The Impact of Technology and Regulatory Changes on the Relationship between a Firm's External Governance Index and its Financial Performance and Earnings Management

Sung S. Kwon
Haiping Wang
Taslima Nasreen*

1. Introduction

After multiple corporate scandals and a severe financial crisis, there is now widespread recognition, as well as growing empirical evidence, that good corporate governance (CG) can substantially reduce information asymmetry between a firm and its outside investors. Information asymmetry, by increasing the monitoring and auditing costs of external investors and facilitating managerial manipulation, leads to lower firm valuation and more opportunities for earnings management (e.g., Lombardo and Pagano, 2006). Therefore, generally stronger corporate governance should help improve a firm's valuation and reduce the magnitude of opportunistic earnings management. However, extant literature provides mixed results about the impact of CG on firm valuation and earnings management (e.g., Gompers et al., 2003; Black, 2011; Bhagat and Black, 2002; Bergstresser and Philippon, 2006), indicating that the relationship between CG and firm valuation/earnings management may be conditional. Therefore, in this article, we aim to fill this gap by examining the two conditions under which corporate governance's impact on firm valuation and opportunistic earnings management would be more eminent: technology (high-tech versus non-high-tech firms) and regulatory changes (the Sarbanes-Oxley Act of 2002 in the USA or SOX).

The specific purpose of this article is two-fold. First, this research examines whether relationships between CG practice (derived from differential practices of CG) and firm valuation and between CG practice and opportunistic earnings management differ significantly between high-tech (HT) and NHT (non-high-tech) firms. Second, this paper investigates whether relationships between CG practice and firm valuation and between CG practice and opportunistic earnings management differ significantly between pre-SOX and post-SOX periods.

HT firms have some unique characteristics that suggest that CG may affect them more than NHT firms in the areas of firm valuation and earnings management. First, information asymmetry is more severe for HT firms. Innovative projects developed in HT firms are much less well-understood by outside investors, since past

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*The authors are, respectively, Professor, Assistant Professor, and faculty member at York University, Toronto, Canada.

experience or realized performance can offer little guidance in assessing the prospects of completely new projects (Guiso, 1998). Therefore, distinguishing between good and bad projects is more difficult than in more traditional fields. Furthermore, HT firms have little incentive to communicate information on their innovative projects externally, to protect useful information from being revealed to the firm's competitors (Bhattacharya and Ritter, 1983). This lack of incentive, in turn, deteriorates the firm's informational environment and thus exacerbates information asymmetry. Stronger CG, which aims at improving the firm's information environment, should alleviate the information asymmetry problem to a greater extent in HT firms. Since firm valuation is an increasing function of the firm's information quality (Titman and Trueman, 1986), stronger CG should in turn improve firm valuation to a greater extent in HT firms. Similarly, since information asymmetry and firms' opportunistic earnings management is positively associated (Chaney and Lewis, 1995), stronger CG should impact HT firms to a greater extent in reducing opportunistic earnings management. [1]

Second, HT firms usually have more difficulty raising external capital (Trueman et al., 2000). Hence, good corporate governance practice should be more important for HT firms to facilitate their external financing activities. HT firms involve substantial investment in R&D rather than in plant and equipment. In contrast to investment in equipment and machinery which can serve as collateral, expenditure on R&D can only be backed by the revenue it generates, which comprises only a small portion of the total R&D expenditure (Guiso, 1998). As a result, financial intermediaries, facing greater risks in investing in HT firms, may end up allocating less to HT projects than they would in the NHT sector. Good CG, under such circumstances, is likely to improve the firm's information environment and thus alleviates the concerns of financial intermediaries and facilitates the external financing of the HT firms, which in turn should lead to higher firm valuation and less need to manipulate earnings to attract external investors.

Third, HT firms are subject to higher litigation risks. On the one hand, HT firms attract more attention from financial analysts and the investment community than NHT firms because of their enormous opportunities for growth and their favored status in the technology-based New Economy (Kwon and Yin, 2006). As a result, high-tech firms undergo closer scrutiny by financial analysts as objects of investment recommendations to

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[1] Klein (2002) demonstrates that there exists a negative relation between audit committee or board independence (higher levels of governance) and opportunistic earnings management. This evidence of bad earnings management is additionally found in prior studies such as Healy (1985), Jones (1991), Dechow et al. (1996), Hanna (1999), etc. The empirical evidence of responsible use of earnings management (good earnings management) from the blocked communication concept of Demski and Sappington (1987) is also documented in prior research including Subramanyam (1996), Tucker and Zarowin (2006), etc. Since the paper's main focus is on the relationship between corporate governance and earnings management, and unlike the case with bad earnings management, there is no evidence from prior research that suggests a negative relation between the amount of good earnings management and the heightened level of governance (i.e., SOX), any reduction of the use of accruals after SOX should be more directly associated with bad, opportunistic earnings management than with good, legitimate earnings management.

clients and the closer scrutiny is likely to increase litigation risks (Kwon et al., 2006).[2] On the other hand, according to Skinner and Sloan (2002), growth stocks (HT firms) exhibit asymmetrically large negative price responses to negative earnings surprises. Thus, HT firms face higher probabilities of shareholder class action lawsuits. Therefore, good CG should better alleviate the risks of HT firms compared to NHT firms, resulting in higher firm valuation and less need to manipulate earnings.

The high-profile corporate failures during 2001-2002 led to the passage of the Sarbanes-Oxley Act (SOX) in 2002 which promulgated new standards for corporate accountability and purports to ensure good corporate governance. The SOX has been widely recognized as the most far-reaching securities legislation since Securities Act of 1933 and Securities Exchange Act of 1934.[3] The Act not only imposed additional requirement on disclosure, but also proposed substantive corporate governance mandates (Romano, 2005). The SOX aims to prevent deceptive accounting and management misbehaviour by requiring more oversight, imposing larger-scale penalties for managerial misconduct and dealing with potential conflicts of interest. Therefore, if the implementation of SOX has been effective, we should observe a number of positive outcomes such as better monitoring, less opportunistic earnings management and better firm valuation. However, there have been substantial concerns regarding the costs of SOX compliance. Executives complain that complying with the rules diverts their attention from doing business (Solomon and Bryan-Low, 2004). Moreover, CEOs claim that they will take less risky actions, which results in changing their business strategies and potentially reducing firm value (Ribstein, 2002). Consequently, while SOX should effectively reduce opportunistic earnings, the net effect of SOX on firm value is still an empirical question.

Using heteroscedasticity-corrected multiple regression analyses, we find that the positive association between corporate governance and financial performance, which has been documented in prior research, is greater for HT firms than for NHT firms during the sample period 1997-2005. Moreover, when we dichotomize the sample period between the pre-SOX and the post-SOX periods, the positive relationship for HT firms is significantly greater in the post-SOX period than in the pre-SOX period. We also find that HT firms exhibit a strong inverse relationship between corporate governance and earnings management, and this inverse relationship between a firm's corporate governance and its magnitude of earnings management is stronger for HT firms in the post-SOX period than in the pre-SOX period. Moreover, these empirical findings are quite

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[2] The results of Kwon (2002) also support this explanation. Kwon (2002) finds that the absolute forecast errors and forecast dispersion are negatively related to the number of analysts and market-to-book value of assets.

[3] See President Bush's speech at the signing ceremony of SOX (http://www.whitehouse.gov/news/releases/2002/07).

robust to the use of different proxies for both dependent and independent variables and to the different treatments of extreme values.

This article contributes to the debate on CG's impact on firm valuation and earnings management in a number of ways. First, extant evidence on the relationship between CG and firm valuation/earnings management is mixed. We believe that the mixed results indicate that the relation may be conditional, and in this paper we propose and document that two moderators, technology and regulation changes, affect this relationship. Second, this paper adds to the technology literature by providing evidence that corporate governance matters more in high-tech firms in increasing firm value and reducing opportunistic earnings management. Third, the results of this article complement the SOX literature by confirming the effectiveness of SOX on reducing opportunistic earnings management, and by adding evidence that the net effect of SOX on firm valuation is positive. The findings of this paper may be useful for investors, regulators and academics in assessing the differential effect of corporate governance practices on a firm's financial performance and earnings management between technology-based and non-technology-based industries.

The rest of the article is organized as follows. Section 2 describes the development of hypotheses based on prior relevant research. Section 3 explains sample selection procedures and the measurement of variables. Section 4 contains the results of empirical tests. Section 5 deals with sensitivity issues, and Section 6 offers a conclusion and limitation.

2. Literature Review

Corporate governance (CG) refers to the set of mechanisms that influence the decisions made by managers when there is a separation of ownership and control (Larcker et al., 2007). Hence, CG is the set of processes, customs, policies, laws and procedures that affect the way a corporation is evaluated, directed and monitored. The central notion behind CG is to establish sound relationships among the many stakeholders involved.

The empirical research examining the relation between typical measures of corporate governance and various accounting outcomes has not produced a consistent set of results. On the one hand, a number of studies find a significant association between good corporate governance and firm valuation. For example, in their seminal work, Gompers et al. (2003) find that higher external governance index scores (i.e., lower governance quality) are associated with lower firm value. Using somewhat different measures of corporate governance, Yermack (1996), Beiner et al. (2006), Bebchuk et al. (2009) and Black (2011) also document a positive association between quality of corporate governance and firm valuation. Lemmon and Lins (2003) and Baek et al. (2004) show that corporate governance affects a firm's value during financial crises, using ownership structure and foreign ownership concentration as proxies for corporate governance. Adopting an international

perspective, Chhaochharia and Laeven (2009) and Ammann et al. (2011) document a strong, positive relation between firm-level corporate governance and firm valuation. Using stock returns as a proxy for firm performance, Core et al. (2006) find that firms with weak shareholder rights exhibit significant stock market underperformance.

On the other hand, a series of studies show that the association between corporate governance and firm valuation is not robust under certain conditions. For instance, Hermalin and Weisbach (1991) and Bhagat and Black (2002) find no link between the proportion of outside directors and firm valuation. Yermack (1996) documents an inverse relation between board size and Tobin's Q. Bebchuk and Cohen (2005) and Brown and Caylor (2006) find that only a small subset of provisions marketed by corporate governance data providers are related to firm valuation.

Literature documenting the impact of corporate governance on earnings management is more sparse and the results of these limited studies are mixed. Klein (2002) shows that CG, proxied by audit committee and board characteristics, is related to opportunistic earnings management by the firm. Similarly, Cornett et al. (2008, 2009) find that institutional ownership of shares, institutional investor representation on the board of directors and the presence of independent outside directors on the board all reduce earnings management. Furthermore, Bekiris and Doukakis (2011) examine the association between corporate governance and accruals earnings management using a corporate governance index consisting of 55 individual corporate governance measures and find an inverse relationship between corporate governance and earnings management. However, Bergstresser and Philippon (2006) find an inconsistent relation between accruals and an index of corporate governance quality.

The mixed findings above on the impacts of corporate governance on firm valuation and opportunistic earnings management suggest that these associations may be conditional. Therefore, in this study we investigate the conditions that affect these impacts of corporate governance. Specifically, we propose that technology and regulatory changes should affect the association between corporate governance and firm value and opportunistic earnings management.

HT firms, or innovation-intensive firms, have attracted much attention from academia in recent years. As discussed in the previous section, HT firms have some unique features such that CG may affect them to a greater extent in the areas of firm valuation and earnings management. First, evidence suggests that there is greater information asymmetry in HT firms due to the innovative projects they develop, which in turns results in unpredictable performance (e.g., Guiso, 1998; Bhattacharya and Ritter, 1983). CG that aims to improve the firm's information environment should therefore have a greater effect on HT firms. Since firm valuation is an increasing function of the firm's information quality (Titman and Trueman, 1986), stronger CG should in turn

improve firm valuation to a greater extent in HT firms. Similarly, because information asymmetry and firms' opportunistic earnings management is positively associated (e.g. Chaney and Lewis, 1995), stronger CG should impact HT firms to a greater extent in reducing opportunistic earnings management.

Second, HT firms generally have more difficulty raising external capital (Trueman et al., 2000). Hence, good corporate governance practice should be more important for HT firms in facilitating their external financing activities. In addition, HT firms also incur a greater amount of unusual or nonrecurring expenses in order to survive in today's fast-changing, fiercely competitive market. As a result, financial intermediaries and prospective investors, facing greater risks in investing in HT firms, may end up allocating less to HT projects than they would in the NHT sector. Stronger CG practice should restore confidence among shareholders and lenders by sending the capital markets a clear signal that the governing body will keenly monitor management to ensure the efficient and effective use of resources. Thus, stronger CG should alleviate the concerns of financial intermediaries and prospective investors and facilitate the external financing activities of HT firms. Under such circumstances, we should expect higher firm valuation and less need for earnings management.

Third, HT firms are generally subject to higher litigation risks because of the greater attention from financial analysts and the investment community than NHT firms (Kwon and Yin, 2006) and the large negative price responses to negative earnings surprises (Skinner and Sloan, 2002).[4] Consequently, good CG should better alleviate the risks of HT firms compared to NHT firms, which may result in higher firm valuation and less earnings management.

Based on the analysis above, HT firms, compared with NHT firms, generally face a more asymmetric informational environment, generally have more difficulty raising external capital, and are generally subject to higher litigation risks. Thus, good CG practice should affect firm value and opportunistic earnings management to a greater extent for HT firms versus NHT firms. Therefore, we develop our first set of hypotheses as follows:

H1A: *The impact of strong corporate governance in improving a firm's valuation is greater on HT firms than on NHT firms.*

H1B: *The impact of strong corporate governance in reducing a firm's opportunistic earnings is greater on HT firms than on NHT firms.*

The high-profile corporate failures in the United States over the 2001-2002 period led to the Sarbanes-Oxley Act of 2002 (SOX). The SOX legislation includes different provisions with the purpose of ensuring alignment of incentives of corporate insiders with those of investors, and of reducing the likelihood of corporate

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[4] Skinner and Sloan (2002) document that the absolute magnitude of the stock price response to negative earnings surprises significantly exceeds the stock price response to positive surprises, particularly for HT firms.

misconduct and fraud. A key feature of SOX is that it mandates a vastly increased role for monitoring by outside or "independent" directors. Consequently, in the post-SOX period we would expect there to be greater interest alignment and fraud control. However, empirical evidence regarding the economic impact of SOX is mixed. On the one hand, a number of studies find that SOX rules have a significant effect on improving firm value and reducing earnings management. For example, Chhaochharia and Grinstein (2007) find that the announcement of SOX rules had a significant effect on firm value. Similarly, Switzer (2007) documents that firms subject to SOX experienced an incremental increase in market valuation ranging between 15.7% and 34%, depending on the measure of CG. Lobo and Zhou (2006) show that the SOX considerably altered the financial reporting environment in which managers operate, leading to an increase in accounting conservatism, a decrease in financial flexibility in financial reporting, and a decrease in earnings management.

On the other hand, a handful of other studies have attempted to discern the overall cost effectiveness of SOX. The main argument in this strand of research is that the overall direct and indirect private costs of SOX on businesses may well outweigh its private benefits. Zhang (2007) finds that firms experienced a significant negative cumulative abnormal return around key SOX events, and that the non-audit services and governance provisions impose net costs. Bhattacharya et al. (2002) examine the market response to CEO and CFO certification required by SOX and find no significant price reactions. Based on the findings above, if the implementation of SOX is cost-effective, the impact of good corporate governance on firm value should be greater. Otherwise, SOX may not have a significant impact on the association between corporate governance and firm valuation. However, we believe that SOX should not affect the effectiveness of CG in reducing opportunistic earnings management despite it being too costly for some firms. The additional cost that SOX imposes may reduce the value that CG adds to the company, but it should not alter the beneficial impact of CG on earnings management. Therefore, we develop this article's second set of hypotheses, one in null form andthe other with predicted direction, as follows:

H2A: The impact of CG on firm value is the same in the pre-SOX and the post-SOX periods.

H2B: The impact of CG on earnings management is stronger in the post-SOX period than in the pre-SOX period.

3. Sample Selection and Methodology:

3.1 Sample Selection and Descriptive Statistics:

To categorize HT and NHT firms, we adopt the same procedure in Kwon (2012) and Kwon and Yin (2006). We combine the technology firms listed on CNNFN.COM with high-tech firms as defined by Francis

and Schipper (1999) to form a sample of high-tech firms.[5] According to Francis and Schipper (1999), HT firms are those in the computer, electronics, pharmaceutical, and telecommunications industries. NHT firms are all other firms excluding some highly regulated industries such as financial institutions (SICs 6000-6999) and utilities (SICs between 4400-5000).[6] Table 1 provides the sample selection process. Financial data are obtained from COMPUSTAT database, and Governance Index data, which is based on Investors Responsibility Research Center (IRRC) data, is downloaded from Andrew Metrick's web page.[7] The IRRC data is only available for 1990, 1993, 1995, 1998, 2000, 2002, 2004, and 2006.[8] The sample begins with 16,765 firm-years. 15,208 firm-years have been removed due to insufficient and missing data for the investment opportunity set, earnings management proxies, institutional ownership percentage, and other dependent and independent variables. This sample selection procedure results in 363 firm-year observations for HT firms and 1194 firm-year observations for NHT firms. This article and Nasreen (2012) share the same samples of HT and NHT firms. Table 2 shows the distribution of the sample of HT and NHT firms according to industry type measured by three-digit (two-digit) Standard Industrial Classification codes for HT (NHT) firms. The sample period covers nine years of observations during 1997-2005.

Panel A of Table 3 shows the mean, median and standard deviation of dependent and independent variables measuring corporate governance and financial performance. Most of the variables are significant at the 1% two-tailed level of significance in both parametric and non-parametric tests except for PPE/Sales and Institutional ownership, which are not significant at the 10% level in non-parametric tests.[9] A control variable, Institutional ownership percentage (INSTP), is used to estimate the shareholders' influence on the board of directors. This variable is used in place of the "Closely-held ownership" variable used in Ammann et al.

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5 The exact website address is http://cnnfn.cnn.com/news/technology/techstocks. The website classifies tech stocks in several categories: tech blue chips (15), cable (7), chips (31), computer/peripherals (16), internet (16), networking (9), satellite (5), software (29), tech retail (3), telecommunications (12), telecommunications (global) (3), and wireless (16). Some companies like Motorola, AT&T, IBM, Hewlett-Packard, etc. are included in more than one category.

[6] Cheng and Warfield (2005) and Burgstahler and Eames (2003) argue that managers in these regulated industries might have different motivations to manage earnings.

[7] We are grateful to Fernando Penalva for giving guidance and sending the link for Andrew Metrick web page.

[8] Gompers et al. (2003) and J.M. Garcia Lara et al. (2009; footnote 14) report that for the majority of firms there is little time-series variation in the index. Like Cremers and Nair (2005) and J.M. Garcia Lara (2009), we align the index variables available for 1995 with firm data for 1997, the index values for 1998 with firm data for 1998 and 1999, the index values for 2000 with firm data for 2000 and 2001, the index values for 2002 with firm data for 2002 and 2003, the index values for 2004 with firm data for 2004, and the index values for 2006 with firm data for 2005.

[9] Institutional ownership is calculated as percentage of institutional ownership in fiscal year t from the TFSD ownership database.

(2011).[10] The average TOBINQ of HT firms (3.395) is higher than that of NHT firms (2.073). This indicates a higher market value for HT firms versus NHT firms. Similarly, the ROA of HT firms (10%) is much higher than that of NHT firms (7.4%). That implies HT firms are using their assets more efficiently than NHT firms. As expected, the average GI index of HT firms is lower than that of NHT firms, which indicates, on average, stronger governance for HT firms. In general, relative to NHT firms, HT firms show greater R&D spending, greater cash holdings, less capital investments, a higher ratio of property-plant-equipment to sales or earnings before interest and tax to total assets, lower leverage, and lower institutional ownership.

Panel B of Table 3 shows descriptive statistics of dependent and independent variables for corporate governance and earnings management. Similar to the prior descriptive statistics, most of the variables are significant at the 1% two-tailed level of significance. The average Absolute Discretionary Accruals (ADA) of HT firms (95.358) is higher than that of NHT firms (20.453). Similarly, the Absolute Performance-Matched Discretionary Accruals (APDA) of HT firms (99.284) is much higher than that of NHT firms (26.820). These statistics further support our claim that HT firms have more incentives to manage earnings than NHT firms as we discussed in the hypotheses development section. The 10-year rolling average variability for either sales or cash flow from operations is remarkably higher for HT firms than for NHT firms. On average, almost all HT and NHT sample firms are audited by one of the Big 4 audit firms. In addition, HT firms show a higher degree of variability in sales or operating cash flows, a lower level of capital intensity, and a higher level of investment opportunity than NHT firms. Moreover, HT firms are bigger and younger than NHT firms.

Panel C of Table 3 shows descriptive statistics of additional dependent and independent variables for corporate governance and earnings management that are used in sensitivity analyses. Since prior studies also use stock price as a measure of financial performance, we also adopt cumulative monthly raw and market-adjusted returns for a fiscal year as dependent variables that are used as proxies for financial performance. HT firms do not exhibit significantly different stock price performance during the sample period when compared to the stock price performance of NHT firms. There is also weak evidence that HT firms are audited more by Big 5 accounting firms than NHT firms.[11]

3.2 Methodology

3.2.1 Measurement of Variables

3.2.1.1 Independent Variables

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[10] Ammann et al. (2011) has used "closely held" as the percentage of shares that are held by block holders with ownership stakes exceeding five percent of the company's equity.

[11] The number of "big" audit firms changed from six to five in 1998 and in 2002 to four. PricewaterhouseCoopers, Deloitte, Ernst&Young, and KPMG are currently the four big accounting firms.

Corporate Governance Proxies

We use "the takeover protection index" that was originally constructed by Gompers et al. (2003) as a proxy for the strength of a firm's external governance.[12] Lusk et al. (2008) claim that this index is one of the most widely used measures of a firm's external governance and is based on the corporate-scoring index. Cremers and Nair (2005) also use a narrower alternative takeover index that only accounts for the three components of the IRRC data that are critical to takeovers. They report that their results do not change and conclude that there are no systematic biases in the Gompers et al. index, and that it can be correctly interpreted as a measure of takeover protection. Gompers et al. (2003) extract data from the IRRC database and use the State takeover law data. Currently, the IRRC presents information about 24 distinct corporate governance provisions and provides information about more than 1800 firms.

Using these data sources, Gompers et al. (2003) constructed a firm-specific index by adding one point for every provision that reduces shareholders rights. The IRRC selects firms based on the Standard & Poor's (S&P) 500 and an annual listing of the largest corporations in the Fortune, Forbes and Businessweek publications. The 24 distinct corporate governance provisions used in calculating the index are: blank check, classified board, special meeting, written consent, compensation plans, contracts, golden parachutes, indemnification, liability, severance, bylaws, charter, cumulative voting, secret ballot, supermajority, unequal voting, anti-green mail, directors' duties, fair price, pension parachutes, poison pill, silver parachutes, business combination law and cash-out law. Higher values of this index are associated with more protection against takeovers, which ultimately represent weaker governance.

3.2.1.2 Dependent Variables

Opportunistic earning management proxies

Because of the existence of information asymmetry and the presence of opportunistic behavior and discretionary decision–making power, management has incentives to manipulate financial earnings either directly or through indirect accounting methods to achieve a specific result. This article uses two proxies for opportunistic earnings management: Discretionary Accruals in Absolute Value (ADA) and Performance-matched Discretionary Accruals in Absolute Value (APDA).

Absolute Discretionary Accruals (ADA) and Absolute Performance-Matched Accruals (ADPA): We compute discretionary accruals using the cross-sectional modified Jones model estimated by industry and by year. To neutralize the effects of industry-wide economic and structural changes on total accruals, the use of the cross-sectional approach was appropriate. Below, we formulate and explain the modified Jones model and

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[12] See Appendix A for a brief description.

performance-matched discretionary accruals.

$$TACCR_{i,t} / A_{i,t-1} = \alpha_t (1/A_{i,t-1}) + b1_t (\Delta REV_{i,t} - \Delta REC_{i,t}) / A_{i,t-1} + b2_t (PPE_{i,t} / A_{i,t-1}) + \varepsilon_{i,t} \qquad (1)$$

where for firm i at time t,

$TACCR_{i,t}$	=total accruals,[13]
$A_{i,t-1}$	=lagged total assets;
$\Delta REV_{i,t}$	=change in sales;
$\Delta REC_{i,t}$	=change in accounts receivable;
$PPE_{i,t}$	=gross property, plant and equipment; and
$\varepsilon_{i,t}$	=error term.

All of the variables, including the intercept, are scaled by total assets at the end of year t-1. Discretionary accruals are estimated as the difference between reported total accruals and fitted values of total accruals (nondiscretionary accruals) using coefficient estimates from equation (1) for the period of 1997-2005:

$$DA_{i,t} = TACCR_{i,t}/A_{i,t-1} - [\alpha_t (1/A_{i,t-1}) + b1_t (\Delta REV_{i,t} - \Delta REC_{i,t}) / A_{i,t-1} + b2_t (PPE_{i,t} / A_{i,t-1})] \qquad (2)$$

where $DA_{i,t}$ is discretionary accruals and $\Delta REC_{i,t}$ is the change in accounts receivable. We also adjust discretionary accruals for performance and industry effects as suggested by Kothari, Leone, and Wasley (2005) because potential measurement errors in discretionary accruals may correlate with industry membership, growth, or performance. Specifically, we calculate performance-matched discretionary accruals for firm i as discretionary accruals of firm i less discretionary accruals of firm j, the firm that exhibits the closest ROA in the same industry.

Firm valuation measures:

To measure the financial performance of HT and NHT firms, this study uses three performance proxies: Tobin's Q (market-oriented), ROA (accounting-oriented) and cumulative monthly market−adjusted returns (market-oriented). As in prior research (such as Eric and Stephen, 1981), we use Tobin's Q as a proxy for the financial performance of the company. Tobin's Q is computed as the ratio of the market value of a firm to the replacement cost of its assets. Tobin's Q has considerable economic significance and usefulness because it reflects the financial markets as well as the markets for goods and services. If the market value reflected exactly the recorded assets of a company, Tobin's Q would be 1.0. A Tobin's Q greater than 1 implies that a firm's

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[13] $TACCR_{i,t} = \Delta CA_{i,t} - \Delta CL_{i,t} - \Delta Cash_{i,t} + \Delta STD_{i,t} - Dep_{i,t}$, where, for firm i at time t, $\Delta CA_{i,t}$= change in current assets; $\Delta CL_{i,t}$ = change in current liabilities; $\Delta Cash_{i,t}$ = change in cash and cash equivalents; $\Delta STD_{i,t}$ = change in debt included in current liabilities; and $Dep_{i,t}$ = depreciation and amortization expense.

market value is higher than its book value. This would indicate that the market value captures some unrealized or unrecorded assets (such as brand reputation, competitive positioning, or market leadership) of the company. In other words, the capital market is overvaluing the company relative to book value. To the contrary, if Tobin's Q is less than 1, the market value is less than the book value of the assets of the company. This would suggest that the market is undervaluing the company relative to book value.

ROA is considered another indicator of a firm's financial performance. ROA is an indicator of how profitable a company is relative to its total assets. ROA gives an idea of how efficient management is in using its assets to generate earnings. ROA is calculated by dividing a company's annual earnings before extraordinary items by its total assets. As a metric of financial performance, it is considered superior to income statement profitability measures like return on sales. ROA unambiguously takes into account the assets used to carry out business activities. One of the main contributions of ROA is that it determines whether the company is able to generate an adequate return on these assets. A group of extant researchers (e.g. Slater and Narver 1994, Dawes, 1999) used ROA as a measure of financial performance and document a positive association between ROA and market-oriented performance.

Another frequently used proxy for a firm's performance is stock return (e.g., Kang and Shivdasani, 1995, Bebchuk et al., 2009). Stock return is a performance measure that is not affected by changes in accounting procedures and captures the long-term impacts of corporate governance not reflected in short-term accounting measures. In this study, we use annual market-adjusted return (ANNMAR) and annual raw return (ANNMRR) as other proxies for a firm's performance.

3.2.1.3 Key Control Variable:<u>*Investment opportunity set (IOS):*</u>

In place of the intangible intensity (INT_Intensity) and intangible dummy (INT_Dummy) control variables used by Lara, Osma and Penalva (2009), the Investment Opportunity Set (IOS) variable is used in this study.[14] The justification for the use of this variable is that all of these variables indicate growth opportunities and future performance abilities (this sentence is a bit confusing – I'm wondering what is "all of these variables" referring to?). IOS refers to all possible investments that a company is able to make at a given point in time. IOS serves as a proxy for the growth opportunity of a firm. Kwon and Yin (2006) document that IOS significantly differs between HT and NHT firms. To alleviate the differential effect of IOS on the corporate governance structure of HT and NHT firms, such as in Kwon and Yin (2006), we include a composite measure of IOS in the models of financial performance to control for the differences between HT and NHT firms. The

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[14] Lara et al. (2009) use the sum of the firm's reported R&D and advertising expenses, scaled by total assets as a proxy for INT_Intensity. The absence of intangibles is measured with an indicator variable (Int_Dummy) that takes on the value of one if the intensity of intangibles is zero, and zero otherwise.

variable definitions of IOS are as follows[15]:

1. Investment Intensity (INVINT)

$$\frac{\sum_{i=t-2}^{i=t}[\text{Capital expenditures} + \text{R\&}D\ expense + Acquisitions]}{\sum_{i=t-2}^{i=t} Depreciation}$$

2. Geometric mean annual growth rate of market value of total assets (MVAGR)

$$\sqrt[n]{\frac{\text{Market value of total assets}_t}{\text{Market value of total assets}_{t-n}}}$$

   where n=max [1,2,3], depending on data availability

3. Market-to-book value of total assets (MTBA)

$$\frac{\text{Market value of total assets}_t}{\text{Book value of total assets}_t}$$

4. Research and development expenditure to total assets (RNDA)

$$\frac{\text{Research and development expense}_t}{\text{Book value of total assets}_t}$$

3.2.2 Models specification for empirical test (Also see Appendix B for the definition of regression test
   variables):

   To test the first set of hypotheses that there is a positive relationship between strong governance and strong financial performance, and that the degree of this positive relationship is greater for HT firms than for NHT firms and is also greater for HT firms in the post-SOX period than in the pre-SOX period, the following regression models have been specified[16]:

$$\textbf{PERFORMANCE}_{i,t} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1}\textbf{GI}_{i,t} + \boldsymbol{\beta_2}\textbf{HDUM}\times\textbf{GI}_{i,t} + \boldsymbol{\beta_3}\textbf{LAT}_{i,t} + \boldsymbol{\beta_4}\textbf{PGSAL}_{i,t} + \boldsymbol{\beta_5}\textbf{XRDSAL}_{i,t} +$$
$$\boldsymbol{\beta_6}\textbf{CHAT}_{i,t} + \boldsymbol{\beta_7}\textbf{CAPXAT}_{i,t} + \boldsymbol{\beta_8}\textbf{PPEGTSAL}_{i,t} + \boldsymbol{\beta_9}\textbf{EBITSAL}_{i,t} +$$
$$\boldsymbol{\beta_{10}}\textbf{LEVERAGE}_{i,t} + \boldsymbol{\beta_{11}}\textbf{INSTP}_{i,t} + \boldsymbol{\beta_{12}}\textbf{IOS}_{i,t} +$$
$$\sum \boldsymbol{\beta_j}\textbf{YEAR}_{i,t} + \boldsymbol{\varepsilon}_{it} \qquad\qquad\qquad\qquad\qquad\qquad\textbf{(3)}$$

$$\textbf{PERFORMANCE}_{i,t} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1}\textbf{GI}_{i,t} + \boldsymbol{\beta_2}\textbf{HDUM} \times \textbf{GI}_{i,t} + \boldsymbol{\beta_3}\textbf{SOXDUM} \times \textbf{GI}_{i,t} +$$

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[15] The investment opportunity set composite, IOS, is computed by performing the principal component analysis on the four IOS measures from combined observations of high-tech and non-high-tech firms for the period spanning 1997-2005 (363 and 1194 firm years, respectively).The principal component is calculated from eigen vectors (coefficients) and the four proxies are computed at the beginning of fiscal year t.

[16] We use the same set of control variables as the ones adopted in Ammann et al. (2011) except for the following two variables: ADR = a dummy variable which equals 1 if the firm has American Depository Receipts and 0 otherwise. Since we use firms in North America, this variable is irrelevant to our analysis. CLOSELY-HELD = the percentage of closely held shares, i.e., held by block holders with ownership stakes exceeding five percent of the company's equity. We replace this variable with the institutional ownership percent variable (INSTP).

$$\beta_4 SOXDUM \times HDUM \times GI_{i,t} + \beta_5 LAT_{i,t} + B_6 PGSAL_{i,t} + B_7 XRDSAL_{i,t} +$$

$$\beta_8 CHAT_{i,t} + \beta_9 CAPXAT_{i,t} + \beta_{10} PPEGTSAL_{i,t} + \beta_{11} EBITSAL_{i,t} +$$

$$\beta_{12} LEVERAGE_{i,t} + \beta_{13} INSTP_{i,t} + \beta_{14} IOS_{i,t} +$$

$$\sum \beta_j YEAR_{i,t} + \varepsilon_{it} \tag{4}$$

Where, for firm i in year t,

PERFORMANCE$_{i,t}$ is one of the following three measures:

TOBINQ$_{i,t}$ = (Market value of equity + book value of preferred stock and Debt) / Total Assets;

ROA$_{i,t}$ = Return on Assets, the ratio of net income before extraordinary items to total assets; and

ANNMAR$_{i,t}$ = Annual market-adjusted returns which are cumulative monthly market-adjusted returns from

the CRSP file where market-adjusted returns = raw returns – value-weighted market returns.

Independent Variables are :

GI$_{i,t}$ = External Governance Index;

HDUM$_{i,t}$ = Industry dummy, 1 for HT firms and 0 for NHT firms;

SOXDUM$_{i,t}$ = 1 for the post-SOX period and 0 for the pre-SOX period;

LAT$_{i,t}$ = Logarithm of total assets;

PGSAL$_{i,t}$ = Growth of sales over last two years;

XRDSAL$_{i,t}$ = The ratio of research and development expenditure to sales;

CHAT$_{i,t}$ = The ratio of cash to total assets;

CAPXAT$_{i,t}$ = The ratio of capital expenditure to total assets;

PPEGTSAL$_{i,t}$ = The ratio of property-plant-equipment to sales;

EBITSAL$_{i,t}$ = The ratio of earnings before interest and tax to total assets;

LEVERAGE$_{i,t}$ = The ratio of total debt to total assets;

INSTP$_{i,t}$ = Institutional ownership percentage collected from the TFSD Ownership database;

IOS$_{i,t}$ = The investment opportunity set composite index computed by performing the principal

component analysis on the four IOS measures;

YEAR$_{i,t}$ = a dummy variable for each of the eight years from 1997-2004; and

ε_{it} = The error term.

If HT firms show a higher association between strong governance and financial performance than NHT firms, the coefficient (β_2) of HDUM*GI in equation (3) must be negative and significant. In addition, if such an association is greater in the post-SOX period than in the pre-SOX period for HT firms, then the coefficient (β_4) of SOXDUM*HDUM*GI in equation (4) must be negative and significant. In either equation, a lower GI means a higher degree of external governance.

To investigate the relationship between corporate governance and earnings management and to see whether the magnitude of earnings management differs between HT and NHT firms in connection with regulatory changes (i.e., SOX in this paper), the following regression models have been specified[17]:

$$\text{ADA}_{i,t} \text{ or } \text{APDA}_{i,t} = \beta_0 + \beta_1 \text{GI}_{i,t} + \beta_2 \text{HDUM} \times \text{GI}_{i,t} + \beta_3 \text{LAT}_{i,t} + \beta_4 \text{STDSALE}_{i,t} + \beta_5 \text{STDCFO}_{i,t} +$$
$$\beta_6 \text{OPERCY}_{i,t} + \beta_7 \text{CAP\_INT}_{i,t} + \beta_8 \text{BIG4}_{i,t} + \beta_9 \text{IOS}_{i,t} + \beta_{10} \text{LOGFAGE}_{i,t} +$$
$$\sum \beta_j \text{YEAR}_{i,t} + \varepsilon_{it} \qquad\qquad (5)$$

$$\text{ADA}_{i,t} \text{ or } \text{APDA}_{i,t} = \beta_0 + \beta_1 \text{GI}_{i,t} + \beta_2 \text{HDUM} \times \text{GI}_{i,t} + \beta_3 \text{SOXDUM} \times \text{GI}_{i,t} +$$
$$\beta_4 \text{SOXDUM} \times \text{HDUM} \times \text{GI}_{i,t} + \beta_5 \text{LAT}_{i,t} + B_6 \text{STDSALE}_{i,t} + \beta_7 \text{STDCFO}_{i,t} +$$
$$\beta_8 \text{OPERCY}_{i,t} + \beta_9 \text{CAP\_INT}_{i,t} + \beta_{10} \text{BIG4}_{i,t} + \beta_{11} \text{IOS}_{i,t} + \beta_{12} \text{LOGFAGE}_{i,t} +$$
$$\sum \beta_j \text{YEAR}_{i,t} + \varepsilon_{it} \qquad\qquad (6)$$

Where, for firm i in year t,

$\text{ADA}_{i,t}$ = Modified Jones Model discretionary accruals in absolute value;

$\text{APDA}_{i,t}$ = Performance/industry matched discretionary accruals in absolute value;

$\text{GI}_{i,t}$ = External Governance Index;

$\text{HDUM}_{i,t}$ = Industry dummy, 1 for HT firms and 0 for NHT firms;

$\text{SOXDUM}_{i,t}$ = 1 for the post-SOX period and 0 for the pre-SOX period;

$\text{STDSALE}_{i,t}$ = Sales variability computed as the standard deviation of rolling 10-year sales revenue;

$\text{STDCFO}_{i,t}$ = Operating Cash Flow variability computed as the standard deviation of the firm's rolling 10-year cash flow from operations;

$\text{OPERCY}_{i,t}$ = Log of the sum of the firm's days of receivables and days of inventory;

$\text{CAP\_INT}_{i,t}$ = The ratio of the gross book value of property, plant and equipment to total assets;

$\text{BIG4}_{i,t}$ = Equals one if the firm's auditor is one of the 'Big Four' audit firms, or zero otherwise;

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[17] We use a set of control variables similar to those adopted in Lara et al. (2009) except for the following variables: Int_Intensity = the intangibles intensity measured as the sum of research and development and advertising expenses scaled by sales at the beginning of the year. Int_Dummy = an indicator variable that equals one if Int_Intensity = 0 and zero otherwise. We replaced these two control variables with the IOS variable. The justification for this replacement is that all of these variables indicate growth opportunities and future performance abilities. Investment Opportunity Set (IOS) means all possible investments that a company is able to make at a given point in time. IOS serves as a proxy for the growth opportunity of a firm. As is done in Brown and Caylor (2006), we also used an additional control variable, LOGFAGE, beyond those proposed by Lara et al. (2009). We also assume that a similar set of control variables can be used for both conservatism and earnings management in connection with corporate governance.

$IOS_{i,t}$= The investment opportunity set composite computed by performing the principal component analysis on the four IOS measures;

LOGFAGE=Log of firm age, where the firm age is computed as fiscal year t of the observation minus the year the firm first appeared on CRSP; and

ε_{it}= The error term.

If there is a negative relationship between the level of governance and the magnitude of earnings management, and if the degree of this negative relationship is greater for HT firms than for NHT firms, the coefficient of HDUM*GI ($\beta2$) in equation (5) must be positive and significant. In addition, if the degree of such negative relationship is greater for HT firms in the post-SOX period than in pre-SOX period, then the coefficient of SOXDUM*HDUM*GI ($\beta4$) in equation (6) must be positive and significant. In both regression models, a low GI represents stronger governance.

4. Empirical Results

Panel A of Table 4 shows Pearson's product moment correlation coefficients between key financial performance, governance index and other control variables used to specify regression model (3). As expected, there is a positive relationship between strong external governance and firm performance. The coefficients for TOBINQ and ROA are -0.17 and -0.17, respectively. Since the lower the GI, the higher the level of corporate governance, the negative sign of the correlation coefficients means a positive relation between strong external governance and firm performance. The table indicates that most of the variables are statistically significant (in bold) at the 1% level (two-tailed). Panel B of Table 4 documents Pearson's product moment correlation coefficients between key earnings management, governance index and other control variables used to specify regression model (5). The table indicates that most of the variables are statistically significant (in bold) at the 1% level (two-tailed). The correlation coefficient between ADA (APDA) and GI is 0.01(0.01). More importantly, the correlation coefficient between ADA (APDA) and HDUM*GI is 0.18(0.17), implying that stronger external governance (a lower GI) leads to less earnings management in magnitude.

To mitigate the problems related to the use of incorrect standard errors, inaccurate interval estimates, and invalid hypothesis tests when heteroskedasticity is present, we use White heteroskedasticity-consistent standard errors, covariance, and t-statistics. White's estimator for the standard errors helps us avoid computing incorrect values for test statistics in the presence of heteroskedasticity (Berry and Feldman, 1985).

The empirical evidence presented in Table 5 is generally consistent with hypothesis 1A that there is a positive relationship between a firm's level of corporate governance and its financial performance. The degree of this positive relationship is greater for HT firms than for NHT firms. The coefficient between TOBINQ (ROA or ANNMAR) and GI is -0.03735 (-0.00035, or -0.00286) for NHT firms, and it implies that a lower GI

index, which indicates stronger governance, is associated with higher firm value. This relationship is significant at the 1% two-tailed level of significance for TOBINQ.

With respect to HT firms, the coefficient between TOBINQ (ROA or ANNMAR) and GI is -0.05636 (-0.00124 or -0.00437), and it implies that the degree of the positive relationship between stronger governance and higher financial performance is much greater for HT firms than for NHT firms. The t-statistic is -2.53 (-4.36 or -0.58) for TOBINQ (ROA or ANNMAR), and it is statistically significant at the 5% (1%), two-tailed level of significance for TOBINQ (ROA). These results generally support H1A that the magnitude of value addition through corporate governance practice is higher for HT firms compared to NHT firms. As adopted in prior research, we also use similar control variables including total assets, sales growth, research and development, cash, capital expenditure, investment in PPE, EBIT, debt to equity ratio, institutional ownership, and IOS in these regression tests.

The empirical results of Table 6 also strongly support hypothesis H1B that there is a positive relationship between the level of corporate governance and financial performance. The degree of this positive relationship is greater for HT firms in the post-SOX period than in the pre-SOX period. β_1, a coefficient for GI, represents the effect of GI on financial performance for NHT firms in the pre-SOX period whereas the sum of $(\beta_1 + \beta_2)$ represents the effect of GI on financial performance for HT firms in the pre-SOX period. In addition, the sum of $(\beta_1 + \beta_3)$, coefficients for GI and SOXDUM*GI, represents the effect of GI on financial performance for NHT firms in the post-SOX period whereas the sum of $(\beta_1 + \beta_2 + \beta_3 + \beta_4)$, the coefficients for GI, HDUM*GI, SOXDUM*GI, and SOXDUM*HDUM*GI, respectively, represents the effect of GI on financial performance for HT firms in the post-SOX period.

The Sarbanes-Oxley Act of 2002 targets mostly HT firms since the corporate accounting scandals arose from mostly HT firms (e.g., Enron, WorldCom, etc.). Thus, the effect of GI on financial performance in the post-SOX period is expected to be greater than in the pre-SOX period. Consistent with this expectation, the t-statistic for β_4 for TOBINQ (ROA, or ANNMAR) is -4.75 (-2.67 or -3.75), all of which are negative and significant at the 1% level (two-tailed). The sum of the coefficients that reflect the effect of GI on TOBINQ for HT firms in the post-SOX (pre-SOX) period is -0.06456 (-0.04253). In other words, a 1% decrease in GI will result in a 6.5% increase in TOBINQ. Similarly, the sum of the coefficients that reflect the effect of GI on ROA for HT firms in the post-SOX (pre-SOX) period is -0.00214 (-0.00025) and that related to ANNMAR for HT firms in the post-SOX (pre-SOX) period is -0.00970 (0.00240). In other words, a 1% decrease in GI will result in a 0.2% (0.03%) increase in ROA and a 1.0% (-0.2%) increase in ANNMAR in the post- (pre-) SOX period. This significant negative result implies that a lower GI score, signifying stronger governance, is associated with stronger financial performance for HT firms particularly in the post-SOX period.

The empirical results of Table 7 generally (do not) support a positive association between better governance and less earnings management for HT (NHT) firms. This is because, as discussed in the hypothesis development section of this paper, HT firms have strong incentives to manage earnings from both opportunistic (bad earnings management) and efficient-contracting (good earnings management) perspectives, and the stronger corporate governance will significantly reduce the magnitude of this earnings management. White's t-statistics for the coefficient of HDUM*GI are 2.82 for Modified Jones discretionary accruals in absolute value (ADA) and 2.57 for performance-matched discretionary accruals in absolute value (APDA), both of which are significant at the 1% level (two-tailed).

The control variables we adopt in these regression tests are similar to those used in Lara et al. (2009) except for two independent variables – Int_Intensity and Int_Dummy – which we replace with the IOS variable. These variables indicate growth opportunities and future performance abilities. We assume that attributes affecting accounting conservatism and earnings management are similar because both conservatism and earnings management deal with reporting earnings in a biased manner. In other words, conservatism favors an earnings understatement rather than an earnings overstatement whereas earnings management favors an earnings understatement or overstatement depending upon the specific objective (i.e., the avoidance of debt covenant violations, the attainment of maximum executive bonuses, the avoidance of governmental regulations, etc.) of a firm's management for a fiscal year.[18]

The evidence of the regression tests in Table 8 also supports hypothesis H2B that the negative association between the level of governance and the magnitude of earnings management is greater for HT firms in the post-SOX period than in pre-SOX period. White's t-statistics for the coefficient of SOXDUM*HDUM*GI are 2.91 for modified Jones discretionary accruals in absolute value (ADA) and 2.64 for performance-matched discretionary accruals in absolute value (APDA), both of which are significant at the 1% level (two-tailed).

5. Sensitivity Analyses

Investment Opportunity Set (IOS)

This control variable, a proxy for the growth opportunity of a firm, is known to distinguish between HT and NHT firms and has been found to be significantly different between the two sectors in prior research. Therefore, if we can find any high-technology sector effect in connection with the tests of the association between a firm's governance quality and financial performance or earnings management, then it should not be

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[18] For a more detailed discussion of three hypotheses of positive accounting theory and patterns of earnings management, refer to Watts and Zimmerman (1986), Watts and Zimmerman (1990), and Healy (1985).

dependent on the inclusion or exclusion of such a control variable as IOS. As we expected, our empirical results in tables 5-8 are qualitatively similar before and after we control for the IOS variable.

ANNMRR

In order to enhance external validity of our results, we use another financial performance proxy, annual raw returns (ANNMRR), in the regression tests of equations 3 (Table 5) and 4 (Table 6). The empirical results are qualitatively the same as those based on ANNMAR.

BIG5

We also replaced BIG4 with BIG5 in the regression tests of equations 5 (Table 7) and 6 (Table 8) to see whether any change in the number of big accounting/audit firms might affect the empirical results. Again, the evidence documented in the above tables did not change from the use of this proxy.

Firm Age Control Variable (LOGFAGE)

As was done by Brown and Caylor (2006), we added, in equations 5 (Table 7) and 6 (Table 8), an additional control variable, LOGFAGE, to the set of control variables similar to those adopted in Lara et al. (2009). The addition of this control variable did not change the conclusions of the empirical results documented in Tables 7 and 8.

6. Conclusion and Limitations

This study examines the relationship between a firm's level of corporate governance and its financial performance and degree of earnings management, using a GI that includes 24 takeover and state provisions, and attempts to identify any differences between HT and NHT firms in this relationship. Based on samples of North American HT and NHT firms, this study finds a strong positive relationship between corporate governance and firm performance. More importantly, we find that this positive association between corporate governance and financial performance is greater for HT firms than for NHT firms during the sample period 1997-2005. Moreover, when we dichotomize the sample period between the pre-SOX and the post-SOX periods, the positive relationship for HT firms is significantly greater in the post-SOX period than in the pre-SOX period.

This paper also examines the relationship between corporate governance and earnings management in in HT and NHT firms. Based on the same samples of HT and NHT firms, this study finds that HT firms exhibit a strong inverse relationship between corporate governance and earnings management. The results of this paper suggest that those HT firms that apply high levels of corporate governance standards are likely to reduce the amount of opportunistic earnings management. Due to external pressures (such as venture capitalists, financial analysts) and frequent capital requirements for substantial R&D expenditures, HT firms with high levels of corporate governance have more incentives to avoid opportunistic earnings management behaviour. This finding is consistent with the results of Bekiris and Doukakis (2011), who suggest that corporate governance

constrains managers' motives, ensuring the quality of the financial reporting process. Additional tests of their study suggest that the negative relationship holds for large and middle capitalization firms but not for small capitalization firms.

Consistent with hypothesis H2B, the inverse relationship between a firm's corporate governance and its magnitude of earnings management is stronger for HT firms in the post-SOX period than in the pre-SOX period. This result likely reflects the fact that the SOX is the most sweeping corporate governance regulatory reform in the US in the last 70 years (Byrnes et al., 2003 and Brown and Caylor, 2006), and accounting scandals that provided the impetus for the SOX have been committed mostly by HT firms, which is likely to significantly curtail the opportunistic earnings management behavior of HT firms.

The findings of this study have been robust to several different treatments of extreme values (e.g., winsorize (delete) the sample values at 1% or 2% in both sides), to the use of a different stock return (big audit firms) proxy for a firm's financial performance (the quality/reputation of an audit firm), and to the inclusion or exclusion of the IOS variable which in prior research has been used to distinguish between HT and NHT firms. More specifically, our results are qualitatively similar before and after we control for the IOS variable in all regression tests. In other words, we find that the level of industry participation (i.e., high-tech versus non-high-tech) has incremental contracting value beyond the investment opportunity set (IOS) in determining the relationship between a firm's level of corporate governance and its financial performance and earnings management.

This study contributes to existing literature by examining the relationship between corporate governance, financial performance and earnings management in the context of industry group participation (i.e., high-tech versus non-high-tech). Although there is extensive literature examining the relationship between corporate governance and firm value, there is no consensus yet on how to measure corporate governance (e.g., Ertugrul and Hegde, 2009; Larcker et al., 2007). Therefore, in this study we focus on the widely used, external governance index developed by Gompers et al. (2003) in the examination of this relationship. Ongoing research efforts in the realm of corporate governance will likely lead to the development of a more comprehensive governance index that captures a firm's external and internal governance practices more holistically and effectively.

Although this article documents differential effects of industry participation and regulation-induced changes in the level of governance on financial performance and earnings management, it also has some limitations, similar to previous studies done in the areas of corporate governance, earnings management, and financial performance measurement. First, the governance proxy used by this paper is only an external index, which does not take into consideration the governance structure or policies (e.g., the independence of the board

of directors) established within a company. Therefore, it is an imperfect proxy for governance. We suggest that future research develop a more holistic proxy for corporate governance. Second, the sample period covers only 11 years (1997-2005), which may not be sufficient enough to conclude any differential effects of technology and regulatory change on financial performance and earnings management due to the possibility that (1) many of the SOX-induced regulatory changes took effect in the years following 2002, the year of SOX legislation, and (2) the definition of HT firms may change over time.[19] Future research can also focus on the differential effects of another significant regulatory change (i.e., Dodd–Frank Wall Street Reform and Consumer Protection Act in 2010) on financial performance and earnings management.

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[19] For example, the requirement of an auditor's attestation in section 404 of SOX did not apply to most smaller public companies until their 2008 annual reports. The 2007 annual report was the first year that the management assessment needed to be included.

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Table 1
Sample Selection

Panel A: *Sample Selection Process*

Firm-Year Observations with available IRRC data (the antitakeover protection index from Andrew Metrick's web page)[a]

	Fiscal Year								
	1997	1998	1999	2000	2001	2002	2003	2004	2005
	1496	1914	1914	1887	1887	1894	1894	1983	1896

Less:

Observations with insufficient
Compustat & Institutional Ownership
   data to compute:
   Investment Opportunity Set
   Earnings Management proxies
   Institutional Ownership
    Percent
   Other dependent and

	1997	1998	1999	2000	2001	2002	2003	2004	2005
Independent variables	(1316)	(1735)	(1725)	(1695)	(1732)	(1739)	(1725)	(1804)	(1710)
Final Firm-Year Observations	153	179	189	192	155	155	169	179	186

Panel B: *Total Number of Firm-Year Observations and Final Samples*

Total Number of Firm-Year Observations	1,557
High-Tech (HT) Firms	363
Non-High-Tech (NHT) Firms	1,194

The Number of Firms that have appeared at least once out of nine years (1997 – 2005)

Final Samples   HT: 67 firms and NHT: 206 firms

[a] The data covers the period 1997 through 2005. The IRRC data is only available for 1990, 1993, 1995, 1998, 2000, 2002, 2004, and 2006. Gompers et al. (2003) and J.M. Garcia Lara et al. (2009; footnote 14) report that for the majority of firms there is little time-series variation in the index. Like Cremers and Nair (2005) and J.M. Garcia Lara (2009), I align the index variables available for 1995 with firm data for 1997, the index values for 1998 with firm data for 1998 and 1999, the index values for 2000 with firm data for 2000 and 2001, the index values for 2002 with firm data for firm data for 2002 and 2003, the index values for 2004 with firm data for 2004, and the index values for 2006 with firm data for 2005. As in the works of Francis and Schipper (1999) and Kwon (2002), I define HT firms as those in the computer, electronics, pharmaceutical, and telecommunications industries whereas NHT firms are all other firms except financial institutions (SICs between 6000-6999) and utilities (SICs between 4400 and 5000). These firms are excluded because Cheng and Warfield (2005) and Burgstahler and Eames (2003) point out that managers in these regulated industries might have different motivations to manage earnings.

Table 2

Three-digit (Two-digit) SIC Codes of High-tech (Non-HT) Sample

Panel A: High-tech (HT) Firms

3-digit SIC code	Industry	Number of firms (Percent)
272	Periodicals	1(1.49)
283	Drugs	11(16.42)
355	Special Industry Machinery	4(5.97)
357	Computer and Office Equipment	5(7.46)
361	Electric Distribution Equipment	1(1.49)
362	Electrical Industrial Apparatus	1(1.49)
363	Household Appliances	2(2.99)
364	Electric Lighting and Wiring Equipment	1(1.49)
366	Communications Equipment	3(4.48)
367	Electronic Components and Accessories	13(19.40)
369	Misc. Electrical Equipment & Supplies	1(1.49)
381	Search and Navigation Equipment	1(1.49)
382	Measuring and Controlling Devices	4(5.97)
386	Photographic Equipment and Supplies	2(2.99)
481	Telephone Communications	2(2.99)
573	Radio, TV, and Electronic Stores	2(2.99)
737	Computer and Data Processing Services	11(16.42)
738	Miscellaneous Business Services	2(2.99)
	Total	67(100.00)

Table 2 (continued)

Panel B: Non-high-tech (NHT) Firms

2-digit SIC code	Industry	Number of firms (Percent)
13	Oil and Gas Extraction	7(3.40)
14	Nonmetallic Minerals, Except Fuels	2(0.97)
16	Heavy Construction	1(0.49)
20	Food and Kindred Products	20(9.71)
22	Textile Mill Products	2(0.97)
23	Apparel and other Textile Products	2(0.97)
24	Lumber and Wood Products	2(0.97)
25	Furniture and Fixtures	4(1.94)
26	Paper and Allied Products	8(3.88)
27	Printing and Publishing	7(3.40)
28	Chemicals and Allied Products	17(8.25)
29	Petroleum and Coal Products	5(2.43)
30	Rubber and MISC. Plastics Products	3(1.46)
31	Leather and Leather Products	2(0.97)
32	Stone, Clay, and Glass Products	1(0.49)
33	Primary Metal Industries	7(3.40)
34	Fabricated Metal Products	6(2.91)
35	Industrial Machinery and Equipment	15(7.28)
37	Transportation Equipment	14(6.80)
38	Instruments and Related Products	9(4.37)
39	Miscellaneous Manufacturing Industries	3(1.46)
40	Railroad Transportation	1(0.49)
42	Trucking and Warehousing	8(3.88)
50	Wholesale Trade__Durable Goods	10(4.85)
51	Wholesale Trade__Nondurable Goods	3(1.46)
52	Building Materials and Garden Supplies	3(1.46)
53	General Merchandise Stores	4(1.94)
54	Food Stores	3(1.46)
55	Automotive Dealers and Service Stations	2(0.97)
56	Apparel and Accessory Stores	6(2.91)
57	Furniture and Homefurnishings Stores	2(0.97)
58	Eating and Drinking Places	3(1.46)
59	Miscellaneous Retail	4(1.94)
72	Personal Services	2(0.97)
73	Business Services	6(2.91)
75	Auto Repair Services, and Parking	2(0.97)
79	Amusement and Recreation Services	2(0.97)
80	Health Services	4(1.94)
87	Engineering and Management Services	4(1.94)
	Total	206(100.00)

Table 3
Descriptive statistics of dependent and independent variables[a]

HT Mean	Median	Std.Dev.	NHT Mean	Median	Std.Dev.	Student T	Wilcoxon Z
Panel A: Financial Performance							
Dependent Variables							
Tobin's q							
3.395	2.460	2.619	2.073	1.676	1.178	13.53***	10.59***
ROA							
0.100	0.089	0.067	0.074	0.068	0.051	7.57***	6.09***
Independent Variables							
External Governance Index (GI)							
9.377	9.000	2.255	10.193	11.000	2.721	-5.20***	-5.83***
RD/SALES (XRDSAL)							
0.082	0.063	0.071	0.013	0.001	0.024	28.35***	18.62***
CASH/ASSETS (CHAT)							
0.104	0.075	0.099	0.062	0.033	0.076	8.43***	9.31***
CAPEX/ASSETS (CAPXAT)							
0.050	0.042	0.035	0.058	0.045	0.047	-2.71***	-1.75*
PPE/SALES (PPEGTSAL)							
0.513	0.419	0.384	0.634	0.444	0.685	-3.22***	-1.62
EBIT/SALES (EBITSAL)							
0.187	0.161	0.118	0.118	0.102	0.073	13.57***	10.57***
PGSALE (PGSAL)							
26.754	21.100	30.467	20.850	16.415	27.942	3.45***	3.60***
Leverage (LEVERAGE)							
0.436	0.442	0.181	0.552	0.557	0.169	-11.26***	-10.40***
Institutional Ownership Percentage (INSTP)							
64.071	69.090	21.948	67.644	69.380	17.763	-3.17***	-1.57

Table 3 (continued)

	HT			NHT		Student	Wilcoxon
Mean	Median	Std.Dev.	Mean	Median	Std.Dev.	t	Z

Panel B: Earnings Management

Dependent Variables

ADA (Modified Jones Discretionary Accruals in Absolute Value)

95.358	1.272	308.596	20.453	0.429	110.882	7.03***	6.23***

APDA (Performance-matched Discretionary Accruals in Absolute Value)

99.284	2.233	308.944	26.820	1.192	123.820	6.56***	4.88***

Independent Variables

Log of Total Assets (LAT)

8.315	8.199	1.634	7.935	7.876	1.396	4.36***	4.09***

STDCFO

609.620	173.517	1150.309	234.834	88.078	513.299	8.75***	7.31***

STDSALE

2223.860	593.810	4265.990	1491.780	530.810	3278.920	3.46***	2.57***

Operating Cycle (OPERCY)

4.967	4.986	0.540	4.627	4.701	0.623	9.38***	9.80***

Capital Intensity (CAP_INT)

0.421	0.379	0.254	0.607	0.571	0.318	-10.18***	-10.35***

Investment Opportunity Set (IOS)

1.363	0.791	2.665	-0.438	-0.802	1.579	15.91***	13.54***

BIG4

0.871	1.000	0.336	0.866	1.000	0.341	0.22	0.22

FAGE

33.000	29.000	18.760	36.000	32.000	18.060	-3.12***	-4.26***

LOGFAGE

| 3.350 | 3.370 | 0.560 | 3.490 | 3.470 | 0.480 | -4.63*** | -4.26*** |

Table 3 (continued)

| | HT | | | NHT | | Student | Wilcoxon |
Mean	Median	Std.Dev.	Mean	Median	Std.Dev.	t	Z

Panel C: Additional Variables for Sensitivity Tests

Dependent Variables

ANNMAR

0.091	0.003	0.449	0.082	0.025	0.347	0.41	-1.37

ANNMRR

0.169	0.082	0.513	0.145	0.107	0.336	1.08	-1.44

Independent Variable

BIG5

0.995	1.000	0.074	0.982	1.000	0.135	1.75*	1.75*

_____

[a]   *, **, and *** indicate statistical significance levels of 10%, 5%, and 1%, respectively, in two-tailed tests. All calculations are based on 363 (1,194) firm-year observations for HT (NHT) firms. For firm i in year t, TOBINQ$_{i,t}$ = (Market value of equity + book value of preferred stock and Debt) / Total Assets; ROA$_{i,t}$ = Return on Assets, the ratio of net income before extraordinary items to total assets;GI$_{i,t}$= External Governance Index;HDUM$_{i,t}$= Industry dummy, 1 for HT firms, otherwise 0; GI is the external corporate governance index; LAT$_{i,t}$=Logarithm of total assets; PGSAL$_{i,t}$=Growth of sales over last two years; XRDSAL$_{i,t}$=The ratio of research and development expenditure to sales; CHAT$_{i,t}$=The ratio of cash to total assets; CAPXAT$_{i,t}$=The ratio of capital expenditure to total assets; PPEGTSAL$_{i,t}$=The ratio of property-plant-equipment to sales; EBITSAL$_{i,t}$=The ratio of earnings before interest and tax to total assets; LEVERAGE$_{i,t}$=The ratio of total debt to total assets; YEAR$_{i,t}$= a dummy variable for each of eight years from 1997-2004; ADA$_{i,t}$ = modified Jones Model discretionary accruals in absolute value; APDA$_{i,t}$ =Performance/industry matched discretionary accruals in absolute value; STDSALE$_{i,t}$ = Sales variability computed as the standard deviation of rolling 10-year sales revenue; STDCFO$_{i,t}$= Operating Cash Flow variability computed as the standard deviation of the firm's rolling 10-year cash flow from operations; OPERCY$_{i,t}$= Log of the sum of the firm's days of receivables and days of inventory at the beginning of the year; CAP_INT$_{i,t}$=The ratio of the gross book value of property, plant and equipment to total asset at the beginning of the year; BIC5$_{i,t}$= one if the firm's auditor is one of the Big Five, or zero otherwise; LOGFAGE=Log of firm age, where the firm age is computed as fiscal year t of the observation minus the year the firm first appeared on CRSP; IOS$_{i,t}$= The investment opportunity set composite computed by performing the principal component analysis on the four IOS measures; INSTP$_{i,t}$=Institutional ownership percent collected from the TFSD Ownership database**;** ANNMRR = Cumulative Monthly Raw Returns for Fiscal Year t from CRSP; ANNMAR= Cumulative Monthly Market-Adjusted Returns for Fiscal Year t from CRSP where Market-Adjusted Returns = Raw Returns – Value-Weighted Market Returns;and BIC4$_{i,t}$= one if the firm's auditor is one of the Big Four, or zero otherwise.

Table 4
Pearson Correlation Statistics

Panel A: **Financial Performance, GI, and Other control variables**

	TOBINQ	ROA	GI	HDUM*GI	LAT	PGSAL	XRDSAL	CHAT	CAPXAT	PPEGTSAL	EBITSAL	LEVERAGE	INSTP	IOS
TOBINQ	1.00													
ROA	0.72	1.00												
GI	-0.17	-0.17	1.00											
HDUM*GI	0.29	0.17	-0.02	1.00										
LAT	0.11	-0.02	0.07	0.13	1.00									
PGSAL	0.22	0.19	-0.09	0.08	0.06	1.00								
XRDSAL	0.50	0.31	-0.06	0.56	0.11	0.10	1.00							
CHAT	0.27	0.34	-0.11	0.17	-0.16	0.03	0.34	1.00						
CAPXAT	0.07	0.10	-0.17	-0.07	-0.04	0.12	-0.09	-0.08	1.00					
PPEGTSAL	-0.15	-0.19	0.05	-0.07	0.17	-0.05	-0.06	-0.16	0.39	1.00				
EBITSAL	0.61	0.59	-0.04	0.31	0.22	0.19	0.47	0.18	0.02	0.25	1.00			
LEVERAGE	-0.28	-0.40	0.23	-0.23	0.31	-0.10	-0.35	-0.37	-0.11	0.06	-0.28	1.00		
INSTP	-0.09	-0.11	0.20	-0.05	0.02	0.05	0.04	0.06	-0.05	0.04	-0.01	0.07	1.00	
IOS	0.53	0.35	-0.10	0.35	0.07	0.33	0.58	0.18	-0.05	-0.14	0.47	-0.23	-0.01	1.00

Panel B: Earnings Management, GI, and Other control variables

	ADA	APDA	GI	HDUM*GI	LAT	STDCFO	STDSALE	OPERCY	CAP_INT	BIG5	IOS	LOGFAGE
ADA	1.00											
APDA	0.95	1.00										
GI	0.01	0.01	1.00									
HDUM*GI	0.18	0.17	-0.02	1.00								
LAT	0.16	0.16	0.07	0.13	1.00							
STDCFO	0.17	0.16	-0.13	0.21	0.61	1.00						
STDSALE	0.11	0.11	-0.16	0.08	0.60	0.84	1.00					
OPERCY	0.09	0.09	0.13	0.22	0.01	-0.04	-0.13	1.00				
CAP_INT	-0.09	-0.09	-0.04	-0.24	-0.01	-0.03	-0.02	-0.33	1.00			
BIG4	0.03	0.02	0.04	0.04	0.12	0.04	0.05	0.02	-0.05	1.00		
IOS	0.11	0.11	-0.10	0.35	0.07	0.15	0.05	0.15	-0.34	0.05	1.00	
LOGFAGE	0.03	0.03	0.17	-0.08	0.48	0.26	0.31	0.05	0.08	0.07	-0.17	1.00

Table 5
The relationship between financial performance (TOBINQ, ROA, and ANNMAR) and independent variables, including governance index, governance index interacted with high-tech firms, and other control variables[a]

$$\text{Performance}_{i,t} = \beta_0 + \beta_1 GI_{i,t} + \beta_2 HDUM{\times}GI_{i,t} + \beta_3 LAT_{i,t} + \beta_4 PGSAL_{i,t} + \beta_5 XRDSAL_{i,t} + \beta_6 CHAT_{i,t} + \beta_7 CAPXAT_{i,t} +$$

$$\beta_8 PPEGTSAL_{i,t} + \beta_9 EBITSAL_{i,t} + \beta_{10} LEVERAGE_{i,t} + \beta_{11} INSTP_{i,t} + \beta_{12} IOS_{i,t} +$$

$$\sum \beta_j YEAR_{i,t} + \varepsilon_{it}$$

(3)

Dependent Variable

	TOBINQ		ROA		ANNMAR	
	Coefficient	**White-t Statistic**	**Coefficient**	**White-t Statistic**	**Coefficient**	**White-t Statistic**
C	0.415589	1.64*	0.066224	8.60***	0.107880	1.40
		[0.10]		[0.00]		[0.17]
GI	-0.03735	-3.50***	-0.00035	-1.00	-0.002858	-0.82
		[0.00]		[0.32]		[0.41]
HDUM*GI	-0.01901	-2.53**	-0.00089	-4.36***	-0.001509	-0.58
		[0.02]		[0.00]		[0.56]
LAT	0.096548	4.01***	0.00016	0.18	-0.019759	-2.93***
		[0.00]		[0.86]		[0.00]
PGSAL	0.000908	0.56	-4E-06	-0.13	0.004600	3.86***
		[0.58]		[0.90]		[0.00]
XRDSAL	5.174503	4.45***	-0.06829	-2.44**	0.354887	1.22
		[0.00]		[0.02]		[0.22]
CHAT	1.893802	2.66***	0.098307	4.58***	0.140066	0.95
		[0.01]		[0.00]		[0.34]
CAPXAT	6.786593	7.61***	0.253476	9.79***	0.050595	0.22
		[0.00]		[0.00]		[0.83]
PPEGTSAL	-0.86255	-12.10***	-0.03389	-16.54***	-0.001901	-0.11
		[0.00]		[0.00]		[0.91]
EBITSAL	9.810681	15.93***	0.379736	20.50***	0.199550	1.44
		[0.00]		[0.00]		[0.15]
LEVERAGE	0.008917	0.04	-0.03688	-3.46***	-0.027572	-0.45
		[0.97]		[0.00]		[0.65]
INSTP	-0.00306	-1.66*	-0.00018	-3.62***	0.000500	1.29
		[0.09]		[0.00]		[0.20]
IOS	0.124283	4.46***	-0.00038	-0.66	-0.020612	-3.32***
		[0.00]		[0.51]		[0.00]
Adjusted R-squared	0.58		0.59		0.13	

| F-statistic | 107.08*** | 114.66*** | 12.69*** |

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[a] The regression tests are based on 1557 firm-year observations, and year dummy variables (not shown) are included in the tests.
  All variables except indicator variables are winsorized at the extreme one percentile (i.e., values less (greater) than the 1st (99th)
  percentile are set equal to the value of the 1st (99th) percentile).   The symbols *, **, and *** indicate statistical significance levels of 10%, 5%,
  and 1%, respectively, in two-tailed tests. White's (1980) heteroscedasticity-consistent t-statistics are reported. All variables are defined in Table 3.
  See Appendix B for the definition of variables.

Table 6
The relationship between financial performance (TOBINQ, ROA, and ANNMAR) and independent variables, including governance index, governance index interacted with high-tech firms, governance index interacted with post-SOX period and high-tech firms, and other control variables[a]

$$\text{Performance}_{i,t} = \beta_0 + \beta_1 GI_{i,t} + \beta_2 HDUM \times GI_{i,t} + \beta_3 SOXDUM \times GI_{i,t} + \beta_4 SOXDUM \times HDUM \times GI_{i,t} + \beta_5 LAT_{i,t} + \beta_6 PGSAL_{i,t}$$
$$+ \beta_7 XRDSAL_{i,t} + \beta_8 CHAT_{i,t} + \beta_9 CAPXAT_{i,t} + \beta_{10} PPEGTSAL_{i,t} + \beta_{11} EBITSAL_{i,t} + \beta_{12} LEVERAGE_{i,t} +$$
$$\beta_{13} INSTP_{i,t} + \beta_{14} IOS_{i,t} + \sum \beta_j YEAR_{i,t} + \varepsilon_{it} \quad \text{(4)}$$

Dependent Variable

	TOBINQ		ROA		ANNMAR	
	Coefficient	White-t Statistic	Coefficient	White-t Statistic	Coefficient	White-t Statistic
C	0.231282	0.83 [0.41]	0.071598	8.77*** [0.00]	0.104753	1.27 [0.21]
GI	-0.066110	-3.63*** [0.00]	0.000012	0.02 [0.98]	-0.005568	-1.01 [0.31]
HDUM*GI	0.023577	1.76* [0.07]	-0.000259	-0.79 [0.43]	0.007971	1.88* [0.06]
SOXDUM*GI	0.057080	2.65*** [0.01]	-0.000720	-1.13 [0.26]	0.005400	0.84 [0.40]
SOXDUM*HDUM*GI	-0.079102	-4.75*** [0.00]	-0.001146	-2.67*** [0.01]	-0.017504	-3.75*** [0.00]
LAT	0.099697	4.16*** [0.00]	0.000167	0.19 [0.85]	-0.019241	-2.84*** [0.00]
PGSAL	0.000548	0.34 [0.73]	-0.000013	-0.40 [0.69]	0.001363	3.59*** [0.00]
XRDSAL	5.487295	4.76*** [0.00]	-0.067877	-2.43** [0.02]	0.404740	1.39 [0.16]
CHAT	1.681664	2.43** [0.02]	0.096608	4.54*** [0.00]	0.099481	0.68 [0.50]
CAPXAT	6.956128	7.74*** [0.00]	0.252974	9.83*** [0.02]	0.073936	0.32 [0.75]
PPEGTSAL	-0.872047	-12.15*** [0.00]	-0.033977	-16.56*** [0.00]	-0.003778	-0.22 [0.82]
EBITSAL	9.743518	16.24*** [0.00]	0.380348	20.64*** [0.00]	0.192026	1.40 [0.16]
LEVERAGE	0.018016	0.08 [0.94]	-0.037056	-3.49*** [0.00]	-0.027052	-0.44 [0.66]
INSTP	-0.003426	-1.90* [0.06]	-0.000183	-3.73*** [0.00]	0.000511	1.27 [0.26]
IOS	0.120479	4.46*** [0.00]	-0.000415	-0.72 [0.47]	-0.021358	-3.47*** [0.00]
Adjusted R-squared	0.59		0.60		0.14	

F-statistic	101.58***	105.17***	12.54***

[a] The regression tests are based on 1557 firm-year observations, and year dummy variables (not shown) are included in the tests.
All variables except indicator variables are winsorized at the extreme one percentile (i.e., values less (greater) than the 1st (99th)
percentile are set equal to the value of the 1st (99th) percentile). The symbols *, **, and *** indicate statistical significance levels of 10%, 5%,
and 1%, respectively, in two-tailed tests. White's (1980) heteroscedasticity-consistent t-statistics are reported. All variables are defined in Table 3.
See Appendix B for the definition of variables.

Table 7
The relationship between earnings management (ADA and APDA) and independent variables,
including governance index, governance index interacted with high-tech firms, and other control
variables[a]

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$$ADA_{i,t} \text{ or } APDA_{i,t} = \beta_0 + \beta_1 GI_{i,t} + \beta_2 HDUM \times GI_{i,t} + \beta_3 LAT_{i,t} + \beta_4 STDSALE_{i,t} + \beta_5 STDCFO_{i,t} + \beta_6 OPERCY_{i,t} +$$
$$\beta_7 CAP\_INT_{i,t} + \beta_8 BIC5_{i,t} + \beta_9 IOS_{i,t} + \beta_{10} LOGFAGE_{i,t} + \sum \beta_j YEAR_{i,t} + \varepsilon_{it}$$

(5)

Dependent Variable

Variables	ADA Coefficient	White-t Statistic	APDA Coefficient	White-t Statistic
C	-96.12093	-1.64*	-85.37958	-1.43
		[0.10]		[0.15]
GI	-0.379886	-0.21	-0.571310	-0.30
		[0.84]		[0.76]
HDUM*GI	5.107861	2.82***	4.626349	2.57**
		[0.00]		[0.01]
LAT	15.74269	3.58***	15.72844	3.43***
		[0.00]		[0.00]
STDCFO	0.033558	1.61	0.032298	1.55
		[0.11]		[0.12]
STDSALE	-0.004134	-1.37	-0.003536	-1.14
		[0.17]		[0.26]
OPERCY	16.84585	1.80*	18.20331	1.94*
		[0.07]		[0.06]
CAP_INT	-15.57363	-1.34	-15.73101	-1.33
		[0.18]		[0.18]
BIG4	-24.93217	-1.83*	-28.24593	-1.97**

		[0.07]		[0.05]
IOS	2.237064	0.75	2.522439	0.82
		[046]		[0.41]
LOGFAGE	-14.74132	-1.27	-16.50126	-1.42
		[0.20]		[0.15]
Adjusted R-squared		0.07		0.07
F-statistic		7.42***		7.12***

a The regression tests are based on 1557 firm-year observations, and year dummy variables (not shown) are included in the tests.
 All variables except indicator variables are winsorized at the extreme one percentile (i.e., values less (greater) than the 1st (99th)
 percentile are set equal to the value of the 1st (99th) percentile). The symbols *, **, and *** indicate statistical significance levels of 10%, 5%, and

 1%, respectively, in two-tailed tests. White's (1980) heteroscedasticity-consistent t-statistics are reported. All variables are defined in Table 3.
 See Appendix B for the definition of variables.

Table 8
The relationship between earnings management (ADA and APDA) and independent variables, including governance index, governance index interacted with high-tech firms, governance index interacted with post-SOX period and high-tech firms, and other control variables[a]

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$ADA_{i,t}$ or $APDA_{i,t} = \beta_0 + \beta_1 GI_{i,t} + \beta_2 HDUM{\times}GI_{i,t} + \beta_3 SOXDUM{\times}GI_{i,t} + \beta_4 SOXDUM{\times}HDUM{\times}GI_{i,t} + \beta_5 LAT_{i,t} +$

$B_6 STDSALE_{i,t} + \beta_7 STDCFO_{i,t} + \beta_8 OPERCY_{i,t} + \beta_9 CAP\_INT_{i,t} + \beta_{10} BIC5_{i,t} + \beta_{11} IOS_{i,t} + \beta_{12} LOGFAGE_{i,t}$

$+ \sum \beta_j YEAR_{i,t} + \varepsilon_{it}$

(6)

	Dependent Variable			
	ADA		**APDA**	
Variables	**Coefficient**	**White-t Statistic**	**Coefficient**	**White-t Statistic**
C	-99.35133	-1.69***	-92.92205	-1.54
		[0.09]		[0.12]
GI	-0.119044	-0.07	-0.776558	-0.42
		[0.94]		[0.68]
HDUM*GI	-0.177063	-0.11	-0.137633	-0.08
		[0.91]		[0.93]
SOXDUM*GI	-0.597175	-0.21	0.338864	0.11
		[0.83]		[0.91]
SOXDUM*HDUM*GI	9.706944	2.91***	8.751232	2.64***
		[0.00]		[0.01]
LAT	16.14790	3.65***	16.06642	3.49***
		[0.00]		[0.00]
STDCFO	0.029712	1.44	0.028842	1.39
		[0.15]		[0.16]
STDSALE	-0.003688	-1.24	-0.003115	-1.01
		[0.22]		[0.31]
OPERCY	16.83515	1.81*	18.15082	1.95*
		[0.07]		[0.06]
CAP_INT	-15.51902	-1.34	-15.50598	-1.31
		[0.18]		[0.19]
BIG4	-24.52354	-1.82*	-27.86633	-1.97**
		[0.07]		[0.05]
IOS	2.819331	0.93	3.060816	0.99
		[0.35]		[0.32]
LOGFAGE	-16.43663	-1.43	-17.88626	-1.56
		[0.15]		[0.12]
Adjusted R-squared		0.08		0.07
F-statistic		7.77***		7.23***

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[a] The regression tests are based on 1557 firm-year observations, and year dummy variables (not shown) are included in the tests. All variables except indicator variables are winsorized at the extreme one percentile (i.e., values less (greater) than the 1st (99th)

percentile are set equal to the value of the 1st (99th) percentile). The symbols *, **, and *** indicate statistical significance levels of 10%, 5%, and

1%, respectively, in two-tailed tests. White's (1980) heteroscedasticity-consistent t-statistics are reported. All variables are defined in Table 3.

See Appendix B for the definition of variables.

Appendix A
Components of the Governance Index[20]

This table briefly describes components of the Governance Index.

Anti-greenmail: Greenmail refers to a transaction between a large shareholder and a company in which the shareholder agrees to sell his stock back to the company, usually at a premium, in exchange for the promise not to seek control of the company for a specified period of time. Anti-greenmail provisions prevent such arrangements unless the same repurchase offer is made to all shareholders or approved by a shareholder vote.

Blank Check: Blank Check preferred stock is stock over which the board of directors has broad authority to determine voting, dividend, conversion, and other rights. While it can be used to enable a company to meet changing financial needs, its most important use is to implement poison pills or to prevent takeover by placing this stock with friendly investors.

Business Combination Laws: Business Combination laws impose a moratorium on certain kinds of transactions (e.g., asset sales, mergers) between a large shareholder and the firm, unless the transaction is approved by the Board of Directors.

Bylaw and Charter: *Bylaw and Charter* amendment limitations limit shareholders' ability to amend the governing documents of the corporation.

Cash-out laws: Control-share *cash-out laws* enable shareholders to sell their stakes to a "controlling" shareholder at a price based on the highest price of recently acquired shares.

Cash-out laws: a *Classified Board* (or "staggered" board) is one in which the directors are placed into different classes and serve overlap ping terms. Since only part of the board can be replaced each year, an outsider who gains control of a corporation may have to wait a few years before being able to gain control of the board.

Compensation Plans: Compensation Plans with changes-in-control provisions allow participants in incentive bonus plans to cash out options or accelerate the payout of bonuses if there should be a change in control.

Contracts: Director Indemnification *Contracts* are contracts between the company and particular officers and directors indemnifying them from certain legal expenses and judgments resulting from lawsuits pertaining to their conduct.

Cumulative Voting: Cumulative Voting allows a shareholder to allocate his total votes in any manner desired, where the total number of votes is the product of the number of shares owned and the number of directors to be elected.

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[20] This table is reproduced from Appendix 1 of Gompers et al. (2003) paper.

Directors' Duties: Directors' Duties provisions allow directors to consider constituencies other than shareholders when considering a merger. These constituencies may include, for example, employees, host communities, or suppliers.

Fair-Price: Fair-Price provisions limit the range of prices a bidder can pay in two-tier offers. They typically require a bidder to pay to all shareholders the highest price paid to any during a specified period of time before the commencement of a tender offer, and do not apply if the deal is approved by the board of directors or a supermajority of the target's shareholders.

Golden Parachute: Golden Parachutes are severance agreements that provide cash and noncash compensation to senior executives upon an event such as termination, demotion, or resignation following a change in control. They do not require shareholder approval.

Indemnification: Director ***Indemnification*** uses the bylaws, charter, or both to indemnify officers and directors from certain legal expenses and judgments resulting from lawsuits pertaining to their conduct.

Liability: Limitations on director ***Liability*** are charter amendments that limit directors' personal liability to the extent allowed by state law. They often eliminate personal liability for breaches of the duty of care, but not for breaches of the duty of loyalty or for acts of intentional misconduct or knowing violation of the law.

Pension Parachutes: Pension Parachutes prevent an acquirer from using surplus cash in the pension fund of the target to finance an acquisition. Surplus funds are required to remain the property of the pension fund and to be used for plan participants' benefits.

Poison Pills: Poison Pills provide their holders with special rights in the case of a triggering event such as a hostile takeover bid. If a deal is approved by the board of directors, the poison pill can be revoked, but if the deal is not approved and the bidder proceeds, the pill is triggered.

Secret Ballot: Under a ***Secret Ballot*** (also called confidential voting), either an independent third party or employees sworn to secrecy are used to count proxy votes, and the management usually agrees not to look at individual proxy cards.

Severance: Executive ***Severance*** agreements assure high-level executives of their positions or some compensation and are not contingent upon a change in control (unlike Golden or Silver Parachutes).

Silver Parachute: Silver Parachutes are similar to Golden Parachutes in that they provide severance payments upon a change in corporate control, but differ in that a large number of a firm's employees are eligible for these benefits.

Special Meeting: Special Meeting limitations either increase the level of shareholder support required to call a special meeting beyond that specified by state law or eliminate the ability to call one entirely.

Supermajority or Control-Share Acquisition laws: Supermajority requirements for approval of mergers are charter provisions that establish voting requirements for mergers or other business combinations that are higher than the threshold requirements of state law. They are typically 66.7, 75, or 85 percent, and often exceed attendance at the annual meeting. In practice, these provisions are similar to ***Control-Share Acquisition laws***.

Unequal Voting: Unequal Voting rights limit the voting rights of some shareholders and expand those of others. Under time-phased voting, shareholders who have held the stock for a given period of time are given more votes per share than recent purchasers.

Written Consent**:** Limitations on action by ***Written Consent*** can take the form of the establishment of majority thresholds beyond the level of state law, the requirement of unanimous consent, or the elimination of the right to take action by written consent. Such requirements add extra time to many proxy fights.

Appendix B
Definition of Variables

1. Financial Performance Test Variables

For firm i in year t,

Dependent Variables

$TOBINQ_{i,t}$ = (Market value of equity + book value of preferred stock and Debt) / Total Assets;
$ROA_{i,t}$ = Return on Assets, the ratio of net income before extraordinary items to total assets;
ANNMRR = Cumulative Monthly Raw Returns for Fiscal Year t from CRSP
ANNMAR = Cumulative Monthly Market-Adjusted Returns for Fiscal Year t from CRSP
    where Market-Adjusted Returns = Raw Returns − Value-Weighted Market Returns

Independent Variables

$GI_{i,t}$ = External Governance Index;
$HDUM_{i,t}$ = Industry dummy, 1 for HT firms, otherwise 0;
$SOXDUM_{i,t}$ = 1 for the post-SOX period and 0 for the pre-SOX period;
$LAT_{i,t}$ = Logarithm of total assets;
$PGSAL_{i,t}$ = Growth of sales over last two years;
$XRDSAL_{i,t}$ = The ratio of research and development expenditure to sales;
$CHAT_{i,t}$ = The ratio of cash to total assets;
$CAPXAT_{i,t}$ = The ratio of capital expenditure to total assets;
$PPEGTSAL_{i,t}$ = The ratio of property-plant-equipment to sales;
$EBITSAL_{i,t}$ = The ratio of earnings before interest and tax to total assets;
$LEVERAGE_{i,t}$ = The ratio of total debt to total assets;
$INSTP_{i,t}$ = Institutional ownership percent collected from the TFSD Ownership database
$YEAR_{i,t}$ = a dummy variable for each of eight years from 1997-2004; and
$IOS_{i,t}$ = The investment opportunity set composite computed by performing the principal component analysis on
    the four IOS measures

2. Earnings Management Test Variables

For firm i in year t,

Dependent Variables

$ADA_{i,t}$ = Modified Jones Model discretionary accruals in absolute value;
$APDA_{i,t}$ = Performance/industry matched discretionary accruals in absolute value;

Independent Variables

$GI_{i,t}$ = External Governance Index;

$HDUM_{i,t}$= Industry dummy, 1 for HT firms, otherwise 0;

$SOXDUM_{i,t}$= 1 for the post-SOX period and 0 for the pre-SOX period;

$LAT_{i,t}$=Logarithm of total assets;

$STDCFO_{i,t}$= Operating Cash Flow variability computed as the standard deviation of the firm's rolling 10-year cash flow from operations;

$STDSALE_{i,t}$ = Sales variability computed as the standard deviation of rolling 10-year sales revenue; $OPERCY_{i,t}$= Log of the sum of the firm's days of receivables and days of inventory at the beginning of the year;

$CAP\_INT_{i,t}$=The ratio of the gross book value of property, plant and equipment to total assets at the beginning of the year;

$BIC4_{i,t}$= one if the firm's auditor is one of the Big Four, or zero otherwise;

$BIC5_{i,t}$= one if the firm's auditor is one of the Big Five, or zero otherwise;

$IOS_{i,t}$= The investment opportunity set composite computed by performing the principal component analysis on the four IOS measures.

LOGFAGE=Log of firm age, where firm age is computed as fiscal year t of the observation minus the year the firm first appeared on CRSP;