AUDIT COMMITTEE, CORPORATE GOVERNANCE AND THE SARBANES-OXLEY ACT 2002

by

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Statements:

The candidate confirms that the work submitted is his own and that appropriate credit has been given where reference has been made to the work of others.

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ABSTRACT

The Sarbanes-Oxley Act 2002 aimed to improve listed companies' financial reporting standards and protect shareholders' interests. However, most of the provisions are perceived to be costly to U.S. issuers and benefits of the Act have continued to be the subject of much debate. This thesis utilises a unique corporate governance dataset that covers both the pre- and post-SOX periods and attempts to first, investigate what changes have there been in corporate governance practices since SOX was implemented, and second, to analyse the consequences of any changes in corporate governance practices post-SOX, and whether these changes are beneficial to shareholders. To achieve these two objectives, the thesis investigates the impact of SOX in four empirical chapters.

The main findings of this thesis suggest that companies opted to follow a box-ticking procedure in selecting their corporate governance structures post-SOX. SOX did not achieve its objectives of improving financial reporting quality, but it had, albeit unintentionally, enhanced corporate value for some firms. Overall audit committee effectiveness decreased during the SOX period, but it increased in the post-SOX period, which indicates, in terms of corporate governance, SOX was beneficial to shareholders because it improved the overall audit committee effectiveness. Finally, earnings informativeness improved after SOX was enacted. However, this improvement may not be attributable to the changes in audit committee effectiveness.

The thesis concludes that SOX improved U.S. companies' financial reporting quality, financial account usefulness and audit committee effectiveness. However, the improvements of financial reporting quality and financial account usefulness seemed not to be attributable to the changes in corporate governance practices, but it was more likely to be attributable to other internal control requirements, i.e. Section 404 "Assessment of internal control", Section 302 "Internal control certifications" and Section 201 "Services outside the scope of practice of auditor".

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LIST OF ABBREVIATIONS

2SLS	Two-Stage Least Squares
A-Index	Audit Committee Quality Index
AudC	Audit Committee
BRC	Blue Ribbon Committee
CAR	Cumulative Abnormal Returns
DCA	Discretionary Accruals
ERC	Earnings Response Coefficients
FF	Portfolio consisting of companies that included at least one financial expert both pre- and post-SOX
FN	Portfolio consisting of companies that included a financial expert pre-SOX but they did not include any financial expert post-SOX
FWDDCA	Discretionary Accruals Derived from Dechow's Forwarded Model
FWDNDCA	Non-Discretionary Accruals Derived from Dechow's Forwarded Model
G-Index	Corporate Governance Index
GMM	Generalized Method of Moments
LAGDCA	Discretionary Accruals Derived from Dechow's Lagged Model
LAGNDCA	Non-Discretionary Accruals Derived from Dechow's Lagged Model
MJDCA	Discretionary Accruals Derived from Modified Jones Model
MJNDCA	Non-Discretionary Accruals Derived from Modified Jones Model

NDCA	Non-Discretionary Accruals
NF	Portfolio consisting of companies that did not include a financial expert pre-SOX but they included a financial expert post-SOX
NN	Portfolio consisting of companies that did not include any financial expert either pre- or post-SOX
OLS	Ordinary Least Squares
PCAOB	Public Company Accounting Oversight Board
PFWDDCA	Discretionary Accruals Derived from Performance-Matched Dechow's Forwarded Model
PFWDNDCA	Non-Discretionary Accruals Derived from Performance-Matched Dechow's Forwarded Model
PMJDCA	Performance-Matched Modified Jones Discretionary Accruals
PMJNDCA	Performance-Matched Modified Jones Non-Discretionary Accruals
PLAGDCA	Discretionary Accruals Derived from Performance-Matched Dechow's Lagged Model
PLAGNDCA	Non-Discretionary Accruals Derived from Performance-Matched Dechow's Lagged Model
PWC	PricewaterhouseCoopers
Q	Tobin's Q
S&P 500	Standard & Poor's 500 Large-Cap corporations
SEC	U.S. Securities and Exchange Commission
SOX	The Sarbanes-Oxley Act 2002
UE	Unexpected Earnings or Earnings Surprises

1 INTRODUCTION

The Sarbanes-Oxley Act of 2002 (SOX) introduced regulations aimed at improving corporate financial and governance practice. The Act aimed to change US regulations from a discretionary disclosure regime to a mandated corporate governance mechanism that was designed to restore investor confidence after several accounting scandals. However, many of the requirements and their impacts are controversial and lack the support of empirical evidence[1]. This therefore motivates the research in this thesis.

This thesis has two objectives:

1) to investigate what has changed in corporate governance practice since the Act has been implemented;

and

2) to investigate the consequences of the changes of corporate governance practice post-SOX, and analyses whether the Act is beneficial to a company's shareholders.

In order to achieve the two objectives, the thesis focuses on the impact of the Act on audit committee practice. This is because a) audit committee practice is one of the most relevant governance practices to restore investors' confidence

[1] For example, it is argued that Section 404 of SOX substantially increases listed companies compliance costs, but it can also enhances a company's financial reporting quality. However, whether the overall benefits from higher quality financial reporting outweigh the overall costs from compliance is still debatable and lacks of empirical evidence.

after the accounting scandals (DeZoort, Dana, Deborah and Scott 2002, DeFond and Francis 2005) and b) the Act has paid a reasonably large amount of attention on improving the requirements of audit committee compositions (SEC 2002a, SEC 2002d, SEC 2002c). Investigating the changes of audit committee practice from pre- to post-SOX and its consequences provides insightful knowledge on the impacts of Act.

The thesis therefore examines four empirical research questions. First, have the determinants of audit committee financial expertise changed after SOX? Secondly, have the changes in audit committee financial expertise led to higher firm value and financial reporting quality? Thirdly, has overall audit committee effectiveness changed after SOX? Finally, have the changes in overall audit committee effectiveness led to more informative earnings? Due to limited research in this area, each of these four questions is original and the research outcomes significantly contribute to the audit committee literature.

The structure of the thesis is organised as follows. It starts with a literature review in Chapter 2 and a detailed discussion of the SOX in Chapter 3. I provide a basic analysis of the sample data in Chapter 4. The empirical analyses of the above four questions are provided in Chapter 5 to Chapter 8, and the final chapter concludes and discusses future research opportunities.

Chapter 2 reviews the major auditing literature from the 1970s to 2008. Based on an examination on the results in previous studies, the chapter summarises answers to the following questions. These questions are a) What motivates executives to manipulate earnings information? b) Can external auditors constrain financial malpractices and reduce agency costs? c) Can audit committees constrain financial misconduct? and d) What influences the quality of external auditors and audit committees?

The review shows that the separation of corporate ownership and control generates agency costs that impair a company's value and performance. The agents (corporate managers) tend to manipulate financial reports to improve their own benefits over remote shareholders' interest. In order to constrain a manager from window dressing, corporate stakeholders therefore appoint external auditors and audit committees to oversee firm managers. The review also suggests that for external auditors, the potential litigation costs, service fees, and affiliations between clients and auditors determined the auditor quality, whereas for audit committees, the existing governance structure and potential litigation and reputation costs are the main determinants of their overall quality. Finally, the review shows that previous studies suggest higher auditor or audit committee quality led to higher the financial reporting quality.

Chapter 3 describes main provisions in the Sarbanes-Oxley Act and discusses the potential impact of those provisions. The discussion is divided into four parts. The first part discusses provisions that relate to corporate internal control, especially Section 404, and the impact on issuers. This part shows that Section 404 caused issuers to exert millions of dollars to enhance internal control functions immediately after SOX. However, these compliance costs decreased in the following years. This implies that the marginal benefits of Section 404 started to increase from the second year.

The second section discusses provisions that relate to auditor independence, which include Section 201 and 203. Section 201 prohibits auditors to provide certain types of non-audit services, whereas Section 203 requires issuers to change auditors every five years. Previous empirical studies found that non-audit services fees decreased substantially post-SOX. However, statistics show that auditors have tried to compensate the reduction of non-audit fees by increasing audit

services fees so that their total revenues (audit fees plus non-audit fees) did not change substantially post-SOX.

The third section discusses requirements on audit committee effectiveness and some relevant research concerns and questions. This section mainly covers Section 202, 204, 301 and 407. Section 202 and 204 are requirements for the interactions and communications between auditors and audit committees. Section 301 imposes requirements on audit committee independence, whereas Section 407 imposes requirements on the disclosure of audit committee financial expertise. The last section discusses criminal penalties of the Act under Title VIII, "Corporate and Criminal Fraud Accountability", Title IX "White Collar Crime Penalty Enhancement" and Title XI which has provisions on "Corporate Fraud Accountability".

Chapter 4 describes the process of the corporate governance data collection and the construction of the corporate governance data sample in this thesis. It also provides some descriptive statistics on the corporate governance variables, firm characteristics variables, and auditing and non-auditing services variables. In addition, it investigates the changes of corporate governance from pre- to post-SOX on a yearly basis. The statistics show that the US corporate governance system kept improving from 2001 to 2005, and SOX attributed significantly to this improvement.

Chapter 5 is the first empirical chapter and considers the first question which is "Have the determinants of audit committee financial expertise changed after SOX"? Using manually collected audit committee data that covers both pre- and post-SOX, this chapter examines the impact of SOX on the determinants of audit committee financial expertise. It starts with a discussion of the SOX requirements and defines the term "financial expertise" that is used in this study. It then analyses the differences in the probabilities of a company that included at

least one financial expert to the audit committee between pre- and post-SOX. It also analyses the changes of the impact of the existing corporate governance mechanisms and ownership structure on the level of audit committee financial expertise from pre- to post-SOX.

The results show that there were more companies that employed at least one financial expert post-SOX. I hypothesise that if this change was totally caused by SOX, the decision that a company employs at least one financial expert ("the decision" hereafter) would not be affected by the firm's economic performance and existing corporate governance post-SOX. Consistent with this hypothesis, the logistic analysis shows that issuers' economic performance and existing corporate governance were statistically significant in determining the decision pre-SOX, but lost statistical power post-SOX. This suggests after SOX was enacted, companies decided to include at least one financial expert mainly to comply with the Act, whereas pre-SOX issuers made this decision based on individual company requirements.

In addition, I hypothesise that if the increase in financial expertise is totally caused by SOX, the magnitude of the impact of existing governance mechanisms and ownership structure on the level of audit committee financial expertise would decrease post-SOX. I employ the Two Stage Least Square Regression with Generalized Method of Moments (GMM) iteration to obtain estimates of the audit committee financial expertise determinants model. The results show that coefficients of governance variables and ownership structure variables decreased significantly post-SOX. Incorporating this result with results from the logistic analysis, after SOX was enacted, an issuer was mainly motivated to employ financial experts by complying with Section 301 and 407 of the Act, but not by the companies' requirements. In addition, results also show that issuers employ

financial experts to complement existing governance pre-SOX[2]. In contrast, post-SOX issuers employ financial experts to substitute existing governance[3].

Chapter 5 shows that SOX has successfully achieved its goal in enhancing issuers' corporate governance structure. Financial expertise of issuers' audit committees increased substantially after the Act was implemented. However, there is no research investigating the consequences of the increases of financial expertise from pre- to post-SOX. Therefore this motivates investigations in Chapter 6.

Chapter 6 extends the analysis in Chapter 5 and investigates the consequences to companies that increase financial expertise post-SOX. Specifically, it examines whether the issuers' firm value and financial reporting quality have been improved / impaired after they appointed / dismissed financial experts to /from the audit committee.

The sample in Chapter 6 consists of 630 firm-years, with 315 observations pre-SOX and 315 observations post-SOX. The sample is then divided into four portfolios: the NN portfolio, the FF portfolio, the NF portfolio and the FN portfolio. The NN portfolio consists of companies that did not include any financial expert either pre- or post-SOX. The FF portfolio consists of companies that included at least one financial expert both pre- and post-SOX. The NF portfolio consists of companies that did not include a financial expert pre-SOX but they included a financial expert post-SOX; and the FN portfolio consists of companies that included a financial expert pre-SOX but they did not include any financial expert post-SOX.

[2] I define "complement" here as that the combination of existing governance and additional audit committee financial experts makes the governance system more efficient thus adds more value to the firm.

[3] I define "substitute" here as companies appoint new financial experts on the audit committee instead of using existing governance mechanisms to maintain or improve the efficiency of the firm's governance system thus add more value to the firm.

The sample distributions show that the majority of issuers chose to follow the spirit[4] of the Act both pre- and post-SOX, i.e. include at least one financial expert in both periods. I further examine which portfolio had greater improvements in financial reporting quality. The results show that companies that maintained or switched to include at least one financial expert post-SOX had lower improvements in financial reporting quality than companies that maintained not to appoint financial experts. Inconsistent with the hypothesis that firms retain appointing financial experts have greater increase in financial reporting quality, both the FF and NF portfolios had lower increase in financial reporting quality relative to the NN portfolio from pre- to post-SOX. In addition, financial reporting quality improved when the audit committee became more active, and the changes were more obvious for companies that maintained not to follow the rules in Section 407, such as the NN portfolio. However, all results suggest that companies that switched from having financial experts to not having financial experts had lowest financial reporting quality.

In the context of firm value, the descriptive statistics show that companies in the NF portfolio had highest firm value both pre- and post-SOX. In contrast, companies in the FN portfolio had the lowest firm value pre- and post-SOX. Firm value of the FF and the NN portfolios are between firm value of the NF and the FN portfolios. Further, the regression analysis shows that firms that chose to follow Section 407 post-SOX, e.g. the FF portfolio and the NF portfolio, had a greater increase in firm value than firms that did not follow the rules post-SOX.

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[4] Section 407 does not mandate issuers to appoint financial experts. Instead, it requires issuers to disclose whether they have financial experts on the audit committee and explain the reason if they do not have one. This indicates issuers have discretions to appoint financial experts. Further, there is no requirement on audit committee financial expertise pre-SOX. Therefore if issuers appoint a financial expert to the audit committee, I define them as 'following the spirit' or 'following the rules' of the Act.

The results generally indicate that SOX is beneficial to investors in that, overall, both firm value and financial reporting quality has been improved post-SOX. In the context of firm value, the improvements were more substantial for firms which include financial experts post-SOX. However, in terms of financial reporting, Section 407 has not achieved its intended improvements in financial reporting quality through appointing financial experts.

Further, the results in Chapter 6 show that both audit committee expertise and activity are critical in enhancing financial reporting quality. There is until now no method to measure the collective impacts of audit committee compositions, expertise and activities. This motivates the study in Chapter 7, which shows the construction of a composite measure of the overall audit committee effectiveness.

Chapter 7 therefore provides a practical method to construct an overall audit committee effectiveness index. It also investigates the impact of SOX on overall audit committee effectiveness. Among the various measurements of financial reporting quality, I chose the discretionary accruals as a benchmark to evaluate the audit committee effectiveness[5]. Utilizing three comprehensive discretionary accruals models[6] and a unique sample of audit committee data, the audit committee characteristics are ranked according to the magnitude the discretionary accruals deviate from zero[7]. The overall audit committee effectiveness index (A-Index hereafter) is then calculated as the sum scores from the rankings.

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[5] Detailed discussions of why I choose discretionary accruals as a benchmark are discussed in Section 7.2.

[6] The three models include the performance-matched modified Jones Model (Jones 1991, Kothari, Leone and Wasley 2005), the performance-matched Lag model and the performance-matched Growth model derived from Dechow, Richardson and Tuna (2003)

[7] Because discretionary accrual is the residuals from normal accruals, theoretically if financial reporting quality is a hundred percent credible and there is no earnings management, discretionary accruals should be equal to zero. Therefore the less discretionary accrual deviates from zero, the higher financial reporting quality.

After constructing the A-Index, a probit analysis is conducted to examine the relationship between overall audit committee quality and various audit committee characteristics. The analysis shows that more effective audit committees are larger, have a higher level of financial expertise and independence, and work more efficiently in the committee meetings. In addition, when comparing two audit committees, *ceteris paribus*, a larger, more independent, more expert, or more active audit committee is more effective.

In addition, I construct a score (the "SEC score" hereafter), based on the SEC requirements and the methods in previous studies (DeFond, Hann and Hu 2005, Carcello, Hollingsworth, Klein and Neal 2006a, Abbott, Parker and Peters 2004), and examine its capability in reflecting overall audit committee effectiveness. I compare the SEC score with the A-Index and find that the SEC score is weakly correlated with the A-Index, and it does not reflect the same changes as A-Index over time. While the A-Index shows that overall audit committee effectiveness decreased during the SOX period, the SEC score reports contrasting results. This implies that, the SEC score and the A-Index could not substitute with each other in reflecting the overall audit committee effectiveness.

Chapter 5, 6 and 7 investigate the impact of SOX on the determinants of audit committee effectiveness, the consequences and its developments from pre- to post-SOX respectively. However, there still lacks research on the impacts of SOX on investors' response to financial reporting quality conditional on the audit committee effectiveness. Chapter 8 therefore investigates this last question.

Chapter 8 investigates the impact of SOX and the audit committee on the stock market's response to the earnings announcement. Using the A-Index that is constructed in Chapter 7, the chapter examines the differences in earnings response coefficients (ERC) between firms with different quality audit

committees. It also investigates the changes in ERC from pre- to post-SOX conditional on the audit committee effectiveness.

By incorporating the audit committee effectiveness with the revised earnings responses model that captures the S-shape earnings-return relation, the analysis find that first, in contrast to Ahmed, Hossain and Adams (2006) and Begley, Cheng and Gao (2007), SOX has improved listed companies' financial reporting quality and thus increased the usefulness of accounting earnings to investors. The results show that the earnings response coefficients (or "ERC") increased significantly from pre- to post-SOX. This implies that SOX is beneficial to shareholders because it enhanced the earnings usefulness to shareholders.

Secondly, consistent with the hypothesis that firms with superior governance structures have higher earnings information quality, I found that before SOX was introduced, the ERC is significantly greater for firms with more effective audit committees. This is consistent with previous studies (Ahmed *et al.* 2006, Anderson, Deli and Gillan 2003, Vafeas 2000) and suggests that in a less strict legal environment, a more effective audit committee is better at reducing the noise embedded in accounting earnings.

Thirdly, the results also show that, however, after SOX was introduced, there is no difference in the ERC between more effective audit committees and less effective audit committees. This implies that first, other sections of the Act e.g. Section 404, Section 302 and Section 201 rather than Section 407 enhanced earnings quality and thus the earnings informativeness. Other sections of the Act may have improved earnings informativeness to the minimum required level, so that the improved audit committee effectiveness post-SOX did not add marginal credibility to the earnings. Secondly, the result also implies that the Act may increase the conservatism of corporate managers. Post-SOX, corporate executives are concerned about higher reputation costs and legal liabilities, they

may not release irrelevant information to the public until they fully verify the financial accounts, which in turn increased the earnings usefulness to investors. Finally, the results also imply that the relation of corporate governance and the ERC may no longer hold post-SOX.

The final chapter concludes the results and discusses the limitations of this thesis. The thesis has answered the four research questions empirically and found that first, SOX has changed the determinants of audit committee financial expertise, and listed companies appoint financial experts mainly for regulatory compliance post-SOX. Secondly, maintaining appointing financial experts to the audit committees pre- and post-SOX led to higher firm value, but not financial reporting quality. Thirdly, the overall audit committee effectiveness increased significantly after SOX was introduced. Finally, SOX led to more informative earnings, but it is not attributable to the higher quality audit committees.

Bringing all results together, the thesis concludes that SOX was beneficial to a company's shareholders in terms of improving a company's financial reporting quality, firm performance, corporate governance and earnings informativeness. However, the results in this thesis seem to indicate that the improvements of financial reporting standards and earnings informativeness were not attributable to provisions that aim to improve audit committee effectiveness.

2
LITERATURE REVIEW

The separation of ownership and control dominates characteristics of modern corporations, where corporate owners have a company's ownership but they do not manage the company's daily operation. Instead they appoint agents to run the company to maximise the firm value. However, while agents try to maximise firm owners' interests, they may also manipulate financial accounts to optimize their own benefits through increased compensation and job security. Enhancing executives' compensations, inflating stock prices, securing job positions, avoiding lending contracts violations and avoiding potential litigious costs are motivations for executives to manipulate financial accounts.

In order to constrain corporate managers from accounting manipulation, corporate shareholders appoint external auditors and audit committees to oversee the financial reporting procedures and information disclosures of the firm. Previous studies find that this reduces the likelihood of corporate managers having accounting anomalies. Further, the quality of external auditors and audit committees also significantly affects the credibility of accounting information released to the public. In sum, auditors and audit committees, especially more qualified auditors and audit committees, play a very important role in corporate governance in ensuring financial reporting quality.

2.1 What Motivates Executives to Conduct Accounting Manipulation?

The separation of ownership and control in modern corporations gives managers opportunities to consume the firms' free cash flow for their own benefit (Jensen and Meckling 1976). To align interests of managers (agents) with owners (principal), a *"high-powered incentive scheme"* (Aggarwal and Samwick 1999, page 1999) is necessary to motivate agents to maximise the principals' wealth (Aggarwal and Samwick 1999).

The principal-agent model suggests that linking executives' compensation with their performance is the primary means of motivating executives to maximise shareholders' interests (Aggarwal and Samwick 1999). Previous research finds that executives' pay is positively related to firm performance. For example, Murphy (1985) finds that executive compensation is positively related to firm performance and shareholders' wealth, whereas Jensen and Murphy (1990) find that increase in executive pay is positively related to increase in shareholders' wealth. Other executive compensation studies, e.g. Aggarwal and Samwick (1999), Hall and Liebman (1998) and Baker and Hall (2004), find similar and consistent results to support the positive association between executive pay and firm performance (Aggarwal and Samwick 1999, Hall and Liebman 1998, Baker and Hall 2004). In addition, managerial ownership studies show that, beyond a certain level of executive shareholdings, executives' interests are aligned with shareholders' interests. Morck, Shleifer and Vishny (1988), Short and Keasey (1999) and Davies, Hillier and McColgan (2005) all find that corporate value relate positively to managerial ownership before a certain point.

From the principal's perspective, the purpose of linking executives' compensation to performance is to motivate corporate managers to act as

entrepreneurs and to maximise shareholders' wealth (Jensen and Meckling 1976). From the agents' perspective, the first order effect of the pay-performance linkage is to incentivize executives to work harder and achieve better performance. However, the second order effect is unintended, where it incentivizes executives to manipulate firm performance to improve their own benefits and to lower their costs (Dechow *et al.* 2003).

The second order effect of the pay-performance relation reflects a dysfunctional response to the executive compensation schemes (Bushman and Smith 2001a, Abowd and Kaplan 1999). For example, Healy (1985) finds that corporate managers manipulate earnings[8] downwards when the pay-performance sensitivity is zero. Similarly, Holthausen, Larcker and Sloan (1995) find that managers would manipulate earnings downwards when they have achieved the maximum cap of their bonus plan. In addition, Burgstahler and Dichev (1997) and Dechow *et al.* (2003) find that managers tend more to report small positive earnings than small negative earnings. They suggest that this might be caused by the managers' desire to increase firm performance (Dechow *et al.* 2003). More recently, Cheng and Warfield (2005) and Bergstresser and Philippon (2006) find that executives with high equity incentives in their compensation scheme tend more to manage earnings upwards to inflate share prices and enhance their compensation. Burns and Kedia (2006) present evidence that firms are more likely to restate financial reports when the CEO's wealth is more sensitive to the firm's share price.

It tends to be common for executives to manage earnings to affect their benefits. The common use of earnings manipulation is mainly due to the

[8] According to Healy and Wahlen (1999), earnings management is defined as *"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"* (Healy and Wahlen 1999, page 368).

prevalence of accounting numbers in executive compensation contracts (Bushman and Smith 2001b). As cited in Bushman and Smith (2001b), Murphy (2000) shows that 91% of a sample of 177 firms uses accounting measures in the executive compensation schemes, and *"out of 68 firms that use single performance measure in their annual bonus plan, 65 use a measure of accounting profits"* (Bushman and Smith 2001b, page 50). In addition, Ittner, Larcker and Rajan (1997) finds that 312 out of 317 firms use at least one accounting or financial ratios as a performance measure in the executive bonus contracts (Ittner *et al.* 1997 cited in Bushman and Smith 2001b). These financial ratios include earnings per share (EPS), Net Income, Operating Income before Tax and Return on Equity (Ittner *et al.* 1997). Keating (1997) also find that accounting metrics are more important and more frequently used in evaluating managers' performance when the manager has greater impact over the firm and its divisions.

However, enhancing executive compensation is not the only incentive for managers to conduct earnings management. Healy and Wahlen (1999) conclude that managers also manipulate earnings when they want *"to window dress financial statements prior to public securities offerings, to increase corporate managers' compensation and job security, to avoid violating lending contracts, or to reduce regulatory costs or to increase regulatory benefits"* (Healy and Wahlen 1999, page 367).

For example, earnings management enables corporate managers to inflate security prices prior to public offerings. Teoh, Welch and Wong (1998a) find that issuers of initial public offerings (IPO) who report aggressive earnings have higher short term stock returns but poorer long term stock returns post IPO compared to issuers that report more conservatively. The same results also apply to seasoned equity offerings (SEO) (Teoh, Welch and Wong 1998b). Results in these two studies imply that managers tend to inflate securities prices prior to equity offerings by managing earnings upwards.

Further, the next motivation for earnings management is to secure executive employment. Previous studies found that managers are more likely to be dismissed if they perform poorly. For instance, Weisbach (1988) finds that poor performance increases the likelihood of CEO turnover, and the likelihood is higher when the issuer's board of directors is more independent. In the context of UK firms, Hillier, Linn and McColgan (2005) find that forced CEO turnover is more likely in poorly performing companies when firms undertake equity offerings. Kaplan (1995) and Kang and Shivdasani (1995) document similar results for German and Japanese companies that CEO turnover rates increase in poorly performing companies. Therefore managing firm performance upwards enables corporate managers to reduce the likelihood of being dismissed.

Managing earnings also enables managers to avoid violating lending contracts. Previous research finds that managers intend to avoid violating future debt-covenants by choosing income increasing earnings management strategy (Healy and Wahlen 1999). Further, both DeFond and Jiambalvo (1994) and Sweeney (1994) show that corporate managers choose income increasing accounting procedures when their firms are close to debt covenant violation.

In addition, avoiding potential regulatory costs also motivates managers to manipulate earnings. Cahan (1992) investigates earnings management activities during the monopoly related anti-trust investigation, and finds that managers tend to manipulate earnings downwards to avoid being prosecuted for anti-trust violation. Similar results are provided in Jones (1991) that corporate managers tend to manage earnings downwards during the import relief investigations.

In sum, the principal-agent model suggests linking executive pay with firm performance to motivate corporate managers to maximise shareholder wealth. However, the second order effect of this pay-performance relation is that executives may conduct accounting manipulation to influence firm performance

and their compensation. Besides, to inflate share prices prior to equity offerings, to secure job positions, to avoid lending contract violations, and to avoid being prosecuted during specific regulatory investigations are other motivations for executives to conduct financial malpractices (Healy and Wahlen 1999).

2.2 Can External Auditors Constrain Financial Malpractices and Reduce Agency Costs?

To constrain the agents from earnings management and financial fraud, the principal need to appoint independent external auditors to testify his firm's financial reports (Jensen and Meckling 1976, Watts and Zimmerman 1983). The principal-agent model predicts that appointing an independent external auditor to certify financial reports can improve financial reporting quality and reduce information asymmetries (Watkins, Hillison and Morecroft 2004). Auditors can issue qualified opinions to firms who have aggressive accounting policies. For example, Francis and Krishnan (1999) find that auditors are conservative in issuing clean opinions to high-accrual firms, where they are more likely to issue modified opinions to these firms. Bartov, Gul and Tsui (2000) compare earnings management activities of firms that receive qualified opinions to firms that receive clean opinions from their auditors. They find the likelihoods of a client receiving an audit qualification increase with the level of earnings management.

The principal-agent model also suggests that appointing an independent external auditor can reduce agency costs. Blackwell, Noland and Winters (1998) examine the differences in the cost of debt capital between firms that hire auditors (or "audited firms" hereafter) to firms that do not hire auditors (or "non-audited firms" hereafter). They find that audited firms pay lower interest rates to their lenders than non-audited firms. This implicitly indicates that auditors reduce the firm's agency costs hence the total cost of capital.

Further, agency theory also suggests that greater agency costs would demand higher quality external audit (Watts and Zimmerman 1983, Watkins *et al.* 2004). However, audit quality varies from big auditors to small auditors because auditors have different incentives and different levels of independence[9] (DeAngelo 1981b, Watts and Zimmerman 1983). DeAngelo (1981b) argues that *"the larger the auditor as measured by number of clients, the less incentive the auditor has to behave opportunistically and the higher the perceived quality of the audit"* because bigger auditors have greater reputation costs (DeAngelo 1981b, page 184). In addition, Dopuch and Simunic (1982) argue that big auditors have more characteristics that directly associate with audit quality. For example, big auditors would have more *"specialized trainings and peer reviews, than do non-big auditors"* (Krishnan 2003, page 111). Therefore the auditor quality[10] differs according to the size of the accounting firm.

Previous studies have presented evidence of how big auditors differ from small auditors in reducing agency costs. Becker, Defond, Jiambalvo and Subramanyam (1998) examine the relationship between auditor quality and earnings management. Using discretionary accruals as the proxy for earnings management, they show that firms audited by brand name auditors have lower level of earnings management than firms audited by small auditors. Francis, Maydew and Sparks (1999) find similar results and show that firms audited by brand name auditors have lower level of discretionary accruals in their financial reports than firms audited by small auditors. In addition, Krishnan (2003) further examine the differences in information quality of discretionary accruals between big and non-big auditors. The results show that discretionary accruals are more informative for firms audited by brand name auditors.

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9 Big auditor is defined as big four (2002 onwards) or big five (1998-2002) or big eight (before 1998) auditors.

10 According to DeAngelo (1981b), auditor quality is defined as the *"market-assessed joint probability that a given auditor will both discover a breach in the client's accounting system and report the breach"* (DeAngelo 1981b, page 186).

There are also a number of studies presenting implicit evidence that brand name auditors are better at reducing agency costs. Pittman and Fortin (2004) and Mansi, Maxwell and Miller (2004) examine the relationship between auditor quality and the cost of debt. They argue that lenders would charge less for firms audited by brand name auditors because there are lower monitoring costs incurred. Further, Teoh and Wong (1993) examine the relationship between auditor quality and information quality. They argue that financial information audited by brand name auditors is more accurate and less noisy. This implies that there are lower agency costs incurred for firms which employed brand name auditors.

In sum, previous research shows that appointing an external auditor can constrain executives' ability in conducting accounting manipulations. Due to auditors' different reputation costs, expertise and incentives, auditor quality varies from firm to firm. In order to have higher quality monitoring, previous studies suggest employing a brand name auditor who is better at constraining executives from accounting manipulation and reducing agency costs.

2.3 What Influences Auditor Quality?

In this section I discuss possible factors that may influence auditor quality. Briefly, previous studies suggest that a) auditors' economic dependence on their clients; b) the auditor-client relationship; c) auditor's industry specialization; and d) the legal environment are the main determinants to auditor quality.

2.3.1 Economic Dependence

Auditors' economic dependence on their clients is mainly due to their need for audit fees and non-audit fees. One of the economic dependence examples is the

low-balling practice[11], which is perceived to impair auditor's independence (DeAngelo 1981a). DeAngelo (1981a) states that auditors lower their initial engagement price and compensate the sunk costs from *"client-specific quasi-rents"*[12] which would be earned in the future. Because there were sunk costs incurred in the initial engagement, incumbent auditors are *"locked"* to be economically dependent on their client's future quasi-rents. Therefore *"the optimal level of auditor independence is less than perfect independence"* (DeAngelo 1981a, page 126).

Previous studies find evidence of the low-balling phenomenon. Francis and Simon (1987) use a dummy variable to proxy for initial audit engagement in their audit pricing model. They find significant price cutting for the initial audit engagement. Baber, Brooks and Ricks (1987) find similar results in the public sector. Simon and Francis (1988) further examine the low-balling practice by using a larger sample with longer sample period. They find that low-balling practices exist for the first three years of audit engagement, and audit prices do not return to normal level until the fourth year. Specifically, audit fees are 25% lower than the normal level in the first year, and 15% lower in the second and third year (Simon and Francis 1988, Ettredge and Greenberg 1990).

Auditors' economic dependence on their clients not only reflects on audit services fees, but also non-audit fees. Debates about whether an auditor should provide non-audit services date back to the 1980s. Simunic (1984) argues that auditors would improve their audit efficiency in providing both audit and non-audit services because the knowledge spills over between the two services. If *"the production of auditing generates knowledge useful in MAS (Management Advice Services) production and/or the production of MAS reduces the marginal cost of auditing and audit*

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11 "Low balling" refers to the practice that auditors reduce the initial engagement audit price to their clients in order to obtain larger market shares (DeAngelo 1981a).

12 "Client-specific quasi-rents" refer to audit or non-audit services fees that auditors can receive from their clients (DeAngelo 1981a).

demand is relatively elastic" (Simunic 1984, page 698), then a positive relation between audit and non-audit fees would be observed. Both Simunic (1984) and Palmrose (1986) examine this relationship and provide evidence to support this argument. Davis, Ricchiute and Trompeter (1993) find similar results with Simunic (1984) and Palmrose (1986), but they interpret this relationship as auditors charging a premium for greater efforts exerted when they provide non-audit services to their clients.

However, it is also argued that when auditors provide both audit and non-audit services, it may create conflicts of interest because auditors may be reluctant to disclose inefficiency in their non-audit services (Simunic 1984). This indicates that the more non-audit services the auditor provides the less independent the auditor may be. There are a number of studies examining this argument but results are mixed.

On one hand, some studies find significant relations between non-audit services and impaired auditor independence. Frankel, Johnson and Nelson (2002) examine the relation between earnings management and non-audit fees. They find that clients paying more non-audit fees compromise their auditor's independence. Kinney, Palmrose and Scholz (2004) examine the relation between the likelihood of financial restatement and non-audit fees. They found that the more non-audit services provided by the auditor, the more likely it is that a firm would restate its financial accounts.

On the other hand, other studies could not find significant evidence that non-audit services impair auditor independence. Ashbaugh, LaFond and Mayhew (2003) replicate Frankel *et al.* (2002)'s study, and they further control for firm performance in measuring earnings management. In contrast to Frankel *et al.* (2002), they find that non-audit services do not affect auditor independence. In addition, DeFond, Raghunandan and Subramanyam (2002) examines the relation

between the propensity of client firms receiving going concern opinions and non-audit services. However, they find no evidence that non-audit services impair auditor independence.

2.3.2 Relationship Dependence

Besides economic dependence, the auditors' relationship with its clients and the clients' internal auditor may affect audit quality. For example, Felix, Gramling and Maletta (2001) find that the closer an auditor works with the clients' internal auditor, the more efficient the audit is. There are limited studies that directly examine the impact of the relationship between internal and external auditors on auditing quality. However, Elliott and Korpi (1978), Stein, Simunic and O Keefe (1994) and Felix, Gramling and Maletta (2001) suggest that the more internal auditors contribute to the financial audit, the less efforts are required by the external auditors to audit financial reports, and this would be reflected in audit fees. Although Stein *et al.* (1994) could not find evidence for this argument, both Elliott and Korpi (1978) and Felix *et al.* (2001) find that audit fees are significantly lower when internal auditors contribute more to the financial audit.

In contrast, Lennox (2005) and Menon and Williams (2004) suggest that the more affiliate auditors work with their clients, the less likely the auditor provides high quality audit. Menon and Williams (2004) find that if the clients' former audit partner[13] becomes the client's board director or executive officers, the firm is more likely to manipulate accounting information. Further, they find that these firms report larger discretionary accruals than other firms. Lennox (2005) also finds that firms with auditor affiliation have greater probabilities of receiving clean audit opinions than firms with no affiliation. This indicates that auditor-client affiliation impairs auditor quality.

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[13] Former audit partner is defined as a profession who engaged in the client's audit before.

2.3.3 Industry Specialization

Previous studies also suggest that industry specialization influences auditor quality. Craswell, Francis and Taylor (1995) argue that *"auditor industry specialization will lead to a higher level of audit assurance"* if the industry requires *"specialized contracts and accounting technologies"*, and this will be reflected in audit prices (Craswell *et al.* 1995, page 301). They present evidence that audit fees for industry specialists are significantly higher than non-specialist auditors. This supports the existence of industry specialization and implies a higher level of audit assurance for industry specialists. Ferguson, Francis and Stokes (2003) further examine this argument after the merger of some big auditors. Their findings suggest that auditor-mergers improve audit efficiency so that the costs of investments are partially offset by the benefits from economies of scale. Hence they find limited evidence of audit price premiums for industry specialization.

More recent research in this area examines whether auditor industry specialization improves financial reporting quality. These studies generally indicate that industry specialist auditors provide higher quality audit. For example, Owhoso, Messier and Lynch (2002) find that auditors work more efficiently in detecting errors within industries that they are specialized in. In addition, Balsam, Krishnan and Yang (2003) finds that industry specialist auditors improve financial reporting quality by constraining managers from earnings management. They also find that earnings response coefficients ("ERC" hereafter), which is a proxy for information quality, is greater for firms audited by industry specialists. Further, Dunn and Mayhew (2004) document evidence that specialist auditors assist their clients in enhancing financial disclosures quality. They find that financial disclosure quality for firms that employ industry specialist auditors is ranked higher by financial analysts.

2.3.4 Legal Environment and Litigation Costs

Previous studies assert that the legal environment will influence auditor quality. While auditing clients' financial statements, auditors would concern with potential legal liabilities when their clients go bankrupt (Lee and Mande 2003, Watkins *et al.* 2004). Under circumstances where auditors face higher probabilities of being sued, they are more likely to choose conservative accounting (DeFond and Subramanyam 1998). This indicates that auditors are more likely to enhance their clients' financial reporting standards within stricter legal environment.

Auditors also adjust their auditing standards according to their clients' litigation risk threat. DeFond and Subramanyam (1998) examine the changes of discretionary accruals when companies change their auditors. They found that auditors tend to adjust earnings downwards through income decreasing accruals in the last year they audit the client's financial reports, and these *"are concentrated among the sample partitions that are expected to pose the greatest client litigation risk threat to the auditor"* (DeFond and Subramanyam 1998, page 37). In addition, Lee and Mande (2003) examine auditors' impacts on earnings managements pre- and post Private Securities Litigation Reform Act of 1995 (PSLRA). The Act eliminated the *"joint and several liabilities"*[14] and abolishes the auditors' legal responsibilities. Lee and Mande (2003) find that income increasing discretionary accruals are significantly higher post PSLRA. This implies that a less strict legal environment allows auditors to lower their audit quality.

Other indirect evidence is documented in Seetharaman, Gul and Lynn (2002). Seetharaman *et al.* (2002) find that *"UK auditors charge higher fees for their*

[14] According to Lee and Mande (2003) and Watkins *et al.* (2004), prior to 1995, auditors may need to *"pay the entire amount of liabilities if their client was bankrupt"* even if the clients' investors think they are only responsible for a small fraction of the entire damage (Lee and Mande page 166, Watkins *et al.* 2004 page 94). However, after the Act was implemented, auditors are responsible for proportionate liabilities.

services when their clients access US, but not non-US, capital markets" (Seetharaman *et al.* , page 93). Their findings suggest that auditors account for litigation costs in the fees of audit services, and they will charge a risk premium in a stricter legal environment. Francis (1984) examine the low-balling practices in Australia, where audit fees are mandated to disclose to the public. However, they find no evidence that auditors conduct low balling practices in stricter legal environments. All these studies suggest that the legal environment affects the auditor's concerns of their legal liability and hence their efforts and quality in conducting audit.

2.3.5 Summary

In sum, both audit and non-audit services studies show that auditors tend to be economically dependent on their clients. Previous studies found that low-balling practices do exist for US companies. In addition, there is some evidence that non-audit service fees lower auditor independence. Both audit and non-audit fees studies indicate that auditors' independence is affected by the economic dependence on their clients. Besides, auditor-client affiliations may impair auditor independence as well, which in turn lower the audit quality. Previous studies also suggest that auditors invest a large amount of resources in improving their industry specializations, which in turn yield higher audit efficiency due to economies of scale. In addition, empirical evidence shows that industry specialist auditors are of higher quality in improving financial reporting standards. Finally, legal environment also impacts on auditor's accounting choice and auditing standard.

2.4 Can Audit Committee Constrain Accounting Manipulation?

The principal-agent model predicts that shareholders appoint a board of directors to monitor executives. *'The board of directors delegates some of its oversight responsibilities*

to the audit committee" due to the board's diverse responsibilities. (DeZoort *et al.* 2002, page 40). Delegating part of the responsibilities to the audit committee has two advantages for the board. According to Menon and Williams (1994), the first advantage is to improve the independence of the oversight body, where both internal and external auditors have to report to a group of directors who are independent from the firm's executives. The second is to improve board efficiency in monitoring corporate managers from earnings management, since *"adequate attention can be paid to the board functions of reviewing financial reporting policies and coordinating with auditors only if a subset of the board charges with these responsibilities"* (Merchant 1987 cited in Menon and Williams 1994, page 123).

The major responsibilities of the audit committee include overseeing financial reporting; internal controls to address key risks and auditor activity (DeZoort *et al.* 2002). After the Sarbanes-Oxley Act (SOX) was introduced, there are new responsibilities for audit committees. Brodsky, Baker, Grochowski and Huber (2003) state that post-SOX, *"the relationship between management and outside auditors is largely replaced by one between the audit committee and outside auditors. The audit committee now is directly responsible for the appointment, compensation, retention, and oversight of independent auditors, who report directly to the audit committee"* (Brodsky *et al.* 2003, page 1)[15].

This raises an empirical research question, "Is audit committee effective[16] in overseeing and preventing corporate executives from accounting anomalies". Previous studies generally find that audit committees are effective in constraining corporate managers from accounting manipulation. For example, a more

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[15] A detailed discussion of the rules regarding audit committee and financial reporting in the Sarbanes Oxley Act 2002 would be discussed in the Chapter 3.

[16] According to DeZoort et al. (2002), *"an effective audit committee has qualified members with the authority and resources to protect stakeholder interests by ensuring reliable financial reporting, internal controls, and risk management through its diligent oversight efforts"* (DeZoort et al. 2002, page 41).

qualified audit committee is more effective in reducing earnings management and the propensity of financial statement frauds and earnings restatements.

Previous studies mainly look at the impact of independence, financial expertise and activity of the audit committee on the monitoring functions, and these are discussed in the following sections.

2.4.1 Independence

A number of studies examine whether independent audit committees could constrain earnings management. Klein (2002a) argues that audit committees act as an arbiter between corporate managers and external auditors and *"weigh and broker divergent views of both parties to produce ultimately a balanced, more accurate report"* (Klein 2002a, page 378). Therefore a more independent audit committee would provide more objective views on the financial report. Klein (2002a) examines the relationship between audit committee independence and the magnitude of discretionary accruals, and finds that the two variables are negatively related. The findings also suggest that this relation is most profound when the board and audit committee compromise a majority of independent directors (Klein 2002a). Bedard, Chtourou and Courteau (2004) also investigates this relation, but they find that only an audit committee with 100% independence is sufficient in constraining earnings management (Bedard *et al.* 2004).

In addition, another group of audit committee studies examines whether independent audit committees could reduce the propensity of extreme accounting manipulation. For example, McMullen and Raghunandan (1996) compare audit committee characteristics between firms with financial reporting problems ("problem firms"[17] hereafter) to firms without financial reporting problems ("no-

[17] Problem firms are defined as firms with SEC enforcement action or material restatements of quarterly earnings in McMullen and Raghunandan (1996).

problem firms" hereafter). They find that audit committee independence is negatively related with financial misconducts. Specifically, 86% of no-problem firms have solely independent audit committee, where only 67% of problem firms have solely independent audit committee. However, using governance data after 2000, Agrawal and Chadha (2005) could not find significant relation between audit committee independence and financial reporting problems. This possibly reflects the decreasing marginal effect of audit committee independence post 1999, when the Blue Ribbon Commission recommendations in 1999 suggested audit committees should be composed of solely independent directors. Moreover, controlling for audit committee activity, Abbott *et al.* (2004) find that firms with independent audit committee have lower chances to restate their financial statements.

Other studies investigate the dynamics between audit committees and external auditors. Carcello and Neal (2000) examine the probability of auditors issuing going-concern opinions to a sample of financially distressed companies conditional on audit committee characteristics. They find that firms with higher proportion of affiliate directors on the audit committee are less likely to receive going-concern opinions from their auditors. They explain that independent audit committees could mitigate management pressure on auditors which allows auditors to provide objective opinions on the financial reports (Carcello and Neal 2000). Carcello and Neal (2003a) further examine if independent audit committee can shield auditors from being dismissed if they issue going-concern opinions to their clients. They show that more independent and expert audit committees are more effective in shielding auditors from dismissal (Carcello and Neal 2003a). Their results are consistent with Archambeault and DeZoort (2001)'s findings that companies with *"suspicious auditor switches"* have a less independent audit committee. Moreover, Abbott and Parker (2000) find independent audit committees are more likely to appoint industry specialist auditors.

2.4.2 Expertise and Activity

A growing body of literature suggests all or at least one of the audit committee members should be financially literate (Cohen, Krishnamoorthy and Wright 2004b, DeZoort *et al.* 2002, DeFond and Francis 2005). SOX also requires that issuers should disclose whether their audit committees have at least one member that is financially expert (SEC 2002j)[18]. The primary reason for including a financial expert is that it improves the committee's efficiency in evaluating the quality of financial accounts and discovering errors and manipulation in financial reporting. McDaniel, Martin, Maines and Peecher (2002) examine the differences in evaluating financial reporting quality between financial experts and financial literate. They find that financial experts concentrate more on the underlying quality of financial reports, but financial literates pay more attention to reporting treatments for business activities that are prominent in business press (McDaniel *et al.* 2002). They suggest including a financial expert to the audit committee would change the focus of the committee and therefore affect financial reporting quality (McDaniel *et al.* 2002).

Prior literature provides empirical evidence to support that audit committee expertise is positively related to financial reporting quality and firm performance. Xie, Davidson and DaDalt (2003) and Bedard *et al.* (2004) examine whether including a financial expert in the audit committee constrains earnings management. They argue that audit committees with financial experts are more likely to support external auditors in the disputes with management (DeZoort and Steven 2001), and focus on concerns that are critical to financial reporting quality (Bedard *et al.* 2004, McDaniel *et al.* 2002). Therefore a more expert audit committee is more likely to improve financial reporting quality. Consistent with their arguments, they found that audit committees that include financial experts

[18] SEC is the short form of the U.S. Securities and Exchange Commission

have lower level of earnings management, which in turn indicates a higher level of financial reporting quality.

Moreover, Agrawal and Chadha (2005) find that audit committees which include independent financial experts are less likely to restate financial statements. DeFond *et al.* (2005) examine the stock market reaction to the appointment of financial experts to audit committees. They find that the market reacts positively to the appointments of the financial expert. This suggests the market believes that financial experts add value to the firm.

Literature on audit committee activity argues that an audit committee would be dysfunctional if they lack in diligence (DeZoort *et al.* 2002, Cohen *et al.* 2004b, DeFond and Francis 2005). Research in this area in general suggests audit committees become more effective if the committee is more active. For example, Abbott *et al.* (2004) find that audit committees are less likely to be sanctioned by the SEC if they meet at least twice a year. Abbott and Parker (2000) find that committees that meet at least twice a year are more likely to appoint brand name auditors who show higher audit quality. In addition, Abbott *et al.* (2004) also find that audit committee activity is significantly negatively related to earnings restatement. However, Bedard *et al.* (2004) examine whether audit committees that meet at least twice a year could constrain earnings management activities, but they do not find any significant relation.

2.4.3 Summary

Overall, previous audit committee research examines whether increasing audit committee independence, financial expertise and diligence could mitigate agency costs and constrains accounting manipulation. The results are in general consistent with the SEC expectations that a more qualified audit committee is more effective in constraining accounting manipulation.

2.5 Conclusions

This chapter starts with reviewing literature on executives' incentives of accounting manipulation. Using the principal-agent model, previous studies state that although corporate shareholders try to incentivize managers to maximise firm value by linking executive pay to firm performance, managers still have other incentives of financial misconducts. Enhancing executives' compensations, inflating stock prices, securing job positions, avoiding lending contracts violations and avoiding potential litigious costs are motivations that executives have accounting manipulation.

To reduce the above agency costs, corporate directors appoint external auditors and audit committee to monitor managers and prevent them from window dressing. I then review literature on the impact of external auditors and audit committees on overseeing corporate managers respectively. Previous studies in general suggest that external auditors are effective in constraining mangers from accounting manipulation, especially brand name auditors. However, there are several factors that might affect the quality of external auditors. These factors include the low-balling practices, the provision of non-audit services, affiliation between auditors and clients, industry specialization and the legal environment.

I further review literature on audit committee effectiveness, and examine whether audit committees are effective in monitoring corporate managers. Prior literature mainly focuses on examining the relation between characteristics of the audit committee and accounting anomalies. The results generally suggest that audit committees are effective in overseeing corporate managers and preventing them from earnings management. Specifically, committees that are more independent, with more expertise and are more active can better constrain

managers from earnings management, and reduce the propensity of earnings restatement and financial fraud.

In the next Chapter, I will discuss the provisions in the Sarbanes-Oxley Act 2002 with respect to changes in corporate governance, and its impacts on listed companies after the Act was introduced.

3

EVALUATING CORPORATE GOVERNANCE MANDATES IN THE SARBANES-OXLEY ACT 2002

"The Sarbanes-Oxley (SOX) Act of 2002, in which Congress introduced a series of corporate governance initiatives into the federal securities laws, is not just a considerable change in law, but also a departure in the mode of regulation. The federal regime had until then consisted primarily of disclosure requirements rather than substantive corporate governance mandates, which were traditionally left to state corporate law" (Romano 2005, page 1523).

The Sarbanes-Oxley Act 2002 (SOX or the "Act" hereafter) has brought in several new mandates aimed at improving corporate financial reporting quality. These includes provisions that enhance internal control over financial reporting (Section 404), auditor independence (Section 201 and 203), audit committee effectiveness (Section 202, 204, 301 and 407), and corporate executives' and directors' litigation costs (Section 302, 807, and 906). This chapter discusses the above provisions and their impacts on U.S. issuers post-SOX.

3.1 Key Provisions of the Sarbanes-Oxley Act 2002

The Sarbanes-Oxley Act 2002 was introduced in 2002 in response to a number of accounting scandals in the United States. It was formed by reconciling the Representative Michael G. Oxley's bill (H.R. 3763) and the Senator Paul Sarbanes's bill (S. 2673) by a Conference Committee, that was formed by the United State House of Representatives (the House) and the United State Senate (the Senate) (Zhang 2007). The final bill was approved by the Conference Committee on 24th July 2002 and named as "the Sarbanes-Oxley Act 2002". It was later signed by President George W. Bush on 30th July 2002 (Zhang 2007).

SOX applies to issuers that:

1) *"have registered securities under the U.S. Securities Exchange Act of 1934 (1934 Act)"*;

2) *"are required to file reports under Section 15 (d) of the 1934 Act"*; and

3) *"have filed a registration statement under the U.S. Securities Act 1933 (1933 Act)"* (Cohen and Qaimmaqami 2005).

It includes mandates that aim at improving financial reporting quality under eleven titles, which are listed as follows:

1) Title I - "Public Company Accounting Oversight Board (PCAOB)";

2) Title II - "Auditor Independence";

3) Title III - "Corporate Responsibility";

4) Title IV - "Enhanced Financial Disclosures";

5) Title V - "Analyst Conflicts of Interest";

6) Title VI - "Commission Resources and Authority";

7) Title VII - "Studies and Reports";

8) Title VIII - "Corporate and Criminal Fraud Accountability";

9) Title IX - "White Collar Crime Penalty Enhancement";

10) Title X - "Corporate Tax Returns"; and

11) Title XI - "Corporate Fraud Accountability"[19].

The key provisions that relate to corporate governance are under Title II, III and IV. Specifically, mandates under Title II ("Auditor Independence") aim to impose requirements on external auditors to increase their independence from corporate managers, and limit conflicts of interest that arise from providing different services to the companies. It also establishes requirements for the audit committee to approve audit and non audit services. Provisions that relate to corporate governance include Section 201, 202, 203 and 204. Section 201 regulates the type of "services outside the scope of practice of auditors" (SEC 2002c), such as management consultancy. Section 202 requires audit committees to pre-approve services provided by auditors. Section 203 regulates the incumbent auditors' tenure, and Section 204 requires auditors to provide timely reports to the audit committee regarding material accounting policy and treatment.

19 Sarbanes Oxley Act 2002 Sections, available at:
http://www.sarbanes-oxley.com/section.php?level=1&pub_id=Sarbanes-Oxley

Mandates under Title III ("Corporate Responsibility") imposed requirements on the responsibilities of corporate officers to ensure financial reporting accuracy and validity. It also imposed requirements on the interaction between corporate audit committees and its external auditors. Sections that relate to corporate governance include Section 301 and 302. Section 301 imposes requirements on the compositions of issuers' audit committee and defines the term "independence" in the Act. Section 302 requires corporate executives to approve and certify the integrity of the annual or quarterly reports (Romano 2005).

Mandates under Title IV ("Enhanced Financial Disclosures") impose requirements that aim to enhance financial disclosure and internal control within the firm. Sections that relate to corporate governance include Section 404 and 407. Section 404 has requirements on internal control over financial reporting, while Section 407 requires the issuer to disclose whether they have a financial expert on the audit committee.

In addition, mandates under Title VIII ("Corporate and Criminal Fraud Accountability"), Title IX ("White Collar Crime Penalty Enhancement") and Title XI ("Corporate Fraud Accountability") are important in improving corporate governance. Sections under these three titles address criminal penalties for corporate managers who undertake financial fraud. These mandates therefore may make corporate managers more risk-averse post-SOX. Provisions that are discussed in the thesis include Section 302, Section 807 and Section 906.

The next section discusses the above provisions and their impact on U.S. issuers post-SOX.

3.2 Evaluating SOX Provisions

There is a growing literature discussing the benefits and costs of SOX. Li, Pincus and Rego (2008) and Jain and Rezaee (2006) find the SOX added firm value to issuers, whereas Zhang (2007) and Chhaochharia and Grinstein (2007) find that the Act brought negative effects to listed companies. In addition, Leuz, Triantis and Wang (2008) and Engel, Hayes and Wang (2007) find that more issuers, especially smaller issuers, chose to go-dark or go-private post-SOX, which suggests that some companies tried to avoid the heavy compliance costs of the Act.

This section evaluates main provisions that would increase compliance costs as well as provisions that add value to issuers. The SOX provisions would be discussed within four domains, which are first, internal control over financial reporting; secondly, auditor independence; thirdly, audit committee effectiveness and finally executives' and directors' litigation costs.

3.2.1 Section 404 – Internal Control over Financial Reporting

Section 404 of SOX is perceived to be the most costly provision for listed companies to comply with. It requires the issuer to provide an internal control report in their annual/quarterly financial reports (Cohen and Qaimmaqami 2005). Specifically, it is required that the internal control report:

> *"(a) RULES REQUIRED- The Commission shall prescribe rules requiring each annual report required by section 13 of the Securities Exchange Act of 1934 (15 U.S.C. 78m) to contain an internal control report, which shall-*

(1) state the responsibility of management for establishing and maintaining an adequate internal control structure and procedures for financial reporting; and

(2) contain an assessment, as of the end of the most recent fiscal year of the issuer, of the effectiveness of the internal control structure and procedures of the issuer for financial reporting.

(b) INTERNAL CONTROL EVALUATION AND REPORTING- With respect to the internal control assessment required by subsection (a), 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"[20] (SEC 2002i).

In the managements' annual assessment report, managers must provide the following statements and assessments on internal control for financial reporting:

"A statement of management's responsibility for establishing and maintaining adequate internal control over financial reporting;

A statement identifying the framework used by management to evaluate the effectiveness of the issuer's internal control over financial reporting;

Management's assessment of the effectiveness of the issuer's internal control over financial reporting as of the end of the most recent fiscal year, including a statement as to whether or not the issuer's internal control over financial reporting is effective.

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[20] The discussion presented in Italic in this chapter is taken directly from the Sarbanes Oxley Act and the SEC, so the section and subsection notations follow the original text.

> *The statement must also include disclosure of any material weakness in the issuer's internal control over financial reporting identified by management. Management is not permitted to conclude that the issuer's internal control over financial reporting is effective if there are one or more material weaknesses in internal control;*
>
> *A statement that the independent auditor that audited the financial statements included in the annual report has issued an attestation report on management's assessment of the issuer's internal control over financial reporting (the independent auditor's attestation report must also be provided in the annual report)"* (SEC 2002b).

Section 404 is argued to be the most costly provision because it enforces issuers to exert internal and external resources to prepare periodic financial statements (SEC 2002b). The SEC estimated that the compliance costs of Section 404 would be $91,000 per company (SEC 2002b). However, A.R.C. Morgan[21] reported that the actual compliance costs ranged from USD 1.56 million to USD 10 million (A.R.C. Morgan 2005). This is consistent with findings of the Financial Executive Institute (FEI) survey 2004 (FEI 2004), where the compliance costs reported by the A.R.C. Morgan and the FEI were much higher than the SEC estimates. Detailed disclosed compliance fees are listed in Table 3-1[22].

According to a survey from PricewaterhouseCoopers ("PWC" hereafter), executives estimate that 76% of these compliance costs are from internal resources whereas the remaining 24% are from external assistance (PWC 2003). The survey also asserts that these costs mainly come from *"documentation (which is mentioned by 74% of executives), legal requirements (72%), detailed policy development (65%),*

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21 A.R.C. Morgan is a company which provided reports that investigates issuers' compliance costs of SOX Section 404.

22 Table 3-1 is directly taken from A.R.C. Morgan (2005)

self-assessment (62%), attesting requirements and certifications (59%), staff training (56%), and cost of new tools and technology (41%)" (PWC 2003, page 2).

Table 3-1 Disclosed compliance fees by company size

Average Company Annual Sales in US$	**Average Cost of Section 404 Compliance for External Resources only**
0 – 250 Million	US$ 1.56 million
250 – 500 Million	US$ 1.71 million
500 – 750 Million	US$ 1.78 million
750 – 1 Billion	US$ 2.03 million
1 – 2 Billion	US$ 2.4 million
2 – 7 Billion	Insufficient data
7 - 10 Billion	US$ 10 million

Source: A.R.C. Morgan, Sarbanes-Oxley Implementation Costs, What companies are reporting in their SEC Filings, February 2005

Compliance of Section 404 is perceived to be more costly for small companies. According to the SEC, small size companies have *"more limited resources, fewer internal personnel and less revenue with which to offset both implementation costs and the disproportionate fixed costs of Section 404 compliance"* (SEC 2006). In addition, small size companies also face problems such as lacking clear guidance on Section 404 compliance, unfamiliarity with regulatory environment and a lack of sufficient resources and competencies in areas that the company did not emphasize before (SEC 2006). These problems are perceived to burden small companies. Moreover, since small size companies *"rely to a greater degree on the tone at the top to facilitate accurate financial reporting"* (SEC 2006), improving corporate internal control add less value to these firms compared to larger companies. Concerning the marginal benefits of compliance, small size companies therefore are more likely to delist from the stock market after SOX (Leuz *et al.* 2008).

The FEI report also shows that Section 404 compliance costs fell after the initial implementation. The FEI 2006 survey found that the average SOX 404

compliance costs in 2005 was 3.8 million, a decrease of 16.3% in 2004 (FEI 2006). Specifically, internal staff time decreased by 11.8%, external costs dropped by 22.7% and the auditor attestation costs dropped by 13%. The compliance costs went further down in 2006, where the average compliance costs were 2.9 million, a decrease of 23.2% from the previous year (FEI 2007).

In sum, this section discusses provisions that relate to corporate internal control, especially Section 404, and their impact on issuers. This section reports that Section 404 of the Act caused issuers to allocate a higher proportion of resources to enhance its internal control functions immediately after SOX. This in turn costs issuers millions of dollars to comply with the rules especially more costly to small firms. However, the compliance costs have started to decrease from the second year and this trend continued in subsequent years.

3.2.2 Section 201 and 203 – Auditor Independence

Sections 201 and 203 are provisions that aim at improving auditor independence. Since non audit services are perceived to impair auditor independence, Section 201 prohibits 9 categories of non-audit services. These services include:

> *"(1) bookkeeping or other services related to the accounting records or financial statements of the audit client;*
>
> *(2) financial information systems design and implementation;*
>
> *(3) appraisal or valuation services, fairness opinions, or contribution-in-kind reports;*
>
> *(4) actuarial services;*
>
> *(5) internal audit outsourcing services;*
>
> *(6) management functions or human resources;*

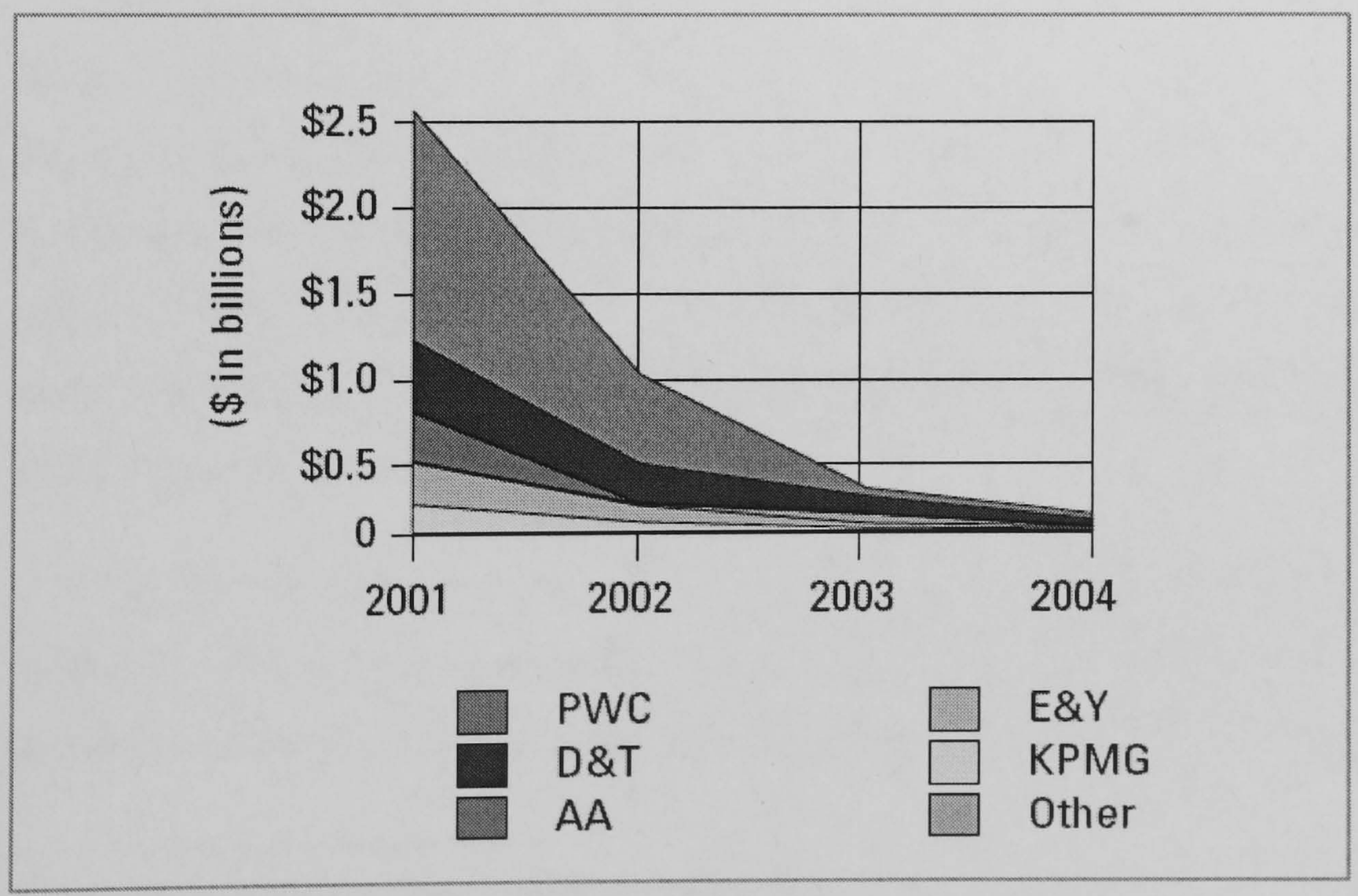
(7) broker or dealer, investment adviser, or investment banking services;

(8) legal services and expert services unrelated to the audit; and

(9) any other service that the Board determines, by regulation, is impermissible" (SEC 2002c).

Section 201 assumes that fees for the above 9 categories of non-audit services impair auditor independence. However, as discussed in Chapter 2, previous studies find mixed results for the impact of non-audit services on auditor independence. While some studies found that the level of non-audit services is significantly and positively related to auditor inefficiency (Frankel *et al.* 2002, Kinney *et al.* 2004), others found this relation not significant (Ashbaugh *et al.* 2003, DeFond *et al.* 2002). Therefore the introduction of Section 201 still lacks substantial empirical support.

Figure 3-1 "Non-audit services fees, which are classified as other fees in Ciesielski, J. T., and T. R. Weirich. 2006, from 2001 to 2004"



Source: Ciesielski, J. T., and T. R. Weirich. 2006. Ups and Downs of Audit Fees since the Sarbanes-Oxley Act: A Closer Look at the Effects of Compliance

One of the impacts of Section 201 is it caused substantial reduction in non-audit services provided by auditors. Ciesielski and Weirich (2006) investigate the changes of audit fees and non-audit fees from pre- to post-SOX. As shown in Figure 3-1[23], there was a significant drop of non-audit services after the Act was enacted. They found that non-audit services fees dropped from $2.3 billion in 2001 to about $100 million in 2004 (Ciesielski and Weirich 2006). These results are consistent with statistics reported in Table 4-5 in Chapter 4.

Since non-audit fees are one of the major revenues for auditors (Frankel *et al.* 2002, Kinney *et al.* 2004, Ashbaugh *et al.* 2003, DeFond *et al.* 2002), the substantial reduction of non-audit fees might incentivize auditors to increase audit fees to compensate for the loss in non-audit fees post-SOX. A number of studies find there was substantial increase in audit fees after SOX. For example, Asthana, Balsam and Kim (2004), Eldridge and Kealey (2005) and Ciesielski and Weirich (2006) all find that audit fees increase substantially after SOX.

One possible reason that audit fees increased post-SOX might be that Section 404 increased audit hours. Section 404 requires an attestation of audit report on the internal control of the firm. In addition, the Public Company Accounting Oversight Board ("PACOB" hereafter) requires the internal control audit to follow Auditing Standard No.2. These requirements would increase the audit hours and hence audit fees because audit efforts are the main determinants of audit prices (Simunic 1980).

Another possible reason might be that auditors try to compensate the loss of non-audit services by increasing audit fees. Table 3-2[24] and statistics in Table 4-5 in Chapter 4 discover that, the total fees (audit fees plus non-audit fees) did not

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[23] Figure 3-1 is directly taken from Ciesielski and Weirich (2006).

[24] Table 3-2 is directly taken from Ciesielski and Weirich (2006).

change greatly from pre- to post-SOX. Since total fees did not change greatly but audit fees increased substantially from pre- to post-SOX, it indicates auditors' intended to increase audit fees to compensate the reduced revenues from non-audit services.

Table 3-2 Total fees to auditors from 2001 to 2004

($ in millions)	2001	2002		2003		2004	
AA	$ 575.2	$ -	N/A	$ -	N/A	$ -	N/A
D&T	$ 876.8	$ 927.7	5.8%	$ 920.8	-0.7%	$ 1,130.0	22.7%
E&Y	$ 754.2	$ 912.5	21.0%	$ 899.5	-1.4%	$ 1,088.0	21.0%
KPMG	$ 444.1	$ 520.2	17.1%	$ 584.0	12.3%	$ 754.5	29.2%
PWC	$ 2,175.2	$ 1,727.8	-20.6%	$ 1,468.9	-15.0%	$ 1,842.7	25.4%
Other	$ 18.6	$ 168.2	804.3%	$ 143.8	-14.5%	$ 97.1	-32.5%
AA: Arthur Andersen LLP; D&T: Deloitte & Touche; E&Y: Ernst & Young; PWC: PricewaterhouseCoopers							

Source: Ciesielski, J. T., and T. R. Weirich. (2006). Ups and Downs of Audit Fees since the Sarbanes-Oxley Act: A Closer Look at the Effects of Compliance

Section 203 requires that issuers have to change other public accounting firms to audit their financial reports in each of the 5 previous years. The detailed mandate is as follows:

> *"(j) AUDIT PARTNER ROTATION- It shall be unlawful for a registered public accounting firm to provide audit services to an issuer if the lead audit partner (having primary responsibility for the audit) or the audit partner responsible for reviewing the audit that is assigned to perform those audit services has performed audit services for that issuer in each of the 5 previous fiscal years of that issuer"* (SEC 2002e).

Previous studies argue that auditor tenure might impair auditor independence. One argument is if the auditor expects longer audit tenure, they would charge a lower initial engagement price. Auditors then become more economically dependent on their clients because they have to recover the sunk costs (DeAngelo, L. E. 1981a). Therefore Section 203 intends to shorten the auditors' tenure and hence indirectly reduce low-balling practices and improve auditor independence.

In sum, this section discusses provisions that relate to auditor independence, which include Section 201 and 203. Section 201 prohibits auditors from providing certain types of non-audit services, whereas Section 203 requires issuers to change principle auditors every five years. Previous empirical studies find that non-audit service fees decreased substantially post-SOX. However, statistics show that auditors increased audit service fees post-SOX in order to compensate the greater efforts required by the Section 404 and/or the reduction in non-audit fees required by the Section 201.

3.2.3 Section 202, 204, 301 and 407 – Audit Committee Effectiveness

Section 202, 204, 301 and 407 of the Act collectively regulate the requirements of the issuers' audit committee composition and its interaction with external auditors. These sections mainly extend or amend Rule 10A of the US Securities Exchange Act of 1934 (the "Exchange Act" or "1934 Act" hereafter). Section 301 and 407 regulate the composition and responsibilities of the audit committee while Section 202 and 204 regulate activities and the interaction between audit committee and the external auditor.

Section 301 adds the following to the Rule 10A of the Exchange Act:

> *"(A) IN GENERAL- Each member of the audit committee of the issuer shall be a member of the board of directors of the issuer, and shall otherwise be independent.*
>
> *(B) CRITERIA- In order to be considered to be independent for purposes of this paragraph, a member of an audit committee of an issuer may not, other than in his or her capacity as a member of the audit committee, the board of directors, or any other board committee--*
>
> *(i) accept any consulting, advisory, or other compensatory fee from the issuer; or*

(ii) be an affiliated person of the issuer or any subsidiary thereof.

(C) EXEMPTION AUTHORITY- The Commission may exempt from the requirements of subparagraph (B) a particular relationship with respect to audit committee members, as the Commission determines appropriate in light of the circumstances" (SEC 2002g).

These additional requirements further ensure audit committee independence which in turn should enhance financial reporting standards (Klein 2002a, Abbott, Park and Parker 2000, Carcello and Neal 2003b). As reported in Chapter 2, a number of studies have found that more independent audit committees are more capable in reducing earnings management (Klein 2002a, Bedard *et al.* 2004) and accounting manipulation (Carcello and Neal 2000, Carcello and Neal 2003a). Section 301 therefore prevents issuers from having affiliate directors on the audit committee and hence forces issuers to have a totally independent audit committee.

The second issue in improving audit committee quality is about to increase the number of financial and accounting expert on the audit committee. The financial scandals in 2002 have awakened investors and regulators to the importance of financial experts in protecting shareholders' interests. In response to these accounting scandals, the SEC introduced Section 407, which requires disclosure of a company's audit committee financial expertise.

In particular, the final rule of Section 407 defines the term financial expert as follows:

"(b) CONSIDERATIONS- In defining the term `financial expert' for purposes of subsection (a), the Commission shall consider whether a person has, through education and experience as a public accountant or auditor or a principal

financial officer, comptroller, or principal accounting officer of an issuer, or from a position involving the performance of similar functions -

(1) an understanding of generally accepted accounting principles and financial statements;

(2) experience in -

(A) the preparation or auditing of financial statements of generally comparable issuers; and

(B) the application of such principles in connection with the accounting for estimates, accruals, and reserves;

(3) experience with internal accounting controls; and

(4) an understanding of audit committee functions. "(SEC 2002j).

There are a number of concerns in employing financial experts to the audit committee and the impact that will have on disclosure. First, is including a financial expert beneficial to investors? There would be a trade-off between improved financial reporting quality and increased costs of auditing and regulatory compliance. For example, concerned with their reputation, a financial expert may require the issuer to appoint a brand name auditor to perform the audit. This would in turn increase the accuracy and standard of financial reports and reduce litigation risks, but it would also incur higher audit fees in employing a brand name auditor.

Secondly, would there be a negative impact on share prices if the issuer discloses that its audit committee does not include a financial expert? If disclosure of financial experts signals to investors that the company's financial reporting standards are higher, investor may downgrade the credibility of financial reports

of issuers that do not disclose or do not have financial expert on their audit committees. The stock market may therefore response less favourably to issuers who do not disclose or do not have financial expert on their audit committee. DeFond *et al.* (2005) find some evidence to support this argument. They find that the stock market responded favourably to issuers who announced they employed a new financial expert to the audit committee.

The third concern is that there might not be sufficient supply of financial experts in the labour market because first, being a financial expert requires specialist knowledge and secondly, the potential high litigation costs of SOX may prevent financial experts from voluntarily joining the audit committee. Deloitte (2003) investigated issuers' disclosure practices after the Act was implemented. The report shows that of those companies that have at least one financial expert, only half of them decided to disclose all financial experts' name to the public. Carcello, Hollingsworth and Neal (2006b) find similar results and suggest that companies are conservative in disclosing full information of financial experts in their audit committees. These findings imply that being a financial expert on the audit committee is perceived to incur high litigation costs, because financial experts may receive more attention from investors if regulators once financial fraud occurs[25].

Section 301 also has the following requirements for the audit committee's responsibilities, complaints procedure and its authority to engage independent advisors:

> *"(2) RESPONSIBILITIES RELATING TO REGISTERED PUBLIC ACCOUNTING FIRMS- The audit committee of each issuer, in its capacity*

[25] Other concerns also include the impact of Director and Officer Insurance (D&O Insurance) on mitigating directors' litigation risk, where this would increase the likelihood of successful appointment of a financial expert to the audit committee in the post SOX era.

as a committee of the board of directors, shall be directly responsible for the appointment, compensation, and oversight of the work of any registered public accounting firm employed by that issuer (including resolution of disagreements between management and the auditor regarding financial reporting) for the purpose of preparing or issuing an audit report or related work, and each such registered public accounting firm shall report directly to the audit committee.

(4) COMPLAINTS- Each audit committee shall establish procedures for -

(A) the receipt, retention, and treatment of complaints received by the issuer regarding accounting, internal accounting controls, or auditing matters; and

(B) the confidential, anonymous submission by employees of the issuer of concerns regarding questionable accounting or auditing matters.

(5) AUTHORITY TO ENGAGE ADVISERS- Each audit committee shall have the authority to engage independent counsel and other advisers, as it determines necessary to carry out its duties" (SEC 2002g).

Since non-audit services provided by auditors may impair the auditors' independence, Section 202 has the following requirements for the pre-approvals of audit and non-audit services by the audit committee.

"(A) AUDIT COMMITTEE ACTION- All auditing services (which may entail providing comfort letters in connection with securities underwritings) and non-audit services, other than as provided in subparagraph (B), provided to an issuer by the auditor of the issuer shall be preapproved by the audit committee of the issuer" (SEC 2002d).

In addition, Section 204 requires external auditors to provide timely report to the audit committee for any critical and/or material accounting policies and treatments:

> *"(k) REPORTS TO AUDIT COMMITTEES- Each registered public accounting firm that performs for any issuer any audit required by this title shall timely report to the audit committee of the issuer--*
>
> *(1) all critical accounting policies and practices to be used;*
>
> *(2) all alternative treatments of financial information within generally accepted accounting principles that have been discussed with management officials of the issuer, ramifications of the use of such alternative disclosures and treatments, and the treatment preferred by the registered public accounting firm; and*
>
> *(3) other material written communications between the registered public accounting firm and the management of the issuer, such as any management letter or schedule of unadjusted differences"* (SEC 2002f).

Section 301, 202 and 204 all aim to increase the issuer's audit committee's responsibilities, authorities and its interaction and communications with external auditors. This in turn will increase the workload of audit committees. Deloitte (2003) shows that the majority of audit committees met 8 to 9 times per year after the Act was implemented. This was twice as many times pre-SOX, where audit committees met only 4 to 5 times per year. Linck, Netter and Yang (2008) find similar results showing that the number of audit committee meetings doubled from 3-4 times per year in 2001 to 5-8 times per year in 2004. These results are consistent with statistics in Table 4-8 of Chapter 4[26].

[26] Table 4-8 in Chapter 4 also shows that after SOX was enacted, the number of audit committees meetings increased to nearly twice as many as pre-SOX.

This section summarises SOX requirements that aim at improving audit committee effectiveness. Section 301 imposed requirements of the composition, responsibilities and authority of the audit committee, whereas Section 407 sets requirements regarding disclosure of audit committee financial expertise. Section 202 and Section 204 have rules regarding the interaction between audit committees and external auditors. Results of previous research show that the marginal impact of audit committee independence decreased post 1999. In addition, companies were reluctant to disclose information of all financial experts on the audit committee due to concerns of greater potential litigation costs. Further, the more responsibilities imposed by Section 202 and Section 204 has made audit committees increase their workload post-SOX, where post-SOX audit committees hold twice as many meetings as pre-SOX.

3.2.4 Section 302, 807, and 906 – Increased Criminal Penalties

Section 302 and 906 are provisions that mandate corporate executives' responsibilities and/or the criminal penalties to corporate managers if financial frauds occur. Section 302 of the Act increases corporate executives' responsibilities in ensuring financial reporting quality. It has the following requirements:

> *"(a) REGULATIONS REQUIRED. - The Commission shall, by rule, require, for each company filing periodic reports under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m, 78o (d)), 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 report filed or submitted under either such section of such Act that -*
>
> *(1) the signing officer has reviewed the report;*

(2) based on the officer's knowledge, the report does not contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements made, in light of the circumstances under which such statements were made, not misleading;

(3) based on such officer's knowledge, the financial statements, and other financial information included in the report, fairly present in all material respects the financial condition and results of operations of the issuer as of, and for, the periods presented in the report;

(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, summarise, 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 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"* (SEC 2002h).

Section 906 has similar requirements. It *"added section 1350 to the U.S. federal criminal code"* (Cohen and Qaimmaqami 2004) and require that:

> *"(a) CERTIFICATION OF PERIODIC FINANCIAL REPORTS- Each periodic report containing financial statements filed by an issuer with the Securities Exchange Commission pursuant to section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a) or 78o(d)) shall be accompanied by a written statement by the chief executive officer and chief financial officer (or equivalent thereof) of the issuer.*
>
> *(b) CONTENT- The statement required under subsection (a) shall certify that the periodic report containing the financial statements fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C 78m or 78o(d) and that information contained in the periodic report fairly presents, in all material respects, the financial condition and results of operations of the issuer"* (SEC 2002l).

The difference between Section 302 and Section 906 is that Section 302 does not carry any criminal sanctions. According to Cohen and Qaimmaqami (2004) and Cohen and Qaimmaqami (2005), for Section 302, any *"false certifications are*

subject to SEC enforcement action for violating the Exchange Act and also possibly to both SEC and private litigation alleging violations of the anti-fraud provisions of the Exchange Act (e.g., Section 10 (b) of the Exchange Act)".

However, if Section 906 is violated, there would be criminal penalties to whomever:

> *"(1) certifies any statement as set forth in subsections (a) and (b) of this section knowing that the periodic report accompanying the statement does not comport with all the requirements set forth in this section shall be fined not more than $1,000,000 or imprisoned not more than 10 years, or both; or*
>
> *(2) wilfully certifies any statement as set forth in subsections (a) and (b) of this section knowing that the periodic report accompanying the statement does not comport with all the requirements set forth in this section shall be fined not more than $5,000,000, or imprisoned not more than 20 years, or both."* (SEC 2002l).

Moreover, Sections under Title VIII and Title XI have imposed criminal penalties to those who defraud shareholders. For example, Section 807 sets criminal penalties for defrauding shareholders of publicly traded companies against:

> *'Whoever knowingly executes, or attempts to execute, a scheme or artifice*
>
> *(1) to defraud any person in connection with any security of an issuer with a class of securities registered under section 12 of the Securities Exchange Act of 1934 (15 U.S.C. 78l) or that is required to file reports under section 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78o(d)); or*
>
> *(2) to obtain, by means of false or fraudulent pretences, representations, or promises, any money or property in connection with the purchase or sale of any security of an*

> *issuer with a class of securities registered under section 12 of the Securities Exchange Act of 1934 (15 U.S.C. 78l) or that is required to file reports under section 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78o (d)); shall be fined under this title, or imprisoned not more than 10 years, or both"* (SEC 2002k).

All of these sections aim to increase corporate executives' responsibilities and litigation costs, and reduce the possibilities of financial and accounting fraud. One possible result of these criminal sanctions is that corporate executives and board directors become more risk-averse in the post-SOX period (Cohen, Dey and Lys 2004a, Linck *et al.* 2008). In addition, this would increase the expenses of hiring corporate directors. Linck *et al.* (2008) show that average cash pay to corporate directors increased from $29,827 in 2001 to $37,500 in 2004, and equity-based pay increased from $31,927 in 2001 to $70,216 in 2004. The average increase of total pay to corporate directors from 2001 to 2004 is about 51.4%. These figures suggest that corporate directors might have become more risk-averse post-SOX and charge a premium for director fees due to increased litigation risk.

3.3 Conclusions

This chapter describes provisions in SOX that receive the most attention from the stock market. I start with evaluating Section 404 of SOX, which requires issuers to invest resources to improve the internal control functions over financial reporting. A number of studies in industry find that Section 404 has caused issuers to spend millions of dollars to comply with the rules. However, research also shows that from the second year after SOX was implemented,

Section 404 compliance costs started to decrease and this trend continued in the third and fourth year.

Section 202 and Section 203 set rules for the independence of external auditors. Section 202 prohibits auditors from providing several types of non-audit services to their clients while Section 203 does not allow issuers to employ accounting firms who was their principle auditor in the previous five years to audit their financial reports. The prohibition of non-audit services has caused substantial decrease of non-audit services after the Act was implemented. However, statistics show that external auditors tended to increase audit service fees to compensate the loss from the reduction of non-audit fees. This in turn caused the average total fees for audit and non-audit services to remain broadly similar from pre- to post-SOX.

Next Section 301, 407, 202 and 204 were discussed, which imposed requirements on the composition of the audit committee, the committee members' responsibilities and the committee's interaction and communication with the external auditor. Section 301 requires audit committees to be entirely composed of independent directors. Section 407 requires issuers to disclose whether they have a financial expert on the audit committee and if not, they should explain why. Section 202 requires the audit committee to pre-approve all audit and non-audit services, whereas Section 204 requires external auditors to provide timely reports of material accounting policy and treatment to the audit committee. Research shows that the marginal impact of audit committee independence decreased post 1999. In addition, issuers are reluctant to disclose full information in relation to their financial experts on the audit committee post-SOX. This is possibly because financial experts may concern that they have to bear greater responsibility once financial fraud occurs. The Act has also increased the workload of audit committees.

Finally I discuss the requirements that increase directors' responsibilities and potential litigation costs. Section 302 and Section 906 both require corporate executives to certify financial reports. However, Section 302 carries no criminal penalties whereas Section 906 does. In addition, sections under Title VIII, Title IX and Title XI also increase criminal penalties on corporate executives and directors if financial fraud occurs. These sections increase directors' responsibilities as well as the degree of directors' risk-aversion. As a result, the expense of hiring corporate directors has increased substantially post-SOX.

The next chapter will describe the process of constructing the sample for the analyses in this thesis. It will also provide descriptive statistics on the corporate governance variables, firm characteristics variables, and auditing and non-auditing services variables from 2001 to 2005.

4
DATA

This chapter describes the process of constructing the data sample for the empirical analysis in this thesis. It also provides descriptive statistics of the sample distributions, firm characteristics, governance structures and audit fees from 2001 to 2005. The chapter is organised as follows. Section 4.1 describes how the data sample is constructed, and shows the annual sample distributions. It also presents statistics of the sample's industry distribution. Section 4.2 shows changes of sample firm characteristics from 2001 to 2005. Section 4.3 presents statistics on audit and non-audit fees from pre- to post-SOX. Section 4.4 shows how SOX impacted on corporate governance structures and especially audit committee compositions. It also illustrates some specific examples of how governance structures changes during the sample period. Section 4.4 finally compares key governance variables to prior studies and presents a picture of how U.S. corporate governance has changed over the last 15 years. The final section concludes.

4.1 Sample Construction

My sample consists of S&P 500 non-financial firms from 2001 to 2005. This is because SOX was enacted in July 2002 and it affected the whole auditing industry as well as the U.S. corporate governance system. Choosing the period from 2001 to 2005 enables me to capture the impact of the SOX on corporate governance in the United States. However, not all U.S. issuers comply with the Act immediately after it was introduced. Only accelerated filers, such as S&P 500 companies, were supposed to comply with the new regulation immediately. I therefore choose the S&P 500 from 2001 to 2005 to analyse the impact of SOX on leading U.S. issuers.

All the corporate governance information was manually collected from the companies' proxy statements (Form DEF 14A), which can be accessed from the SEC website. Director information is provided in the "Election of directors" section. Audit committee composition, audit fees and non-audit fees information are provided in the "Audit Committee Report" section, while director ownership information is provided in the "Stock Ownership" section within the proxy statements.

The sample is constructed as follows. The initial sample consisted of 3000 firm-years from 2001 to 2006, but the final sample is reduced to 5 years from 2001 to 2005.[27] This is because issuers report directors' information for the current fiscal year, but they report audit fees, audit committee information and ownership information for the last fiscal year in the proxy statement in the current year. Therefore director information reported in the current year has to be matched with auditing and ownership information reported in the next fiscal

[27] The sample consists of all non-financial companies in the S&P 500 index, therefore it represents the population of the largest listed non-financial companies in the US stock market.

year. As a result, all director information in 2006 has to be deleted because there is not enough information on auditing and ownership in the 2007 proxy statements when I constructed this dataset[28]. Some observations in 2005 have to be deleted as well because some firms had not submitted their proxy statements to the SEC by April 2006. In addition, for newly nominated directors, only those directors who were successfully elected would be included into the dataset. Information about whether newly nominated directors were successfully elected is obtained from proxy statements in the next fiscal year. Finally, retired directors were excluded from the dataset.

Panel A in Table 4-1 shows the year on year distributions of the sample. The initial sample has 500 companies in which there are 90 financial institutions. Therefore there are 410 non-financial firms each year. Statistics show that there are more missing proxy statements in 2001 (171 firms missing) compared to the other years. There are only 293 available proxy statements in 2001, whereas there are more than 300 proxy statements for the other four year. Further, there are slightly more firms lacking audit committee information in 2005 because some proxy statements were not available yet at the time I collected the data. 450 observations for financial institutions and 414 observations with missing governance information were deleted from the original sample. Thereby the final sample consists of 1636 observations with a maximum of 346 observations in 2005, and a minimum of 277 observations in 2001.

Panel B in Table 4-1 shows the industry distribution of the sample. Industry sector codes were collected from *DataStream*. There are totally 8 sectors which include oil and gas, basic materials, industrials, consumer goods, healthcare, consumer services, telecommunications, utilities and technology. The table also shows the percentage of firms relative to the whole sample in the eight sectors.

[28] I collected this dataset in April 2006

80% of the sample consists of firms in the industrials, consumer goods, healthcare, consumer services and technology sector, while the rest of the sample is from oil & gas, basic materials, telecommunications and utility sector.

Table 4-1 Descriptive statistics - sample distributions

Panel A: Distribution by year

Year	Original Sample	Financial Institutions	Missing Proxy Statement	Available Proxy Statement	Missing AudC Info.	Final Sample	% Sample	% Sample - % Original Sample
2001	500	90	117	293	16	277	16.93%	-3.07%
2002	500	90	67	343	15	328	20.05%	0.05%
2003	500	90	55	355	15	340	20.78%	0.78%
2004	500	90	51	359	14	345	21.09%	1.09%
2005	500	90	44	366	20	346	21.15%	1.15%
Total	2500	450	334	1716	80	1636	100.00%	0.00%

Panel B: Distribution by industry

Industry Sector	Original Sample	% of Original Sample	Missing Proxy Statement	Available Proxy Statement	Missing AudC Info.	Final Sample	% Sample	% Sample - % Original Sample
Oil & Gas	145	7.07%	36	109	10	99	6.05%	-1.02%
Basic Materials	120	5.85%	25	95	4	91	5.56%	-0.29%
Industrials	355	17.32%	40	315	18	297	18.15%	0.84%
Consumer Goods	295	14.39%	37	258	1	257	15.71%	1.32%
Healthcare	255	12.44%	38	217	13	204	12.47%	0.03%
Consumer Services	360	17.56%	33	327	15	312	19.07%	1.51%
Telecommunication	50	2.44%	16	34	8	26	1.59%	-0.85%
Utilities	150	7.32%	39	111	7	104	6.36%	-0.96%
Technology	320	15.61%	70	250	4	246	15.04%	-0.57%
Total	2050	100.00%	334	1716	80	1636	100.00%	0.00%

The sample consists of up to 346 non-financial S&P 500 companies per year during the period 2001 to 2005. The sample is constructed by examining all S&P 500 companies with available corporate governance information filed in the proxy statements on the Securities and Exchange Commission (SEC) website from 2001 to April 2006. Firm years are omitted from the sample if information regarding audit committee composition, board and audit committee meetings at the year end is unavailable. The initial sample consists of 500 companies induding 90 financial companies each year. Missing Proxy Statement refers to the aggregate number of proxy statements missing from the SEC website. Missing AudC. Info refers to observations missed due to unavailable governance information in the proxy statements at the year end. The final sample consists of 1636 observations. The last column refers to the percentage of firms each year or each sector of the total number of firms in the final sample (1636).

The last column of Panel B in Table 4-1, "%Sample-%Original Sample", shows the differences in industry distributions between my sample and the original sample. The oil & gas, consumer goods and consumer services sector have slightly greater deviation from the original sample distribution than other

sectors. The differences are -1.02%, 1.32% and 1.51% for the three sectors respectively. The statistics show that my sample shows similar industry distribution with the population.

The rest of this chapter is set as follows. Section 4.2 describes changes of sample firm characteristics from 2001 to 2005. Section 4.3 presents statistics of how SOX affected fees for audit and non-audit services. Section 4.4 shows how the SOX affected of the sample firm's corporate governance structure in the sample period. Section 4.5 concludes.

4.2 Changes in Firm Characteristics from 2001 to 2005

Table 4-2 presents the definitions of the key firm characteristics variables in this thesis. All accounting data was collected from WorldScope database provided by Thomson One Financial. The variables are defined as follows.

Table 4-2 Definitions of firm characteristics variables

Variable	Definition	Equation
Assets	Year-end total assets of the firm	n/a
Sales	Year-end total sales of the firm	n/a
Income	Year-end total income of the firm	n/a
ROA	ROA is Income divided by total assets	Income/Assets
ROS	ROS is Income divided by total sales	Income/Sales
E/P ratio	E/P ratio is defined as the Income divided by the market value of the equity	Income/MV
Market Value (MV)	Year end market value of common equity	n/a
MKBV	The market value of common equity plus book value of debt and then divided by the book value of firm's total assets	(MV+Debt)/Assets
Debt	Year-end total debt	n/a
Market leverage ratio	Debt divided by the sum of Debt and MV	Debt/(Debt+MV)
Book leverage ratio	Debt divided by book value of assets	Debt/Assets

Table 4-3 shows descriptive statistics of the sample firm characteristic from 2001 to 2005, and Table 4-4 presents the Wilcoxon Signed Rank Test and examines the significance of the annual changes in firm characteristics.

Table 4-3 Descriptive statistics - firm characteristics

Year End	***2001***			***2002***			***2003***			***2004***			***2005***			***Pooled Sample***		
	N=277			*N=328*			*N=340*			*N=345*			*N=346*			*N=1636*		
	Mean	*Std*	*Median*	*Mean*	*Std*	*Median*	*Mean*	*Std*	*Median*	*Mean*	*Std*	*Median*	*Mean*	*Std*	*Median*	*Mean*	*Std*	*Median*
Assets ($bn)	14.73	26.92	5.93	14.76	26.20	6.44	15.97	27.76	7.04	16.92	28.31	7.98	17.76	28.88	8.32	16.10	27.67	7.22
Sales ($bn)	12.16	23.74	5.59	11.83	22.50	5.39	12.79	23.14	5.83	14.18	24.43	6.76	15.87	27.24	7.55	13.44	24.33	6.10
Income ($bn)	0.53	1.57	0.21	0.54	1.68	0.25	0.70	1.59	0.30	0.93	1.80	0.41	1.14	2.00	0.53	0.78	1.76	0.34
ROA	4.32%	8.84%	4.80%	3.39%	10.52%	4.59%	4.51%	8.59%	5.30%	6.36%	6.68%	6.52%	7.32%	6.67%	6.99%	5.24%	8.46%	5.60%
ROS	4.04%	16.51%	5.23%	2.15%	20.31%	5.62%	4.76%	15.59%	6.16%	7.32%	12.22%	7.23%	8.64%	11.50%	7.83%	5.48%	15.61%	6.45%
E/P ratio	2.07%	8.19%	3.42%	0.30%	15.74%	4.65%	2.24%	9.00%	3.98%	3.86%	5.74%	4.51%	4.27%	8.12%	5.11%	2.60%	10.03%	4.31%
Market Value ($bn)	20.31	41.71	7.65	15.96	33.58	6.35	20.30	37.51	7.95	21.55	36.12	9.49	21.93	35.12	10.63	20.04	36.75	8.47
MKBV	3.47	2.95	2.57	2.58	2.34	1.88	3.07	2.56	2.24	3.09	2.48	2.44	3.06	2.43	2.53	3.04	2.56	2.31
Debt ($bn)	4.17	7.56	1.43	4.28	7.46	1.51	4.15	7.09	1.53	4.14	7.01	1.60	4.17	7.03	1.62	4.18	7.21	1.53
Market leverage ratio	0.22	0.19	0.16	0.25	0.20	0.20	0.20	0.18	0.15	0.18	0.16	0.14	0.18	0.16	0.13	0.21	0.18	0.15
Book leverage ratio	0.28	0.15	0.27	0.28	0.15	0.26	0.26	0.14	0.25	0.24	0.14	0.22	0.24	0.14	0.22	0.26	0.15	0.25

The sample consists of up to 346 non-financial S&P 500 companies per year during the period 2001 to 2005. Accounting data is collected from the Worldscope database. MV is the year-end market value of the firm. MKBV is defined as the market value of the equity plus book value of debt and then divided by the book value of firm's total assets. Debt / Assets is defined as year-end total debt divided by year-end total assets of the firm. Sales are the year-end total sales of the firm. Income is the year-end total income of the firm. Debt / (Debt + MV) is defined as year-end total debt divided by the sum of year-end market value of the firm and total debt. E/P ratio is defined as the Income divided by MV. ROA is Income divided by total assets. ROS is Income divided by total sales. Assets, sales, income, market value and debt are in billion U.S. dollars ($bn).

Table 4-3 shows that the Dot Com bubble, the terrorist attack on the Twin Towers, and a series of financial scandals during 2001 and 2002 led US firms to suffer significant losses during the sample period[29]. Statistics in Table 4-3 show that the average firm market value decreased substantially from $20.31bn in 2001 to $15.96bn in 2002. The Wilcoxon Signed Rank Test in Table 4-4 shows that companies' market value decreased significantly at 1% by $3.46 (billion). Firm growth opportunities, measured by the Market to Book ratio (MKBV), dropped from 3.47 to 2.58. On average, MKBV dropped by 0.77 and was significant at 1%. These statistics indicate that companies had poor stock performance and had fewer opportunities for growth in year 2002.

Company capital structure also changed substantially in 2002. Table 4-3 shows that firms tended to use more debt but less equity to finance projects. The firm's total debt level increased from $4.17bn in 2001 to $4.28bn in 2002. In addition, Table 4-4 shows that total assets increased by $0.3bn from 2001 to 2002, and total debt increased by $0.21bn at the same time. This suggests that 70% increase in total assets attributed to the increase in debt from 2001 to 2002. Further, the market leverage ratio increased by 0.03 and this increase is significant at 1%[30]. Incorporated with the fact that the stock market performed poorly in 2002, these results imply that companies tended to finance projects with debts rather than equity in 2002.

Firm operating performance also decreased significantly in 2002. ROA decreased from 4.32% to 3.39%, and ROS dropped from 4.04% to 2.15%. E/P ratio also dropped from 2.07% to 0.3%. Table 4-4 shows that from 2001 to 2002,

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[29] Specifically, only the Consumer Goods, Consumer Services and the Healthcare industry did not experience decrease in operating performance from 2001 to 2002. All other industries in my sample had negative changes in ROA and ROS from 2001 to 2002.

[30] Specifically, the average Market Leverage ratio of all the eight industries increased from 2001 to 2002, while the Basic Materials, Consumer Goods, Consumer Services and the Healthcare industry have increased the total amount of Debt from 2001 to 2002.

ROA and ROS decreased by 0.17% (significant at 5%) and 0.14% (significant at 1%) respectively, whereas the E/P ratio decreased by 0.33% (significant at 1%). These statistics suggest that for investors' returns are lower for every dollar that invested in the company in 2002 compared to 2001[31].

Table 4-4 Annual changes of firm characteristics from 2001 to 2005

	2002-2001 *Pairs=274*	***2003-2002*** *Pairs=326*	***2004-2003*** *Pairs=337*	***2005-2004*** *Pairs=341*	***2005-2001*** *Pairs=273*
Assets ($bn)	0.30 ***	1.05 ***	0.87 ***	0.71 ***	2.93 ***
Sales ($bn)	-0.25 *	0.88 ***	1.37 ***	1.29 ***	2.82 ***
Income ($bn)	0.08 ***	0.15 ***	0.24 ***	0.18 ***	0.60 ***
ROA	-0.17% **	1.07% ***	1.83% ***	0.97% ***	3.09% ***
ROS	-0.14% ***	2.73% ***	2.50% ***	1.35% ***	5.15% ***
E/P ratio	-0.33% ***	1.78% **	1.51% ***	0.38% ***	2.31% ***
Market Value ($bn)	-3.46 ***	3.99 ***	1.30 ***	0.23 **	1.55 ***
MKBV	-0.77 ***	0.48 ***	0.03	-0.02 *	-0.34 *
Debt ($bn)	0.21 ***	-0.08	-0.07 ***	0.07	0.22 **
Market leverage ratio	0.030 ***	-0.044 ***	-0.021 ***	-0.003	-0.032 ***
Book leverage ratio	0.003	-0.018 ***	-0.023 ***	-0.003 ***	-0.039 ***

The sample consists of up to 346 non-financial S&P 500 companies in the US during the period 2001 to 2005. Accounting data is collected from the Worldscope database. MV is the year-end market value of the firm. MKBV is defined as the market value of the equity plus book value of debt and then divided by the book value of firm's total assets. Debt / Assets is defined as year-end total debt divided by year-end total assets of the firm. Sales are the year-end total sales of the firm. Income is the year-end total income of the firm. Debt / (Debt + MV) is defined as year-end total debt divided by the sum of year-end market value of the firm and total debt. E/P ratio is defined as the Income divided by MV. ROA is Income divided by total assets. ROS is Income divided by total sales. Units of assets, sales, income, market value and debt are billion U.S. dollars. The Wilcoxon Signed Rank test is performed to test the significance of the changes from year to year. ***, ** and * indicate the changes are significant at 1%, 5% and 10% respectively.

Firm performance started to recover in 2003. Companies have higher firm value, higher total income and higher profit margins from 2003 onwards. Both company total assets and market value increased significantly year on year after 2002. The last column of Table 4-4 shows that on average, there was $2.93bn

31 The lower investor returns may be caused by the poorer operating performance and stock performance of listed companies between 2001 and 2002.

increase in total assets and $1.55bn increase in market value from 2001 to 2005. In addition, ROA increased by 3.09% and ROS increased by 5.15% from 2001 to 2005 Further, firm total income increased by $0.60bn, whereas E/P ratio increased by 2.31%. Table 4-4 shows that these increase in ROA, ROS, E/P ratio and total income were significant.

Due to better stock market performance in 2003, companies reduced the amount of debt and returned to use equity for project financing. Table 4-3 shows total debt dropped from $4.28bn in 2002 to $4.15bn in 2003. Table 4-4 also shows that total debt continued to drop by $0.07bn from 2003 to 2004. Moreover, both Table 4-3 and Table 4-4 suggest that the market leverage ratio and the book leverage ratio decreased significantly from 2002 to 2005. This implies that companies tended to use equity rather than debt for project financing from 2003 onwards.

4.3 Changes in Audit and Non-audit Fees post-SOX

Table 4-5 presents the descriptive statistics of audit and non-audit service fees from 2001 to 2005. Audit fees are defined as fees charged by the accounting firm solely for auditing service. Non-audit fees include audit-related fees, tax fees and fees of all other services. Total fees are the sum of audit and non-audit fees. Fee ratio is defined as the percentage of audit fees to the total fees. Variables of audit fees, non-audit fees and total fees are scaled by the value of total assets to control for the client's firm size. Since the scaled values of audit, non-audit and total fees were too small; they were further adjusted by multiplying 1000. The Wilcoxon Signed Rank Tests are performed to examine the significance of annual changes in audit and non-audit fees in Table 4-6.

Table 4-5 Descriptive statistics - audit and non-audit services fees

Year End	***2001***			***2002***			***2003***			***2004***			***2005***			***Pooled Sample***		
	N=277			*N=328*			*N=340*			*N=345*			*N=346*			*N=1636*		
	Mean	*Std*	*Median*	*Mean*	*Std*	*Median*	*Mean*	*Std*	*Median*	*Mean*	*Std*	*Median*	*Mean*	*Std*	*Median*	*Mean*	*Std*	*Median*
Audit fees ($m)	2.71	3.77	1.56	3.57	4.89	1.92	4.51	5.30	2.69	6.72	6.74	4.43	7.10	6.84	4.71	5.02	2.99	5.94
Non-audit fees ($m)	5.49	7.92	2.74	3.93	6.55	1.64	3.03	5.11	1.39	2.49	4.06	1.19	2.14	3.82	1.04	3.33	1.45	5.71
Total fees ($m)	8.57	12.55	4.45	7.78	11.62	3.78	7.77	10.66	4.44	9.49	11.41	5.71	9.50	11.13	5.77	8.63	4.92	11.46
Fee ratio	0.40	0.18	0.37	0.54	0.19	0.54	0.65	0.17	0.64	0.77	0.14	0.79	0.81	0.14	0.83	0.64	0.67	0.22
Audit fees*1000/Assets	0.34	0.30	0.24	0.41	0.34	0.31	0.52	0.48	0.37	0.74	0.59	0.55	0.72	0.55	0.56	0.55	0.39	0.50
Non-audit fees*1000/Assets	0.61	0.63	0.43	0.43	0.51	0.25	0.32	0.39	0.18	0.25	0.31	0.13	0.20	0.30	0.10	0.35	0.19	0.46
Total fees*1000/Assets	0.97	0.90	0.71	0.85	0.79	0.60	0.85	0.78	0.61	1.00	0.83	0.77	0.93	0.76	0.69	0.92	0.81	0.67

The sample consists of up to 346 non-financial S&P 500 companies per year during the period 2001 to 2005. Audit and non-audit services fees data are collected from the companies' Proxy Statements (DEF 14A) on the Securities and Exchange Commission (SEC) website. Audit fees are fees billed by the accounting firms solely on auditing services. Non-audit fees are the sum of audit-related fees and all other fees billed by the accounting firm including consultant fees. Total fees are the sum of audit and non-audit fees. Ratio is defined as the proportion of audit fees to total fees billed by the accounting firm. Audit fees/Assets (Non-audit fees/Assets, Total fees/Assets) is defined as audit fees (non-audit fees, total fees) divided by firms' total assets. Audit fees/Assets, Non-audit fees/Assets and Total fees/Assets shown in the table are all scaled by multiplying 1000.

The mean, median and standard deviation of audit and non-audit fees from 2001 to 2005 were presented in Table 4-5. Consistent with Ciesielski and Weirich (2006) and Ghosh and Pawlewicz (2008) (presented in Figure 3-1 of Chapter 3), the statistics in Table 4-5 show that non-audit fees decreased substantially after the Act prohibited certain types of non-audit services. The average total non-audit fees dropped from $5.49m in 2001 to $3.93m in 2002, and continued to decrease to $2.14m in 2005. Table 4-6 shows that the annual decreases in non-audit fees from 2001 to 2005 were all significant at 1%.

Table 4-6 Annual changes of audit fees from 2001 to 2005

	2002-2001 *Pairs=274*		***2003-2002*** *Pairs=326*		***2004-2003*** *Pairs=337*		***2005-2004*** *Pairs=341*		***2005-2001*** *Pairs=273*	
Audit fees ($m)	1.01	***	0.92	***	2.22	***	0.27		4.38	***
Non-audit fees ($m)	-1.65	***	-0.96	***	-0.53	***	-0.39	***	-3.41	***
Total fees ($m)	-0.74	***	-0.08	***	1.75	***	-0.15		0.91	***
Fee ratio	0.15	***	0.11	***	0.12	***	0.04	***	0.40	***
Audit fees*1000/Assets	0.07	***	0.12	***	0.21	***	-0.01	***	0.37	***
Non-audit fees*1000/Assets	-0.21	***	-0.12	***	-0.07	***	-0.04	***	-0.40	***
Total fees*1000/Assets	-0.15	***	0.00		0.14	***	-0.06	***	-0.04	

The sample consists of up to 346 non-financial S&P 500 companies per year during the period 2001 to 2005. Audit and non-audit services fees data are collected from the companies' Proxy Statements (DEF 14A) on the Securities and Exchange Commission (SEC) website. Audit fees are fees billed by the accounting firms solely on auditing services. Non-audit fees are the sum of audit-related fees and all other fees billed by the accounting firm including consultant fees. Total fees are the sum of audit and non-audit fees. Ratio is defined as the proportion of audit fees to total fees billed by the accounting firm. Audit fees/Assets (Non-audit fees/Assets, Total fees/Assets) is defined as audit fees (non-audit fees, total fees) divided by firms' total assets. Audit fees/Assets, Non-audit fees/Assets and Total fees/Assets shown in the table are all scaled by multiplying 1000. The Wilcoxon Signed Rank test is performed to test the significance of the changes from year to year. ***, ** and * indicate the changes are significant at 1%, 5% and 10% respectively.

In contrast to non-audit fees, audit fees increased significantly from 2001 to 2005. Table 4-5 shows the absolute level of audit fees increased from $2.71m in 2001 to $7.10m in 2005, while the scaled value of audit fees increased from 0.34 in 2001 to 0.72 in 2005. In addition, the fee ratio increased from 0.4 in 2001 to 0.81 in 2005. Table 4-6 shows that these increases in audit and non-audit fees were significant.

There are two possible reasons for the increase in audit fees. First, in order to comply with requirements in Section 404 of SOX, audit hours may increase substantially to ensure audit quality. Further, SOX also required auditors to follow the Auditing Standard No.2 to conduct auditing and attest audit reports to the internal control reports. These factors may have increased auditors' workload which would be reflected in the audit price. Secondly, accounting firms might increase audit fees to compensate for the loss of non-audit fees after SOX was introduced.

If the second explanation holds, the total fees would remain the same from pre- to post-SOX. Table 4-5 shows that adjusted for firm size, total fees decreased slightly in 2002 and 2003 in response to SOX. However, it increased back to the pre-SOX level from 2004 onwards. Table 4-6 shows that, from 2001 to 2005, the adjusted total fees decreased by only 0.04 and was not significant. The statistics therefore imply that companies increased audit fees to supplement the loss of non-audit fees.

4.4 Corporate Governance Data

4.4.1 Variable Definitions

Table 4-7 summarises the definitions of corporate governance variables in this thesis. Board size is defined as the total number of directors on the board. Independent directors are defined as non-executive directors. Former executive who retired within the last five years, relatives of CEO or main executive directors, or those who have significant transactions or business relationships with the company are categorized as affiliate directors. Retired founders, who serve as board chairman emeritus, are defined as affiliate directors as well. Board independence is defined as the percentage of independent directors on the board.

Table 4-7 Definitions of corporate governance variables

Variables / Items	Definition
Independent Director	Non-executive directors who have no affiliation with the company beyond for being directors
Affiliate Director	Former employees in the last five years, founding directors who have retired from the company, relatives of the CEO or those who have significant transactions and/or business relationships with the company
Insider	Current employees of the company
Founder	Directors who found or co-found the company
Financial Expert	Directors who specialize in finance or accounting, or who have worked in the Banking and Accounting industry for more than 5 years, or who are Chief Financial/Investment Officer or President of Finance of the company, or who are qualified as CPA or CFA, or Professors in Finance or Accounting are categorized as a financial expert
Board Size	The number of directors serving on the company's board at the beginning of the financial year
AudC Size	The number of directors serving on the company's audit committee at the beginning of the financial year
No. Indep.	The number of independent directors on the company's board at the beginning of the financial year
% Indep.	The percentage of independent directors on the company's board at the beginning of the financial year
% Founder	The percentage of founding directors on the company's board at the beginning of the financial year
% FinExp.	The percentage of financial experts on the company's board at the beginning of the financial year
% NAudC FinExp.	The percentage of financial experts on the company's board, who are not serving on the audit committeee, at the beginning of the financial year
No. AudC Indep.	The number of independent directors on the company's audit commitee at the beginning of the financial year
% AudC Indep.	The percentage of independent directors on the company's audit commitee at the beginning of the financial year
% AudC FinExp.	The percentage of financial experts on the company's audit committee at the beginning of the financial year
Board Meetings	The number of board meetings held at the end of the financial year
AudC Meetings	The number of audit commitee meetings held at the end of the financial year
Dual role CEO	CEO of the company who also serves as the chairman of the board
Inside Director Ownership	Total percentage of shareholdings of inside and affiliate directors serving on the board
Outside Director Ownership	Total percentage of shareholdings of independent directors serving on the board

I define financial expertise using a narrower definition in accordance with the initial definition in the Section 407 proposal. This indicates the financial experts on the audit committee should have:

"Education and experience as a principal financial officer, principal accounting officer, controller, public accountant or auditor or experience in one or more positions that involve the performance of similar functions" (SEC 2002j).

Therefore directors who specialize in finance or accounting, or who have worked in the Banking and Accounting industry for more than 5 years, or who are Chief Financial/Investment Officer or President of Finance of the company, or who are qualified as CPA or CFA, or Professors in Finance or Accounting are categorized as a financial expert.

Other variables are defined as follows. Board (AudC) meetings are the number of board (audit committee) meetings held in one year. Inside (Outside) Director Ownership is defined as total percentage of shareholdings of inside or affiliate (outside) directors. Dual role CEO is defined as CEO who also serves as the chairman of the board.

4.4.2 Changes in Governance Variables between 2001 and 2005

Previous studies suggest that a smaller and more independent board indicates superior corporate governance system (Yermack 1996, Hillier and McColgan 2006, Rosenstein and Wyatt 1990, Shleifer and Vishny 1997). Table 4-8 presents the descriptive statistics of corporate governance variables in my sample. The statistics suggest that the U.S. corporate governance system changed in the direction in accordance with previous studies from 2001 to 2005. Corporate boards became slightly smaller after 2002. Board size decreased from 10.57 in 2001 to 10.47 in 2005. However, Table 4-9 shows that the decrease in board size is not significant. Board independence, on the other hand, increased every year from 2001 to 2005, and the increases are significant. Further, the percentage of firms that have at least one affiliate director decreased from 36% in 2001 to 32% in 2005.

Table 4-8 Descriptive statistics for corporate governance variables

Year End	***2001*** *N=277*			***2002*** *N=328*			***2003*** *N=340*			***2004*** *N=345*			***2005*** *N=346*			***Pooled Sample*** *N=1636*		
	Mean	*Std*	*Median*	*Mean*	*Std*	*Median*	*Mean*	*Std*	*Median*	*Mean*	*Std*	*Median*	*Mean*	*Std*	*Median*	*Mean*	*Std*	*Median*
Board Size	10.57	2.45	11.00	10.54	2.51	11.00	10.40	2.32	10.00	10.44	2.26	10.00	10.40	2.08	10.00	10.47	2.32	10.00
Independence (No. of)	8.35	2.41	8.00	8.44	2.48	8.00	8.39	2.33	8.00	8.56	2.23	9.00	8.58	2.05	9.00	8.47	2.30	8.00
Independence (%)	79%	11%	80%	80%	11%	82%	81%	10%	83%	82%	10%	83%	82%	9%	85%	81%	10%	83%
Boards with Affiliate Directors (% of firms)	36%	48%	0%	34%	48%	0%	33%	47%	0%	31%	46%	0%	32%	47%	0%	33%	47%	0%
Boards with founding directors (% of firms)	9%	28%	0%	9%	28%	0%	8%	28%	0%	8%	27%	0%	8%	27%	0%	8%	28%	0%
Boards with dual role CEO (% of firms)	74%	44%	100%	75%	43%	100%	75%	43%	100%	74%	44%	100%	71%	46%	100%	74%	44%	100%
Financial Experts (%)	17%	13%	17%	19%	14%	18%	20%	14%	18%	21%	13%	18%	21%	14%	20%	20%	14%	18%
AudC Size	4.01	1.13	4.00	4.00	1.15	4.00	3.95	1.07	4.00	3.97	1.01	4.00	3.92	0.99	4.00	3.97	1.07	4.00
AudC Independence (No. of)	3.96	1.14	4.00	3.97	1.17	4.00	3.93	1.08	4.00	3.95	1.01	4.00	3.89	0.99	4.00	3.94	1.08	4.00
AudC Independence (%)	99%	5%	100%	99%	4%	100%	99%	4%	100%	99%	3%	100%	99%	4%	100%	99%	4%	100%
AudC. Financial Experts (No. of)	0.86	0.83	1.00	0.93	0.85	1.00	1.04	0.85	1.00	1.16	0.88	1.00	1.20	0.91	1.00	1.05	0.88	1.00
AudC. Financial Experts (%)	22%	23%	20%	25%	23%	25%	28%	24%	25%	31%	25%	25%	33%	27%	25%	28%	25%	25%
Board Meetings	7.54	2.97	7.00	7.53	2.71	7.00	7.91	3.14	7.00	8.18	3.11	8.00	8.44	3.35	8.00	7.94	3.09	7.00
AudC Meetings	5.60	2.50	5.00	7.46	2.75	7.00	8.59	3.16	8.00	9.14	3.12	9.00	9.38	3.07	9.00	8.14	3.23	8.00

The sample consists of up to 346 non-financial S&P 500 companies per year during the period 2001 to 2005. The sample is constructed by examining all S&P 500 companies with available corporate governance information filed in the proxy statements on the Securities and Exchange Commission (SEC) website from 2001 to April 2006. Board/AudC size is the number of directors serving on the company's board/audit committee at the beginning of the fiscal year. Independent directors are defined as non-executive directors who have no affiliation with the company beyond being directors. Financial experts are defined as directors who are specialized in finance or accounting. Directors who specialize in finance or accounting, or who have worked in the Banking and Accounting industry for more than 5 years, or who are Chief Financial/Investment Officer or President of Finance of the company, or who are qualified as CPA or CFA, or Professors in Finance or Accounting are categorized as a financial expert. Board/AudC meetings are defined as the number of board/audit committee meetings held over the fiscal year.

In fact, from 2001 to 2005, companies in the sample tended to reduce board size and increase board independence. For example, Pfizer Inc. (CIK CODE: 0000078003) had 19 directors on the board in 2001 and 18 directors in 2002. The company reduced the board size to 15 in 2003 and 2004 and further to 14 in 2005. Another example is Tyson Foods Inc. (CIK CODE: 0000100493). The company had 5 executive directors and 4 affiliate directors on the board in 2001 and 2002. These directors were former employees of the company and became consultants to the company after they retired. However, the company reduced the number of affiliate directors to 2 and hence board independence increased to 50% by 2005.

The requirements of SOX also increased the workload of company boards. Table 4-8 shows the number of board meetings increased slightly from 7.54 times per year in 2001 to 8.44 times per year in 2005. In addition, Table 4-9 shows that the number of board meetings on average increased by 0.375 times from 2002 to 2003, and by 0.275 times from 2003 to 2004. In total, board meetings increased by 0.904 times per year from 2001 to 2005 and significant at 1%.

Companies that are listed on the NYSE and NASDAQ have to comply with the requirement that all audit committee members are independent of the companies' management after December 1999 (Klein 2002a). In addition, Section 301 also requires audit committees to be composed of independent directors (SEC 2002g). Therefore audit committees are supposed to be fully independent after 1999.

However, the statistics presented in Table 4-8 show that the mean level of audit committee independence for the sample is 99% from 2001 to 2005. This is because there were a number of directors who were declared as independent directors by the company were defined as affiliate directors in this thesis. For example, Pall Corporation (CIK CODE: 0000075829) defined Abraham Appel as

an independent director in 2004. As presented in Table 4-7, affiliate directors include founding directors and executives from the parent or controlling companies. Since Mr. Appel was the founding director of the company who may have strong power over the management, I defined him as an affiliate director. Therefore although the Act requires audit committees to be fully independent, some audit committee actually may still include non-independent directors.

Table 4-9 Annual changes of corporate governance variables

	2002-2001 *Pairs=274*	**2003-2002** *Pairs=326*	**2004-2003** *Pairs=337*	**2005-2004** *Pairs=341*	**2005-2001** *Pairs=273*
Board Size	-0.044	-0.077	0.036	-0.038	-0.070
Independence (No. of)	0.099	0.031	0.148 **	0.026	0.308 ***
Independence (%)	1.38% ***	0.91% ***	1.14% ***	0.57% **	3.70% ***
Boards with Affiliate Directors (% of firms)	-2.92%	-1.23%	-2.08%	0.00%	-5.49% *
Boards with founding directors (% of firms)	-0.73%	-0.61%	-0.30%	0.00%	-1.47%
Boards with dual role CEO (% of firms)	2.92%	-0.31%	-0.59%	-2.64% *	-2.93%
Financial Experts (%)	1.43% ***	0.96% ***	0.68% **	0.79% ***	3.85% ***
AudC Size	0.000	-0.037	0.033	-0.059 *	-0.077
AudC Independence (No. of)	0.026	-0.028	0.030	-0.065 *	-0.055
AudC Independence (%)	0.54% **	0.18%	0.00%	-0.15%	0.46% *
AudC. Financial Experts (No. of)	0.055 *	0.104 ***	0.116 ***	0.050 **	0.344 ***
AudC. Financial Experts (%)	1.74% **	2.95% ***	2.96% ***	2.06% ***	10.68% ***
Board Meetings	-0.055	0.375 *	0.275 **	0.149	0.904 ***
AudC Meetings	1.937 ***	1.047 ***	0.514 ***	0.191	3.607 ***

The sample consists of up to 346 non-financial S&P 500 companies per year during the period 2001 to 2005. The sample is constructed by examining all S&P 500 companies with available corporate governance information filed in the proxy statements on the Securities and Exchange Commission (SEC) website from 2001 to April 2006. Board/AudC size is the number of directors serving on the company's board/audit committee at the beginning of the fiscal year. Independent directors are defined as non-executive directors who have no affiliation with the company beyond being directors. Financial experts are defined as directors who are specialized in finance or accounting. Directors who specialize in finance or accounting, or who have worked in the Banking and Accounting industry for more than 5 years, or who are Chief Financial/Investment Officer or President of Finance of the company, or who are qualified as CPA or CFA, or Professors in Finance or Accounting are categorized as a financial expert. meetings are defined as the number of board/audit committee meetings held over the fiscal year. The Wilcoxon Signed Rank test is performed to test the significance of the changes from year to year. ***, ** and * indicate the changes are significant at 1%, 5% and 10% respectively.

Table 4-8 shows that companies tended to reduce audit committee size and increase the committee's financial expertise and activeness during the sample

period. For example, PEPSICO (CIK CODE: 0001076405) had 11 members on the audit committee in 2001 and 2002 without any financial experts. However, the company reduced the number of audit committee members to 6 and appointed one financial expert to the audit committee in 2003. Further, the number of meetings of Pepsico's audit committee increased from 2 times per year in 2001 to 5 times per year in 2003, and this increased again to 9 times per year in 2005.

Since previous studies suggest that an audit committee is more effective if it is smaller, with greater financial expertise and more active (DeZoort *et al.* 2002, Abbott *et al.* 2004, Anderson, Mansi and Reeb 2004, Carcello *et al.* 2006a, Xie *et al.* 2003), statistics in Table 4-8 suggest audit committee became more effective post-SOX. It shows that the average audit committee size decreased slightly from 4.01 in 2001 to 3.92 in 2005, but not significantly. In addition, Table 4-9 shows that financial expertise increased significantly by 10.68% from 2001 to 2005. Further, the number of committee meetings increased significantly by 3.607 times per year from 2001 to 2005. This is consistent with Linck *et al.* (2008) that they found the workload of audit committees increased significantly post-SOX. The statistics overall imply that SOX had positive impact on the companies' audit committees, and made it more effective in enhancing the companies' financial reporting standards.

Table 4-10 presents the comparisons of key corporate governance variables in this thesis with variables in prior research, which enables me to create a picture of how the U.S. corporate governance system has developed in the last 15 years. The average number of board directors decreased from 12 in the 1990s to 10 after 2000, whereas the average number of audit committee members decreased from 4.5 in the 1990s to about 4 after 2000. Further, since 1990, board

independence has increased from 58% to 81%, and audit committee independence has increased from 80% to 99%.

Table 4-10 Comparing key governance variables with prior research

Basic Information	*Klein (2002 a, 2002 b)*	*Anderson et. al. (2004)*	*Xie et al. (2003)*	*Anderson, Deli & Gillan (2003)*	*This Study*
Sample Firms	S&P 500	S&P 500	S&P 500	S&P Super 1500	S&P 500
Sample Size	803(a), 692(b)	1052	282	1241	
Period	1991-1993	1993-1998	1992, 1994, 1996	2001	2001-2005
Variables	Mean	Mean	Mean	Mean	Mean
Board Size	12.00	12.10	12.48	9.39	10.47
Independence (No. of)		6.90		6.00	8.47
Independence (%)	58%	57%	67%	63%	81%
Financial Experts (%)			24%		20%
AudC Size		4.50	4.53	3.64	3.97
AudC Independence (No. of)					3.94
AudC Independence (%)	80%	70%	85%	88%	99%
AudC. Financial Experts (No. of)		0.90			1.05
AudC. Financial Experts (%)			29%		28%
Board Meetings			8.26	6.64	7.94
AudC Meetings		3.50	3.87	3.97	8.14

The sample consists of up to 346 non-financial S&P 500 companies per year during the period 2001 to 2005. The sample is constructed by examining all S&P 500 companies with available corporate governance information filed in the proxy statements on the Securities and Exchange Commission (SEC) website from 2001 to April 2006. Board/AudC size is the number of directors serving on the company's board/audit committee at the beginning of the fiscal year. Independent directors are defined as non-executive directors who have no affiliation with the company beyond being directors. Financial experts are defined as directors who are specialized in finance or accounting. Directors who are working in the Banking and Accounting industry for more than 5 years, or as Chief Financial/Investment Officer or President of Finance of the company, or qualified as CPA or CFA, or Professors in Finance or Accounting. Board/AudC meetings are defined as the number of board/audit committee meetings held over the fiscal year.

However, because the definition of financial expert in this thesis is narrower than the definition in Xie *et al.* (2003), the overall board financial expertise is lower in this thesis. Audit committee financial expertise is 27% in this thesis, whereas in Xie *et al.* (2003), it was 29.2%.

The number of board meetings did not change too much. It decreased slightly from 8.26 times per year to 7.94 times per year. However, the number of audit committee meetings has jumped from an average of 3.5 times per year to

8.14 times per year. As discussed before, this was largely due to the introduction of SOX which increased the workload of the audit committee.

In sum the results show that first, during the last 15 years, both boards and audit committees have become smaller and more independent. Secondly, more financial experts were appointed to company audit committees. Further, both boards and audit committees became more active post-SOX. The statistics suggest that U.S. corporate governance structure kept developing in the last 15 years in the direction that is accordance with "good governance" in previous literature.

4.5 Conclusions

This chapter describes the process of constructing the data sample for the analyses in this thesis and presents statistics for firm characteristics, audit fees and governance variables. Section 4.1 presents sample distributions, and Section 4.2 describes changes in sample firm characteristics from 2001 to 2005. The descriptive statistics show that companies experienced poor stock market performance in 2002, and hence they were more likely to finance projects with debt than equity. In addition, companies also had poor operating performance in 2002 compared to the other years. Firm performance started to recover from 2003, as firms had higher value and better performance from 2003 onwards.

Section 4.3 presents statistics on fees for audit and non-audit services from pre- to post-SOX. SOX prohibits public accounting firms from providing certain types of non-audit services. Therefore the total non-audit fees decreased substantially after SOX was introduced. However, audit fees increased significantly post-SOX. It is possible that the greater workload and higher quality of audit that is required post-SOX drove up the audit price. However, it is also

possible that accounting firms tended to increase auditing services fees to compensate for the reduction in non-audit services after the Act came into force.

Section 4.4 shows how SOX affected the sample firm's corporate governance structures during the sample period. It illustrates some examples with respect to specific companies to highlight how corporate governance changed from 2001 to 2005. Companies tended to reduce the board size and audit committee size during the sample period, but increased both the level of board and audit committee independence. In addition, after SOX was enacted, audit committees increased financial expertise and became more active.

Section 4.4 also compares key governance variables to prior studies dating from 1991 onwards to show a picture of how the U.S. corporate governance system has changed over the last 15 years. It is found that during the last 15 years, U.S. corporate governance system has developed in the direction that is accordance with "good governance" in previous literature. Companies tended to reduce the board size, increase board independence and increase audit committee financial expertise and activeness to enhance their monitoring over managers.

The next chapter is the first empirical chapter in this thesis. It analyses whether the determinants of audit committee financial expertise have changed after SOX.

5

THE SARBANES-OXLEY ACT, CORPORATE GOVERNANCE STRUCTURE AND AUDIT COMMITTEE FINANCIAL EXPERTISE

Using a unique dataset of governance characteristics, I examine the impact of the Sarbanes-Oxley Act (SOX) on the determinants of audit committee financial expertise. I find that there were more companies including at least one financial expert in the audit committee post-SOX. However, companies that appoint financial experts to the audit committee mainly aimed to comply with the SOX requirements rather than to fulfil the companies' requirements. The regression analysis also suggests that companies appointed financial experts to complement existing governance mechanisms pre-SOX, but to substitute existing governance mechanisms post-SOX. A Chow test is performed and proved that the changes in the determinants of audit committee financial expertise post-SOX were significant.

5.1 Introduction

The Sarbanes-Oxley Act of 2002 (SOX, or the "Act") introduced regulations aimed at the upgrading of financial reporting practice and corporate governance in U.S. listed companies. The effective outcome from SOX was to change US regulations from a discretionary disclosure regime to mandated corporate governance mechanisms, designed to restore investor confidence after several accounting scandals. Many of the requirements, however, are controversial and the impact of these requirements to issuers lacks empirical evidence.

Previous research has mainly examined the market wide impact of the whole package of SOX provisions, rather than the impact of specific requirements on issuers. The most recent SOX studies focus on whether the Act was value adding and beneficial to shareholders, but the results are mixed. For example, Zhang (2007) finds that SOX has significantly increased firm's costs thus impaired listed companies' (or "issuers", or "listed companies" hereafter) firm value. Since listed companies perceived that SOX brought a net loss to them, more companies, especially small companies, decided to go private after SOX (Leuz *et al.* 2008, Engel *et al.* 2007). In contrast, Li *et al.* (2008) and Jain and Rezaee (2006) suggest that SOX improved companies' corporate governance system[32] thus brought in total net benefits to listed firms. Chhaochharia and Grinstein (2007) extend this strand of research and find that large firms, that were less compliant with SOX, earned higher abnormal returns compared to small firms that were less compliant with SOX.

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32 As discussed in Chapter 2, previous studies find that more independent and expert board or audit committee, although they may be overly bureaucratic and restrict managers from risk-taking, adds more value to the firm and improves financial reporting quality. Therefore I assume that boards with more independent and expert directors are a better governance structure.

In addition, previous research found that SOX made directors more conservative, and accounting anomalies were less likely to occur. For example, Cohen *et al.* (2004a) find that executives become more risk-averse and conservative post-SOX, and Cohen, Dey and Lys (2005) find that accounting earnings management activities dropped significantly post-SOX. Further, Linck *et al.* (2008) find that executive and director compensation increased substantially post-SOX, possibly because directors face higher litigation costs and became more risk-averse.

There are however limited studies examining the impact of specific SOX requirements on corporate governance practices. One of the SOX provisions that receive the most attention is Section 407, which requires public companies to disclose to the Securities Exchange Commissions (SEC) whether they have a financial expert on the audit committee. This provision significantly increased the stock market's focus on audit committee financial expertise and DeFond *et al.* (2005) find that the stock market reacts favourably to firms that appoint a financial expert to their audit committee. In addition, Carcello *et al.* (2006b) find that companies were reluctant to disclose details of financial literate directors because there would be greater litigation costs to specialist directors post-SOX.

Section 407 of SOX is premised on the assumption that including a financial expert in the audit committee will ensure higher quality financial reporting (SEC 2003). In theory audit committees, in implementing higher quality internal control systems and attesting to financial quality, may require the use of greater financial expertise (DeZoort *et al.* 2002, DeZoort and Steven 2001). In practice, issuers had two responses to SOX Section 407. First, listed companies did employ more financially literate directors post-SOX, but they did not disclose all of the financial experts' information to the SEC (Deloitte 2003, Carcello *et al.* 2006b).

Secondly, most listed companies employed the widely defined financial experts[33] in accordance with the final rules of Section 407 (Carcello *et al.* 2006b). Since only narrowly defined financial experts[34] are capable in improving financial reporting quality (Xie *et al.* 2003, Bedard *et al.* 2004, Carcello *et al.* 2006a), it seems listed companies appoint financial literature directors to *"signal that their existing financial reporting system passes the due diligence tests by an accounting financial expert"* (Engel 2005, page 199).

In the SOX requirements, it is within the company's discretion to decide upon the degree of financial expertise, thus they are not supposed to appoint financial experts to the audit committee as long as they explain the reason to the SEC[35]. Therefore the response of issuers to SOX raises the following empiric questions: first, do listed companies employ financial expert directors based on their needs or based on regulation compliance? Secondly, has SOX affected companies' decision in the level of financial expertise they include on the audit committee? And thirdly, have the determinants of audit committee financial expertise changed post-SOX? These three questions have not been previously investigated and therefore motivate research of this chapter.

This chapter contributes to the audit committee and SOX literature that it investigates the determinants of audit committee financial expertise and the impact of SOX on these determinants. There are two differences between Carcello *et al.* (2006b) and this chapter. First, this chapter provides insights of the

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33 Widely defined financial experts refer to financial literature directors. This will be discussed in detail in Section 5.2.

34 Narrowly defined financial experts refer to directors who are specialized in accounting and finance. This will be discussed in detail in Section 5.2.

35 In particular, Section 407 requires that *"The Commission shall issue rules, as necessary or appropriate in the public interest and consistent with the protection of investors, to require each issuer, together with periodic reports required pursuant to sections 13(a) and 15(d) of the Securities Exchange Act of 1934, to disclose whether or not, and if not, the reasons therefore, the audit committee of that issuer is comprised of at least 1 member who is a financial expert, as such term is defined by the Commission"*.

actual incentives listed companies have when appointing financial experts to the audit committee. Carcello *et al.* (2006b) examine only the relation between firm characteristics and the disclosure of audit committee financial experts which indicates that the association only reflects companies' desire to disclose information regarding the level of audit committee financial expertise. In contrast, this chapter uses the narrowly defined financial expertise and manually collated information from proxy statements. Therefore it enables me to investigate companies' desire to appoint financial experts instead of disclosing financial expert information.

The second difference is that Carcello *et al.* (2006b) did not compare issuers' disclosure practices pre- and post-SOX. Carcello *et al.* (2006b) only examine the response of issuers to SOX in disclosing financial expertise information, but they did not provide information on whether and how issuers disclosed financial expertise pre-SOX. This chapter however explores possible determinants of audit committee financial expertise and compares the differences in the determinants from pre- to post-SOX. Therefore it contributes to existing audit committee studies by examining why companies appoint financial experts, why some issuers appoint more financial experts, and what has changed post-SOX.

In addition, this chapter also contributes to the audit committee and SOX research in posing a number of research questions. It investigates whether companies appoint financial experts to complement or substitute the existing governance system which was discussed theoretically in previous research (DeFond and Francis 2005, DeFond *et al.* 2005, Engel 2005). In addition, it also provides evidence of how companies, which did not have financial experts, fulfilled requirements in SOX Section 404 and 407 without having financial experts on the audit committee. Providing empirical evidence to these questions gives both investors and regulators a better understanding of the role of financial

experts in corporate governance and why they are important in designing the corporate governance system.

My results show there were more companies that employed at least one financial expert post-SOX. I hypothesise that if this change was totally caused by SOX, the decision that a company employs at least one financial expert ("the decision" hereafter) would not be affected by the firm's economic performance and existing corporate governance post-SOX. Consistent with this hypothesis, the logistic analysis shows that issuers' economic performance and existing corporate governance were statistically significant in determining the decision pre-SOX, but lost statistical power post-SOX. This suggests after SOX was enacted, companies decided to include at least one financial expert only to comply with the Act, whereas pre-SOX issuers made this decision based on individual company requirements.

In addition, I also hypothesise that if the increase in financial expertise is totally caused by SOX, the magnitude of the impact of existing governance mechanisms and ownership structure on the degree of audit committee financial expertise would decrease post-SOX[36]. I employ the Two Stage Least Square Regression with Generalized Method of Moments (GMM) iteration to obtain estimates of the audit committee financial expertise determinants model. The results show that coefficients of governance variables and ownership structure variables decreased significantly post-SOX. Incorporating this result with results from the logistic analysis, after SOX was enacted, an issuer was mainly motivated to employ financial experts by complying with Section 301 and 407 of the Act, but not by the companies' requirements. In addition, results also show that

36 This suggests that the use of financial experts is mainly regulatory compliance motivated rather than economically motivated post SOX.

issuers employ financial experts to complement existing governance pre-SOX[37]. In contrast, post-SOX issuers employ financial experts to substitute existing governance[38].

Finally, the results also indicate that audit committees, which did not employ financial experts, tended to increase the usage of other substitute mechanisms post-SOX. For example post-SOX, audit committees that did not have a financial expert held substantially more meetings than audit committees with a financial expert. These results suggest that in order to fulfil the SOX requirements in ensuring the internal control and financial reporting quality, companies that did not have financial experts in the audit committee may be more likely to use other mechanisms, e.g. their board of directors meets more frequently to evaluate the company's internal functions, to substitute for the lack of financial expertise.

The rest of this chapter is set as follows. In the next section, I discuss the regulatory and definitional aspects of the analysis. Section 5.3 develops the hypotheses and in Section 5.4, the model and methodologies are presented. Section 5.5 presents descriptive statistics and Section 5.6 discusses the empirical results. Section 5.7 concludes the chapter.

5.2 Definition of Financial Expert

Section 407 of SOX requires that companies disclose the identity of at least one financial expert serving on the audit committee. A financial expert is defined finally by the Securities Exchange Commissions (SEC) as a person who has:

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37 I define "complement" here as that the combination of existing governance and additional audit committee financial experts makes the governance system more efficient thus adds more value to the firm.

38 I define "substitute" here as companies appoint new financial experts on the audit committee instead of using existing governance mechanisms to maintain or improve the efficiency of the firm's governance system thus add more value to the firm.

"(1) An understanding of generally accepted accounting principles and financial statements;

(2) Experience in

(A) the preparation or auditing of financial statements of generally comparable issuers; and

(B) the application of such principles in connection with the accounting for estimates, accruals, and reserves;

(3) Experience with internal accounting controls; and

(4) An understanding of audit committee functions[39]*"* (SEC 2002j).

However, the originally proposed definition is as follows:

"(1) An understanding of generally accepted accounting principles and financial statements;

(2) Experience applying such generally accepted accounting principles in connection with the accounting for estimates, accruals, and reserves that are generally comparable to the estimates, accruals and reserves, if any, used in the registrant's financial statements;

(3) Experience preparing or auditing financial statements that present accounting issues that are generally comparable to those raised by the registrant's financial statements;

(4) Experience with internal controls and procedures for financial reporting; and

[39] The discussion presented in Italic in this chapter is taken directly from the Sarbanes Oxley Act and the SEC, so the section and subsection notations follow the original text.

(5) An understanding of audit committee functions" (SEC 2002a).

The main difference between the two definitions is that with the originally proposed definition of financial expertise, a person can acquire the attributes through:

> *'Education and experience as a principal financial officer, principal accounting officer, controller, public accountant or auditor or experience in one or more positions that involve the performance of similar functions"* (SEC 2002a, Deloitte 2003).

However, with the final definition, a person can acquire the attributes not only through the above experience but also through:

> *'Experience actively supervising a principal financial officer, principal accounting officer, controller, public accountant, auditor or person performing similar functions, or overseeing or assessing the performance of companies or public accountants with respect to the preparation, auditing or evaluation of financial statements"* (SEC 2002a, Deloitte 2003).

The change in the definition of financial expert raises research questions as to how a company can measure financial expertise and the discretion that companies can employ in their identification. Within the final definition, companies have a wider scope in designating financial expertise. For example, companies may designate directors to be financial experts if they do not have education or experience in accounting but have prior experience as an audit committee director. Carcello *et al.* (2006b) reported that in many cases financial expertise was misclassified under the current disclosure requirements, thus making it difficult for empirical research to determine why firms appoint financial experts to the audit committee.

In fact, empirical research mainly found that only narrowly defined financial expertise, which is in accordance with the original proposed definition, is effective in monitoring corporate managers and constraining managers from earnings management (Xie *et al.* 2003, Bedard *et al.* 2004, Carcello *et al.* 2006a). In addition, DeFond *et al.* (2005) find that the stock market reacts positively to the presence of narrowly defined financial experts. Therefore the SOX initial definition of financial expert better defines financial expertise than the definition in the final rules.

Financial expertise in this thesis is defined using the narrower definition in accordance with the initial definition in the SOX 407 proposal. This indicates the financial experts on the audit committee should have *"Education and experience as a principal financial officer, principal accounting officer, controller, public accountant or auditor or experience in one or more positions that involve the performance of similar functions"* (SEC 2002a).

With regard to disclosure, since the identity of only one financial expert needs to be disclosed, companies may not disclose all financial experts to the SEC. A plausible reason for this is that financial experts bear high reputational costs and legal liability. Once financial fraud occurs, audit committee members, especially financial experts, will face severe punishment from both capital markets and labour markets (Srinivasan 2005). Thereby approximately half of the companies which have more than one expert planned to disclose only one expert to the SEC (Deloitte 2003). In determining the number of financial experts I apply the definition of financial expertise in this thesis to the proxy statements to arrive at a more precise representation of the degree of audit committee financial expertise, whether committee members are explicitly disclosed as experts or not.

5.3 Hypothesis Development

This section examines the impact of SOX on the determinants of audit committee financial expertise. I hypothesise that the influence of SOX is likely to be heterogeneous across existing governance mechanisms and thus I begin in Section 5.3.1 with a discussion of a number of determinants of the appointment of financial experts to the audit committee. In Section 5.3.2 I derive further testable hypotheses following a discussion of the impact of SOX upon the likelihood a company appointing financial experts to the audit committee. Last I discuss the impact of SOX upon the determinants of the level of audit committee financial expertise.

5.3.1 Determinants of Audit Committee Financial Expertise

Board Structure

Agency and signalling theories provide conflicting explanations as to why corporate boards appoint financial experts. Agency theory suggests that companies appoint more financial experts to the audit committee when existing corporate governance system is more superior (Klein 2002b, Beasley and Salterio 2001). For example when the board is more independent or has a higher degree of business expertise, it is more likely a firm to employ financial experts to further reduce agency costs by ensuring that the audit function is effective (Beasley and Salterio 2001). Since the efficient functioning of audit committees requires a relatively high degree of accounting sophistication (DeFond *et al.* 2005), a stronger presence of accounting experts is more likely to constrain creative accounting techniques such as earnings management (Xie *et al.* 2003, Bedard *et al.* 2004, Carcello *et al.* 2006a). Under agency theory, the appointment of experts will

be undertaken when marginal benefits of employing experts exceed the marginal costs in order to reduce the cost of capital and increase firm value.

On the other hand, signalling theory suggests that companies with weak governance will appoint financial experts to signal to the market that the firms' *"...existing financial reporting system passes the due diligence tests by an accounting financial expert"* (Engel 2005, page 199). However, poorly governed firms are at risk of incurring regulatory discipline (Abbott *et al.* 2000, Carcello and Neal 2003b). For example, poorly governed companies are more likely to perform badly (Gompers, Ishii and Metrick 2003), manipulate earnings (Klein 2002a, Xie *et al.* 2003), and have financial reporting restatements (Abbott *et al.* 2004, Abbott *et al.* 2000, Carcello and Neal , 2003a, 2003b). Financial experts may therefore be unwilling to work with them due to potential high penalties from the SEC and the labour market (Srinivasan 2005).

Previous studies lend support to agency theory explanations rather than the signalling theory explanation. Menon and Williams (1994), Klein (2002b) and Beasley and Salterio (2001) suggest that better governed firms are more likely to appoint independent and experienced directors to the audit committee. Therefore following agency theory more independent boards with stronger financial expertise and better governance are more likely to appoint financial experts to the audit committee.

Outside Director Equity Holdings

Agency theory predicts that corporate governance and firm value improves with higher level director share ownership. As directors increase the equity holding in their firm, executives' objectives become more aligned with that of outside shareholders (Jensen 1993, Jensen and Meckling 1976, Anderson *et al.* 2004). Research also suggests that the share ownership of independent directors

substitutes for some governance mechanisms. For example, Klein (2002b) shows that the audit committee requires less independent directors when shares held by independent directors increase. In addition, Anderson *et al.* (2004) reports that the cost of capital is lower for firms that have higher outside directors share holding, and Abbott *et al.* (2004) find that financial restatements are less likely when outside directors ownership increases. These studies all show that director share ownership serves as a substitute for other governance mechanisms such as the inclusion of independent directors or financial experts. Therefore outside director ownership is possibly to be negatively related with financial expert appointments.

Inside Director Equity Holdings

Extant research has found that executive directors can become more entrenched for certain director ownership levels (Hermalin and Weisbach 1991, Davies *et al.* 2005, Short and Keasey 1999, Morck *et al.* 1988). On one hand, at lower levels of ownership, risk aversion dominates directors' behaviour because of their concerns of external discipline (Davies *et al.* 2005). Therefore, as their ownership grows, their objectives become more aligned with that of other shareholders (Hermalin and Weisbach 1991, Short and Keasey 1999, Davies *et al.* 2005). As appointing financial experts to the audit committee is perceived to better protect shareholders' interest (DeFond and Francis 2005), for the lower levels of ownership, executives may be more likely to improve audit committee financial expertise when their shareholding increases.

On the other hand, at higher levels of ownership, executive directors have stronger voting power, and external governance processes are much weaker (Davies *et al.* 2005). Executives have stronger control over corporate decision making and financial reporting, and their incentives are less aligned at this stage (Hermalin and Weisbach 1991, Davies *et al.* 2005, Short and Keasey 1999, Morck *et al.* 1988). In such circumstances, executives may need more protection over

their private information. Hence it is less likely that financial experts would be appointed to the audit committee.

As a result, in line with studies that found an inverted U-shape relation between managerial ownership and firm value, I expect that there may be an inverted U-shape relationship between ownership of executive directors and financial expert appointments.

5.3.2 The Impact of SOX on the Determinants of Audit Committee Financial Expertise

Prior to SOX, there was no mandate or disclosure requirement for audit committee financial expertise, and hence there was less pressure from investors on firms to provide this information. Companies used their discretions in deciding upon whether to appoint financial experts and the number of financial experts to the audit committee. Therefore before SOX was introduced, companies determined the degree of financial expertise solely based on their company characteristics. For instance the level of financial expertise would be influenced by firm size, firm performance, board compositions and the structure of director ownership as discussed in the previous section.

However, after SOX was introduced, the determinants of the level of audit committee financial expertise might change significantly by the Act. SOX may have two main impacts on listed companies. The first order impact of SOX is issuers are required to improve financial reporting quality and reduce the likelihood of financial fraud. Provisions under Title VIII, IX and XI of the Act impose greater criminal penalties on corporate managers and directors if financial fraud occurs. Possibly due to the higher litigation costs and responsibilities, independent board directors became more expensive to be appointed (Linck *et al.* 2008) and behaved more conservatively post-SOX (Linck, Netter and Yang 2007, Cohen *et al.* 2004a). Because corporate executives bear greater responsibilities (as

required in Section 302[40]) and all directors face higher criminal penalties, it would be more likely that companies employ financial experts to the audit committee in order to reduce the likelihood of financial fraud.

The second order effect of SOX is that issuers avoid explaining to the SEC and the public as to why the issuer does not appoint a financial expert to their audit committee, as required by Section 407 in SOX[41]. As discussed in Chapter 3, issuers may be concerned that there may be a negative impact on share prices if they disclose their audit committee does not include a financial expert (DeFond *et al.* 2005). Therefore in order to avoid the negative impact of not employing a financial expert and to avoid explaining to the SEC, issuers may employ one financially literate director to the audit committee just to comply with the requirements.

Both impacts would cause issuers to decide the level of audit committee financial expertise base on regulations rather than the companies' requirements post-SOX. This indicates that company characteristics and corporate governance structure have weaker impact in determining the likelihood of appointing financial experts and the degree of audit committee financial expertise post-SOX. Therefore if SOX had no impact on the determinants of audit committee financial expertise, I have the following hypotheses:

H1: Issuers' decision on appointing at least one financial expert to the audit committee was strongly influenced by firm characteristics post-SOX as it was pre-SOX.

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[40] Section 302 of SOX requires corporate executives to approve and certify the integrity of the annual or quarterly reports.

[41] Rule (a) of SOX Section 407 has the following requirement: *"(a) RULES DEFINING 'FINANCIAL EXPERT'- The Commission shall issue rules, as necessary or appropriate in the public interest and consistent with the protection of investors, to require each issuer, together with periodic reports required pursuant to sections 13(a) and 15(d) of the Securities Exchange Act of 1934, to disclose whether or not, and if not, the reasons therefore, the audit committee of that issuer is comprised of at least 1 member who is a financial expert, as such term is defined by the Commission"*

H2: Issuers' decision on the level of audit committee financial expertise was strongly influenced by firm characteristics post-SOX as it was pre-SOX.

5.4 Research Method and Models

To test hypothesis 1, I use the Logistic regression analysis with Model 5-1. I examine the model on two subsamples respectively. One subsample includes pre-SOX data and the other subsample includes post-SOX data.

Model 5-1 Determinants of audit committee financial expertise, logistic analysis

$$DummyAudFinex_{i,t}=\alpha+\beta_1 Board\ Size_{i,t}+\beta_2\ Board\ Indep_{i,t}$$
$$+\beta_3\ NonAUDCFinex_{i,t}+\beta_4\ Dual\ board_{i,t}+\beta_5 OutSDirOwn_{i,t}$$
$$+\beta_6\ InSDirOwn_{i,t}+\beta_7 LNMV_{i,t}+\beta_8\ MKBV_{i,t}+\beta_9 ROS_{i,t}+\beta_{10} LOSS_{i,t}+\varepsilon_{i,t}$$

The percentage of financial experts on the audit committee (AudFinex) represents for the degree of audit committee financial expertise. Board size (Board Size) is defined as the natural log of the number of directors on the board. Board independence (Board Indep) is defined as percentage of independent directors on the board. NonAUDCFinex is defined as the percentage of financial experts, who are not audit committee members, on the board. CEO duality (Dual board) is equal to 1 if the CEO chairs the board of directors. Following Klein (2002b), I define outside director ownership (OutSDirOwn) as the percentage of equity shares owned by all independent directors, whereas inside director ownership (InSDirOwn) is defined as the percentage of equity shares owned by all inside or affiliate directors[42]. Following previous research Klein (2002b), Beasley and Salterio (2001), the model controls for firm size, growth opportunities and operating performance. If coefficients of these variables are

[42] Definition of these variables are summarised in Chapter 4.

significant pre-SOX but become insignificant post-SOX, hypothesis 1 would be rejected.

To examine hypothesis 2, I employ Model 5-2 to test the relation between existing governance mechanisms and financial expert appointments from pre- to post-SOX.

Model 5-2 Determinants of audit committee financial expertise, regression analysis

$$AudFinex_{i,t}=\alpha+\beta_1 Board\ Size_{i,t}+\beta_2\ Board\ Indep_{i,t}+\beta_3\ NonAUDCFinex_{i,t}$$
$$+\beta_4\ Dual\ board_{i,t}+\beta_5 OutSDirOwn_{i,t}+\beta_6\ InSDirOwn_{i,t}+\beta_7\ InsDirOwnSQ_{i,t}$$
$$+\beta_8 LNMV_{i,t}+\beta_9\ MKBV_{i,t}+\beta_{10} ROS_{i,t}+\beta_{11} LOSS_{i,t}+\beta_{12} SOX$$
$$+\beta_{13} SOX*Board\ Size_{i,t}+\beta_{14} SOX*Board\ Indep_{i,t}+\beta_{15} SOX*NonAUDCFinex_{i,t}$$
$$+\beta_{16} SOX*Dual\ board_{i,t}+\beta_{17} SOX*OutSDirOwn_{i,t}+\beta_{18} SOX*InSDirOwn_{i,t}$$
$$+\beta_{19} SOX*InsDirOwnSQ_{i,t}+\beta_{20} SOX*LNMV_{i,t}+\beta_{21} SOX*MKBV_{i,t}$$
$$+\beta_{22} SOX*ROS_{i,t}+\beta_{23} SOX*LOSS_{i,t}+\varepsilon_{i,t}$$

Following previous studies (Hermalin and Weisbach 1991, Davies *et al.* 2005, Short and Keasey 1999, Morck *et al.* 1988), I use the square of inside director ownership (InSDirOwnSQ) to allow for a non-linear relation between inside director ownership and financial expertise. The dummy SOX is defined as 1 if the reported date of proxy statement is after June 30 2003, when was one year after SOX was enacted and was also the time that big companies were expected to comply with the Act. All variables are winsorized at the 1% level to avoid bias caused by outliers.

The dummy variable SOX is controlling for the incremental value of audit committee financial expertise from pre- to post-SOX[43]. In addition, all interactive

[43] The use of dummy variables and interaction dummy variables may potentially introduce multicollinearity problems into the model. However, preliminary tests show that the overall conclusion in the study holds when multicollinearity problem is controlled.

SOX dummies reflect the changes in the impact of independent variables on the level of financial expertise from pre- to post-SOX. If all or most interactive SOX dummies in Model 5-2 are significant, hypothesis 2 will be rejected.

Further, since AudFinex and NonAUDCFinex may simultaneously determine each other, a Hausman test was performed to test for the endogenous relationship between AudFinex and NonAUDCFinex. The results show that the endogenous relation between AudFinex and NonAUDCFinex could not be rejected. Therefore the Two Stage Least Square Regression with Generalized Method of Moments (GMM) iteration that uses instrumental variables has performed to solve the endogeneity problems. I therefore employ Model 5-3 to estimate NonAUDCFinex with the following instrumental variables as the first stage regression.

Model 5-3 Determinants of board financial expertise, regression analysis

$$NonAUDCFinex_{i,t}=\alpha+\beta_1 Board\ Size_{i,t}+\beta_2\ Board\ Indep_{i,t}+\beta_3\ Dual\ board_{i,t}$$
$$+\beta_4 OutSDirOwn_{i,t}+\beta_5\ InSDirOwn_{i,t}+\beta_6 LNMV_{i,t}+\beta_7\ MKBV_{i,t}+\beta_8 Leverage_{i,t}$$
$$+\beta_9 CaptialExp_{i,t}+\beta_{10} QuickRatio_{i,t}+\beta_{11} SOX+\beta_{12} SOX*Board\ Size_{i,t}$$
$$+\beta_{13} SOX*Board\ Indep_{i,t}+\beta_{14} SOX*Dual\ board_{i,t}+\beta_{15} SOX*OutSDirOwn_{i,t}$$
$$+\beta_{16} SOX*InSDirOwn_{i,t}+\beta_{17} SOX*LNMV_{i,t}+\beta_{18} SOX*MKBV_{i,t}$$
$$+\beta_{19} SOX*Leverage_{i,t}+\beta_{20} SOX*CaptialExp_{i,t}+\beta_{21} SOX*QuickRatio_{i,t}+\varepsilon_{i,t}$$

5.5 Data and Company Characteristics

5.5.1 Sample Construction and Sample Distribution

The analysis draws on a sample of S&P 500 companies comprising 1,636 firm-years between 2001 and 2005. Taking the S&P 500 constituents as a base, 2,500 company proxy statements (every statement between 2001 and 2005) were

collected from the SEC website. Data on board composition, CEO duality, director financial expertise, director ownership, audit committee composition, and board and audit committee meetings was manually collated from the proxy statements for each firm-year. Accounting data are taken from WorldScope database provided by Thomson One Banker. A full description of each governance variable is presented in Table 4-7 in Chapter 4.

Table 5-1 Descriptive statistics - sample distributions

Panel A: Distribution by year

Year	Original Sample	Financial Institutions	Missing Proxy Statement	Available Proxy Statement	Missing AudC Info.	Final Sample	% of Pooled Sample	% Sample - % Original Sample
2001	500	90	117	293	16	277	16.93%	-3.07%
2002	500	90	67	343	15	328	20.05%	0.05%
2003	500	90	55	355	15	340	20.78%	0.78%
2004	500	90	51	359	14	345	21.09%	1.09%
2005	500	90	44	366	20	346	21.15%	1.15%
Total	2500	450	334	1716	80	1636	100.00%	0.00%

Panel B: Distribution by industry

Industry Sector	Original Sample	% of Original Sample	Missing Proxy Statement	Available Proxy Statement	Missing AudC Info.	Final Sample	% of Pooled Sample	% Sample - % Original Sample
Oil & Gas	145	7.07%	36	109	10	99	6.05%	-1.02%
Basic Materials	120	5.85%	25	95	4	91	5.56%	-0.29%
Industrials	355	17.32%	40	315	18	297	18.15%	0.84%
Consumer Goods	295	14.39%	37	258	1	257	15.71%	1.32%
Healthcare	255	12.44%	38	217	13	204	12.47%	0.03%
Consumer Services	360	17.56%	33	327	15	312	19.07%	1.51%
Telecommunication	50	2.44%	16	34	8	26	1.59%	-0.85%
Utilities	150	7.32%	39	111	7	104	6.36%	-0.96%
Technology	320	15.61%	70	250	4	246	15.04%	-0.57%
Total	2050	100.00%	334	1716	80	1636	100.00%	0.00%

The sample consists of up to 346 non-financial S&P 500 companies per year during the period 2001 to 2005. The sample is constructed by examining all S&P 500 companies with available corporate governance information filed in the proxy statements on the Securities and Exchange Commission (SEC) website from 2001 to April 2006. Firm-years are omitted from the sample if information regarding audit committee composition, board and audit committee meetings at the year end is unavailable. The initial sample consists of 500 companies induding 90 financial companies each year. Missing Proxy Statement refers to the aggregate number of proxy statements missing from the SEC website. Missing AudC. Info refers to observations missed due to unavailable governance information in the proxy statements at the year end. The final sample consists of 1636 observations. The last column refers to the percentage of firms each year or each sector of the total number of firms in the final sample (1636).

Table 5-1, panel A presents a full breakdown of the sample. After deducting a total of 450 firm-years by removing financial firms and 334 firm-years for firms that did not provide proxy statements, there were 1,716 available proxy statements. I further removed 80 proxy statements because of incomplete or no governance data. The final sample comprises 1,636 firm-years from 346 companies across five years (2001-2005).

Unlike previous studies (Krishnan and Visvanathan 2005, DeFond *et al.* 2005), I choose the period covering pre-SOX, SOX and post-SOX to capture any impact of the Act on audit committee composition and expertise. Panel B of Table 5-1 shows the industry distribution of the overall sample. The sample firms are focused mainly in the industrial, consumer goods, consumer services and technology industries. Differences between the sample distribution and original sample distribution do not exceed 5%, indicating that the distribution of the sample of this chapter is fully representative of the distribution of the population of firms in the S&P 500.

5.5.2 Company Characteristics

Table 5-2 reports the descriptive statistics of the key variables of this study. I include audit committee size, independence and number of audit committee meetings in the table for comparison with prior research. The statistics generally suggest that companies in this sample have a stronger governance environment than previous studies. For example, Klein (2002b, 2002a), Xie *et al.* (2003), and Anderson *et al.* (2004) all found that the average board size is above 12. However, from 2001 onwards, Anderson *et al.* (2003) find that boards are smaller, a finding I support, with the sample companies in this thesis employing an average of 10.5 board members. Further, audit committees exhibits a similar trend that the

average committee size decreased from approximately 4.5 in the 1990s to 3.96 (Anderson *et al.* 2003) across my sample from 2001to 2005[44].

Table 5-2 Descriptive statistics of firm characteristics and governance variables

	Mean	Median	Std.	Max	Min
Panel A - Board Information Variables					
Board Size	10.47	10.00	2.32	16.00	6.00
% Independent Directors	80.7%	83.3%	10.3%	93.3%	50.0%
Financial Experts (No. Of)	2.03	2.00	1.41	6.00	0.00
% Financial Experts	19.7%	18.2%	13.6%	60.0%	0.0%
Non AudC. Financial Experts (No. Of)	0.98	1.00	1.01	4.00	0.00
% Non AudC. Financial Experts	9.1%	8.3%	9.3%	37.5%	0.0%
Board Meetings	7.94	7.00	3.09	20.00	4.00
Dual Board	0.74	1.00	0.44	1.00	0.00
Panel B - Director Ownership Variables					
Insider Ownership	0.03	0.01	0.05	0.29	0.00
Outsider Ownership	0.01	0.00	0.04	0.29	0.00
Panel C- Audit Committee Variables					
AudC Size	3.97	4.00	1.07	7.00	2.00
% AudC Independent Directors	99.3%	100.0%	3.9%	100.0%	75.0%
% AudC Financial Experts	28.0%	25.0%	24.7%	100.0%	0.0%
AudC Financial Experts (No. Of)	1.05	1.00	0.88	3.00	0.00
AudC Meetings	8.14	8.00	3.23	17.00	3.00
Panel D - Control Variables					
Market Value ($billion)	20.04	8.47	36.75	242.77	1.05
Return on Sales (ROS)	0.05	0.06	0.16	0.35	-1.00
Loss	0.06	0.00	0.24	1.00	0.00
Market / Book	3.04	2.31	2.56	14.86	0.25

The sample consists of up to 346 non-financial S&P 500 companies per year during the period 2001 to 2005. The sample is constructed by examining all S&P 500 companies with available corporate governance information filed in the proxy statements on the Securities and Exchange Commission (SEC) website from 2001 to April 2006. Board/AudC size is the number of directors serving on the company's board/audit committee at the beginning of the fiscal year. Independent directors are defined as non-executive directors who have no affiliation with the company beyond being directors. Financial experts are defined as directors who are specialized in finance or accounting. Directors who are working in the Banking and Accounting industry for more than 5 years, or as Chief Financial/Investment Officer or President of Finance of the company, or qualified as CPA or CFA, or Professors in Finance or Accounting. Board/AudC meetings are defined as the number of board/audit committee meetings held over the fiscal year. Accounting data is collected from the Worldscope database. MV is the year-end market value of the firm. MKBV is defined as the market value of the equity plus book value of debt and then divided by the book value of firm's total assets. ROA is Income divided by total assets. ROS is Income divided by total sales.

Compared with previous studies, the board and audit committee have become more independent as the sample period progresses. Average board independence increases from 58% (Klein 2002b, Klein 2002a) in 1991-1993 to 81% in 2001-2005, whereas audit committee independence increases from 80%

[44] Table 4-10 in Chapter 4 provides detailed comparison of governance variables between previous studies and this thesis.

to 99% respectively. Not all audit committees in this sample are completely independent. The Exchange Act 10A and Section 301 of SOX require that an audit committee member should not be someone who *"a) accepts any consulting, advisory, or other compensatory fee from the issuer; or b) be an affiliated person of the issuer or any subsidiary thereof"* (SEC 2002g). During the data collection from the proxy statements, it was found that some companies define those who worked for the company in the previous five years as independent directors. However, according to previous studies (Klein 1998, Hillier and McColgan 2006, Anderson *et al.* 2003), these directors should be categorized as affiliate directors. I follow this approach to define audit committee independence and therefore less than 1% of the sample firms are not totally independent.

Audit committee financial expertise has grown through time. The average number of audit committee financial experts grows from 0.9 in the 1990s (Anderson *et al.* 2004) to 1.05 in this thesis. Meanwhile, the number of audit committee meetings increases from average 3.5 times per year over the same period (Anderson *et al.* 2004, Xie *et al.* 2003) to 8.14 times per year in this sample period. However, the number of board meetings does not change as much. The statistics suggest that corporate boards delegated more responsibilities to sub-committees such as the audit committee to ensure the quality of the respective function, especially post-SOX, audit committee have to bear more responsibilities. Panel B reports director ownership characteristics. Generally, inside directors hold more shares than outside directors. The average inside director ownership is 3%, whereas the average outside director ownership is only 1%.

All in all, the statistics of this sample shows that companies have a stronger governance environment than in previous research. Boards and audit committees in this sample are more independent, have more financial expertise and are more active.

5.6 Results

5.6.1 Descriptive Statistics

Table 5-3 compares firm and governance characteristics of companies with and without financial expertise on the audit committee pre- and post-SOX respectively. The Wilcoxon-Mann-Whitney Test is performed to compare whether the differences in governance variables between different groups are significant. The statistics show that post-SOX, there are more firms that included a financial expert on the audit committee compared to the pre-SOX. The percentage of firms without financial experts dropped from 33.52% pre-SOX to 24.52% post-SOX, a 9% decrease. However, there remained 178 firm-years that did not include financial expert post-SOX.

In addition, the results also show that prior to SOX, companies that appointed financial experts had more superior governance characteristics compared to companies that did not include financial experts. The boards of these firms were significantly more independent and with a higher degree of financial expertise. In addition, inside director ownership is significantly higher, whereas outside director ownership is significantly lower. However, differences in most corporate governance variables and firm characteristics between firms with financial experts and without financial experts were not significant post-SOX. This implies that determinants of audit committee financial expertise might be dominated by regulation compliance other than self-selection.

Table 5-3 Firm and governance characteristics and audit committee financial expertise

	Pre-SOX				*Post-SOX*				*AudFinex=0*		*AudFinex=1*	
	AudFinex =0	AudFinex >0	Differences	Wilcoxon Test (p-value)	AudFinex =0	AudFinex >0	Differences	Wilcoxon Test (p-value)	Post-SOX - Pre-SOX	Wilcoxon Test (p-value)	Post-SOX - Pre-SOX	Wilcoxon Test (p-value)
N	305	605	Total=910		178	548	Total=726					
Percentage of the sub-sample	33.52%	66.48%	32.97%		24.52%	75.48%	50.96%		-9.00%		9.00%	
Board Size	10.52	10.50	-0.02	0.448	10.44	10.40	-0.04	0.468	-0.08	0.399	-0.10	0.202
% Independent Directors	79.01%	80.14%	1.14%	**0.034**	81.76%	81.79%	0.03%	0.434	2.76%	**0.002**	1.65%	**0.013**
Non AudC. Financial Experts (No. Of)	0.88	1.06	0.18	**0.002**	0.81	0.99	0.19	**0.071**	-0.07	0.463	-0.07	**0.074**
% Non AudC. Financial Experts	8.02%	9.91%	1.89%	**0.001**	7.74%	9.21%	1.46%	0.100	-0.28%	0.370	-0.70%	0.106
Dual Board	74.10%	75.37%	1.27%	0.338	73.60%	71.90%	-1.70%	0.330	-0.50%	0.452	-3.47%	**0.091**
Insider Ownership	2.31%	3.18%	0.87%	**0.001**	2.66%	2.94%	0.28%	0.122	0.35%	0.106	-0.24%	0.472
Outsider Ownership	1.34%	1.13%	-0.21%	**<.0001**	1.47%	1.11%	-0.36%	**0.006**	0.14%	0.181	-0.02%	0.500
Board Meetings	7.54	7.82	0.28	0.213	8.65	8.21	-0.44	**0.016**	1.11	**<.0001**	0.39	**0.016**
Audit Committee Meetings	6.96	7.37	0.41	**0.075**	9.11	9.35	0.24	0.110	2.16	**<.0001**	1.99	**<.0001**
Market Value ($billion)	25.73	14.99	-10.74	**<.0001**	25.92	20.54	-5.38	**0.004**	0.19	**0.009**	5.54	**<.0001**
Return on Sales (ROS)	4.73%	2.85%	-1.88%	**0.069**	8.69%	7.74%	-0.95%	0.370	3.96%	**0.001**	4.89%	**<.0001**
Loss	3.93%	6.12%	2.18%	**0.085**	6.74%	7.66%	0.92%	0.342	2.81%	**0.086**	1.55%	0.150
Market to Book	3.12	2.86	-0.26	**0.085**	2.91	3.24	0.33	0.159	-0.22	0.422	0.38	**<.0001**

The sample consists of up to 346 non-financial S&P 500 companies per year during the period 2001 to 2005. The sample is constructed by examining all S&P 500 companies with available corporate governance information filed in the proxy statements on the Securities and Exchange Commission (SEC) website from 2001 to April 2006. Board/AudC size is the number of directors serving on the company's board/audit committee at the beginning of the fiscal year. Independent directors are defined as non-executive directors who have no affiliation with the company beyond being directors. Financial experts are defined as directors who are specialized in finance or accounting. Directors who are working in the Banking and Accounting industry for more than 5 years, or as Chief Financial/Investment Officer or President of Finance of the company, or qualified as CPA or CFA, or Professors in Finance or Accounting. Board/AudC meetings are defined as the number of board/audit committee meetings held over the fiscal year. Accounting data is collected from the Worldscope database. MV is the year-end market value of the firm. MKBV is defined as the market value of the equity plus book value of debt and then divided by the book value of firm's total assets. ROA is Income divided by total assets. ROS is Income divided by total sales. Wilcoxon-Mann-Whitney test is performed to test differences of the variable between two samples. ***, ** and * indicate the changes are significant at 1%, 5% and 10% respectively.

Comparing the number of board and audit committee meetings from pre- to post-SOX between firms with financial experts and firms without financial experts, the results show that firms without financial experts tended to meet more frequently after the Act was implemented. The number of audit committee meetings of firms without financial experts is statistically lower than their counterpart (firms with financial experts) pre-SOX (6.96 < 7.73, significant at 10%). However, their boards met more frequently (8.65 times) post-SOX than their counterparts (8.21 times). In addition, increase in board and audit committee meetings was greater for firms without financial experts than firms with financial experts from pre- to post-SOX (1.11 > 0.39 for board meetings, 2.16 > 1.99 for audit committee meetings).

The above statistics imply that companies decided whether to appoint financial expert to the audit committee based on the companies' requirements pre-SOX. However, after SOX was introduced, companies appointed financial experts only to comply with the Act. In addition, the results also show that firms that did not employ financial experts may hold more audit or board meetings post-SOX to ensure the internal control function. To investigate the relation between financial expert appointments and firm characteristics, I utilise both the logistic analysis and regression analysis in the next section.

5.6.2 Logistic Analysis

Table 5-4 shows the results of the logistic analysis. The logistic regression shows the relationship between governance variables and the probabilities of having at least one financial expert on the audit committee, where the positive sign reflects higher probability.

Table 5-4 Logistic regression - the impact of SOX on the probabilities of appointing financial experts to the audit committee

$$DummyAudFinex_{i,t} = \alpha + \beta_1 BoardSize_{i,t} + \beta_2 BoardIndep_{i,t} + \beta_3 NonAUDCFinex_{i,t} + \beta_4 Dualboard_{i,t} + \beta_5 OutSDirOwn_{i,t} + \beta_6 InSDirOwn_{i,t} + \beta_7 LNMV_{i,t} + \beta_8 MKBV_{i,t} + \beta_9 ROS_{i,t} + \beta_{10} Loss_{i,t} + \varepsilon_{i,t}$$

Variables	Pre-SOX		Post-SOX	
	Estimate	Wald Chi-square	Estimate	Wald Chi-square
Intercept	0.795	0.85	2.017	3.47 *
Board Size	0.053	2.30	0.029	0.42
Board Indep.	2.701	11.29 ***	0.989	0.94
Non AUDC FinExp. (Fit)	2.519	9.64 ***	1.937	3.64 *
Dual Board	-0.060	0.11	-0.142	0.47
OutS. Dir. Own.	-2.192	1.68	-1.950	1.15
InS. Dir. Own.	5.112	8.80 ***	0.415	0.57
LNMV	-0.351	20.13 ***	-0.246	6.96 ***
MKBV	0.024	0.59	0.096	5.07 **
Loss	0.440	1.42	0.079	0.04
ROS	-0.134	0.09	-0.462	0.26
Observations		910		726

The sample consists of up to 346 non-financial S&P 500 companies per year during the period 2001 to 2005. sample is constructed by examining all S&P 500 companies with available corporate governance information filed in the proxy statements on the Securities and Exchange Commission (SEC) website from 2001 to April 2006. Dependent variable takes 1 if the audit committee has at least one financail expert, 0 otherwise. Board size is defined as the natural log of number of directors on the board. Board independence is defined as the percentage of independent directors on the board. Non-AudC. FinExp. is defined as the percentage of financial experts who are not audit committee members on the board. Dual Board is defined as 1 if the companies' CEO also serves as chairman of the board. OutSDirOwn. is defined as the sum of ownership hold by independent directors on the board. InSDirOwn. is defined as the sum of ownership hold by inside or affiliate directors on the board. Accounting data is collected from the Worldscope database. LNMV is the natural log of the year-end market value of the firm. MKBV is defined as the market value of the equity plus book value of debt and then divided by the book value of firm's total assets. ROS is Income divided by total sales. Loss is 1 if the company have negative net income in the previous two years. Pre-SOX/Post-SOX is firm years before/after the date June 30th 2003. ***, ** and * indicate the changes are significant at 1%, 5% and 10% respectively.

The results show that existing governance mechanisms were the main factors that influenced the decision of financial expert appointment pre-SOX. However, the determinants of audit committee appointments tended to be dominated by regulatory compliance rather than firm and governance characteristics post-SOX. Board independence, board financial expertise, inside director ownership and firm size are the main factors that affect the appointment

of financial expert pre-SOX. These variables were significant at 1% in the model in the pre-SOX subsample.

However, board independence and inside director ownership did not affect the decision process post-SOX. Both board independence and inside director ownership lose power in the logistic model in the post-SOX subsample. In addition, the significance level of board financial expertise has changed from 1% to 5%. The intercept becomes significant in the post-SOX subsample, which indicates that a majority of companies appointed at least one financial expert to the audit committee post-SOX. This is another indication that regulatory compliance dominated the determinants of financial expert appointments. This result implies that regulatory compliance strongly dominates the determinant process post-SOX. Since most governance variables were not as significant post-SOX as they were pre-SOX, therefore hypothesis 1 is rejected.

5.6.3 Regression Analysis

Table 5-5 reports the results of the regression analysis with the Generalized Method of Moments (GMM) estimation for Model 5-2. The left-hand side of the table shows estimates for the determinants of audit committee financial expertise pre-SOX, whereas the right-hand side shows estimates for the variables post-SOX. The dummy variable (SOX) controls for the changes in audit committee financial expertise from pre- to post-SOX, while the interactive dummy variable (SOX*Variables) controls for the impact of SOX on the determinants of audit committee financial expertise. As discussed in Section 5.3.2, if the interactive dummies are significant, it indicates that SOX has impacted on the determinants of audit committee financial expertise and hence hypothesis 2 would be rejected.

Table 5-5 Regression analysis with GMM estimation - the impact of SOX on the determinants of audit committee financial expertise

$$AudFinex = \alpha + \beta_1 Board\ Size_{i,t} + \beta_2 Board\ Indep_{i,t} + \beta_3 NonAUDCFin\,ex_{i,t} + \beta_4 Dual\ board_{i,t} + \beta_5 OutSDirOwn_{i,t} + \beta_6 InSDirOwn_{i,t} + \beta_7 InsDirOwnSQ_{i,t} + \beta_8 LNMV_{i,t} + \beta_9 MKBV_{i,t} + \beta_{10} ROS_{i,t} + \beta_{11} LOSS_{i,t} + \beta_{12} SOX + \beta_{13} SOX * Board\ Size_{i,t} + \beta_{14} SOX * Board\ Indep_{i,t} + \beta_{15} SOX * NonAUDCFin\,ex_{i,t} + \beta_{16} SOX * Dual\ board_{i,t} + \beta_{17} SOX * OutSDirOwn_{i,t} + \beta_{18} SOX * InSDirOwn_{i,t} + \beta_{19} SOX * InsDirOwnSQ_{i,t} + \beta_{20} SOX * LNMV_{i,t} + \beta_{21} SOX * MKBV_{i,t} + \beta_{22} SOX * ROS_{i,t} + \beta_{23} SOX * LOSS_{i,t} + \varepsilon_{i,t}$$

	GMM estimates					Post SOX Estimate
Variables	Estimate	t-stat		Estimate	t-stat	
Intercept	-5.056	-2.89 ***	SOX	5.935	3.39 ***	0.879
Board Size	-0.017	-0.40	SOX*Board Size	0.002	0.04	-0.015
Board Indep.	3.077	2.66 ***	SOX*Board Indep.	-3.216	-2.78 ***	-0.139
Non AUDC FinExp	1.639	1.61	SOX*Non AUDC FinExp	-1.280	-1.26	0.359
Dual Board	0.427	1.82 *	SOX*Dual Board	-0.506	-2.14 **	-0.079
OutS. Dir. Own.	2.489	0.88	SOX*OutS. Dir. Own.	-2.497	-0.88	-0.008
InS. Dir. Own.	65.663	3.60 ***	SOX*InS. Dir. Own.	-64.679	-3.54 ***	0.984
InS. Dir. Own.SQ	-215.868	-3.74 ***	SOX*InS. Dir. Own.SQ	212.688	3.68 ***	-3.180
LNMV	0.204	2.78 ***	SOX*LNMV	-0.223	-3.02 ***	-0.019
MKBV	-0.079	-2.47 **	SOX*MKBV	0.076	2.36 **	-0.003
Loss	-0.008	-0.04	SOX*Loss	-0.028	-0.12	-0.036
ROS	0.608	1.25	SOX*ROS	-0.617	-1.27	-0.009
Observations			1127			
Adjusted R^2			-34.218			
Degree of freedoms			24			

Chow Test	Observations (Pre-SOX: Post-SOX)	F value	p-value
	605:548	3.67	<.0001

The sample consists of up to 346 non-financial S&P 500 companies per year during the period 2001 to 2005. The sample is constructed by examining all S&P 500 companies with available corporate governance information filed in the proxy statements on the Securities and Exchange Commission (SEC) website from 2001 to April 2006. Dependent variable is the percentage of financial experts on the audit committee. Board size is defined as the natural log of number of directors on the board. Board independence is defined as the percentage of independent directors on the board. Non-AudC. FinExp. is defined as the percentage of financial experts who are not audit committee members on the board. Dual Board is defined as 1 if the companies' CEO also serves as chairman of the board. OutSDirOwn. is defined as the sum of ownership hold by independent directors on the board. InSDirOwn. is defined as the sum of ownership hold by inside or affiliate directors on the board. Accounting data is collected from the Worldscope database. LNMV is the natural log of the year-end market value of the firm. MKBV is defined as the market value of the equity plus book value of debt and then divided by the book value of firm's total assets. ROS is Income divided by total sales. Loss is 1 if the company have negative net income in the previous two years. Pre-SOX/Post-SOX is firm-years before/after the date June 30th 2003. ***, ** and * indicate the changes are significant at 1%, 5% and 10% respectively.

Consistent with the agency theory discussions in Section 5.3.1, a more independent board appoints more financial experts to the audit committee. In

addition, consistent with previous studies (Hermalin and Weisbach 1991, Davies *et al.* 2005, Short and Keasey 1999, Morck *et al.* 1988), there is an inverted U-shape relation between inside director ownership and the degree of financial expertise. However, CEO duality is positively related to financial expertise. Possibly this is because shareholders need more protection to their wealth through appointing more financial experts[45]. However, board size and outside director ownership are not significantly related to the degree of financial expertise.

The right-hand side of the table shows coefficients for the determinants of audit committee financial expertise post-SOX. Interaction dummy variables for board independence, CEO duality and inside director ownership are significant, suggesting that SOX has a significant impact on a company's decision over the level of audit committee financial expertise. The last column shows coefficients of the governance variables and firm characteristics variables post-SOX. The coefficients are calculated as pre-SOX estimates plus the corresponding interaction dummies. Compared to the pre-SOX estimates, all post-SOX estimates are significantly smaller. This indicates that firm and governance characteristics have much smaller impact on the level of financial expertise after the introduction of SOX. This in turn implies that companies that employed financial experts mainly did it to comply with regulations rather than to fulfil their companies' requirements.

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[45] Possible explanations are as follows. Pre-SOX, there were no regulations monitoring corporate managers, therefore shareholders may require more financial experts to conduct the monitoring function in order to ensure financial reporting quality. However, since SOX required issuers to have financial experts on their audit committee, shareholders rely more on regulations instead of self-governance-improvements. Therefore corporate remote shareholders no longer took actions to require the company to appoint financial experts post SOX because they relied on the Act and believed that the Act had enough power to monitor executives.

Moreover, the signs of governance and firm variables changed post-SOX. The pre-SOX estimates show that firms with better governance system appoint more financial experts, indicating that they appoint financial experts to complement existing governance (Klein 2002b, Beasley and Salterio 2001). However, signs for the board independence variable have changed post-SOX. This indicates that companies tended to appoint financial experts to substitute some of the existing governance post-SOX.

Finally, A Chow Test is performed to examine whether changes of the coefficients from pre- to post-SOX in Table 5-5 are statistically significant. The F-value for the Chow Test is 3.67 and significant at the 0.001 level. This provides further evidence that, the changes of coefficients of governance and firm characteristics variables were significantly affected by SOX.

5.6.4 Additional Analysis – the Impact of Governance and Firm Variables on the Additional Expertise

I perform one additional analysis to investigate the impact of governance and firm characteristics on the firms' decision on appointing additional financial experts. I analyse the relation between the changes in audit committee financial expertise on the changes in governance and firm variables from pre- to post-SOX. Pre-SOX period is defined as the period from July 1st 2002 to June 30th 2003, whereas post-SOX period is defined as the period from July 1st 2003 to June 30th 2004. There are totally 315 observations with available data both pre- and post-SOX.

Consistent with analyses in Section 5.6.2 and Section 5.6.3, I perform one logistic analysis and one regression analysis. For the logistic analysis, the dependent variable is 1 when companies add more financial experts to the audit committee and 0 otherwise. All independent variables in Model 5-1 are replaced

by the corresponding variable from pre- to post-SOX. The results show that increase in board size and independence increase the likelihood a firm appointing additional financial experts to the audit committee. However, a decrease in board financial expertise increased the likelihood a firm appointing additional financial experts from pre- to post-SOX.

For the regression analysis, the dependent variable is the changes in audit committee financial expertise and the independent variables are the changes in governance and firm variables. The results show that only the intercept and board financial expertise variable are significant, where board financial expertise is significantly negative. This suggests that first, the changes in audit committee financial expertise is determined by board financial expertise changes. Secondly, because the intercept is significant, it indicates that the changes were caused mainly by regulations rather than firm characteristics.

In sum, the results show that although some governance variables still impact on the firm's decision to appoint financial experts, their decision was strongly affected by the Act.

5.7 Conclusions

This chapter examines the impact of SOX on the determinants of audit committee financial expertise. I first utilise agency theory to analyse factors that are associated with the audit committee financial expertise pre-SOX. Consistent with the agency theory explanation, I find that existing governance mechanisms such as board independence, board financial expertise, CEO control and director ownership, are the main determinants of the firms' decision to include financial experts on the audit committee.

I then examine the impact of SOX on the likelihood a firm will appoint financial experts to the audit committee. I employ a logistic analysis model to explore the relation between the likelihood of a firm appoint financial experts and firm and governance characteristics. The results show issuers' economic performance and existing corporate governance were statistically significant in determining whether to appoint a financial expert pre-SOX, but lost statistical power post-SOX. This suggests after SOX was enacted, companies that decided to include at least one financial expert mainly wanted to comply with the Act, whereas pre-SOX, issuers made this decision based on the companies' requirements.

In addition, I employ a regression model to estimate the impact of governance and firm characteristics variables on the degree of audit committee financial expertise. The results show that companies' decision in relation to the level of financial expertise was based on the companies' governance and firm characteristics pre-SOX. However, coefficients of governance variables and ownership structure variables decreased significantly post-SOX. This implies that companies decide upon the degree of audit committee financial expertise based more on regulatory compliance rather than the companies' need.

Moreover, the signs of some governance variables changed significantly post-SOX, indicating that companies tended to appoint financial experts to complement existing governance mechanisms pre-SOX, but post-SOX they tended to appoint financial experts to substitute existing governance. Last, a Chow test is performed and the results suggest that the Act has a significant impact on the determinants of audit committee financial expertise from pre- to post-SOX.

An additional analysis is performed to examine what factors impacted on the changes in a company's decision of appointing additional financial experts to the

audit committee post-SOX. The results show that only board financial expertise impacted on the changes in firm's decision, and the intercept is statistically significant. This suggests that firm's decision was strongly affected by the Act rather by the firm's requirements.

In sum, the results suggest that after SOX was enacted, an issuer was mainly motivated to employ financial experts to comply with the Act, but not by the companies' needs. In addition, results also suggest that issuers employ financial experts to complement existing governance pre-SOX, but post-SOX issuers employ financial experts to substitute existing governance.

The next chapter, chapter 6, will further investigates the financial impact of the issuers' decision to appoint or dismiss financial experts post-SOX.

6

WAS THE SARBANES-OXLEY ACT BENEFICIAL TO SHAREHOLDERS? AN ANALYSIS OF AUDIT COMMITTEE FINANCIAL EXPERTISE

In response to the enactment of the Sarbanes-Oxley Act 2002, corporate board of directors increased the level of audit committee financial expertise substantially post-SOX. Using a unique dataset of audit committee financial expertise, I examine whether the company's response to SOX Section 407 has improved a firm's financial reporting quality and firm value. In contrast to the SEC expectation, the results show that firms that did not appoint financial experts either pre- or post-SOX had greater improvements in financial reporting quality than firms that appointed financial experts both pre- and post-SOX. However, firms which appointed financial experts pre-SOX but did not appoint financial experts post-SOX had experienced a reduction in financial reporting quality. In relation to firm value, firms that maintained appointing audit committee financial experts pre- and post-SOX had a greater increase in firm value over the sample period. Therefore the results imply that SOX did not achieve its objectives of improving financial reporting quality. However, it has, albeit unintentionally, enhanced corporate value for some firms.

6.1 Introduction

The arrival of the Sarbanes-Oxley Act in 2002 (SOX) imposed significantly higher legal liabilities and greater responsibilities on the directors of listed companies ("companies", or "issuers", or "firms" hereafter). Post-SOX, executives are under considerably more pressure to ensure that their audit function is efficient and able to competently assess the financial health of the firm. As a result, companies appoint more accounting and financial experts to their audit committees in order to enhance financial reporting quality. The financial impact of appointing financial experts to the audit committee, however, has not been empirically examined.

There have been a number of studies examining the impact of SOX on U.S. listed companies. On one hand, the Act, especially Section 404, has imposed higher compliance costs to issuers. It brought additional net costs to listed firms and led to a deterioration in overall firm value (Zhang 2007). Due to the perceived higher compliance costs, most companies either chose to go dark[46] or to go private (Engel *et al.* 2007, Leuz *et al.* 2008). On the other hand, shareholders regarded the Act as beneficial to their interests because it imposed greater liabilities and legal costs on executives and directors, which in turn improved corporate governance and provided better protection on shareholder wealth (Holmstrom and Kaplan 2003, Linck *et al.* 2008; Chhaochharia and Grinstein 2007, Li *et al.* 2008, Jain and Rezaee 2006). While Li *et al.* (2008) and Jain and Rezaee (2006) find that SOX brought total net benefits to listed firms.

[46] Leuz *et al.* (2008) defines "go dark" as *"listed companies cease filing with the Securities and Exchange Commission (SEC) by deregistering their securities, but continue to trade in the Over-the-counter (OTC) market"*, where *"going dark and going private both remove the obligation to provide information to public investors. However, there are important distinctions between these actions, the most notable being that going-dark firms continue trading after the date of deregistration"* (Leuz *et al.*, page 184).

Chhaochharia and Grinstein (2007) find that large firms that were less compliant to SOX earned higher abnormal returns.

Leuz (2007) suggests that previous SOX studies had the following weaknesses. First, Leuz (2007) argues that there was a lack of a control group that was *"not affected by the SOX and comparable to U.S. firms in previous studies"* (Leuz 2007, page 149). Therefore the results in prior research might be contaminated by other news, thus not entirely attributable to SOX. Secondly, since SOX was *"...passed as a package of complementary provisions"* (Leuz 2007, page 149), the overall market reaction may reflect only the net benefits or costs of the whole package but not of a specific SOX provision. In addition, listed-companies' response such as going-dark or going-private (Engel *et al.* 2007, Leuz *et al.* 2008) may reflect the perception of potential costs of SOX rather than the actual costs incurred. These weaknesses raise several questions regarding first, are all provisions costly to issuers? Secondly, are some specific provisions beneficial to issuers, and thirdly, in what aspect is a specific provision beneficial or costly to issuers? These questions motivate research in this chapter.

In this chapter, I investigate the effect of SOX Section 407 on listed companies. To examine the incremental benefits or costs of a specific SOX provision to issuers, Leuz's (2007) advice is to *"...separate the effects of particular SOX provisions by using cross-sectional analysis of stock returns"* (Leuz 2007, page 149). I therefore separate a sample of data into four portfolios according to their responses to SOX Section 407, and compare the differences in financial reporting quality and firm value across the four portfolios. This chapter has the following contributions to the audit committee and SOX research.

First, this study investigates the impact of Section 407 specifically, rather than the Act as a whole. Previous SOX studies focused on examining the net effects of the Act by comparing stock market performance from pre- to post-

SOX (Zhang 2007, Li *et al.* 2008, Jain and Rezaee 2006). Since the Act was passed as *"...a package of complementary provisions"* (Leuz 2007, page 149), previous studies did not assess the impact of a specific provision. In contrast to prior studies, this chapter separates the sample according to the firms' response to Section 407 and compares the differences among different portfolios[47]. In doing so, this study is able to distinguish the impact of Section 407 from other provisions in the Act.

Secondly, this study provides evidence of the consequences of appointing financial experts rather than the reasons to appoint financial experts in response to Section 407. Previous SOX research only examined why companies designated or appointed financial experts in response to SOX. For example, Carcello *et al.* (2006b) examines how company characteristics influence firms' designations of audit committee financial experts in response to Section 407. Further, Chapter 5 in this thesis examines the determinants of audit committee financial expert appointments after the Act was announced. This chapter however explores the financial impact of appointing financial experts to their audit committee post-SOX, e.g. what have changed in the issuers' financial reporting quality and firm value. This is especially important to regulators because it provides an evaluation to the effectiveness of Section 407 in SOX.

Thirdly, this chapter explores whether the decreased earnings management post-SOX attributed to the increased level of audit committee financial expertise. Cohen *et al.* (2005) find that earnings management decreased substantially after SOX was enacted. Meanwhile, both Carcello *et al.* (2006b) and Chapter 5 in this thesis document that the level of audit committee financial expertise increased substantially post-SOX. However, there is no research exploring the link between the decreased earnings management and the increased level of financial expertise post-SOX. This chapter therefore explores this link and documents evidence of

[47] The way I construct the portfolios is summarised in the proceeding sections.

whether the decrease in accounting earnings management was caused by the changes in audit committee financial expertise.

I select a sample that consists of 630 firm-years from the S&P 500 index, with 315 observations pre-SOX and 315 observations post-SOX. The sample is then divided into four portfolios: the NN portfolio, the FF portfolio, the NF portfolio and the FN portfolio. The NN portfolio consists of companies that did not include any financial expert either pre- or post-SOX. The FF portfolio consists of companies that included at least one financial expert both pre- and post-SOX. The NF portfolio consists of companies that did not include a financial expert pre-SOX but they included a financial expert post-SOX; and the FN portfolio consists of companies that included a financial expert pre-SOX but they did not include any financial expert post-SOX.

The sample distributions show that the majority of issuers chose to follow the spirit[48] of the Act both pre- and post-SOX, i.e. to include at least one financial expert in both periods. I further examine which portfolio had greater improvements in financial reporting quality. The results show that companies that maintained or switched to include at least one financial expert post-SOX had lower improvements in financial reporting quality than companies that maintained not to appoint financial experts. Inconsistent with the hypothesis, both the FF and the NF portfolios had a lower increase in financial reporting quality relative to the NN portfolio from pre- to post-SOX. In addition, financial reporting quality improved when the audit committee became more active, but the marginal improvements of financial reporting quality by an audit committee are lower for firms that appoint financial experts post SOX.

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[48] Section 407 does not mandate issuers to appoint financial experts. Instead, it requires issuers to disclose whether they have financial experts on the audit committee and explain the reason if they do not have one. This indicates issuers have discretions to appoint financial experts. Therefore if issuers appoint a financial expert to the audit committee, I define them as following the spirit of the Act.

In the context of firm value, the descriptive statistics show that companies in the NF portfolio had the highest firm value both pre- and post-SOX. In contrast, companies in the FN portfolio had the lowest firm value pre- and post-SOX. Firm value of the FF and the NN portfolios are between the firm value of the NF and the FN portfolios. Further, the regression analysis shows that firms that chose to follow Section 407 post-SOX, e.g. the FF portfolio and the NF portfolio, had a greater increase in firm value than the firms that did not follow the rules post-SOX.

Overall, the results generally indicate that SOX is beneficial to investors in that, overall, both firm value and financial reporting quality has been improved post-SOX. For firm value, the improvements were more substantial for firms which include financial experts post-SOX. However, for Section 407, it has not achieved its intended improvements in financial reporting quality through appointing financial experts.

The rest of this chapter is organised as follows. Section 6.2, develops the hypotheses. Section 6.3 presents the data and methodologies. Section 6.4 discusses the empirical results. Section 6.5 performs additional testing and Section 6.6 concludes the chapter.

6.2 Hypothesis Development

6.2.1 Financial Reporting Quality

Section 407 requires issuers to disclose whether they have at least one financial expert in the audit committees and if not explain why not. Since it is at the companies' discretion to appoint financial experts, a company can either simply follow the rules or the spirit of Section 407 by appointing financial experts to

their audit committees, or do not follow the rules but employ other governance mechanisms to substitute the lack of expertise. Therefore according to a company's choice of appointing financial experts, I create four portfolios, which are the NN portfolio, the FF portfolio, the NF portfolio and the FN portfolio. The NN portfolio consists of companies that did not include any financial expert either pre- or post-SOX. The FF portfolio consists of companies that included at least one financial expert both pre- and post-SOX. The NF portfolio consists of companies that did not include a financial expert pre-SOX but they included a financial expert post-SOX; and the FN portfolio consists of companies that included a financial expert pre-SOX but they did not include any financial expert post-SOX.

Agency theory suggests that the main function of an audit committee is to reduce agency costs by monitoring managers over financial reporting thus ensuring financial reporting integrity (Watts 2003, Jensen and Meckling 1976). The audit committee is therefore vital to ensure internal control, improving financial reporting quality and enhancing communication with external auditors (DeZoort *et al.* 2002, Krishnan 2005). Previous research has documented evidence that appointing financial experts to the audit committee improves financial reporting quality. For example, Carcello *et al.* (2006a) and Bedard *et al.* (2004) find that financial reporting standards are higher for firms that have more financial experts in the audit committee. Abbott *et al.* (2004) reports that firms are less likely to restate financial reports if their audit committees have at least one financial expert. In addition, Krishnan (2005) documents that audit committees with financial experts are less likely to have internal control problems within the firm. Therefore appointing more financial experts into the audit committee can reduce earnings management and improve financial reporting quality.

Since financial reporting quality is associated with the level of audit committee financial expertise and the firm's corporate governance (Klein 2002a, Carcello *et al.* 2006a, Bedard *et al.* 2004, Xie *et al.* 2003), companies that maintain a higher level of audit committee financial expertise are likely to have more reliable accounting information compared to companies that have a lower level of audit committee financial expertise. This suggests that if companies switch from having a higher to having a lower level of financial expertise, they may experience a decrease in financial reporting quality, and vice versa.

As a result, the changes in financial reporting quality for the four portfolios may follow the following order. The FN portfolio has the greatest decrease in financial reporting quality from pre- to post-SOX, whereas the NF portfolio has the greatest increase in financial reporting quality within the four portfolios. Compared to the NN portfolio, the FF portfolio may have greater improvement in financial reporting quality. This is because for the FF portfolios, there are financial experts on the audit committee who are first, more capable in enhancing financial reporting quality; and second they have higher reputation costs motivating them to ensure higher financial reporting quality. Therefore the hypotheses are as follows.

H1: The FN portfolio has the greatest reduction in financial reporting quality, whereas the NF portfolio had the greatest improvement in financial reporting quality from pre- to post-SOX.

H2: The FF portfolio had greater reduction in financial reporting quality than the NN portfolio from pre- to post-SOX.

6.2.2 Firm Value

Agency theory predicts that firms with better governance structure have higher firm value as they are associated with lower agency costs (Jensen 1986, Jensen and

Meckling 1976). Previous research has documented evidence that superior governance structure is associated with higher firm value (Gompers *et al.* 2003). In addition, Yermack (1996) presents evidence that shareholder wealth is higher when the boards are smaller. Core, Holthausen and Larcker (1999) also find that boards with more independent directors have less agency costs and perform better, and Cremers and Nair (2005) report that better governance mechanisms are associated with higher firm performance. Since superior governance structure is associated with higher firm value, appointing (dismissing) financial experts to (from) the audit committee is expected to add (damage) firm value.

In addition, firms with better governance system may incur a lower cost of capital, which in turn enhances firm value. Anderson *et al.* (2004) find that firms with more qualified audit committees pay less on their borrowings. They argue that creditors determine the cost of debt based on the firms' financial reporting reliability[49] (Anderson *et al.* 2004). Companies that employ financial experts to the audit committee therefore may have lower cost of capital, which in turn enhances firm value. DeFond *et al.* (2005) present evidence consistent with this argument, and they find that firms who appointed financial experts to the audit committee have higher stock returns. Although Weir, Laing and McKnight (2002) do not find any significant relationship between audit committee independence and firm value, they suggest better firm performance is associated with a higher profile audit committee. Therefore, it is expected that boards which employ financial experts are likely to have better firm performance and firm value.

As a contrasting argument, recent research on SOX suggests that the Act has imposed excessively high compliance costs to listed companies (Zhang 2007, Chhaochharia and Grinstein 2007). Firms that employ more financial experts in

[49] Anderson et al. (2004) find that creditors consider financial accounts more credible if the issuer's audit committee is of higher profile, and they charge lower interests to issuers with higher profile audit committees, e.g. more independent, expertise and active audit committees.

response to SOX Section 404 would also bear significant compliance costs. Concerned with reputation risk, financial experts are more likely to require their company to expend more resources, both monetary and human, to comply with the Act. This may result in a situation where companies focus more on complying with regulations rather than focusing on business objectives (Solomon and Bryan-Low 2004 cited in Zhang 2007). Consequently, the employment of financial experts will not maximise firm value if the concomitant costs of employment are too high post-SOX (Linck *et al.* 2008). Therefore, firms with more financial experts may actually have a lower firm value compared with their peer companies.

I formulate the hypothesis under the former arguments that appointing (dismissing) financial experts to (from) the audit committee enhances (impairs) firm value. In addition, firms that changed from appointing financial experts to dismissing financial experts would have the greatest change in firm value, and vice versa. Therefore the NF portfolio has the greatest increase in firm value while the FN portfolio has the largest decrease in firm value. Further, the FF portfolio would have higher increase in firm value than the NN portfolio because first, savings from the lower cost of capital which is brought by lower agency cost, could be invested in projects that add value to the firm for the next fiscal year. As a result, better governed companies would have a greater increase in firm value. However, ultimately, these questions are empirical ones.

H3: The NF portfolio had the greatest increase in firm value, whereas the FN portfolio had the greatest decrease in firm value from pre- to post-SOX.

H4: The FF portfolio had a greater increase in firm value than the NN portfolio.

6.3 Data and Methodologies

6.3.1 Data

Table 6-1 Descriptive statistics - sample distributions

Panel A: Distribution by year

Year	Original Sample	Financial Institutions	Missing Proxy Statement	Available Proxy Statement	Missing AudC Info.	Final Sample	% Sample	% Sample - % Original Sample
2002	500	90	67	343	15	328	32.38%	-0.95%
2003	500	90	55	355	15	340	33.56%	0.23%
2004	500	90	51	359	14	345	34.06%	0.72%
Total	1500	270	173	1057	44	1013	100.00%	0.00%

Panel B: Derivation of the sample

	Observations available from pre-SOX to post-SOX	Missing data for the calculation of Tobin's Q and Discretionary Accruals	Final Sample
No. of Observations	328	13	315

The sample consists of up to 345 non-financial S&P 500 companies during the period 2002 to 2004. The sample is constructed by examining all S&P 500 companies with available corporate governance information filed in the proxy statements on the Securities and Exchange Commission (SEC) website from 2002 to 2004. Firm-years are omitted from the sample if information regarding audit committee composition, board and audit committee meetings at the year end is unavailable. The initial sample consists of 500 companies including 90 financial companies each year. Missing Proxy Statement refers to the aggregate number of proxy statements missing from the SEC website. Missing AudC. Info refers to observations missed due to unavailable governance information in the proxy statements at the year end. The final sample consists of 1013 observations. The last column refers to the percentage of firms each year or each sector of the total number of firms in the final sample (1013).

Panel B presents the derivation of the final sample for the analyses in this study. There are 328 firms with available corporate governance information from 2002 to 2004. After deleting firms with unavailable accounting information to calculate Tobin's Q and the Discretionary Accruals, there are 315 firms with all information for the analyses in this study. Pre/Post-SOX is defined as the date before/after June 30 2003.

Panel A of Table 6-1 shows the descriptive statistics of the sample. The analysis draws on a sample of S&P 500 companies comprising of 1,013 firm-years between 2002 and 2004[50]. Taking the S&P 500 constituents as a base, 1,500 company proxy statements (every proxy statement between 2002 and 2004) were collected from the SEC website. Data on audit committee financial expertise was

[50] I restrict the sample period to 2002-2004 because I want to capture the effects on issuers' financial reporting quality and firm value of the immediate changes in audit committee characteristics after SOX was enacted.

manually collated from the proxy statements for each firm-year and accounting data is taken from WorldScope.

After deducting 270 firm-years through omitting financial firms and 173 firm-years for firms that do not have proxy statements and corporate governance information, I was left with 1,013 available observations. The final sample comprises 1,013 firm-years from 343 companies across three years, 2002-2004. Table 6-1, panel A presents a full breakdown of the sample. The sample distributions do not deviate from the original sample distributions since the difference in distributions between this sample and the original sample is less than 1%.

I next chose the period covering pre-SOX and post-SOX to capture the impact of the Act on audit committee financial expertise. As Chapter 4 and Chapter 5 show, June 30th 2003 is one year after the Act was enacted and thus expected to be the date large companies comply with rules, and there was a structural change in the determinants of audit committee financial expertise from this date on. Therefore consistent with Chapter 4 and Chapter 5, the pre-SOX period is defined as the period from July 1st 2002 to June 30th 2003, whereas the post-SOX period is defined as the period from July 1st 2003 to June 30th 2004. Deleting observations that lack accounting data for calculating the discretionary accruals and the Tobin's Q, the final sample consists of 315 observations in both pre- and post-SOX period.

6.3.2 Methodologies

Proxy for Financial Reporting Quality

I employ the modified Jones model derived from the Jones model (Jones 1991) based on the method in Teoh *et al.* (1998a, 1998b) and Dechow *et al.* (1995).

Given that operating performance may affect the power of discretionary accruals as a proxy for financial reporting quality, Kothari *et al.* (2005) suggests to control normal accruals for the firm's operating performance. In addition, my sample period covers the time when the U.S. economy was experiencing poor performance because of the terrorist attacks and accounting scandals. These factors significantly affected the operating performance of listed companies[51] and hence the normal discretionary accruals. I therefore follow Teoh *et al.* (1998a, 1998b) and Kothari *et al.* (2005) to derive the performance matched modified Jones model using the following methods.

Nondiscretionary accruals ($NDCA_{i,t}$) are expected accruals from a cross-sectional modification of Jones (1991) regression in that year of total accruals on a set of independent variables using an estimation sample of all two-digit SIC code peers, and discretionary accruals (or $DCA_{i,t}$) are the residuals (Teoh *et al.* 1998a, Teoh *et al.* 1998b).

Equation 6-1

$$DCA_{i,t} \equiv \frac{AC_{i,t}}{TA_{i,t-1}} - NDCA_{i,t}$$

$AC_{i,t}$ is defined as:

Equation 6-2

$$AC_{i,t} = NetIncome_{i,t}(172) - CashFlowFromOperation_{i,t}(308)^{52}$$

The Performance-Matched Modified Jones (PMJ) model is defined as follows:

51 See Chapter 4 and Chapter 5 for details

52 The Compustat item numbers are in parentheses. I use the matching item in the WorldScope database.

The PMJ model:

Equation 6-3

$$\left(\frac{AC_{j,t}}{TA_{j,t-1}}\right)=b_0\left(\frac{1}{TA_{j,t-1}}\right)+b_1\left(\frac{\Delta Sales_{j,t}}{TA_{j,t-1}}\right)+b_2\left(\frac{PPE_{j,t}}{TA_{j,t-1}}\right)+b_3\left(\frac{ROS_{j,t}}{TA_{j,t-1}}\right)+\varepsilon_{j,t},$$

$$j \in estimation\ \ sample$$

Nondiscretionary total PMJ accruals or PMJNDCA are calculated as:

Equation 6-4

$$PMJNDCA_{i,t}=\hat{b}_0\left(\frac{1}{TA_{i,t-1}}\right)+\hat{b}_1\left(\frac{\Delta Sales_{i,t}-\Delta TR_{i,t}}{TA_{i,t-1}}\right)+\hat{b}_2\left(\frac{PPE_{i,t}}{TA_{i,t-1}}\right)+\hat{b}_3\left(\frac{ROS_{i,t}}{TA_{i,t-1}}\right),$$

where $\Delta Sales_{i,t}$ is the changes of Sales (12) from previous year (t-1), $\Delta TR_{i,t}$ is the change of Trade Receivables (151) from previous year, $PPE_{i,t}$ is the Gross Property, Plant and Equipment (7), $ROS_{i,t}$ is the Net Income (172) divided by Sales (12), $\hat{b}_0$ is the estimated intercept from the Equation 6-3, $\hat{b}_1$, $\hat{b}_2$ and $\hat{b}_3$ are estimated slope coefficients for firm i in year t.

I proxy the changes of financial reporting quality as the absolute value of changes of the discretionary accruals from t-1 to t, which is:

Equation 6-5

$$\Delta PMJDCA_{i,t}=PMJDCA_{i,t}-PMJDCA_{i,t-1}$$

Proxy for Firm Value

Following Davies *et al.* (2005), Gompers et al. (2003) and Yermack (1996), I employ Tobin's Q as the proxy for firm value. Following Gompers et al. (2003), I define Tobin's Q as the market value of assets divided by book value of assets, where the market value of assets is computed as book value of assets plus the market value of common stock less the sum of book value of common stock (WorldScope Item: TotalCommonEquity) and balance sheet deferred taxes (WorldScope Item: DeferredTaxesBalSht). I proxy the changes in firm value as the changes in Q from t-1 to t.

Equation 6-6

$$\Delta Q_{i,t} = Q_{i,t} - Q_{i,t-1}$$

6.4 Results

6.4.1 Descriptive Statistics

Table 6-2 presents the descriptive statistics for the changes in firm characteristics from pre- to post-SOX. Firm size (total sales) growth is defined as the changes in market value of equity (total sales) from t-1 to t divided by market value of equity (total sales) at t-1. The changes in other firm characteristics variables are defined as the value at t minus the value at t-1. Details of the definition of governance variables are summarised in Table 4-7 in Chapter 4. All variables are winsorized at 1%.

Table 6-2 Descriptive statistics of changes in firm characteristics variables

	Mean		Median	Std.	N
Panel A (The NN portfolio)					
Firm Size Growth	18.04%	***	10.85%	33.48%	70
Return on Assets (ROA) Changes	0.146	***	0.052	2.066	70
Growth Opportunities Changes	0.056		-0.001	1.250	70
Total Sales Growth	14.04%	***	11.11%	15.42%	70
Leverage Changes	-0.010	***	-0.018	0.048	70
Capital Expenditure to Total Assets Changes	-0.003		-0.001	0.014	70
Cash Flow to Total Assets Changes	0.235	**	0.065	1.059	70
Audit Committee Meetings Changes (Number of)	0.971	**	0.000	3.064	70
Panel B (The FF portfolio)					
Firm Size Growth	21.20%	***	15.63%	31.69%	220
Return on Assets (ROA) Changes	0.451	***	0.068	3.227	220
Growth Opportunities Changes	0.145	**	0.090	1.206	220
Total Sales Growth	15.66%	***	11.26%	17.50%	220
Leverage Changes	-0.027	***	-0.020	0.044	220
Capital Expenditure to Total Assets Changes	-0.002		0.000	0.021	220
Cash Flow to Total Assets Changes	0.218	***	0.117	1.113	220
Audit Committee Meetings Changes (Number of)	0.558	***	0.000	2.149	220
Panel C (The NF portfolio)					
Firm Size Growth	16.76%	**	22.97%	20.26%	19
Return on Assets (ROA) Changes	-0.028		0.009	1.262	19
Growth Opportunities Changes	0.146		0.070	0.551	19
Total Sales Growth	9.91%	***	9.51%	8.38%	19
Leverage Changes	-0.031	***	-0.029	0.036	19
Capital Expenditure to Total Assets Changes	0.000		0.002	0.011	19
Cash Flow to Total Assets Changes	0.186	**	0.094	0.368	19
Audit Committee Meetings Changes (Number of)	0.500		1.000	1.917	19
Panel D (The FN portfolio)					
Firm Size Growth	19.09%		17.20%	39.62%	6
Return on Assets (ROA) Changes	0.105		0.055	0.212	6
Growth Opportunities Changes	0.631		0.086	2.625	6
Total Sales Growth	9.87%	**	6.50%	8.73%	6
Leverage Changes	-0.016		-0.010	0.052	6
Capital Expenditure to Total Assets Changes	0.003		0.001	0.012	6
Cash Flow to Total Assets Changes	0.059		0.046	0.181	6
Audit Committee Meetings Changes (Number of)	1.833		2.000	1.602	6

The sample consists of up to 315 non-financial S&P 500 companies during the period 2002 to 2004. All accounting data is collected from the WorldScope database. Firm size is the year-end market value of the firm. Growth opportunity is defined as the market value of the equity plus book value of debt and then divided by the book value of firm's total assets. Leverage is defined as year-end total debt divided by year-end total assets of the firm. Units of assets, sales, income, market value and debt are billion U.S. dollars. All growth ratios are calculated as the value of item j at t divided by the value of item j at t-1 minus 1. All changes values are calculated as the value of item j at t minus the value of item j at t-1. The sample is divided into four portfolios, a) The FF portfolio (firms that stick to following the rules in Section 407 pre- and post-SOX, b) the NN portfolio (firms that stick to not-following the rules pre- and post-SOX), c) the FN portfolio (firms that switch from following to not-following the rules post-SOX), and d) the NF portfolio (firms that switch from not-following to following the rules post-SOX).

The majority of the sample (220 firms) followed the rules/spirit of Section 407 (or "follow the rules" hereafter) both pre- and post-SOX. About 22% of the sample (70 firms) did not follow the spirit of SOX either pre- or post-SOX. Compared to the FF portfolio, the NN portfolio had relatively smaller increase in firm size, profitability (ROA), growth opportunities (Market to Book) and sales, but greater increase in free cash flow. This implies that the FF portfolio might have relatively more growth opportunities and greater improvements in performance from pre- to post-SOX than the NN portfolio.

Since companies that appoint financial experts to their audit committees perform better in the stock market (DeFond *et al.* 2005), firms that have financial experts on the audit committee are more likely to increase the proportion of equities to finance projects. Consistent with DeFond *et al.* (2005), Table 6-2 shows that the FF and NF portfolios have a greater increase in equity financing. Changes in the leverage ratio is -0.031, -0.027, -0.01 and -0.016 for NF, FF, NN and FN portfolios respectively. This suggests that issuers who have financial experts on the audit committee are more likely to use equity financing post-SOX.

Table 6-2 also shows that the increase in audit committee meetings was significant for both the NN and FF portfolios. In addition, the increase in audit committee meetings for the NN portfolio was substantially greater for the FF portfolio. In addition to the large increase of audit committee meetings for the FN portfolio, the statistics suggest that companies that did not appoint financial experts tended to be more diligent in order to substitute the lack of expertise in the audit committee.

Only a small amount of companies (6 firms) chose not to follow the rules post-SOX. These companies have substantially greater increase in growth opportunities compared to the other three portfolios. This is consistent with the notion that, opportunistic managers tend to select a less qualified audit committee

(Klein 2002b). However, since most of the changes for the FN portfolio were not significant, I can only draw a conclusion that firms in this portfolio did not have large changes in firm characteristics from pre- to post-SOX.

6.4.2 Univariate Analysis

Table 6-3 Changes in audit committee financial expertise, firm performance and financial reporting quality

	Pre-SOX		Post-SOX		N	Post - Pre	% Changes
Panel A		*A.1. - A.2.*		*A.1. - A.2.*			
A.1. The NN portfolio							
Financial Reporting Quality	0.079	-0.004	0.044	-0.026	70	-0.035 ***	-44.71%
Firm Value	2.310	0.0092	2.288	-0.065	70	-0.022	-0.95%
A.2. The FF portfolio							
Financial Reporting Quality	0.082		0.069		220	-0.013 **	-15.76%
Firm Value	2.301		2.353		220	0.052 ***	2.28%
Panel B		*B.1. - B.2.*		*B.1. - B.2.*			
B.1. The NF portfolio							
Financial Reporting Quality	0.060	0.0193	0.062	0.0151	19	0.003	4.77%
Firm Value	2.416	0.4345	2.439	0.5901	19	0.023	0.93%
B.2. The FN portfolio							
Financial Reporting Quality	0.040		0.047		6	0.007	17.40%
Firm Value	1.982		1.849		6	-0.133	-6.71%

The sample consists of up to 315 non-financial S&P 500 companies during the period 2002 to 2004. All accounting data is collected from the WorldScope database. Firm size is the year-end market value of the firm. Growth opportunity is defined as the market value of the equity plus book value of debt and then divided by the book value of firm's total assets. Leverage is defined as year-end total debt divided by year-end total assets of the firm. Units of assets, sales, income, market value and debt are billion U.S. dollars. All growth ratios are calculated as the value of item j at t divided by the value of item j at t-1 minus 1. All changes values are calculated as the value of item j at t minus the value of item j at t-1. Tobin's Q is defined as the market value of assets divided by book value of assets, where the market value of assets is computed as (book value of assets plus the market value of common stock) less the sum of (book value of common stock (WS Item: TotalCommonEquity) and balance sheet deferred taxes (WS Item: DeferredTaxesBalSht)). The sample is divided into four portfolios, a) The FF portfolio (firms that stick to following the rules in Section 407 pre- and post-SOX, b) the NN portfolio (firms that stick to not-following the rules pre- and post-SOX), c) the FN portfolio (firms that switch from following to not-following the rules post-SOX), and d) the NF portfolio (firms that switch from not-following to following the rules post-SOX).

The Wilcoxon-Mann-Whitney test was performed to test the differences in financial reporting quality and firm value between different portfolios, whereas the Wilcoxon Signed Rank test was performed to test the changes in financial reporting quality and firm value from pre- to post-SOX for the portfolio. ***, ** and * indicate the changes are significant at 1%, 5% and 10% respectively.

I further investigate the changes in financial reporting quality and firm value based on companies' choices in appointing financial experts. Table 6-3 presents the Univariate analysis of the changes in financial reporting quality and firm value for the four portfolios. Panel A reports the comparisons between the FF

portfolio and the NN portfolio, whereas Panel B reports the comparisons of the FN portfolio and the NF portfolio. The Wilcoxon-Mann-Whitney test was performed to test the differences in financial reporting quality and firm value between different portfolios, whereas the Wilcoxon Signed Rank test was performed to test the changes in financial reporting quality and firm value from pre- to post-SOX for the portfolio.

Financial reporting quality, which is measured as the absolute value of discretionary accruals (DCA), was about 8% for both the NN and the FF portfolio pre-SOX. The difference in DCA between the two portfolios was not significant either pre- or post-SOX. However, financial reporting quality increased substantially post-SOX for both portfolios. While DCA decreased by 0.035 for the NN portfolio, it decreased by 0.013 for the FF portfolio. This result is contrast to hypothesis 2. I interpret it as that the greater decrease in financial reporting quality for the NN portfolio was caused by other factors but not the firm's choice in appointing financial experts. For example, it may be caused by the increased diligence of audit committees. As shown in Table 6-2, the increase in the number of audit committee meetings was 0.971 for the NN portfolio, which was greater than 0.558 times for the FF portfolio. Since audit committee diligence could substitute financial expertise in terms of enhancing financial reporting quality (DeZoort *et al.* 2002, Abbott *et al.* 2004), the greater improvements in financial reporting quality for the NN portfolio might be attributable to their more diligent audit committees caused by SOX Section 404.. A further investigation is provided in the following sections.

Comparing firm value between the two portfolios, although the differences in firm value for the FF and the NN portfolio were not statistically significant either pre- or post-SOX, the FF portfolio exhibits a greater increase in firm value (0.052), where the NN portfolio decreased slightly by 0.022. Change in firm value

for the NF portfolio in Panel B was 0.023 and not significant. However, both the FF and the NF portfolios had positive increase in firm value, whereas both the NN and FN portfolios had decrease in firm value. These results suggest that firms that follow the SOX spirit tended to have a greater increase in firm value than firms that did not follow the spirit.

The FN portfolio had the lowest level of DCA and Q, and it exhibited negative changes in firm value. This result tends to imply that smaller firms find it more difficult to follow the rules to include a financial expert to the audit committee. In addition, if including at least one financial expert to the audit committee improves firm value and vice versa, the companies' decision of not following the rules may be one of the reasons that the FN portfolio had lower firm value post-SOX.

The next section further investigates the relation among financial reporting quality, firm value and companies' choices in appointing financial experts with the regression analysis.

6.4.3 Multivariate Analysis

Financial Reporting Quality

Model 6-1 Changes in financial reporting quality

$$\Delta DCA_{i,t}=\alpha+\beta_1\Delta DCA_{i,t-1}+\beta_2\Delta MV_{i,t}+\beta_3\Delta ROA_{i,t}+\beta_4\Delta MKBV_{i,t}+\beta_5\Delta CapExp_{i,t}$$
$$+\beta_6\Delta Cash_{i,t}+\beta_7 DumNN_{i,t}+\beta_8 DumFF_{i,t}+\beta_9 DumNF_{i,t}+\beta_{10}\Delta AudMeet_{i,t}$$
$$+\beta_{11} DumNN_{i,t}*\Delta AudMeet_{i,t}+\beta_{12} DumFF_{i,t}*\Delta AudMeet_{i,t}$$
$$+\beta_{13} DumNF_{i,t}*\Delta AudMeet_{i,t}+\varepsilon_{i,t}$$

Model 6-2 Financial reporting quality post-SOX

$$DCA_{i,t}=\alpha+\beta_1 DCA_{i,t-1}+\beta_2 MV_{i,t}+\beta_3 ROA_{i,t}+\beta_4 MKBV_{i,t}+\beta_5 CapExp_{i,t}$$
$$+\beta_6 Cash_{i,t}+\beta_7 DumNN_{i,t}+\beta_8 DumFF_{i,t}+\beta_9 DumNF_{i,t}+\beta_{10} AudMeet_{i,t}$$
$$+\beta_{11} DumNN_{i,t}*AudMeet_{i,t}+\beta_{12} DumFF_{i,t}$$

I employ Model 6-1 and Model 6-2 to examine whether a firm's choice of appointing financial experts have impact on its financial reporting quality[53]. MV is the year-end market value of the firm. MKBV is defined as the market value of the equity plus book value of debt and then divided by the book value of firm's total assets. ROA is net income divided by total assets. CapExp is defined as capital expenditure divided by total assets, and Cash is operating cash flow. I assume that the changes in DCA follow a random walk procedure hence I add the lag value of DCA to and the lag value of the changes in DCA to Model 6-2. In addition, because both Table 6-2 and Table 6-3 have implications that audit committee diligence can substitute the lack of financial expertise in ensuring financial reporting quality, I add the variable "AudMeet" (audit committee meeting) to the model to control for this effect.

Table 6-4 reports results for the relation between financial reporting quality and companies' choice of appointing financial experts. First, consistent with previous studies, the left-hand side of the table shows that the lag value of ΔDCA is negatively related to the value of ΔDCA, which indicates the reversing nature of discretionary accruals (DeFond and Park 2001). Secondly, the right-hand side of the table shows that the lag value of DCA is positively related to DCA. Consistent with Jensen (2005), this suggests that once corporate managers start manipulating earnings they could not stop it in a short period:

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53 The results of the model that controls for industry are similar to the results in these two models, except that the dummies of NN, FF, NF become insignificant in Model 6-2 when industry is control.

"Once we as managers start lying in the earnings management game, it is nearly impossible to stop because the game cascades forward. If we are having trouble meeting the earnings targets for this year, we push expenses forward, and we pull revenues from next period into this period. Revenues borrowed from the future and today's expenses pushed to tomorrow require even more manipulation in the future to forestall the day of reckoning" (Jensen 2005, page 8).

In contrast to hypothesis 1 and 2, results of Model 6-1 in Table 6-4 shows that companies that did not appoint financial experts post-SOX had greater improvements in financial reporting quality than firms that appointed financial experts. Controlling for the changes in meeting frequency, results show that the NN portfolio had the greatest increase in financial reporting quality post-SOX compared to the other portfolios, while the NF portfolio had greater improvements in financial reporting quality than the FF portfolio.

Similarly, results of Model 6-2 in Table 6-4 show that the NN portfolio had higher financial reporting quality post-SOX, while the NF portfolio had better financial reporting quality than the FF portfolio. Further, both audit committee meeting frequencies and the changes in audit committee meeting frequencies are negative and significant, suggesting that audit committees with a higher level of diligence are more capable in improving financial reporting quality (Abbott *et al.* 2000, DeZoort *et al.* 2002). However, the interactive dummies show that for the FF portfolio, audit committees became less efficient than other portfolios when the committee increased the meeting frequencies. This suggests that the marginal efficiency of audit committee meetings for the NN portfolio was higher than other portfolios.

In general, the results are contrast to my hypothesis and different from the SEC expectations. Incorporated with results in Chapter 5, the analysis shows that SOX intends to enhance corporate financial reporting quality through mandating issuers to disclose the level of financial experts on the audit committee. However,

issuers tended to include more experts to the audit committee mainly to comply with the Act but not to fulfil the companies' requirements. Therefore including more financial experts to the audit committee may not necessarily improve financial reporting quality post-SOX. Results in Table 6-4 support this argument.

Table 6-4 Regression analysis - audit committee financial expertise and financial reporting quality

Changes in financial reporting quality (DCA)				Financial reporting quality (DCA) post-SOX			
	Coefficients	t-stat			Coefficients	t-stat	
Intercept	0.238	3.430	***	Intercept	0.300	2.190	**
Lag Delta DCA	-0.287	-9.280	***	Lag DCA	0.082	1.960	*
Delta MV (scaled by 100)	-0.078	-3.360	***	MV	0.001	0.140	
Delta ROA (scaled by 100)	0.839	7.480	***	ROA	0.826	10.150	***
Delta MKBV (scaled by 100)	0.006	0.970		MKBV	-0.002	-1.140	
Delta CapExp (scaled by 100)	0.080	0.260		CapExp	0.024	0.210	
Del Cash (scaled by 100)	-0.027	-4.510	***	Cash	-0.970	-10.280	***
DummyNN	-0.221	-3.130	***	DummyNN	-0.250	-1.880	*
DummyFF	-0.210	-3.000	***	DummyFF	-0.240	-1.820	*
DummyNF	-0.218	-2.940	***	DummyNF	-0.286	-2.040	**
DelAudMeet	-0.075	-2.510	**	AudMeet	-0.026	-1.720	*
DummyNN*DelAudMeet	0.066	2.190	**	DummyNN*AudMeet	0.025	1.590	
DummyFF*DelAudMeet	0.076	2.520	**	DummyFF*AudMeet	0.024	1.540	
DummyNF*DelAudMeet	0.071	2.160	**	DummyNF*AudMeet	0.028	1.720	*
Observations		315		Observations		315	
Adjusted R^2		38.97%		Adjusted R^2		37.97%	
F Statistic		14.59		F Statistic		13.98	
(p-value)		<.0001		(p-value)		<.0001	

The sample consists of up to 315 non-financial S&P 500 companies during the period 2002 to 2004. All accounting data is collected from the WorldScope database. MV is the year-end market value of the firm. MKBV is defined as the market value of the equity plus book value of debt and then divided by the book value of firm's total assets. Leverage is defined as year-end total debt divided by year-end total assets of the firm. Units of assets, sales, income, market value and debt are billion U.S. dollars. All growth ratios are calculated as the value of item j at t divided by the value of item j at t-1 minus 1. All changes values are calculated as the value of item j at t minus the value of item j at t-1. Tobin's Q is defined as the market value of assets divided by book value of assets, where the market value of assets is computed as (book value of assets plus the market value of common stock) less the sum of (book value of common stock (WS Item: TotalCommonEquity) and balance sheet deferred taxes (WS Item: DeferredTaxesBalSht)). Discretionary accruals are calculated using the Modified Jones model. The sample is divided into four portfolios, a) The FF portfolio (firms that stick to following the rules in Section 407 pre- and post-SOX, b) the NN portfolio (firms that stick to not-following the rules pre- and post-SOX), c) the FN portfolio (firms that switch from following to not-following the rules post-SOX), and d) the NF portfolio (firms that switch from not-following to following the rules post-SOX). ***, ** and * indicate the estimates are significant at 1%, 5% and 10% respectively.

In sum, the results imply that the improvements in financial reporting quality post-SOX were attributed to the changes in whether financial experts were appointed to the audit committee and the changes in audit committee activeness.

However, the results are in contrast to the SOX expectation and previous studies since I found firms that appoint financial experts to the audit committee post-SOX had lower improvements in financial reporting quality.

Firm Value

I use Model 6-3 and Model 6-4 to examine the relation between companies' choice in appointing financial experts and firm value. I assume firm value and its changes follow a random walk procedure hence I add the lag value of changes in Q to Model 6-3 and the lag value of Q to Model 6-4.

Model 6-3 Changes in firm value

$$\Delta Q_{i,t}=\alpha+\beta_1\Delta Q_{i,t-1}+\beta_2\Delta MV_{i,t}+\beta_3\Delta ROS_{i,t}+\beta_4\Delta MKBV_{i,t}+\beta_5\Delta Sales_{i,t}$$
$$+\beta_6\Delta Leverage_{i,t}+\beta_7\Delta CapExp_{i,t}+\beta_8\Delta Cash_{i,t}+\beta_9 DumNN_{i,t}$$
$$+\beta_{10}DumFF_{i,t}+\beta_{11}DumNF_{i,t}+\varepsilon_{i,t}$$

Model 6-4 Firm value post-SOX

$$Q_{i,t}=\alpha+\beta_1 Q_{i,t-1}+\beta_2 MV_{i,t}+\beta_3 ROS_{i,t}+\beta_4 MKBV_{i,t}+\beta_5 Sales_{i,t}+\beta_6 Leverage_{i,t}$$
$$+\beta_7 CapExp_{i,t}+\beta_8 Cash_{i,t}+\beta_9 DumNN_{i,t}+\beta_{10}DumFF_{i,t}+\beta_{11}DumNF_{i,t}+\varepsilon_{i,t}$$

Table 6-5 shows the results of the regression analysis for Model 6-3 and Model 6-4. Consistent with Core *et al.* (1999), Cremers and Nair (2005) and Gompers *et al.* (2003), companies that chose better governance structure perform better than firms that chose poorer governance structure. All the three dummy variables are significant and positive in Model 6-3. Both FF and NF portfolios have a greater increase in firm value than the NN and FN portfolio. However, only the FF dummy variable is significant and positive in Model 6-4. This also supports that only firms that employed financial experts had higher firm value post-SOX.

Table 6-5 Regression analysis - audit committee financial expertise and financial value

Changes in firm value (Tobin's Q)				Firm value (Tobin's Q) post-SOX			
	Coefficients	t-stat			Coefficients	t-stat	
Intercept	-0.359	-2.300	**	Intercept	0.051	0.150	
Lag Delta Q	-0.131	-3.520	***	Lag Tobin's Q	0.606	17.580	***
Delta MV	0.814	9.020	***	MV	0.239	5.380	***
Delta ROA	-0.164	-0.360		ROA	0.118	0.190	
Delta MKBV	0.212	9.470	***	MKBV	0.101	6.540	***
Delta Sales	-0.368	-2.430	**	Sales	-0.230	-5.700	***
Delta Leverage	1.308	2.650	***	Leverage	-0.644	-2.820	***
Delta CapExp	-0.924	-0.810		CapExp	-0.365	-0.430	
Delta Cash	0.024	1.060		Cash	1.168	1.590	
DummyNN	0.266	1.640		DummyNN	0.368	1.760	*
DummyFF	0.324	2.050	**	DummyFF	0.403	1.990	**
DummyNF	0.309	1.740	*	DummyNF	0.369	1.610	
Observations		315		Observations		315	
Adjusted R^2		62.37%		Adjusted R^2		87.37%	
F Statistic		45.65		F Statistic		190.62	
(p-value)		<.0001		(p-value)		<.0001	

The sample consists of up 315 non-financial S&P 500 companies during the period 2002 to 2004. All accounting data is collected from the WorldScope database. MV is the year-end market value of the firm. MKBV is defined as the market value of the equity plus book value of debt and then divided by the book value of firm's total assets. Leverage is defined as year-end total debt divided by year-end total assets of the firm. Units of assets, sales, income, market value and debt are billion U.S. dollars. All growth ratios are calculated as the value of item j at t divided by the value of item j at t-1 minus 1. All changes values are calculated as the value of item j at t minus the value of item j at t-1. Tobin's Q is defined as the market value of assets divided by book value of assets, where the market value of assets is computed as (book value of assets plus the market value of common stock) less the sum of (book value of common stock (WS Item: TotalCommonEquity) and balance sheet deferred taxes (WS Item: DeferredTaxesBalSht)). Discretionary accruals are calculated using the Modified Jones model. The sample is divided into four portfolios, a) The FF portfolio (firms that stick to following the rules in Section 407 pre- and post-SOX, b) the NN portfolio (firms that stick to not-following the rules pre- and post-SOX), c) the FN portfolio (firms that switch from following to not-following the rules post-SOX), and d) the NF portfolio (firms that switch from not-following to following the rules post-SOX). ***, ** and * indicate the estimates are significant at 1%, 5% and 10% respectively.

One of the results is in contrast to my third hypothesis. Hypothesis 3 predicts that the dummy for the NF portfolio had a greater increase in firm value than all other portfolios. However, Table 6-5 shows that the FF portfolio had the greatest increase in firm value, whereas the NF portfolio had the second largest increase in firm value. This result indicates that first, companies that appoint financial experts to their audit committees have a greater increase in firm value than others; and secondly, compared to the FF portfolio, firms in the NF portfolio need to exert more resources, for instance, the initial costs incurred in relation to hiring a financial expert.

Consistent with previous research, the changes in firm size and growth opportunities are positively related to the changes in firm value (Davies *et al.* 2005). However, the lag of the change in firm value is negatively related to the change in firm value. There are two possible reasons for this negative relation. The first reason is that the change in firm value is mean reverting thus any positive change in firm value in the last period will cause negative change in the current year. The second reason is that the U.S. economy experienced poor performance from 2002 but started to recover in 2003. As discussed in Chapter 4, firm value of listed companies dropped significantly from 2001 to 2002, but increased significantly from 2002 to 2003. Since my sample covers period from 2002 to 2004, the poor performance of U.S. economy may be the cause for this negative relation.

In sum, the results are not consistent with hypothesis 3 but consistent with hypothesis 4. The results show that the FF portfolio had the greatest increase in firm value as well as having highest firm value post-SOX. In addition, firms that appointed financial experts post-SOX had a greater increase in firm value compared to firms that did not appoint financial experts. The results generally support the assertion that choosing superior governance structure enhances shareholders' wealth.

6.5 Additional Tests

6.5.1 Other Method to Divide the Sample

I further test whether companies' responses of increasing, maintaining, or decreasing the level of financial expertise improved financial reporting quality and firm value. I divide the sample into three portfolios, a) an increasing portfolio, defined as firms increased the number of financial experts from pre- to post-

SOX; b) a maintaining portfolio, defined as firms did not change the number of financial experts from pre- to post-SOX; and c) a decreasing portfolio, defined as firms reduced the number of financial experts from pre- to post-SOX. The results are consistent with the results in Table 6-4 that firms that did not change in financial expertise had greater improvements than other portfolio. However, for the analysis of firm value, the results show that the companies' decision in changing the degree of audit committee financial expertise did not affect the subsequent firm value.

6.5.2 Other Measures of Earnings Management

I perform additional tests with other measures of earnings management. I use the original modified Jones model which is used in Teoh *et al.* (1998a, 1998b), and the Lag and the Growth model in Dechow *et al.* (2003) to test the robustness of the results in Table 6-4. The results show that the modified Jones model and the Lag model provide similar results with analyses in Table 6-4. However, when the Growth model in Dechow *et al.* (2003) was utilised, the portfolio dummies and the interactive variables became insignificant.

6.5.3 Controlling for the Level of Financial Reporting Quality pre-SOX

I also control for the level of DCA pre-SOX in Model 6-1 by replacing the lag value of the changes in DCA with the pre-SOX DCA. The results show that the pre-SOX DCA is negatively related with the changes in DCA which suggests the marginal changes in DCA are decreasing. In addition, after controlling for the pre-SOX DCA, the results remain robust that the NN portfolio had greater improvements in financial reporting quality.

6.5.4 Controlling for the Sign of DCA

I control for the sign of DCA by replacing the value of DCA with the absolute value of DCA. The analyses show similar results with Table 6-4.

6.5.5 Using annual Stock Returns as a Measure of Firm Value

I use the changes in annual stock returns as the measure of changes in firm value to test the relation between stock returns and the choice of appointing financial experts. Stock returns are measured as the change in annual return post-SOX minus stock returns pre-SOX. The results show that none of the dummy variables is significant. Therefore there is no difference in the changes in stock returns among different portfolios.

6.6 Conclusions

This chapter extends Chapter 5 to investigate the financial impact of a firm's choice of whether to follow the rules in SOX Section 407. Using audit committee financial expertise information, with 630 observations covering pre- and post-SOX, I investigate the changes in financial reporting quality and firm value based on the firm's choice in appointing financial experts post-SOX. I divide the sample into four portfolios and draw out the following conclusions.

First, earnings management has been constrained after SOX was enacted and this is attributed to the level of audit committee financial expertise and diligence. However, the results are inconsistent with SEC expectations and show that companies that maintained or switched to include at least one financial expert post-SOX had smaller improvements in financial reporting quality. Inconsistent

with hypothesis 1, the NN portfolio had the greatest increase in financial reporting quality relative to all other portfolios from pre- to post-SOX.

In addition, the results are also inconsistent with hypothesis 2, where my results find that the NN portfolio had greater improvements in financial reporting quality than the FF portfolio. This suggests issuers who appointed financial experts were not as effective as issuers who did not appoint financial experts in improving financial reporting quality. Further, the results also suggest that issuers that did not appoint financial experts either pre- or post-SOX had more efficient audit committees.

Next, in terms of firm value, the results show that firms that maintained the appointment of financial experts both pre- and post-SOX, e.g. the FF portfolio, had a significantly greater increase in firm value than all other portfolios. Further, firms that chose to follow the rules of Section 407 post-SOX had higher firm value than firms that did not follow the rules.

The results in this chapter remain robust after using different methods and controlling for different factors. Overall, the results suggest that although SOX intended to increase audit committee financial expertise to enhance financial reporting quality, companies that maintained not appointing financial experts from pre- to post-SOX had greater improvements in financial reporting quality than companies that appointed financial experts post-SOX. Since the main purpose of Section 407 is to improve financial reporting quality, all results in this study imply that SOX did not achieve its intended goal in improving financial reporting quality, whereas it has had unintended results in enhancing firm value.

7

OVERALL AUDIT COMMITTEE EFFECTIVENESS, THE SEC REQUIREMENTS AND THE IMPACTS OF THE SARBANES-OXLEY

Utilizing three comprehensive discretionary accruals models and a unique sample of audit committee data, I provide a practical method to construct an audit committee effectiveness index (A-Index). The analysis shows that highly effective audit committees are larger, have a higher level of financial expertise and are more active in holding committee meetings. In addition, when comparing two audit committees, *ceteris paribus*, a larger, or more independent, or an audit committee with greater financial expertise, or more active is more effective. Further, after comparing a score constructed in previous studies (the SEC score) with the A-Index, it is found that the SEC score is weakly correlated with the A-Index. While the A-Index shows that overall audit committee effectiveness decreased during the SOX period, the SEC score reports contrasting results. This implies that the SEC score and the A-Index could not substitute each other in reflecting the overall audit committee effectiveness.

7.1 Introduction

Since the Sarbanes-Oxley Act 2002 (SOX) was enacted, financial reporting quality of U.S. listed companies has been improved substantially[54] (Cohen *et al.* 2005). The audit committee, as the ultimate monitor of companies' financial reporting, has attracted a number of requirements in the Act, e.g. Section 301 and Section 407. Both the structure and workloads of audit committees had changed significantly after SOX was enacted (Linck *et al.* 2008). The changes attributed to different aspects of the effectiveness of audit committees in improving financial reporting quality. As discussed in chapter 6, using only one aspect of the audit committee to proxy for the audit committee effectiveness may sometimes produce inconsistent conclusions. Therefore an overall measurement of the effectiveness of the audit committee that captures both the structural characteristics and activity is necessary.

Previous studies have attempted to score different aspects of the audit committee and integrate them into a composite score as the measure of overall audit committee effectiveness. They then examine the relationship between the composite score, which proxies for audit committee effectiveness, and financial reporting quality. Abbott *et al.* (2000) combines the audit committee independence and meeting frequencies into one score and find that financial fraud is negatively related to audit committee quality. In addition, DeFond *et al.* (2005) and Carcello *et al.* (2006a) integrate the audit committee independence and size into a composite measurement of overall corporate governance quality[55] and find that stronger governance is negatively related with earnings management.

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[54] Chapter 6 also reported evidence that financial reporting quality has improved substantially post-SOX.

[55] The composite measurement of overall corporate governance quality in DeFond *et al.* (2005) and Carcello *et al.* (2006a) consists of six factors. These factors are board size, board independence, audit committee size, audit committee independence, shareholders' rights and institutional ownership. They take a value of 1 if

There are, however, a number of weaknesses in previous studies. First, they lack a theoretical framework that explains why audit committee exists, what causes different audit committee structural characteristics, and how to optimise the effectiveness of the audit committee (DeFond and Francis 2005). Secondly, the validity of the composite measure in previous studies has not been examined empirically. Therefore both theoretically and empirically, it is yet unknown whether the composite measure of audit committee quality that is used in previous studies truly reflects the overall audit committee effectiveness.

In addition, chapter 5 shows that the introduction of SOX has led to structural changes in the composition and activities of audit committees. Further, chapter 6 shows that companies, who did not appoint financial experts to the audit committee either pre- or post-SOX, had greater improvements in financial reporting quality than those appointed financial experts both pre- and post-SOX. Since SOX was enacted, the relation between audit committee composition and financial reporting quality may have changed subsequently. This implies that first, the composite score created based on the SEC requirements pre-SOX may not truly reflect the effectiveness of audit committees; and secondly, a method based on the real effectiveness of audit committees is necessary.

This study contributes to several strands of the audit committee and SOX research. First, unlike DeFond *et al.* (2005), Carcello *et al.* (2006a) and Abbott *et al.* (2000), this study scores four aspects of audit committee characteristics[56] and aggregates them into one composite score. While DeFond *et al.* (2005) and

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these governance characteristics satisfy the criteria of strong governance and 0 otherwise. The overall governance quality is the sum of scores from these six characteristics.

56 The four aspects include audit committee independence, size, financial expertise and activeness, where activeness is measured as the number of meetings the audit committee holds each year. Using these four characteristics provide more precise information regarding the effectiveness of each aspect, but using an aggregate index provide a measure to compare the overall effectiveness of two or more audit committees with different characteristics.

Carcello *et al.* (2006a) used audit committee independence and size to construct their composite score, Abbott *et al.* (2000) used audit committee independence and meeting frequencies. However, first, the Act requires the committee to be composed of fully independent directors and thus the marginal effectiveness of audit committee independence became zero post-SOX. Secondly, previous studies show that audit committee financial expertise and activeness both contribute to enhancing financial reporting quality (Carcello *et al.* 2006a, Bedard *et al.* 2004). Therefore, aggregating these four aspects of the audit committee provides a more updated measure that fully reflects the effectiveness of the audit committee.

Secondly, I construct a more reliable proxy for the audit committee effectiveness compared to previous studies. Previous studies score different aspects of audit committee characteristics and simply aggregate the scores together. The weakness of this method is it lacks control over interactions between various audit committee characteristics. For example, committee A has 4 members and meets 3 times per year, while committee B has 5 members and meets 3 times per year. Previous studies would give different scores to the two committees based on their size, but add the same score to both committees based on their meeting frequencies. The problem of this method is that the marginal effects of the audit committee meetings in an audit committee with 4 members may be different from an audit committee with 5 members. As a result, if previous studies use the above method to consider more aspects of the audit committee, the more interactions they will miss and the less likely the composite score can truly reflect the overall audit committee effectiveness. In this chapter I control for the interactions between different aspects of audit committee characteristics; therefore it is more reliable in reflecting the overall audit committee effectiveness.

Thirdly, this chapter is the first to provide evidence of how the overall audit committee effectiveness changed from pre- to post-SOX. Previous studies found that there were more financial experts appointed to the audit committee, and the workload of audit committees had increased substantially post-SOX (Linck *et al.* 2008) However, they did not examine how audit committee effectiveness as a whole changes from pre- to post-SOX. Using the audit committee effectiveness index created here, this chapter presents a picture to investors, academics and regulators of the changes in overall audit committee effectiveness from pre- to post-SOX.

Finally, the chapter extends Abbott *et al.* (2004) and documents evidence of audit committee effectiveness from pre- to post-SOX. Abbott *et al.* (2004) examines whether the Securities and Exchange Commission (SEC) and Blue Ribbon Committee (BRC) recommendations are in the right direction in improving audit committee effectiveness. The BRC and SEC recommended that reasonably large, independent, expert and active audit committees were more active in reducing financial fraud (Abbott *et al.* 2004), and Abbott *et al.* (2004) provided empirical support for this conjecture. Since the composition of audit committees changed significantly from pre- to post-SOX, the evidence provided by Abbott *et al.* (2004) may not hold. Therefore this chapter extends Abbott *et al.* (2004) and documents updated empirical evidence for this matter.

Among the various measurements of financial reporting quality, I chose the discretionary accruals as a benchmark to evaluate the audit committee effectiveness[57]. Utilizing three comprehensive discretionary accruals models[58] and a unique sample of audit committee data, the audit committee characteristics are

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[57] Detailed discussions of why I chose discretionary accruals as a benchmark are discussed in Section 7.2.

[58] The three models include the performance-matched modified Jones Model (Jones 1991, Kothari *et al.* 2005), the performance-matched Lag model and the performance-matched Growth model derived from Dechow *et al.* (2003)

ranked according to the magnitude that discretionary accruals deviate from zero[59]. The overall audit committee effectiveness index (A-Index hereafter) is then calculated as the sum scores from the rankings.

After constructing the A-Index, a probit analysis is conducted to examine the relationship between overall audit committee quality and various audit committee characteristics. The analysis shows that more effective audit committees are larger, have a higher level of financial expertise and independence, and work more efficiently in the committee meetings. In addition, when comparing two audit committees, *ceteris paribus*, a larger, more independent, with greater financial expertise, or more active audit committee is more effective.

In addition, I construct a score (the "SEC score" hereafter), based on the SEC requirements and the methods in previous studies (DeFond *et al.* 2005, Carcello *et al.* 2006, Abbott *et al.* 2004), and examine whether it is capable of reflecting overall audit committee effectiveness. I compare the SEC score with the A-Index and find that the SEC score is weakly correlated with the A-Index, and it does not reflect the changes in A-Index over time. While the A-Index shows that overall audit committee effectiveness decreased during the SOX period, the SEC score reports contrasting results. This implies that, the SEC score and the A-Index could not substitute with each other in reflecting the overall audit committee effectiveness.

The remainder of this chapter is organised as follows. Section 7.2 develops the method of deriving the three discretionary accruals (DCA) and describes the data sources. Section 7.3 develops the method of constructing the A-Index.

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[59] Because discretionary accrual is the residuals from normal accruals, theoretically if financial reporting quality is a hundred percent credible and there is no earnings management, discretionary accruals should be equal to zero. Therefore the less discretionary accrual deviates from zero, the higher financial reporting quality.

Section 7.4 investigates the impact of SOX on companies' audit committees and their overall effectiveness. Section 7.5 concludes.

7.2 Data and Methodologies

"An effective audit committee has qualified members with the authority and resources to protect stakeholder interests by ensuring reliable financial reporting, internal controls, and risk management through its diligent oversight efforts" (DeZoort *et al.* 2002, page 41).

Both structural characteristics and activities of the audit committee should be able to affect its overall effectiveness (DeZoort *et al.* 2002), but most previous studies only focus on the impact of a single structural characteristic on audit committee effectiveness (Klein 2002a, Anderson *et al.* 2004, Anderson *et al.* 2003, Carcello *et al.* 2006a, Carcello and Neal 2000, Carcello and Neal 2003a, Abbott and Parker 2000, Abbott *et al.* 2004, Abbott, Parker, Peters and Raghunandan 2003, Krishnan 2005). However, results in chapter 6 suggest that both audit committee financial expertise and activities are important in determining the overall committee effectiveness. Therefore, the overall audit committee effectiveness should be the collective effect of audit committee composition, expertise and activeness.

Due to the absence of a theoretical framework of the audit committee composition and activity (DeFond and Francis 2005), the overall audit committee effectiveness index therefore should be created based on a benchmark that reflects the effectiveness of the audit committee. For example, among the literature there are mainly three measures that infer the auditor or audit committee effectiveness. They are the discretionary accruals (DCA), financial restatements, and the propensity of the auditor to issue a qualified opinion (DeFond and Francis 2005). Among the three measures, the most commonly

used measure to reflect the auditor or audit committee effectiveness is the DCA (see Carcello *et al.* 2006a, Kothari *et al.* 2005, Cohen *et al.* 2005, Klein 2002a, DeFond and Subramanyam 1998, DeAngelo 1981b). Although the other two measures provide more direct evidence, they are limited because restatements and qualified opinions are relatively less common compared to the DCA. Therefore the DCA is more generally appropriate as the benchmark to evaluate audit committee effectiveness.

7.2.1 Discretionary Accruals

Assumptions

Previous studies have developed comprehensive models to derive discretionary accruals (Teoh *et al.* 1998a, Teoh *et al.* 1998b, Dechow *et al.* 2003, Dechow, Sloan and Sweeney 1995). Dechow *et al.* (2003) documents that Dechow's lagged model (LAG), Dechow's forward-looking model (FWD) and the modified Jones model provide less biased discretionary accruals. Further, Kothari *et al.* (2005) suggest to control normal accruals for the firm's operating performance, I therefore follow Kothari *et al.* (2005) to add the operating performance variable to Dechow's LAG and FWD model when estimating normal accruals. Kothari *et al.* (2005) also highlight that the performance-matched discretionary accruals is interpreted as *"firms identified as having managed earnings are in fact managing earnings at a rate higher than the comparison sample"* (Kothari *et al.* 2005, page 165). Therefore, consistent with Kothari *et al.* (2005), I draw the following assumption.

Assumption 1: It is assumed that all companies manage earnings, but companies with more effective audit committees would have less material earnings management than its comparison sample.

In addition, because the DCA measure may be noisy and potentially performance biased (DeFond and Francis 2005, Kothari *et al.* 2005), it may not be the best proxy for financial reporting quality (Dechow *et al.* 1995, Dechow and Dichev 2002). However, since most previous studies utilise the DCA as a measure of financial reporting quality (see Dechow *et al.* 2003, Dechow and Dichev 2002 for a review), and as discussed above, the DCA is more generally appropriate as the benchmark to evaluate audit committee effectiveness. I therefore further assume that DCA is the best proxy for financial reporting quality.

Assumption 2: It is assumed that the discretionary accrual is the best proxy for the financial reporting quality.

DCA Models

I utilise the modified Jones model in Teoh *et al.* (1998a, 1998b) and Dechow *et al.* (1995) to derive the modified Jones DCA (MJDCA), and utilise the lagged and forwarded modified Jones model in Dechow *et al.* (2003) to derive the Lagged DCA (LAGDCA) and Forward-looking DCA (FWDDCA)[60]. Given that there is "mechanical relationship" between operating performance and normal accruals, I follow Kothari *et al.* (2005) to control normal accruals with the companies' operating performance, i.e. the return on sales (ROS).

Non-discretionary accruals or $NDCA_{i,t}$ are expected accruals from a cross-sectional modification of Jones (1991) regression of total accruals in that year on a set of independent variables using an estimation sample of all two-digit SIC code peers, and discretionary accruals or $DCA_{i,t}$ are the residuals (Teoh *et al.* 1998a, Teoh *et al.* 1998b).

60 The original estimation of Modified Jones and Dechow's LAG and FWD discretionary accruals are discussed in Appendix A.

Equation 7-1

$$DCA_{i,t} \equiv \frac{AC_{i,t}}{TA_{i,t-1}} - NDCA_{i,t}$$

Total accruals ($AC_{i,t}$) are defined as:

Equation 7-2

$$AC_{i,t} = NetIncome_{i,t}(172) - CashFlowFromOperation_{i,t}(308)^{61}$$

The difference in the three DCA comes from the different modifications of the Jones (1991) models. The performance-matched modified Jones (PMJ) model is defined as follows:

The PMJ model:

Equation 7-3

$$\left(\frac{AC_{j,t}}{TA_{j,t-1}}\right) = b_0\left(\frac{1}{TA_{j,t-1}}\right) + b_1\left(\frac{\Delta Sales_{j,t}}{TA_{j,t-1}}\right) + b_2\left(\frac{PPE_{j,t}}{TA_{j,t-1}}\right) + b_3\left(\frac{ROS_{j,t}}{TA_{j,t-1}}\right) + \varepsilon_{j,t},$$
$$j \in estimation\ \ sample$$

Nondiscretionary total PMJ accruals or PMJNDCA are calculated as:

Equation 7-4

$$PMJNDCA_{i,t} = \hat{b}_0\left(\frac{1}{TA_{i,t-1}}\right) + \hat{b}_1\left(\frac{\Delta Sales_{i,t} - \Delta TR_{i,t}}{TA_{i,t-1}}\right) + \hat{b}_2\left(\frac{PPE_{i,t}}{TA_{i,t-1}}\right) + \hat{b}_3\left(\frac{ROS_{i,t}}{TA_{i,t-1}}\right),$$

where $\Delta Sales_{i,t}$ is the changes of sales (12) from previous year (t-1), $\Delta TR_{i,t}$ is the change in trade receivables (151) from previous year, $PPE_{i,t}$ is the gross property, plant and equipment (7), $ROS_{i,t}$ is the net income (172) divided by

61 The Compustat item numbers are in parentheses. I use the matching item in the WorldScope database.

total sales (12), $\hat{b}_0$ is the estimated intercept, $\hat{b}_1$, $\hat{b}_2$ and $\hat{b}_3$ are estimated slope coefficients for firm i in year t from Equation 7-3. The performance-matched Dechow's LAG (PLAG) and FWD (PFW) model is defined as follows:

The PLAG model:

Equation 7-5

$$\left(\frac{AC_{j,t}}{TA_{j,t-1}}\right)=b_0\left(\frac{1}{TA_{j,t-1}}\right)+b_1\left(\frac{\Delta Sales_{j,t}}{TA_{j,t-1}}\right)+b_2\left(\frac{PPE_{j,t}}{TA_{j,t-1}}\right)+b_3\left(\frac{LagAC_{j,t}}{TA_{j,t-1}}\right)+b_4\left(\frac{ROS_{j,t}}{TA_{j,t-1}}\right)+\varepsilon_{j,t},$$
$$j \in estimation\ \ sample$$

Nondiscretionary total PLAG accruals or PLAGNDCA are calculated as:

Equation 7-6

$$PLAGNDCA_{i,t}=\hat{b}_0\left(\frac{1}{TA_{i,t-1}}\right)+\hat{b}_1\left(\frac{\Delta Sales_{i,t}-\Delta TR_{i,t}}{TA_{i,t-1}}\right)+\hat{b}_2\left(\frac{PPE_{i,t}}{TA_{i,t-1}}\right)$$
$$+\hat{b}_3\left(\frac{LagAC_{i,t}}{TA_{i,t-1}}\right)+\hat{b}_4\left(\frac{ROS_{i,t}}{TA_{i,t-1}}\right),$$

The PFW model:

Equation 7-7

$$\left(\frac{AC_{j,t}}{TA_{j,t-1}}\right)=b_0\left(\frac{1}{TA_{j,t-1}}\right)+b_1\left(\frac{\Delta Sales_{j,t}}{TA_{j,t-1}}\right)+b_2\left(\frac{PPE_{j,t}}{TA_{j,t-1}}\right)+b_3\left(\frac{LagAC_{j,t}}{TA_{j,t-1}}\right)$$
$$+b_4\left(\frac{GR\_Sales_{j,t}}{TA_{j,t-1}}\right)+b_5\left(\frac{ROS_{j,t}}{TA_{j,t-1}}\right)+\varepsilon_{j,t}, j \in estimation\ \ sample$$

Nondiscretionary total PFW accruals or PFWNDCA are calculated as:

Equation 7-8

$$PFWNDCA_{i,t} = \hat{b}_0\left(\frac{1}{TA_{i,t-1}}\right) + \hat{b}_1\left(\frac{\Delta Sales_{i,t} - \Delta TR_{i,t}}{TA_{i,t-1}}\right) + \hat{b}_2\left(\frac{PPE_{i,t}}{TA_{i,t-1}}\right) + \hat{b}_3\left(\frac{LagAC_{i,t}}{TA_{i,t-1}}\right) + \hat{b}_4\left(\frac{GR\_Sales_{i,t}}{TA_{i,t-1}}\right) + \hat{b}_5\left(\frac{ROS_{i,t}}{TA_{i,t-1}}\right),$$

$LagAC_{i,t}$ is the lag value of total accruals, and $GR\_Sales_{i,t}$ is the sales growth from the previous year.

7.2.2 Data

Table 7-1 summarises the derivation of the sample, the sample distribution year on year, and the year on year control sample distributions respectively. My main data sources are hand-collected information of audit committee characteristics from proxy statements of S&P 500 firms in the period between 2001 and 2005, and discretionary accruals data derived from the PMJ model, the PLAG model and the PFW model. All governance data was manually collected from S&P 500 firms' proxy statements from 2001 to 2005 filed with the SEC, while all accounting data were collected from WorldScope database provided by Thomson One Banker.

Panel A of Table 7-1 reports the sample distributions for the data in this chapter. It shows that the sample has a total number of 1636 firm-years with 29 observations that do not have the necessary data for calculating the DCA. I further delete 148 observations that missing information in constructing audit committee quality index (A-Index). The final sample consists of 1459 observations. Panel B and Panel C of Table 7-1 present the distributions of the

governance sample and the DCA estimation sample on a yearly basis. According to previous earnings management studies (Jones 1991, Teoh *et al.* 1998a, Teoh *et al.* 1998b, Dechow *et al.* 2003, Dechow *et al.* 1995), coefficients of normal accruals are estimated from a cross-sectional modification of the Jones (1991) regression in that year of total accruals on a set of independent variables using an estimation sample of all two-digit SIC code peers. The estimation sample shown in Panel C is therefore used to estimate the coefficients of the DCA model.

Table 7-1 Descriptive statistics of sample distributions

Panel A: Sample distribution	
Initial sample	1636
Missing accounting data for DCA calculation	29
	1607
Missing data for A-Index construction	148
Final A-Index sample	1459

Panel B: Year by year sample distribution	
	No. of firms
Year 2001	244
Year 2002	298
Year 2003	306
Year 2004	311
Year 2005	300
Total	1459

Panel C: Year by year control sample distribution

	Original sample	No. of firms with not enough SIC information	Final sample
Year 2001	3739	111	3628
Year 2002	3739	75	3664
Year 2003	3739	59	3680
Year 2004	3739	45	3694
Year 2005	3739	42	3697
Total	18695	332	18363

The sample consists of up to 297 non-financial S&P 500 companies per year in the US during the period 2001 to 2005. Sample is constructed by examining all S&P 500 companies with available corporate governance information filed in the proxy statements on the Securities and Exchange Commission (SEC) website from 2001 to April 2006. All data are manually collected by using the corporate governance data collection system from Survey Partner. Companies may be dropped out from the sample if they do not have information regarding to the audit committee composition, board and audit committee meetings at the year end. The initial sample consists of 500 companies where there are 90 financial companies each year. Observations missed due to not available proxy statements or governance information in proxy statements at the fiscal year are deleted from the sample. In addition to the missing information of 211 firm years to construct the audit committee quality index, the final sample consists of 1396 observations. The control sample for estimating discretionary accruals is derived from the S&P Total Market Index with available accounting data in WorldScope database.

The estimation sample is derived from the S&P Total Market Index with sufficient accounting data to estimate DCA. Following Klein (2002a), Xie *et al.* (2003), Teoh *et al.* (1998a, 1998b) and Dechow *et al.* (2003), each firm-year in the governance sample is required to have at least eight observations with the same two-digit SIC code in that year in the estimation sample. The third column of Panel C shows the number of observations that do not have sufficient observations with the same two-digit SIC code in the estimation sample. After deleting observations that do not have enough information, there are maximum 311 observations in 2004 for the governance sample and 3697 observations in 2005 for the control sample.

7.2.3 Descriptive Statistics of the Sample

Table 7-2 shows the descriptive statistics for the audit committee variables and accrual variables. The results show that, on average audit committees in this sample are highly independent. Although the NYSE and the NASDAQ have required audit committees to be fully composed of independent directors since 1999 (Klein 2002a), the mean audit committee independence is 99%. As discussed in Chapter 4, the reason audit committees in this sample are not fully independent is that I define director independence more strictly in this thesis. Following previous studies, directors who were formerly an employee of the company in the previous 5 years are defined as affiliate directors (Klein 1998, Hillier and McColgan 2006). However, the company may still define them as independent directors. Therefore there are still some directors who are not fully independent in my sample.

Table 7-2 also shows that audit committee characteristics in my sample tend to satisfy both the BRC recommendations and SOX requirements. The BRC recommends that the audit committee should be composed of at least three totally independent members (Abbott *et al.* 2004). It also recommends that the

committee *"...should meet at least four times per year in order to provide the type of interaction and deliberation necessary to fulfil their duties"* (DeFond and Francis 2005, page 22). The descriptive statistics show that on average an audit committee is composed of 3.94 members, nearly 100% independent, and hold on average 8.11 meetings per year. In addition, there are on average 1.03 financial experts on the committee. Detailed information of the changes in audit committee characteristics from pre- to post-SOX will be discussed in the next section.

Table 7-2 Descriptive statistics of firm characteristics variables

	Mean	Std	Median	Max	Min
Panel A - Audit committee characteristics					
Audit committee size	3.94	4.00	1.00	7.00	2.00
Audit committee independence (%)	0.99	1.00	0.04	1.00	0.75
Audit committee financial expertise (no. of)	1.03	1.00	0.85	3.00	0.00
Audit committee meetings (no. of)	8.11	8.00	3.21	17.00	3.00
Panel B - Accruals variables					
Total accruals	-0.07	-0.05	0.07	0.14	-0.40
PMJDCA	-0.04	-0.03	0.13	0.41	-0.57
PMJNDCA	-0.03	-0.02	0.11	0.39	-0.48
PLAGDCA	-0.02	-0.02	0.12	0.40	-0.50
PLAGNDCA	-0.04	-0.03	0.11	0.30	-0.51
PFWDCA	-0.03	-0.03	0.12	0.39	-0.48
PFWNDCA	-0.04	-0.02	0.11	0.29	-0.51
Panel C - Control variables					
Market value ($ billion) (MV)	19.75	8.26	37.24	250.14	1.04
Sales ($ billion)	13.38	5.94	24.66	177.26	0.43
Assets ($ billion)	15.95	6.94	28.86	206.80	0.79
Market to book (MKBV)	3.06	2.33	2.50	14.04	0.17
Return on assets (ROA)	0.05	0.06	0.08	0.20	-0.38

The sample consists of up to 311 non-financial S&P 500 companies per year in the US during the period 2001 to 2005. All accounting data is collected from the WorldScope database. Data on board characteristics and audit committee (AudC) characteristics are manually collected from the companies' proxy statements (DEF 14A) on the Securities and Exchange Commission (SEC) website. Audit committee size is the number of directors serving on the company's audit committee at the beginning of the fiscal year. Audit committee independence and financial expertise are defined as the percentage of independent and financial expert directors serving on the audit committee. Audit committee activeness is defined as the number of meetings of audit committee of the fiscal year. PMJDCA, PLAGDCA and PFWDCA are defined as discretionary accruals derived from the performance matched modified Jones model, Dechow's Lagged model and Dechow's Fowarded model respectively. PMJNDCA, PLAGNDCA and PFWNDCA are defined as non-discretionary accruals derived from the performance matched modified Jones Model, Dechow's Lagged model and Dechow's Fowarded model respectively. Market value is defined as the year-end common stock price multiplied by the year-end total number of common stock. Market to book ratio is defined as market value of equity / (book value of equity + deferred taxes). ROA is defined as the net income divided by total assets.

Mean and median of DCA and NDCA are similar across all models but the standard deviation of DCA in the PMJ model is higher than the other two. This

is consistent with Dechow *et al.* (2003) that the LAG and the FWD model are twice as powerful in estimating DCA. All DCA are between -0.02 to -0.04, which are close to the value of performance-matched DCA in Kothari *et al.* (2005). Total accruals are comparative to previous studies that it is -0.067 in Klein (2002a) and -0.07 in my sample.

7.3 Construction of the Audit Committee Quality Index (A-Index)

7.3.1 Assumptions

Previous studies have documented evidence of the impact of audit committee on financial reporting quality. Klein (2002b) finds that more independent audit committee is more effective in improving financial reporting quality. Xie *et al.* (2003) and Carcello *et al.* (2006a) find that firms with higher financial expertise audit committees have higher financial reporting standards. In addition, Abbott *et al.* (2000) find that fully independent audit committees that meet at least twice a year have lower rate of financial fraud.

Therefore it is assumed that, financial reporting quality is positively related with audit committee effectiveness. In this study, DCA is utilised as the proxy for financial reporting quality. Because DCA is the residuals from normal accruals, theoretically if financial reporting quality is a hundred percent credible and there is no earnings management, discretionary accruals should be equal to zero. Therefore it is assumed that the less the DCA deviates from zero, the higher financial reporting quality and hence the more effective the audit committee is.

Assumption 3: It is assumed that the less the DCA deviates from zero, the more effective the audit committee is.

7.3.2 The Construction of the Audit Committee Quality Index

The audit committee quality index (A-Index) is constructed via a number of sequential steps. First, each characteristic is scored based on the level of PMJDCA and the scores are summed. Next, the same procedure is repeated based on the level of LAGDCA and FWDDCA respectively. The final A-Index is the average of the three sum scores.

I first divide the sample into two sub-samples, positive DCA and negative DCA, and group audit committees by their size and score each group according to the level of DCA for the two sub-samples respectively. Because there are a limited number of observations that have more than 6 members on the audit committee, committees with more than 6 members are allocated into the size-6 group. Thereby there are five groups with the sizes of 2, 3, 4, 5 and 6+.

I then calculate the median positive (negative) DCA of each size group, rank the positive DCA (negative DCA) from the smallest (largest) to the largest (smallest). There are 5 groups hence the scores range from 2-6. The size-group with the smallest positive (largest negative) DCA scores 6 whereas the largest positive (smallest negative) DCA scores 2. Scores obtained from the ranking of positive DCA is Score1 whereas scores obtained from the ranking of negative DCA is Score2 in Equation 7-9.

Equation 7-9

$$TotalScore_{i,t} = \left[(Score1_{i,t} + Score2_{i,t})_{(Size)} + (Score3_{i,t} + Score4_{i,t})_{(Finex*Meet)}\right]/2 + Score5_{i,t(Ind)}$$

The next step is to obtain scores for audit committee expertise and activity, which are Score3 and Score4 in Equation 7-9. I group audit committees by the number of financial experts and the number of meetings respectively. For

expertise, there are 4 groups with a total number of 0, 1, 2 and 3+ financial experts respectively. For meetings, there are 12 groups with from a total number of 3- to 14+ meetings per year respectively. Therefore there are 48 combinations with different expertise and different activities level (4 expertise group times 12 meetings group).

I then calculate the mean positive (negative) DCA of each combination and minus the median positive (negative) DCA of each size group in order to adjust for different audit committee sizes. The adjusted DCA is calculated as follows:

Equation 7-10

$$AdjDCA_{i,t} = MeanDCA(Combin)_{i,t} - MedianDCA(Size)_{i,t}$$

The adjusted positive (negative) DCA of each combination is ranked from the smallest (largest) to the largest (smallest). The scores will be based on the percentile of the ranking and the lowest percentile ranks the highest scores. For example, the 10^{th} percentile will score 10 whereas the 90^{th} percentile will score 1. This score ranges from 1 to 10. Scores obtained from the ranking of positive DCA is Score3 whereas scores obtained from the ranking of negative DCA is Score4 in Equation 7-9.

In addition, if the audit committee is fully independent, Score5 equals 1 and 0 otherwise. The next step is to sum up the Score 1 to 4 and average it by 2 since these scores are obtained from the positive DCA and the negative DCA respectively. The final step is to sum the scores according to Equation 7-9. The three different DCA which are the PMJDCA, the PLAGDCA, and the PFWDCA, would generate three different summed-scores and each of them could be one of the A-Index. In order to mitigate potential errors from model selection, the final A-Index takes the mean of the three total scores.

Equation 7-11

$$A-Index_{i,t} = (Score_{(PMJ)i,t} + Score_{(PLAG)i,t} + Score_{(PFW)i,t})/3$$

7.4 The Impact of SOX on Audit Committee Characteristics and Effectiveness

7.4.1 The Impact of SOX on Audit Committee Characteristics

Panel A of Table 7-3 shows the characteristics and activity of the audit committees in this sample throughout the SOX period. The pre-SOX period is defined as the time from the beginning of 2001 to 30th June 2002. The SOX period is defined as the time from 1st July 2002 to 30th June 2003, whereas the post-SOX is defined as the time period from 1st July 2003 to the end of year 2005.

Audit committee size did not change substantially from pre- to post-SOX, but the standard deviation of audit committee size decreased from 1.10 pre-SOX to 0.96 post-SOX. This implies that it became more common for companies to choose an audit committee with around 4 members post-SOX. In addition, both the number of financial experts and the number of meetings have increased from pre- to post-SOX, where the number of financial experts increased from 0.87 to 1.17 and the number of meetings increased from 6.55 to 9.22. These results are consistent with Linck *et al.* (2008) and show that SOX impacted on the structure and activity of the audit committee.

Table 7-3 Descriptive statistics of the changes in audit committee characteristics variables from pre- to post-SOX

	Pre-SOX				SOX				Post-SOX			
	Mean	Median	Std.	N	Mean	Median	Std.	N	Mean	Median	Std.	N
Panel A - Descriptive statistics of audit committee characteristics												
Audit committee characteristics												
AudC. Size (No. of)	3.96	4.00	1.10	513	3.96	4.00	1.01	306	3.92	4.00	0.96	640
% AudC. Ind.	99%	100%	6%	513	100%	100%	3%	306	100%	100%	4%	640
AudC. Finexp (No. of)	0.87	1.00	0.81	513	1.02	1.00	0.81	306	1.17	1.00	0.89	640
AudC. Meet (No. of)	6.55	6.00	2.73	513	8.41	8.00	3.09	306	9.22	9.00	3.12	640
Panel B - Analysis of frequence of firms fulfilling the requirements of SEC definitions												
SEC requirements												
% (AudC. Size>=3)	95.9%	100.0%	19.8%	513	97.4%	100.0%	16.0%	306	98.0%	100.0%	14.1%	640
% (AudC. Ind.=100%)	96.1%	100.0%	19.4%	513	98.4%	100.0%	12.7%	306	98.0%	100.0%	14.1%	640
% (AudC. Finexp>0%)	63.4%	100.0%	48.2%	513	72.5%	100.0%	44.7%	306	75.9%	100.0%	42.8%	640
% (AudC. Meet>3)	89.9%	100.0%	30.2%	513	98.7%	100.0%	11.4%	306	98.8%	100.0%	11.1%	640

The sample consists of up to 311 non-financial S&P 500 companies per year in the US during the period 2001 to 2005. All accounting data is collected from the WorldScope database. Data on board characteristics and audit committee (AudC) characteristics are manually collected from the companies' proxy statements (DEF 14A) on the Securities and Exchange Commission (SEC) website. Audit committee size is the number of directors serving on the company's audit committee at the beginning of the fiscal year. Audit committee independence and financial expertise are defined as the percentage of independent and financial expert directors serving on the audit committee. Audit committee activeness is defined as the number of meetings of audit committee of the fiscal year. The pre-SOX period is defined as the time from the beginning of year 2001 to 30th June 2002. The SOX period is defined as the time from 1st July 2002 to 30th June 2003, whereas the post-SOX is defined as the time period from 1st July 2003 to the end of year 2005.

The SEC recommends that the audit committee should have at least 3 members, be fully independent, should include financial experts and meet a minimum of 4 times per year (Abbott *et al.* 2004). Panel B shows statistics of the percentage of companies that follow the SEC and the BRC recommendations for audit committee composition and activity.

The results show that nearly all companies have at least 3 members on the audit committee. In addition, there were more issuers with less than 3 members pre-SOX than post-SOX, where there were 95.9% of firms with at least 3 members pre-SOX, and 98% of firms with at least 3 members post-SOX. Some companies had less than 3 members in this sample because their directors were resigning from the audit committee and a replacement was being sought in that year.

There are slightly more firms with affiliate directors pre-SOX than the SOX and post-SOX periods. In addition, consistent with chapter 5 and chapter 6, an increasing number of companies follow Section 407 in the SOX period to include at least one financial expert. The statistics show that there were 72.5% of companies having at least one financial expert since SOX and this figure continued to increase to 75.9%. Moreover, consistent with Linck *et al.* (2008), audit committee work load has increased substantially from pre- to post-SOX, and more and more companies held more than 3 meetings per year. Nearly all companies, 98.7% of the sample, held at least 4 meetings annually in the SOX and post-SOX period.

In sum, results in Table 7-3 show that SOX has changed the composition and activity of the audit committees since SOX was introduced.

7.4.2 The Impact of SOX on the Overall Audit Committee Effectiveness

Table 7-4 presents descriptive statistics of the A-Index and audit committee characteristics. Panel A shows the mean, median and the distributions of A-Index in different index groups. Due to the reliance on DCA in constructing A-Index and its limited data availability, the final sample consists of 1459 observations. The mean and median of the A-Index are 12.29 and 12.17 respectively. In addition, the median value of the A-Index ranges from 7.83 to 17.67. The last column of Table 7-4 shows the distribution of A-Index and the statistics show that most audit committees had effectiveness scores ranging from 9 and 14.

Table 7-4 Descriptive statistics of the audit committee effectiveness index

Panel A - Descriptive statistics of audit committee quality index

A-Index	Mean	Median	Std.	N
A< 9	7.36	7.83	1.43	67
A< 10 and >=9	9.51	9.50	0.26	167
A< 11 and >=10	10.36	10.50	0.28	230
A< 12 and >=11	11.42	11.50	0.27	234
A< 13 and >=12	12.39	12.50	0.23	188
A< 14 and >=13	13.46	13.50	0.30	228
A< 15 and >=14	14.36	14.33	0.26	139
A< 16 and >=15	15.51	15.67	0.32	57
A< 17 and >=16	16.46	16.50	0.24	91
A>=17	17.61	17.67	0.37	58
Total Sample	12.29	12.17	2.47	1459

Panel B - Audit committee quality changes during the SOX

	A-Index		SEC A-Index	
Year	Mean	Median	Mean	Median
Pre-SOX	12.22	12.17	3.45	4.00
SOX	12.07	11.83	3.67	4.00
Post-SOX	12.46	12.33	3.71	4.00

Audit Committee Quality Index (A-Index) is constructed by summing scores from four aspects of audit committee. Audit committee size is the number of directors serving on the company's audit committee at the beginning of the fiscal year. Audit committee independence and financial expertise are defined as the percentage of independent and financial expert directors serving on the audit committee. Audit committee activeness is defined as the number of meetings of audit committee of the fiscal year. The pre-SOX period is defined as the time from the beginning of year 2001 to 30th June 2002. The SOX period is defined as the time from 1st July 2002 to 30th June 2003, whereas the post-SOX is defined as the time period from 1st July 2003 to the end of year 2005.

Panel B of Table 7-4 shows the summary of the changes in the A-Index and the SEC score from pre- to post-SOX and the comparisons between the two

scores. I calculate the SEC scores in accordance with the BRC recommendations and the SOX requirements as follows. It scores one if the audit committee is 100% independent. It adds one extra score if the audit committee has at least one financial expert, another extra score if the audit committee has at least 3 members, and one extra point if the committee meets a minimum of 4 times per year. This method is consistent with the method used in DeFond *et al.* (2005), Carcello *et al.* (2006), Abbott *et al.* (2004) and the BRC and SEC recommendations.

By comparing the A-Index with the SEC scores, the results show that the two scores provide inconsistent results. While the SEC score shows that audit committees have become more effective after SOX was introduced, the A-Index shows that the audit committee is less effective. The A-Index decreased in the SOX period because it may be a learning period for the board and audit committee to learn how to comply with regulations and how to work more effectively. The Pearson correlation tests show that the correlation between the A-Index and the SEC score is only 0.04 and not significant. This indicates that the SEC score and the A-Index could not substitute with each other in reflecting the overall audit committee effectiveness. If A-Index is assumed as the best proxy for audit committee effectiveness, the SEC score should not be used, and vice versa.

I further investigate the relationship between audit committee characteristics and overall audit committee effectiveness. I assume the A-Index to be the best proxy for overall audit committee effectiveness because it captures more on audit committee's effectiveness in monitoring financial reporting quality. A probit analysis is employed and the following model is utilised in the analysis.

Model 7-1 Audit committee characteristics and overall audit committee effectiveness

$$AudIndex_{i,t}=\alpha+\beta_1 Size_{i,t}+\beta_2 Ind_{i,t},FinExp_{i,t}+\beta_3 Meet_{i,t}+\beta_4 Size_{i,t}*FinExp_{i,t}$$
$$+\beta_5 Size_{i,t}*Meet_{i,t}+\beta_6 FinExp_{i,t}*Meet_{i,t}+\beta_7 Size_{i,t}*FinExp_{i,t}*Meet_{i,t}+\varepsilon_{i,t}$$

The interactive terms, $Size * FinExp$, $Size * Meet$ and $FinExp * Meet$, are used to control for the different levels of audit committee size, meetings and financial expertise. The variables of interest in this model include the Size, Ind, FinExp, Meet and the interactive term Size*FinExp*Meet. The variable Size, Ind, FinExp and Meet shows the relation between audit committee characteristics and the A-Index. The interactive variable, Size*FinExp*Meet, shows how to compare effectiveness of two audit committees. If the sign of this variable is negative (positive), this variable shows that if two of these three characteristics (size, expertise or activeness) are equal between two audit committees, the greater the value of the last characteristic the more (less) effective the audit committee is.

Table 7-5 shows the results of Model 7-1 which tests the relationship between the A-Index and the four audit committee characteristics. The coefficients of independent variables show the probabilities of the audit committee having lower A-Index. Therefore a negative sign on the coefficient suggests a greater probability of having higher A-Index.

The results show that audit committee quality increases when the audit committee size, independence, expertise and activities increase[62], which means that audit committee becomes more effective when the committee is larger, more independent, with a higher level of expertise and more active. This is consistent with the BRC recommendations and the SOX requirements.

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62 The estimated parameters in the Probit Analysis suggest the probability of being lower quality. Hence the positive sign suggests a greater probability of having lower A-Index whereas the negative sign suggests a lower probability of having lower quality.

Table 7-5 Probit analysis of A-Index and audit committee characteristics

Dependent variable: A-Index				
	Estimate	Std. Err.	χ^2	p-value
Size	-0.95	0.11	81.46	<.0001
Independence	-0.89	0.17	28.82	<.0001
Financial Expertise (FinExp.)	-4.53	1.32	11.84	0.001
Meetings (Meet.)	-0.22	0.05	16.47	<.0001
Size*FinExp.	1.07	0.35	9.34	0.002
Size*Meet.	0.05	0.01	15.61	<.0001
FinExp*Meet.	0.52	0.15	11.98	0.001
Size*FinExp*Meet.	-0.12	0.04	8.46	0.004
Post-SOX	-0.17	0.06	8.67	0.003
Log Likelihood		-5367.51		
Number of observations		1459		

The sample consists of up to 311 non-financial S&P 500 companies per year in the US during the period 2001 to 2005. All accounting data is collected from the WorldScope database. Data on board characteristics and audit committee (AudC) characteristics are manually collected from the companies' proxy statements (DEF 14A) on the Securities and Exchange Commission (SEC) website. Audit committee size is the number of directors serving on the company's audit committee at the beginning of the fiscal year. Audit committee independence and financial expertise are defined as the percentage of independent and financial expert directors serving on the audit committee. Audit committee activeness is defined as the number of meetings of audit committee of the fiscal year. Audit Committee Quality Index (A-Index) is constructed by summing scores from four aspects of audit committee. The pre-SOX period is defined as the time from the beginning of year 2001 to 30th June 2002. The SOX period is defined as the time from 1st July 2002 to 30th June 2003, whereas the post-SOX is defined as the time period from 1st July 2003 to the end of year 2005.

In addition, the interactive term "Size*FinExp*Meet" is negative and significant. Consistent with Abbott *et al.* (2004), it indicates that, if two of the three characteristics (size, expertise or activeness) are equal between two audit committees, if one audit committee is larger, or with a higher level of financial expertise, or more active, it has greater possibilities to be more effective. Moreover, the dummy variable "post-SOX" shows that, audit committees were more effective post-SOX[63], which is consistent with the aims of Section 301, 202, 204 and 407 in SOX. In addition, the results also imply that the SEC and BRC recommendations are in the right direction in improving audit committee effectiveness.

[63] Another model that adds a slope dummy of post-SOX on the independent variables has been examined, and the results show that the post-SOX slope-dummy does not have impact on the slopes.

Overall, the statistics show that a simple SEC score is not sufficient to reflect the overall audit committee effectiveness. Meanwhile, audit committees were less effective during the SOX period, but it became more effective after SOX was implemented. In addition, effective audit committees are usually larger, more expert and more active. Finally, in comparing two audit committees, if two of the audit committee characteristics are the same, the one that is greater, or more financially expert, or more active has greater capability in monitoring managers.

7.5 Summary and Conclusions

By utilizing the discretionary accruals derived from the performance-matched modified Jones model, the performance-matched Dechow's lagged model, performance-matched Dechow's forward-looking model, and a sample of audit committee characteristics data, I construct the A-Index as a proxy for overall audit committee effectiveness based on the assumption that lower DCA reflects higher audit committee effectiveness.

Descriptive statistics show that there are more companies choosing to appoint 4 members to the audit committees. Issuers also increased the number of financial experts and meetings on the audit committee post-SOX. Further, the results also show that there were more issuers following the BRC and SEC recommendations to employ fully independent directors, include at least one financial expert and meet at least 4 times per year post-SOX.

In addition, I create the SEC score, based on the SEC requirements and previous studies, and compare it with the A-Index. The results show that the SEC score is weakly correlated with the A-Index, and it provides inconsistent results with respect to changes in audit committee effectiveness relative to the A-Index.

Therefore it suggests that the SEC score and the A-Index could not substitute each other in reflecting the overall audit committee effectiveness.

Further, I perform the probit analysis on the relationship between the A-Index and the four audit committee characteristics. I find that, all other three characteristics being constant, when comparing two audit committees, the larger, or the more independent, or committees with a higher level of expertise, or the more active audit committees are more effective in monitoring corporate managers.

The construction of the A-Index as proxy for overall audit committee effectiveness will potentially attract further research on the impact of the audit committee on corporate activities, for example, the impact of audit committee effectiveness on other financial reporting quality proxies, insider trading performance, and information asymmetries between specific traders and the stock market. In addition, higher quality audit committees are more likely to increase directors' or managers' financial reporting conservatism. Since the A-Index provides a proxy for the overall audit committee effectiveness, future audit committee research would be fruitful.

The next chapter investigates how the overall audit committee effectiveness and SOX affected the information content of earnings and their relevance to investors.

8

AUDIT COMMITTEE EFFECTIVENESS, EARNINGS INFORMATIVENESS, AND THE SARBANES-OXLEY ACT 2002

This chapter investigates the impact of the Sarbanes-Oxley Act (SOX) on the earnings informativeness (measured as the earnings response coefficients or "ERC") conditional on audit committee effectiveness. Results show that firstly, the ERC model that controls for the S-Shape return-earnings relation better estimates the ERC. Secondly, earnings informativeness has improved after SOX was enacted. Thirdly, before SOX was introduced, earnings informativeness is greater for firms with more effective audit committees. Finally, however, there is no difference in the ERC between more effective audit committee and less effective audit committee post-SOX. These results imply that SOX was beneficial to investors by enhancing earnings usefulness to investors, but this improvement may not be attributable to the improvements in audit committee effectiveness.

8.1 Introduction

One of the main goals of the Sarbanes-Oxley Act 2002 (SOX or the "Act") is to increase corporate executives' and directors' responsibilities in providing more credible information to the public after a series of accounting scandals in the United States. Corporate boards and audit committees as the ultimate monitors of financial reporting play an important role in determining the transparency and informativeness of accounting earnings (Ahmed *et al.* 2006, Vafeas 2000, Anderson *et al.* 2003). Since results in previous chapters show that audit committee composition and effectiveness have changed significantly post-SOX, informativeness of accounting earnings was supposed to change correspondingly to the changes in audit committee effectiveness. However, this has not yet been tested empirically.

The introduction of the Act was controversial for a number of different areas. First, debate has continued about whether the Act added value to listed companies. Results of empiric studies in this area are mixed. While Li *et al.* (2008), Jain and Rezaee (2006) and Chhaochharia and Grinstein (2007) find that the Act added value to listed companies, Zhang (2007), Leuz *et al.* (2008) and Engel *et al.* (2007) find that the Act only increased the firms' costs to U.S. issuers.

The second debatable area is whether the mandated requirements on corporate governance improved financial reporting quality and the usefulness of accounting information. The Act has increased the independence and financial expertise of the board and audit committees (Carcello *et al.* 2006b, Linck *et al.* 2008), but it is arguable whether this is beneficial to the firm. On one hand, it is argued that including more independent and expert directors helps the board to make more informed decisions that are independent from corporate managers (Carcello *et al.* 2006a, DeFond *et al.* 2005, Bedard *et al.* 2004). Therefore the

accounting information of a firm with a superior governance structure will be more useful and informative to investors (Ahmed *et al.* 2006, Vafeas 2000, Anderson *et al.* 2003).

However, on the other hand, corporate directors will be concerned about potential litigation risks and may become more conservative in a stricter legal environment, e.g. post-SOX (Cohen *et al.* 2004a, Linck *et al.* 2008). Therefore they may be more conservative in releasing relevant financial information to the public thus reducing investors' ability to analyse and evaluate the firm (Begley *et al.* 2007). Since accounting earnings usefulness is determined by the quality of earnings as well as prior relevant financial information (Cai, Faff, Hillier and Mohamed 2007, Teoh and Wong 1993, Kim and Verrecchia 1991), earnings informativeness may decrease for firms that are conservative in releasing useful information for assets valuation. This statement has not been examined and motivates the subsequent research in this chapter.

The contributions of this chapter are as follows. First, this chapter documents evidence of the impact of SOX on earnings informativeness. Previous studies mainly examine the relation between corporate governance and earnings usefulness before SOX was enacted (Anderson *et al.* 2003, Vafeas 2000). However, since U.S. corporate governance structures have changed significantly post-SOX, this affected issuers' financial reporting quality and thus the information content in accounting earnings. This chapter investigates the changes in earnings informativeness from pre- to post-SOX and thereby is the first to document evidence of the impact of SOX on earnings information quality.

Secondly, this chapter documents evidence of the impact of audit committee effectiveness instead of board effectiveness on earnings informativeness. Both Vafeas (2000) and Ahmed *et al.* (2006) examine the impact of board size and independence on earnings usefulness to investors. Since previous studies suggest

that the board of directors delegates responsibilities to the audit committee in order to improve the committee's efficiency (Menon and Williams 1994), it is suggested that audit committees serve as the ultimate monitors of financial reporting (DeZoort *et al.* 2002). Therefore examining the impact of the audit committee on earnings informativeness provides a more direct test of whether and how corporate governance has changed earnings information quality.

Thirdly, this chapter extends Ahmed *et al.* (2006) and documents U.S. evidence of the impact of regulations on corporate governance thus earnings informativeness. Ahmed *et al.* (2006) use a dataset of New Zealand listed companies to examine the impact of the New Zealand Company Act of 1993 and the New Zealand Financial Reporting Act of 1993 on the relation between earnings usefulness and board structure. As discussed in Ahmed *et al.* (2006), agency costs may be different between U.S. and New Zealand companies. The enactment of SOX provides an environment to investigate and compare the impact of regulation changes on earnings informativeness between U.S. and New Zealand.

Finally, this chapter investigates the impact of overall audit committee effectiveness, but not a single audit committee characteristic, on earnings information quality. Anderson *et al.* (2003) investigate the impact of audit committee independence and size on earnings informativeness. As discussed in Chapter 7, different audit committees choose different structures, expertise and activity levels to optimise their effectiveness in controlling financial reporting quality. Therefore results in this chapter show whether and how the overall audit committee effectiveness affects earnings usefulness to investors.

By incorporating the audit committee effectiveness with the revised earnings responses model that captures the S-shape earnings-return relation, the analysis has the following key findings.

First, in contrast to Begley *et al.* (2007), SOX has improved listed companies' financial reporting quality and thus increased the usefulness of accounting earnings to investors. The results show that the earnings response coefficients (or "ERC") increased significantly from pre- to post-SOX. This implies that SOX is beneficial to shareholders because it increased the earnings usefulness to investors.

Secondly, consistent with the hypothesis that firms with superior governance structures have higher earnings information quality, I found that before SOX was introduced, the ERC is significantly greater for firms with more effective audit committees. This is consistent with previous studies that in a less strict legal environment, a more effective audit committee is better at reducing the noise embedded in accounting earnings (Ahmed *et al.* 2006, Anderson *et al.* 2003, Vafeas 2000).

Thirdly, the results also show that, however, after SOX was introduced, there is no difference in the ERC between more effective audit committees and less effective audit committees. This implies that first, other sections of the Act e.g. Section 404, Section 302 and Section 201 rather than Section 407 enhanced earnings quality and thus the earnings informativeness. Other sections of the Act may have improved earnings informativeness to the minimum required level, so that the improved audit committee effectiveness post-SOX did not add marginal credibility to the earnings. Secondly, the result also implies that the Act may increase the conservatism of corporate managers. Post-SOX, corporate executives are concerned about higher reputation costs and legal liabilities, they may not release irrelevant information to the public until they fully verify the financial accounts, which in turn increased the earnings usefulness to investors. Finally, the results also imply that the relation of corporate governance and the ERC may no longer hold post-SOX.

The rest of this chapter is organised as follows. Section 8.2 develops the hypotheses with respect to the theoretical model in Teoh and Wong (1993). Section 8.3 describes the research design and sample data selection, and presents descriptive statistics of the sample data. Section 8.4 presents and discusses the results. Section 8.5 performs additional tests and Section 8.6 concludes.

8.2 Hypothesis Development

8.2.1 Theoretical Framework of the Earnings Response Coefficients

Kim and Verrecchia (1991) provide a theoretic model to examine the information quality of accounting earnings, where earnings information quality is denoted as the earnings response coefficients. Teoh and Wong (1993) modify the Kim and Verrecchia (1991) model and examine the relationship between auditor quality and the ERC. Teoh and Wong (1993) denote that the stock price response is an increasing function of the earnings surprise:

Equation 8-1

$$P_2 - P_1 = \frac{v}{v + \mu}(y_2 - P_1)$$

$(y_2\text{-}P_1)$ captures the earnings surprise and the surrounding noise in the announcement period, the $(P_2 - P_1)$ denotes the stock market's reaction. Denoting the earnings' surprise (UE) as the actual earnings (AE) minus the financial analysts' consensus forecast (AF), dividing P_1 in both sides, Equation 8-1 yields:

Equation 8-2

$$\frac{P_2 - P_1}{P_1} = \frac{v}{v + \mu}\frac{(y_2 - P_1)}{P_1} \rightarrow Return = \frac{v}{v + \mu}(Deflated\ UE)$$

Denoting stock returns as the cumulative abnormal returns in the announcement window (CAR), the earnings response coefficient (ERC) thereby is the ratio of $\frac{v}{v+\mu}$, where v denotes the prior amount of uncertainty of the earnings, and μ denotes the noise in the earnings signal (Teoh and Wong 1993). Following Teoh and Wong (1993), the first differential of ERC to v and μ are:

Equation 8-3

$$\frac{\partial ERC}{\partial v} = \frac{\partial \mu}{(v+\mu)^2} > 0$$

Equation 8-4

$$\frac{\partial ERC}{\partial \mu} = \frac{\partial v}{(v+\mu)^2} < 0$$

Therefore ERC is an increasing function of v (prior uncertainty about the underlining value of stock i), and a decreasing function of μ (noise embedded in the earning information) (Teoh and Wong 1993).

8.2.2 Relation between Audit Committee Effectiveness and ERC

Previous studies suggest that firms with superior governance structure have higher earnings information quality. Vafeas (2000) uses a U.S. sample to examine the relation between board structure and earnings response coefficients, and finds that firms with smallest boards have more informative earnings than other firms. Ahmed *et al.* (2006) use a sample of New Zealand companies and find results consistent with Vafeas (2000). Further, Anderson *et al.* (2003) examine the relation between the audit committee structure and earnings informativeness and find that smaller audit committees provide more informative earnings to shareholders, but they do not find a relation between audit committee independence and earnings informativeness (Vafeas 2005).

Other audit committee research also documents indirect evidence that audit committee effectiveness may affect earnings usefulness. On one hand, Teoh and Wong (1993) find that investors' response to earnings surprise is greater for firms that employ the big eight accounting firms. Their results suggest higher quality external auditors provide less noisy earnings information to the stock market. On the other hand, Abbott and Parker (2000) find that the appointment of external auditors is determined by the audit committee. The two studies imply that audit committee characteristics may impact the earnings usefulness to investors.

Secondly, prior research also finds that accounting manipulations and financial fraud are less likely when the firm's audit committee is more independent, with more financial experts and is more active (Carcello *et al.* 2006a, Klein 2002a, Xie *et al.* 2003, Abbott *et al.* 2000). In addition, incidences of internal control problems are less likely when audit committees are more independent and have a higher level of financial expertise (Krishnan 2005).

Thirdly, since financial experts concentrate on the underlying quality of financial reports (McDaniel *et al.* 2002), an audit committee with greater financial expertise may provide information that is more relevant to the valuation of firms' assets thus creating less uncertainty to investors. Therefore a firm with higher quality audit committee is less likely to disclose irrelevant information to the public prior to earnings announcement until they fully verify the financial account. As a result, earnings information released by higher quality audit committee may contain less noise.

However, as an alternative explanation, firms with more qualified directors may also have the possibility to increase prior market uncertainty of the firms' value. Corporate directors will be concerned with potential litigation risks and become conservative prior to earnings announcement, e.g. post-SOX (Cohen *et al.* 2004a, Linck *et al.* 2008). Therefore they may be more conservative in releasing

relevant financial information to the public thus reducing investors' ability to valuate firms' assets (Begley *et al.* 2007). Since accounting earnings usefulness is determined by the quality of earnings as well as prior relevant financial information (Cai *et al.* 2007, Teoh and Wong 1993, Kim and Verrecchia 1991), earnings informativeness may decrease for firms that are conservative in releasing useful information for asset valuation.

In conjunction with the argument that companies with higher quality audit committees are expected to provide more accurate and less noisy information during earnings announcements, according to Teoh & Wong (1993), I hypothesise that ERC for firms with a more effective audit committee would be higher than firms with a less effective audit committee.

H1: ERC is higher for firms with more effective audit committees.

8.2.3 The Impact of SOX on ERC

SOX imposed several mandated requirements on issuers' auditing functions and improved their financial reporting quality. For example, Section 301 requires the audit committee to be composed solely of independent directors (SEC 2002g). Section 407, although it is not mandated, suggests that issuers include at least one financial expert on the audit committee (SEC 2002j). Since non-audit services are perceived to reduce external auditor's independence, the Act prohibits nine categories of non-audit services within Section 201 (SEC 2002c). In addition, Section 202 requires that all audit and non-audit services have to be pre-approved by the audit committee (SEC 2002d).

Further, other sections of the Act also aim to enhance the credibility of financial accounts. Section 404 requires issuers to invest more resources to enhance internal control over financial reporting (SEC 2002i), while Section 302

requires corporate executives to certify financial accounts and thus take responsibility for ensuring the accuracy and credibility of the financial accounts (SEC 2002h).

Cohen *et al.* (2005) find that financial reporting quality increased substantially post-SOX. Chapter 6 also presents evidence that post-SOX, financial reporting quality improved significantly. These results suggest that post-SOX, the noise embedded in earnings information (or μ) decreased substantially thus the ERC may improve significantly. Therefore I have the following hypothesis:

H2: ERC increased significantly post-SOX.

In addition, after a series of accounting scandals and the introduction of SOX, the stock market may be more aware of the importance of audit committee effectiveness in guaranteeing the financial reporting quality of corporate accounts. For example, investors react more favourably to companies with financial experts on the audit committee (DeFond *et al.* 2005). Therefore the market is more likely to be aware of the difference in the quality of financial accounts provided by different audit committees. This in turn may increase the difference in the ERC between firms with more effective and less effective audit committees.

However, it is also possible that companies' compliance with the Act increased the overall earnings informativeness and so the difference in audit committee effectiveness did not have an incremental impact on the ERC. Since Section 404 of the Act requires external auditors to follow Auditing Standard No.2 to attest the audit to the internal control report, all issuers' financial accounts should have increased to the minimum level of quality that the Act requires. The changes in the ERC post-SOX may attribute mainly to Section 404 and 302 so that the changes in audit committee effectiveness may only add marginal credibility to the financial accounts post-SOX. This is in contrast to pre-

SOX where the difference in the ERC attributed mainly to the firm's oversight body (Ahmed *et al.* 2006, Vafeas 2000, Anderson *et al.* 2003). The difference in the ERC therefore may be greater pre-SOX than post-SOX. There are two alternative hypotheses.

H3: The difference in ERC between firms with more effective audit committees and firms with less effective audit committee become greater post-SOX.

H3a: The difference in ERC between firms with more effective audit committees and firms with less effective audit committee become smaller post-SOX.

8.3 Data and Methodologies

8.3.1 Research Design

Following prior studies (Kim and Verrecchia 1991, Teoh and Wong 1993, Kinney, Burgstahler and Martin 2002), I utilise the coefficient of the short window market reaction (t-2day:t+2day[64]) regression on the earnings surprise (deflated UE) to proxy for the ERC. Since previous studies find that there is an S-Shape[65] relation between stock returns and earnings (Ryan and Zarowin 2003, Kinney *et al.* 2002, Skinner and Sloan 2002, Doyle, Lundholm and Soliman 2006), I add the UE^2 in the following model to control for the S-shape effects.

[64] Results of the t-1:t+1 are similar with the results of t-2:t+2.

[65] The S-shape relation can be explained as follows. According to Freeman and Tse (1992), the extremely large UE contains more transitory earnings information, which is less informative to investors. Therefore its information quality is lower and shows flatter coefficients. Extreme large negative earnings provide even less information to the public than extremely large positive earnings because there may incur more earnings management. Therefore response to extremely large negative earnings will be flatter than extremely large positive earnings.

Model 8-1 Earnings response coefficients controlling for the S-shape earnings-return relationship

$$CAR_{it}=\alpha \ +\beta_1 UE_{it}+\beta_2 UE_{it}^2+\beta_3 UE_{it}^2 UEDUM_{it}+\beta_4 MKBV_{it}+\beta_5 LNMV_{it}+$$
$$\sum_{j=6}^{13}\beta_j IndustryDummy(j)_{it}+\sum_{k=14}^{16}\beta_k QuarterDummy(k)_{it}+\varepsilon$$

CAR_{it} is cumulative abnormal returns from day t-2 to t+2 using the market model with 120 day estimation period from 141 trading days prior to earnings announcement. $UEDUM_{it}$ is 1 when the unexpected earning is negative, and 0 otherwise. This is to control for the asymmetric stock price responses to good news and bad news. Higher β_1 signals higher earnings usefulness to investors. β_2 is expected to be negative and β_3 is expected to be positive. This is because the earnings-return relationship is more steeply sloped for a small absolute surprise, but much flatter for a extremely large absolute surprise (Ryan and Zarowin 2003, Kinney *et al.* 2002, Skinner and Sloan 2002, Doyle *et al.* 2006). The model reflects the S-Shape relationship between CAR and UE. Following Teoh and Wong (1993), I add the firm's growth opportunities (market to book ratio or MKBV), firm size (natural log of market value of equity, or LNMV), industry dummies and earnings announcement quarter dummies in the model to control for different cross-sectional and time series effects[66].

To examine the impact of the audit committee effectiveness, two interactive dummy variables, the "AudM" and the "AudH", are added into the model as follows:

[66] The ERC may vary across different quarters in earnings announcement, therefore I control for the quarterly effects on the ERC by adding dummies of quarters to the model.

Model 8-2 Audit committee effectiveness and earnings informativeness

$$CAR_{it}=\alpha \ +\beta_1 UE_{it}+\beta_2 UE_{it}^2+\beta_3 UE_{it}^2 UEDUM_{it}+\beta_4 ControlVar_{it}+\beta_5 AudM*UE_{it}$$
$$+\beta_6 AudM*UE_{it}^2+\beta_7 AudM*UE_{it}^2 UEDUM_{it}+\beta_8 AudM*ControlVar_{it}+\beta_9 AudH*UE_{it}$$
$$+\beta_{10} AudH*UE_{it}^2+\beta_{11} AudH*UE_{it}^2 UEDUM_{it}+\beta_{12} AudH*ControlVar_{it}+\varepsilon_{it}$$

AudM is medium effective audit committee and AudH is highly effective audit committee. I employ the A-Index that is derived from chapter 7 and define AudM as the A-Index that is in the middle four portfolios, the 11<= A-Index < 15, where AudH is defined as A-Index in the highest three portfolios, e.g. A-Index >= 15. The bottom three portfolios, e.g. A-Index < 11, are defined as the least effective audit committees. ControlVar in the model includes MKBV, LNMV, industry dummies and the quarter dummies. If β_5 or β_9 is significant and positive, hypothesis 1 cannot be rejected.

To examine hypothesis 2, I repeat Model 8-1 in three subsamples[67], which are the pre-SOX, the SOX and the post-SOX subsamples. Earnings announcements during the time period before 30th June 2002 are in the pre-SOX subsample. Earnings announcements during the time period from 1st July 2002 to 30th June 2003 are in the SOX subsample. Earnings announcements during the time period from 1st July 2003 to the end of year 2005 are in the post-SOX subsample. It is expected that β_1 increased from pre- to post-SOX. A Chow test is performed to examine the equality of coefficients across the three subsamples.

To examine hypothesis 3 and 3a, Model 8-2 is then examined in the pre-SOX, SOX and the post-SOX period respectively. It is expected that the difference between β_1 and β_9 would become greater in the SOX and post-SOX

67 The Chow-tests are performed and suggest dividing the sample into three subsamples. However, using interactive slope dummies have similar results.

sample if hypothesis 3 is not rejected. In contrast, the difference may become smaller in the SOX and post-SOX sample if hypothesis 3a is not rejected.

8.3.2 Data

Table 8-1 Descriptive statistics of sample distributions, earnings surprise and cumulative abnormal returns

Panel A: Sample distribution				
Initial sample		1636		
Missing accounting data for DCA calculation		29		
		1607		
Missing data for A-Index construction		148		
Final A-Index sample		1459		
Panel B: Descriptive statistics of UE/P_{t-2} *(*100)*				
	Mean	Median	Std.	N
Pre-SOX	0.033	0.024	0.297	1426
SOX	0.070	0.037	0.384	1156
Post-SOX	0.090	0.047	0.320	2992
Total	0.071	0.039	0.329	5574
Panel C: Descriptive statistics of $CAR_{t-2,t+2}$ *(*100)*				
	Mean	Median	Std.	N
Pre-SOX	0.531	0.637	6.560	1426
SOX	0.664	0.574	6.105	1156
Post-SOX	0.056	0.131	5.057	2992
Total	0.304	0.327	5.703	5574

The governance sample is constructed by examining all S&P 500 companies with available corporate governance information filed in the proxy statements on the Securities and Exchange Commission (SEC) website from 2001 to April 2006. Observations missed due to not available proxy statements or governance information in proxy statements at the fiscal year are deleted from the sample. Due to the missing information of 148 firm years to construct the audit committee quality index, the final sample consists of 1459 observations. The A-Index is constructed following the method described in chapter 7. Quarterly actual earnings and financial analysts forecast (UE) data are collected from the Zacks Investment Research data file with 5574 observations. Stock price data is collected from WorldScope database. Cumulative abnormal return (CAR) is derived from the market model with 120 days estimation period from 141 trading days prior to earnings announcement. Unexpected earning is defined as the actual earnings minus financial analysts forecast deflated by the stock price 2 days prior to the earnings announcement.

Table 8-1 shows the descriptive statistics of sample distributions, earnings surprises ("UE" hereafter) and cumulative abnormal returns ("CAR" hereafter) of the sample. Panel A of Table 8-1 shows that the sample originally consists of 1636 observations. After deleting 177 observations that do not have sufficient information to construct the A-Index, the final sample consists of 1459 firm-years with all available audit committee quality indexes (A-Index) data. The A-Index is constructed following the method described in chapter 7. Quarterly actual earnings and financial analysts forecast data are collected from the Zacks

Investment Research data file[68]. Stock price data is collected from WorldScope database. The cumulative abnormal returns (CAR) is derived from the market model with 120 days estimation period from 141 trading days prior to the earnings announcement. Unexpected earnings are defined as the actual earnings minus financial analysts forecast earnings and deflated by the stock price 2 days prior to the earnings announcement (Teoh and Wong 1993). Matching the A-Index sample with the ERC sample the final sample yields 5574 firm-quarters. Both CAR and UE are winsorized at 1% level to mitigate the influence of outliers.

Panel B of Table 8-1 shows the descriptive statistics for the unexpected earnings (UE) and cumulative abnormal returns (CAR) from pre- to post-SOX. Consistent with Kinney *et al.* (2002), the price deflated UE range from -2% to 2%, where the maximum of UE in this sample is 1.64% and the minimum is -1.51%. Both the mean and median price deflated UE were increasing from pre- to post-SOX. The mean UE jumped from 0.033% to 0.070% from the pre-SOX to SOX period, and it further increased slightly to 0.090% in the post-SOX period.

Panel C of Table 8-1 shows the descriptive statistics of CAR from pre- to post-SOX. Assuming the magnitude of the CAR implies the information asymmetries between insiders and outside shareholders (Cai *et al.* 2007), the significant drop in CAR from the pre-SOX and SOX periods to the post-SOX period indicates a substantial reduction in information asymmetries and this may be attributable to SOX.

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[68] Abarbanell & Lehavy (2002) provide evidence that the I/B/E/S unexpected earnings is 90% correlated with Zacks unexpected earnings. In addition, both Abarbanell and Lehavy (2002) and Bradshaw and Sloan (2002) show that the stock market places more emphasis on Wall Street defined EPS than the Compustat EPS. Hence I chose the EPS in the Zacks file to construct the unexpected earnings.

Table 8-2 Descriptive statistics of earnings surprise and cumulative abnormal returns

*Panel A: UE/P_{t-2} (*100)*	*UE>=0*				*UE<0*			
	Mean	Median	Std.	N	Mean	Median	Std.	N
Pre-SOX								
Least effective audit committee	0.112	0.048	0.172	359	-0.325	-0.104	0.441	94
Medium effective audit committee	0.114	0.044	0.207	667	-0.269	-0.081	0.403	151
Most effective audit committee	0.091	0.028	0.207	116	-0.209	-0.086	0.312	39
SOX								
Least effective audit committee	0.196	0.088	0.302	319	-0.466	-0.153	0.563	79
Medium effective audit committee	0.143	0.049	0.257	495	-0.305	-0.089	0.443	110
Most effective audit committee	0.191	0.074	0.301	124	-0.209	-0.096	0.226	29
Post-SOX								
Least effective audit committee	0.182	0.076	0.312	772	-0.259	-0.092	0.380	166
Medium effective audit committee	0.142	0.059	0.264	1297	-0.229	-0.081	0.359	274
Most effective audit committee	0.147	0.079	0.185	412	-0.163	-0.090	0.247	71
*Panel B: $CAR_{t-2,t+2}$ (*100)*	*UE>=0*				*UE<0*			
	Mean	Median	Std.	N	Mean	Median	Std.	N
Pre-SOX								
Least effective audit committee	0.562	0.547	6.992	359	-0.175	-0.410	8.103	94
Medium effective audit committee	0.766	0.887	6.232	667	-0.365	-0.070	7.075	151
Most effective audit committee	1.327	1.458	5.047	116	-0.985	-0.594	5.218	39
SOX								
Least effective audit committee	0.894	0.686	5.941	319	0.168	-0.512	7.295	79
Medium effective audit committee	0.973	0.946	6.008	495	-1.754	-1.139	5.995	110
Most effective audit committee	1.883	1.543	5.291	124	-1.828	-0.714	7.068	29
Post-SOX								
Least effective audit committee	0.732	0.676	5.201	772	-2.056	-1.638	5.985	166
Medium effective audit committee	0.436	0.454	4.768	1297	-2.496	-1.955	4.919	274
Most effective audit committee	0.416	0.484	4.718	412	-1.530	-2.036	4.170	71

The governance sample is constructed by examining all S&P 500 companies with available corporate governance information filed in the proxy statements on the Securities and Exchange Commission (SEC) website from 2001 to April 2006. Observations missed due to not available proxy statements or governance information in proxy statements at the fiscal year are deleted from the sample. Due to the missing information of 148 firm years to construct the audit committee quality index, the final sample consists of 1459 observations. The A-Index is constructed following the method described in chapter 7. Quarterly actual earnings and financial analysts forecast (UE) data are collected from the Zacks Investment Research data file with 5574 observations. Stock price data is collected from WorldScope database. Cumulative abnormal return (CAR) is derived from the market model with 120 days estimation period from 141 trading days prior to earnings announcement. Unexpected earning is defined as the actual earnings minus financial analysts forecast deflated by the stock price 2 day2 prior to the earnings announcement.

Table 8-2 shows the descriptive statistics for UE and CAR for the three audit committee portfolios across the pre-SOX, SOX and post-SOX periods. Since investors may respond to good news differently from bad news (Roychowdhury and Watts 2007, Basu 1997, Givoly and Hayn 2000), the sample is further divided into a good news portfolio and a bad news portfolio. The good

news portfolio is defined as firms with UE that is not smaller than zero (UE >= 0), while the bad news portfolio is defined as UE that is smaller than zero (UE < 0).

Dechow *et al.* (2003) find that there is a kink in the earnings distribution. Consistent with Dechow *et al.* (2003), the statistics in Table 8-2 show that there is a kink in the unexpected earnings distributions. First, the average magnitude of positive UE is smaller than negative UE. The average absolute value of positive UE ranges from 0.1 to 0.2, whereas the average absolute value of negative UE ranges from 0.2 to 0.4. Secondly, there are more observations reporting positive UE than reporting negative UE. This is consistent with Kinney *et al.* (2002) that more firms report positive UE from 1994 onwards.

In addition, Table 8-2 shows that the difference in the average magnitude of UE between positive UE and negative UE became smaller post-SOX. For example, the absolute value of positive UE for the least effective audit committee increased from 0.112 pre-SOX to 0.182 post-SOX. Meanwhile, the average absolute value of negative UE decreased from 0.325 pre-SOX to 0.259 post-SOX. The medium and most effective audit committees have similar patterns that negative UE decreased from pre- to post-SOX.

Panel B of Table 8-2 presents that the CAR for the most effective audit committees were much higher than the CAR for the medium and least effective audit committees in the pre-SOX and SOX periods. When UE is not less than 0, the mean CAR for most effective audit committee is nearly twice as that of the least effective audit committee pre-SOX. Incorporated with results in Panel A of Table 8-2 that UE is smaller for the most effective audit committees pre-SOX, the results imply a higher ERC for the most effective audit committees.

However, the CAR for the most effective audit committees dropped substantially post-SOX. The statistics suggest that SOX had a significant impact on earnings informativeness to investors. This is further examined and discussed again in the next section.

8.4 Results and Analysis

8.4.1 Model Specifications

Table 8-3 presents the results of the pooled regression of the two earnings response coefficient models. Observations with missing industry information are deleted from the sample. The first model is the ERC model that is employed in Teoh and Wong (1993), while the second model is Model 8-1, which controls for the S-shape earnings-return relation that was documented in previous ERC studies (Kinney *et al.* 2002, Skinner and Sloan 2002).

Comparing coefficients of the price deflated earnings surprise (UE) between the two models; coefficient for the UE is smaller when the S-shape relation is not controlled for. This is consistent with Kinney *et al.* (2002) and Skinner and Sloan (2002) that the greater dispersion of the earnings surprises, the flatter the earnings response coefficients will be. Kinney *et al.* (2002) and Skinner and Sloan (2002) also suggest that without controlling for the S-shape relation, the OLS estimate would be biased towards 0. Therefore the ERC that controls for the S-shape relation is steeper than the linear ERC model. All the three UE estimates in the second model in Table 8-3 are significant at 1% level and the adjusted R^2 is higher than the first model[69].

[69] The reported R^2 are low. However, these are similar to the level of R^2 in Teoh and Wong (1993).

Table 8-3 Earnings response coefficient (ERC) model specifications - controlling for the S-shape return-earnings relation

Model 1: $CAR_{(t-2,t+2)i,t} = \alpha + \beta_1 UE_{i,t} + \beta_2 LogMV_{i,t} + \beta_3 MKBV_{i,t} + \beta_4 ControlVars_{i,t} + \varepsilon_{i,t}$

Model 2: $CAR_{(t-2,t+2)i,t} = \alpha + \beta_1 UE_{i,t} + \beta_2 UE^2_{i,t} + \beta_3 UE^2_{i,t} DumUE_{i,t} + \beta_4 LogMV_{i,t} + \beta_5 MKBV_{i,t} + \beta_6 ControlVars_{i,t} + \varepsilon_{i,t}$

	Model 1 Pool		Model 2 Pool	
	Estimate	t-stat	Estimate	t-stat
Intercept	0.003	0.500	-0.007	-1.08
UE	2.439	10.580 ***	7.597	12.75 ***
UE^2			-368.448	-7.73 ***
UE^2*DumUE			899.417	9.50 ***
Log MV	-0.063	-0.900	0.002	0.03
Market to book	-0.011	-0.420	0.010	0.40
Industry Dummies		yes		yes
Quarter Dummies		yes		yes
No. Obs.		5574		5574
Adj. R^2		2.28%		3.937%
F-Value		9.98		15.18
p-value		<.0001		<.0001

The governance sample is constructed by examining all S&P 500 companies with available corporate governance information filed in the proxy statements on the Securities and Exchange Commission (SEC) website from 2001 to April 2006. Observations missed due to not available proxy statements or governance information in proxy statements at the fiscal year are deleted from the sample. Due to the missing information of 148 firm years to construct the audit committee quality index, the final sample consists of 1459 observations. The A-Index is constructed following the method described in chapter 7. Quarterly actual earnings and financial analysts forecast (UE) data are collected from the Zacks Investment Research data file with 5574 observations. Stock price data is collected from WorldScope database. Cumulative abnormal return (CAR) is derived from the market model with 120 days estimation period from 141 trading days prior to earnings announcement. Unexpected earning is defined as the actual earnings minus financial analysts forecast deflated by the stock price 2 days prior to the earnings announcement. DumUE is 1 when UE<0, otherwise 0. EPS is earnings per share. Market Value (MV) is defined as the year-end common stock price multiplied by the year-end total number of common stock. Market to Book ratio is defined as Market Value of Equity / (Book value of Equity + Deferred Taxes). Observations with missing industry information are deleted from the sample. ***, ** and * indicate the estimates are significant at 1%, 5% and 10% respectively.

In addition, the UE^2 and the UE^2*UEDUM collectively show that the market's response to good news and bad news is asymmetric. For example, the estimate for the market's response to large positive earnings surprise is -368.448, whereas the market's response to large negative earnings surprise is 530.969

($\beta_2+\beta_3$=-368.448+899.471, as shown in Model 2 of Table 8-3). This is consistent with Kinney *et al.* (2002) and Skinner and Sloan (2002) that the market's response to large negative earnings surprise is flatter. The results remain similar after dividing the sample into the positive EPS subsample and the negative EPS subsample.

The variables UE, UE^2 and UE^2*UEDUM are significant, and the R^2 is higher in Model 8-1. Therefore it supports that choosing Model 8-1 as the primary ERC model has additional explanatory power over the ERC model in Teoh and Wong (1993).

8.4.2 The impact of SOX on ERC

Table 8-4 reports results for Model 8-1 to examine the impact of SOX on the ERC. Model 8-1 is examined in the pre-SOX, SOX and post-SOX subsamples respectively. First, Table 8-4 shows consistent results of the return-earnings relation with Table 8-3. Across the three subsamples, the S-shape relation holds and the stock market reaction to a large positive earnings surprise is small in magnitude relative to a large negative earnings surprise. Secondly, the Chow tests are performed to examine whether the sample should be divided into three subsamples. All the F-statistics from the Chow test show that the three subsamples are statistically different in estimating the ERC, so dividing the original sample into three subsamples yields significant improvements in estimating ERC. I therefore divide the original sample into three subsamples to examine Model 8-1 and Model 8-2, instead of pooling the whole sample and run the regression with slope dummies that control for the time series effects[70].

[70] Since the regression needs to control for the effects of SOX, pooling the whole sample into one regression has to add the slope dummies to control for the time series effects.

Table 8-4 The impact of SOX on the earnings response coefficient

$$CAR_{i,t} = \alpha + \beta_1 UE_{i,t} + \beta_2 UE^2_{i,t^2} + \beta_3 UE^2_{i,t2} DumUE_{i,t} + \beta_4 LogMV_{i,t} + \beta_5 MKBV_{i,t} + \varepsilon_{i,t}$$

Pre-SOX			SOX			Post-SOX		
	Estimate	t-stat		Estimate	t-stat		Estimate	t-stat
Intercept	0.007	0.420	Intercept	0.002	0.100	Intercept	-0.023	-2.84 ***
UE	6.297	4.330 ***	UE	6.076	4.660 ***	UE	8.853	12.18 ***
UE^2	-367.780	-2.550 **	UE^2	-201.129	-1.910 *	UE^2	-450.509	-8.15 ***
UE^2*DumUE	869.341	3.460 ***	UE^2*DumUE	639.343	3.180 ***	UE^2*DumUE	993.530	8.46 ***
Log MV	-0.059	-0.350	Log MV	-0.012	-0.070	Log MV	0.120	1.46
Market to book	0.065	1.130	Market to book	-0.042	-0.620	Market to book	-0.006	-0.18
Industry Dummies		yes	Industry Dummies		yes	Industry Dummies		yes
Quarter Dummies		yes	Quarter Dummies		yes	Quarter Dummies		yes
No. Obs.		1426	No. Obs.		1156	No. Obs.		2992
Adj. R^2		4.06%	Adj. R^2		4.26%	Adj. R^2		6.78%
F-Value		3.98	F-Value		3.39	F-Value		14.43
p-value		<.0001	p-value		<.0001	p-value		<.0001
Chow test (Pre- to SOX)		2.2626 ***	Chow test (SOX to post SOX)		2.0837 ***	Chow test (Pre SOX to post SOX)		4.5081 ***

The governance sample is constructed by examining all S&P 500 companies with available corporate governance information filed in the proxy statements on the Securities and Exchange Commission (SEC) website from 2001 to April 2006. Observations missed due to not available proxy statements or governance information in proxy statements at the fiscal year are deleted from the sample. Due to the missing information of 148 firm years to construct the audit committee quality index, the final sample consists of 1459 observations. The A-Index is constructed following the method described in chapter 7. Quarterly actual earnings and financial analysts forecast (UE) data are collected from the Zacks Investment Research data file with 5574 observations. Stock price data is collected from WorldScope database. Cumulative abnormal return (CAR) is derived from the market model with 120 days estimation period from 141 trading days prior to earnings announcement. Unexpected earning is defined as the actual earnings minus financial analysts forecast deflated by the stock price 2 days prior to the earnings announcement. DumUE is 1 when UE<0, otherwise 0. EPS is earnings per share. Market Value (MV) is defined as the year-end common stock price multiplied by the year-end total number of common stock. Market to Book ratio is defined as Market Value of Equity / (Book value of Equity + Deferred Taxes). Observations with missing industry information are deleted from the sample. ***, ** and * indicate the estimates are significant at 1%, 5% and 10% respectively.

Thirdly, the results show that in the SOX period, earnings informativeness decreased slightly since the ERC decreased from 6.297 pre-SOX to 6.076 during SOX. This is in contrast to Begley *et al.* (2007), where companies' information quality was found to have increased temporarily after the passage of SOX. However, after SOX was introduced, earnings informativeness has improved. The ERCs in the post-SOX subsample is 8.853 and is greater than 6.297 in the pre-SOX subsample. Since all the Chow tests for the equality of coefficients across the pre-SOX, SOX and the post-SOX subsamples are significant at 1%, the results suggest that the ERC increased significantly from pre- to post-SOX. Therefore hypothesis 2 cannot be rejected.

The result is also consistent with Cohen *et al.* (2005) and Chapter 6 of this thesis that SOX has improved listed companies' financial reporting quality, and hence the informativeness embedded in earnings has increased post-SOX. This is also evidence that SOX in general is beneficial to corporate shareholders as it has enhanced the usefulness of accounting earnings.

8.4.3 The impact of SOX on ERC Conditional on Audit Committee Effectiveness

Table 8-5 reports results for Model 8-2, which examines the ERCs for different audit committee portfolios across the three periods. The table reports the changes in coefficients for the least effective, the medium effective, and the most effective audit committees respectively from pre- to post-SOX.

Table 8-5 The impact of SOX on the earnings response coefficient conditional on audit committee effectiveness

$$CAR_{i,t} = \alpha + \beta_1 UE_{i,t} + \beta_2 UE_{i,t}^2 + \beta_3 UE_{i,t}^2 DumUE + \beta_4 LogMV + \beta_5 MKBV + \beta_6 ControlVar + \beta_6 AUDM*UE + \beta_7 AUDM*UE^2 + \beta_8 AUDM*UE^2 DumUE + \beta_9 AUDM*LogMV + \beta_{10} AUDM*MKBV + \beta_6 AUDM*ControlVar + \beta_{11} AUDH*UE + \beta_{12} AUDH*UE^2 + \beta_{13} AUDH*UE^2 DumUE + \beta_{14} AUDH*LogMV + \beta_{15} AUDH*MKBV + \beta_6 AUDH*ControlVar + \varepsilon$$

	Pre-SOX		SOX		Post-SOX	
Intercept	-0.016	-0.49	0.000	-0.02	-0.026	-1.81 *
UE	0.116	0.05	3.331	1.52	9.951	8.09 ***
UE^2	249.822	0.83	15.986	0.09	-559.332	-6.29 ***
UE^2*DumUE	-182.397	-0.39	294.463	0.90	1187.565	6.07 ***
Log MV	0.134	0.37	0.036	0.11	0.133	0.89
Market to book	0.020	0.19	-0.316	-1.87 *	-0.022	-0.35
AudM	0.034	0.90	-0.003	-0.07	-0.007	-0.37
AudM*UE	8.662	2.71 ***	4.062	1.39	-1.369	-0.84
AudM*UE^2	-811.808	-2.29 **	-332.617	-1.43	182.777	1.54
AudM*UE^2*DumUE	1377.707	2.38 **	458.270	1.03	-297.620	-1.16
AudM*Log MV	-0.262	-0.62	0.008	0.02	0.082	0.44
AudM*Market to book	0.032	0.25	0.348	1.87 *	0.040	0.54
AudH	0.025	0.32	0.020	0.35	0.016	0.52
AudH*UE	12.857	2.39 **	4.877	1.08	-0.891	-0.35
AudH*UE^2	-1145.069	-2.23 **	-294.074	-0.83	-218.050	-0.71
AudH*UE^2*DumUE	2073.610	2.22 **	966.473	0.82	215.989	0.42
AudH*Log MV	-0.222	-0.32	-0.228	-0.40	-0.350	-1.17
AudH*Market to book	0.168	0.61	0.252	0.56	-0.018	-0.14
Industries Dummies	yes		yes		yes	
Quarter Dummies	yes		yes		yes	
No. Obs.	1426		1156		2992	
Adj. R^2	5.727%		6.569%		8.097%	
F-Value	1.71		1.59		5.29	
p-value	0.0019		0.0069		<.0001	
Chow test	Pre to SOX	1.1241	SOX to post SOX	1.3442 *	Pre to post SOX	2.1802 ***

The governance sample is constructed by examining all S&P 500 companies with available corporate governance information filed in the proxy statements on the Securities and Exchange Commission (SEC) website from 2001 to April 2006. Observations missed due to not available proxy statements or governance information in proxy statements at the fiscal year are deleted from the sample. Due to the missing information of 148 firm years to construct the audit committee quality index, the final sample consists of 1459 observations. The A-Index is constructed following the method described in chapter 7. Quarterly actual earnings and financial analysts forecast (UE) data are collected from the Zacks Investment Research data file with 5574 observations. Stock price data is collected from WorldScope database. Cumulative abnormal return (CAR) is derived from the market model with 120 days estimation period from 141 trading days prior to earnings announcement. Unexpected earning is defined as the actual earnings minus financial analysts forecast deflated by the stock price 2 days prior to the earnings announcement. DumUE is 1 when UE<0, otherwise 0. EPS is earnings per share. Market Value (MV) is defined as the year-end common stock price multiplied by the year-end total number of common stock. Market to Book ratio is defined as Market Value of Equity / (Book value of Equity + Deferred Taxes). Observations with missing industry information are deleted from the sample. ***, ** and * indicate the estimates are significant at 1%, 5% and 10% respectively.

The table presents the following results. First, the results are consistent with all previous studies which find that a better governance structure is positively related to earnings informativeness in the pre-SOX era (Teoh and Wong 1993, Anderson *et al.* 2003, Ahmed *et al.* 2006, Vafeas 2000). There is a significant difference in ERC between the least effective audit committees and the most effective audit committees pre-SOX. The results in the pre-SOX subsample show that UE is not significant, but the two variables, "AudM*UE" and "AudH*UE", are positive and significant at 1%. This is consistent with previous studies that (before SOX was introduced) firms with superior governance structure, e.g. more effective audit committees, have a higher ERC than firms with poor governance system (Ahmed *et al.* 2006, Vafeas 2000, Anderson *et al.* 2003). Therefore in the pre-SOX subsample, hypothesis 1 could not be rejected.

Secondly, the difference in ERC between more effective and less effective audit committees is smaller post-SOX. The results for the post-SOX subsample shows that the variable "AudM*UE" and "AudH*UE" are not significant. This means there is no difference in ERC between the least effective audit committees and the most effective audit committees. Therefore hypothesis 1 is rejected in the post-SOX environment.

Further, the results support hypothesis 3a but not hypothesis 3, where the difference in ERC post-SOX is small relative to the difference in ERC pre-SOX. Since the variable "AudM*UE" and "AudH*UE" are not significant post-SOX, it indicates that difference in ERC between the least and the most effective audit committees is zero post-SOX. Because pre-SOX, this difference is significant, the results suggest that the difference in ERC between most and least effective audit committee decreased from pre- to post-SOX. It implies that after SOX was introduced, the requirements in other sections, e.g. Section 404 and Section 302 and Section 201, are sufficient to increase earnings informativeness to the

minimum level that the Act intended to achieve. Therefore the changes in audit committee effectiveness did not add significant marginal credibility to the earnings.

I further perform the Chow test to examine whether the stock market's response to earnings announcements, conditional on the audit committee effectiveness, has changed significantly from pre- to post-SOX. I perform tests for pre-SOX to SOX, SOX to post-SOX and pre-SOX to post-SOX respectively. Except the test for pre-SOX to SOX, all F-statistics are significant. This suggests that the market's reactions to earnings surprises are not different from pre-SOX to SOX, but are significantly different from pre-SOX to post-SOX.

The results have the following implications. First, the insignificant relation between governance and ERC post-SOX implies that the relation between corporate governance and earnings informativeness may not hold post-SOX. Since the Chow test for the equality of coefficients between the pre- and post-SOX subsamples is significant, future studies have to separate observations in the pre-SOX era from their samples. Secondly, the result also implies that the Act may have increased the corporate managers' conservatism post-SOX. Corporate executives may not release information to the public until they fully verify the financial accounts due to the concern of higher reputation costs and legal liabilities. This has however increased the earnings usefulness to investors.

In sum, this section investigates the impact of SOX on ERC conditional on audit committee effectiveness. My results show that firstly, the ERC model that controls for the S-Shape return-earnings relation better estimates the ERC. Secondly, earnings informativeness has improved after SOX was enacted. Thirdly, before SOX was introduced, earnings informativeness is greater for firms with a more effective audit committee. Finally, however, there is no difference in the ERC between more effective audit committees and less effective audit

committee post-SOX. Results generally imply that SOX was beneficial to investors by enhancing earnings informativeness, but this improvement may not be necessarily attributable to the improvements of audit committee effectiveness.

8.5 Additional Tests

8.5.1 Other Proxy for Audit Committee Effectiveness

In order to test the robustness of the results, I further perform a similar test by dividing the sample into three sub-samples, a) firms with 0 financial expert; b) firms with 1 financial expert; and c) firms with more than 1 financial expert on the audit committee. Previous studies suggest that audit committees with a higher level of financial expertise are more capable of reducing financial fraud and earnings management (Krishnan and Visvanathan 2005, Krishnan 2005, Carcello *et al.* 2006a). Therefore financial expertise could be utilised as another proxy for audit committee effectiveness. I replace the audit committee effectiveness dummies with the audit committee financial expert dummies in Model 8-2 and the results show that the financial expert dummies are not significant in any periods.

8.5.2 Without Controlling for Industry and Quarter effects

I try to remove the industry dummies and the quarter dummies from Model 8-1 and Model 8-2 to see whether industry and quarter affect significantly the results. The statistics show that after removing these two types of dummies and interactive variables from the model, the results remain robust.

8.5.3 Different Measure of CAR and Unexpected Earnings

I replace the 5 day CAR (t-2:t+2) with the three day CAR (t-1: t+1), and deflate the unexpected earnings by the price one day before earnings announcement in Model 8-2. The regression shows consistent results and the ERC is significantly higher where firms have higher quality audit committees pre-SOX, but not post-SOX.

8.5.4 Replacing Unexpected Earnings with Earnings Per Share

I replace the unexpected earnings with earnings per share (EPS) in Model 8-2 in the right-hand side. The results show that the ERC is significantly higher for medium effective audit committees pre-SOX, but not significantly higher for the most effective audit committees. The interactive dummy for the most effective audit committee post-SOX is negative and significant at 10%, which is in contrast to my finding in Table 8-5. However, as shown in Equation 8-2, ERC is the stock market reaction as a function of earnings surprise. Since earnings per share not only reflect earnings surprise but also other information embedded in earnings, the coefficients derived from the model that replaces UE with EPS may have different explanations.

8.6 Conclusions

In this chapter, I investigate the impact of the SOX on the relationship between audit committee effectiveness and the earnings response coefficients (ERC) and draw out the following conclusions. First, the results of the descriptive statistics show that there was a kink in the distribution for earnings surprise. There are more companies reporting earnings to beat the market than companies reporting

negative earnings surprise. In addition, the magnitude of companies having a positive earnings surprise is smaller than those having negative earnings surprise.

Secondly, the results in Table 8-3 show that my modified ERC model that controls for the S-Shape return-earnings relation better estimates ERC. All the three earnings surprise variables are significant at 1%, and the estimate of earnings surprise is less biased to 0. Further, the R-square and F-value of my model is greater than the ERC model that does not control for the S-Shape return-earnings relation.

Thirdly, in contrast to Ahmed *et al.* (2006) and Begley *et al.* (2007), SOX has improved listed companies' financial reporting quality and thus increased the usefulness of accounting earnings to investors. The results show that the ERC increased significantly from pre- to post-SOX. This implies that SOX is beneficial to shareholders because it increased the earnings usefulness to investors.

Finally, consistent with the hypothesis, firms with superior governance structures have higher earnings information quality. I find that before SOX was introduced, the ERC is significantly greater for firms with more effective audit committees. This is consistent with previous studies (Ahmed *et al.* 2006, Anderson *et al.* 2003, Vafeas 2000) and suggests that in a less strict legal environment, a more effective audit committee is better at reducing the noise embedded in accounting earnings. However, the results also show that after SOX was introduced, there is no difference in the ERC between more effective audit committees and less effective audit committees.

The results imply that first, other sections of the Act e.g. Section 404, Section 302 and Section 201 of the Act rather than Section 407 enhanced earnings quality and thus the earnings informativeness. Other SOX sections may have improved earnings informativeness to the minimum required level, so that

the increased audit committee effectiveness post-SOX did not add significantly marginal credibility to the earnings. Secondly, the result also implies that the Act may increase the corporate managers' conservatism post-SOX. Post-SOX corporate executives are more concerned with the reputation costs and legal liabilities. They may therefore not release irrelevant information to the public until they fully verify the financial accounts, which in turn increased the earnings usefulness to investors. Finally, results also imply that the relation between corporate governance and ERC may no longer hold post-SOX.

Bringing in all findings together, the study suggests that SOX is beneficial to shareholders because it increased earnings informativeness to investors. However, the findings suggest that the increase in earnings informativeness may not be attributable to the increased audit committee effectiveness, where it may be attributable to other SOX provisions such as Section 404, 201 and 302.

9 CONCLUSIONS AND FUTURE RESEARCH OPPORTUNITIES

9.1 Introduction

The Sarbanes-Oxley Act 2002 aimed to improve listed companies' financial reporting standards and protect shareholders' interests. However, most of the provisions are perceived to be costly to U.S. issuers and the benefits of the Act has continued to be the subject of much debate. Some of the provisions (Section 202, 204 301 and 407 of SOX, etc.) aimed to improve issuers' audit committee effectiveness. However, whether these provisions are beneficial to shareholders is still subject to intense debate. This thesis utilises a unique corporate governance dataset that covers both the pre- and post-SOX periods and attempts to evaluate the impact of the governance provisions in SOX on listed companies.

This chapter presents a summary and overview of the main findings of this thesis. It will also analyse future research opportunities in this area. The chapter is organised as follows. The next section will revisit the main objectives and research questions of the thesis. Section 9.3 summarises and discusses the main findings of the empirical analysis. Section 9.4 discusses future research opportunities based on the limitation of this thesis and Section 9.5 concludes.

9.2 Research Background and Objectives

The Sarbanes-Oxley Act 2002 aimed to improve listed companies' financial reporting standards and protect shareholders' interests. It brings in a number of

provisions under 11 separate titles in order to improve issuers' financial reporting standards through a number of different channels. Section 404 aimed to enhance internal control over financial reporting. Provisions such as Section 201 and 203 were meant to increase auditor independence. Section 202, 204, 301 and 407 attempted to improve audit committee effectiveness, and provisions 302, 807, and 906 increased corporate executives' and directors' litigation costs. The provisions especially Section 404, however, are perceived to be costly to U.S. issuers and are therefore subject of much debate in the academic community and industry.

The most recent SOX studies focus on whether the Act as a whole package is beneficial or costly to listed companies. Although examining the Act as a whole is important in evaluating SOX, investigating the impact of specific provisions adds more value to regulators around the world because it provides more insights into the effect of specific facets of regulation. SOX attempted to improve financial reporting standards by placing more efforts on improving listed companies' corporate governance structure. Because of this, this thesis investigates specifically the impact of governance provisions in SOX, e.g. Section 407, and its subsequent effects on financial reporting quality, firm value and earnings information usefulness.

This thesis has two objectives. The first is to investigate what changes have there been in corporate governance structure since SOX was implemented. The second objective is to analyse the consequences of any changes in corporate governance post-SOX, and whether these changes are beneficial to shareholders.

To achieve these two objectives, the thesis focuses on answering four empirical questions. These questions are:

1) Have the determinants of audit committee financial expertise changed after SOX?
2) Have the changes in audit committee financial expertise led to better firm performance and financial reporting quality?
3) Has overall audit committee effectiveness changed post-SOX?
4) Have the changes in overall audit committee effectiveness led to more informative earnings?

Investigating the first empirical question provides an insight of how the U.S. corporate governance system operates since the Act was introduced. It shows whether listed companies opted to follow a box-ticking procedure (regulatory compliance) in selecting their corporate governance structures post-SOX. If companies' decisions on appointing financial experts are completely determined by regulatory compliance post-SOX, it provides an environment to test whether self-determined corporate governance system (pre-SOX governance system) is superior to regulatory compliance (post-SOX governance system) for future research.

Investigating the second question provides an evaluation of the success of some SOX provisions in improving issuers' financial reporting standards. This is important since it provides a feedback to regulators about whether their provisions, which are perceived to be costly, are useful to enhance financial reporting standards. If the results find that, although these provisions are costly but it can improve financial reporting standards, regulators should focus on how to cut the costs of the Act. However, if the results find that the provisions are costly but cannot improve the firm's financial reporting standards, regulators should revise their provisions and delete some rules if necessary.

SOX paid considerable attention to a company's auditing function and placed specific requirements on a company's audit committee structure. The third

question therefore provides an assessment to regulators of whether the effectiveness of company's audit committee has improved post-SOX.

The final question aims to provide more insight for the second objective of this thesis. It investigates whether the changes in audit committee effectiveness led to a higher standard of financial reporting. From the regulator's point of view, investigating this question addresses whether it is necessary to change audit committee composition to enhance financial reporting quality. If financial reporting standards and earnings informativeness were improved but not as a result of the changes in corporate governance, it brings a question, which is "Are regulations in corporate governance still necessary"?

Bringing the four research questions together, the thesis can be viewed as trying to answer the question "Is mandated corporate governance necessary and useful to company shareholders"? Answering this question helps regulators to re-consider how to set rules that are useful to shareholders.

9.3 Main Findings of This Thesis

In undertaking an in-depth analysis of the impact of SOX on corporate governance and financial reporting quality, 9 chapters are included in this thesis. The thesis begins with an introduction and presents an overview of the main findings of the analysis. It then reviews the main academic literature in this area in Chapter 2. In Chapter 3 a discussion of the main provisions of SOX is provided. Chapter 4 describes how the corporate governance data are constructed and presents descriptive statistics of how corporate governance and firm characteristics changed from pre- to post-SOX. The four empirical questions are examined in Chapters 5, 6, 7 and 8 respectively. The following section highlights the main findings of the analysis in the four empirical chapters.

9.3.1 Have the Determinants of Audit Committee Financial Expertise Changed after SOX?

I examine the impact of SOX on the determinants of audit committee financial expertise in Chapter 5. The descriptive statistics show that there were more companies including at least one financial expert in the audit committee post-SOX. However, companies that appoint financial experts to the audit committee mainly aimed to comply with SOX provisions rather than to fulfil the companies' governance requirements. The results also suggest that companies appointed financial experts to complement existing governance mechanisms pre-SOX, but to substitute existing governance mechanisms post-SOX. Further, the analysis suggests that the changes in the determinants of audit committee financial expertise post-SOX were significant.

9.3.2 Have the Changes in Audit Committee Financial Expertise Led to Higher Firm Value and Financial Reporting Quality?

In Chapter 6, I examine whether the company's response to SOX Section 407, e.g. changing the level of financial expertise on the audit committee, has improved a firm's financial reporting quality and firm value. In contrast to the SEC's intentions, the results show that firms that did not appoint financial experts either pre- or post-SOX had greater improvements in financial reporting quality than firms that appointed financial experts both pre- and post-SOX. In relation to firm value, firms that maintained appointing audit committee financial experts pre- and post-SOX had a greater increase in firm value over the sample period. Therefore the results imply that SOX did not achieve its objectives of improving financial reporting quality through the implementation of Section 407.

However, it has, albeit unintentionally[71], enhanced corporate value for some firms.

9.3.3 Has Overall Audit Committee Effectiveness Changed post-SOX?

In Chapter 7, I utilise three comprehensive discretionary accruals model and a unique sample of audit committee data, and provide a practical method to construct an audit committee effectiveness index (A-Index). The analysis shows that highly effective audit committees are larger, have a higher level of financial expertise and hold more committee meetings. In addition, when comparing two audit committees, *ceteris paribus*, a larger, or more independent, or an audit committee with greater financial expertise, or more active is more effective. Further, after comparing a score constructed in previous studies (the SEC score) with the A-Index, it is found that the SEC score is weakly correlated with the A-Index. While the A-Index shows that overall audit committee effectiveness decreased during the SOX period, the SEC score reports contrasting results. This implies that, the SEC score and the A-Index could not substitute each other in reflecting the overall audit committee effectiveness.

9.3.4 Have the Changes in Overall Audit Committee Effectiveness Led to More Informative Earnings?

Finally in Chapter 8, I investigate the impact of SOX on the earnings informativeness (measured as the earnings response coefficients or "ERC") conditional on audit committee effectiveness. Results show that firstly, the ERC model that controls for the S-Shape return-earnings relation better estimates the ERC. Secondly, earnings informativeness improved after SOX was enacted.

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[71] SOX aimed at increase the financial reporting quality in order to recover investor's confidence. Therefore the intentional effects of SOX would be to increase the financial reporting quality, whereas other results such as changes in firm value would be unintentional effects of SOX.

Thirdly, before SOX was introduced, earnings informativeness is greater for firms with more effective audit committees. Last, there is no difference in the ERC between more effective audit committee and less effective audit committee post-SOX. These results imply that SOX was beneficial to investors by enhancing earnings usefulness, but this improvement may not be attributable to the improvements in audit committee effectiveness.

9.4 Future Research Opportunities

9.4.1 Further Comparison between the A-Index and the G-Index

Gompers *et al.* (2003) develop a corporate governance index ("G-Index" hereafter) to proxy for the overall corporate governance quality or the overall shareholder protection, and it is widely used in previous studies. The creation of the A-Index in this thesis is the first try to create a proxy for the overall quality of a subcommittee of the board. Further investigation is required to investigate first, the correlation between G-Index and A-Index; secondly, which index is a better proxy for corporate governance quality; thirdly, in which area are these two indexes better proxy for; and fourthly, whether these two scores can be combined to create a more powerful proxy. This can provide future research with guidance for choosing a better proxy for overall quality of corporate governance.

9.4.2 Comparison between US and UK Corporate Governance

To date, there has been no work to compare the impact of the regulations in the UK and the US on the developments of corporate governance. The major research in this area include Linck *et al.* (2008), Linck *et al.* (2007) and Litvak (2007). However, all the above studies focus on the US statutory regulations only. They did not compare the differences in the impact of regulations between the

US and the UK on corporate governance and its consequences. Since the UK adopts the "Comply or explain" strategy, where the US adopts the mandatory requirements, the two regulatory requirements may have different impacts on governance practices and its developments. Therefore research that compares UK and US corporate governance contributes to the literature by providing more insights of the differences in the two regulation systems and the impacts on corporate governance developments. The results of this analysis may provide a direction of developing a more cost-effective corporate governance regulatory system in the future[72].

9.5 Summary

SOX has changed listed companies corporate governance structure, especially audit committee structure and activity levels substantially. Hence it has improved the overall effectiveness of issuers' audit committees. However, the improvements in corporate governance structures did not contribute to the changes in financial reporting quality and earnings informativeness as the SEC expected. First, firms that did not follow the spirit of SOX Section 407 had greater improvements and higher financial reporting quality post-SOX than firms that maintained following SEC recommendations. Secondly, improvements in earnings informativeness are not attributable to changes in audit committee effectiveness. Thirdly, firm value increased for companies that followed Section 407 but it happened unintentionally. As a result, although the findings suggest that SOX was beneficial to shareholders in terms of improving financial reporting

[72] For example, if Section 407 was not as effective as the SEC originally expected and other provisions are powerful enough to enhance financial reporting quality; it would be more cost-effective to employ only provisions that can enhance listed companies' financial reporting quality.

quality, firm value and earnings informativeness, there is still a weak link between these improvements and corporate governance.

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