjunction with An Audit of Financial Statements.* Auditing Standard No. 2. Washington, DC: PCAOB.

_____. 2007. *An Audit of Internal Control Over Financial Reporting That Is Integrated with An Audit of Financial Statements.* Auditing Standard No. 5. Washington, DC: PCAOB.

Rittenberg, L. E., and P. K. Miller. 2005. Sarbanes-Oxley Section 404 work: Look at the benefits. The Institute of Internal Auditors Research Foundation.

Salamon, G. L., and T. L. Stober. 1994. Cross-quarter differences in stock price responses to earnings announcements: Fourth-quarter and seasonality influences. *Contemporary Accounting Research* 11 (1): 297-330.

Sloan, R. G. 1996. Do stock prices fully reflect information in accruals and cash flows about future earnings? *The Accounting Review* 71 (3): 289-315.

Skinner, D., and R.G. Sloan. 2002. Earnings surprises, growth expectations, and stock Returns or don't let an earnings torpedo sink your portfolio. *Review of Accounting Studies* 7: 287-312.

Teoh, S. H., T. J. Wong, and G. Rao. 1998. Are accruals during initial public offerings opportunistic? *Review of Accounting Studies* 3: 175-208.

Wang, D. 2006. Founding family ownership and earnings quality. *Journal of Accounting Research* 44 (3): 619-656.

Watts, R. L., and J. L. Zimmerman. 1990. Positive accounting theory: a ten-year perspective. *The Accounting Review* 65, 131-156.

Xie, H. 2001. The mispricing of abnormal accruals. *The Accounting Review* 76 (3): 357-373.

Zhang, I. X. 2007. Economic consequences of the Sarbanes-Oxley Act of 2002. *Journal of Accounting and Economics* 44: 74-115.

BIOGRAPHICAL INFORMATION

Lei Han graduated from Wuhan University with the Bachelor in Management degree in 2001. After a year of working as a corporate accountant, she came to the U.S. to pursue advanced education. She received her Master of Accountancy degree from Millsaps College in 2004 and doctoral degree in Accounting from the University of Texas at Arlington in 2010. Her research interests include earnings management, analysts' forecasts and corporate governance.