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Small firms and the value of improvements in corporate governance mechanisms ☆

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ABSTRACT

Since 2002, many firms have been required to alter their board of directors and committees to increase management monitoring. Kinney and McDaniel (1989) and Chhaochharia and Grinstein (2007) provide empirical evidence suggesting that investments in corporate governance may differ based on firm size, and that underinvesting in monitoring may be more pronounced in smaller firms. To further test whether the benefits of recent changes in companies' governance mechanisms accrue to smaller firms that have underinvested in governance, we examine the stock market reaction to changes in board structure over the twenty-four months following the passage of the Sarbanes–Oxley Act. We construct a new composite measure of board structure and regress buy-and-hold abnormal returns on changes that occur in the Board Structure Index, finding that improvements in corporate governance quality result in economically significant abnormal returns accruing only to the smaller firms with weak initial board structures.

1. Introduction

Recent corporate scandals have caused policy makers to examine the quality of governance mechanisms more closely, particularly the ability of the board of directors and its committees to effectively monitor management's activities. The result has been the passage of the Sarbanes–Oxley Act of, 2002 (SOX) and the addition of new governance requirements to both the NYSE and the Nasdaq listing standards. The added provisions include independence requirements for the board of directors, as well as for the audit, compensation, and nominating committees. They also require that NYSE-listed firms develop and implement a governance policy. These new mandatory measures were expected to provide additional investor protections and, thus, improve the accuracy and reliability of financial reporting, especially for those firms that had underinvested in these governance mechanisms. The costs of these additional investments in the board of directors, along with other SOX-related costs, however, imposed a significant burden on firms, particularly for those that are smaller (Ahmed, McAnally, Rasmussen, & Weaver, 2010). Thus, we examine whether improvements in companies' corporate governance mechanisms surrounding the passage of SOX provided value to market participants where firms had underinvested in governance mechanisms.

The cost, as well as the benefits, of mandating changes to the governance structures of companies likely affects individual firms differently. Jensen and Meckling (1976) posit that, in order to mitigate management consumption of perquisites, firms will invest resources in monitoring activities up to the point at which monitoring costs are equal to the benefits derived from increases in firm value, and recent empirical evidence supports the idea that firms tailor their governance structures to address firm-specific needs (Coles, Daniel, & Naveen, 2008; Duchin, Matsusaka, & Ozbas, 2010; Linck, Netter, & Yang, 2008; Raheja, 2005). The actions of regulators, on the other hand, suggest that some firms may have underinvested in their monitoring mechanisms and that these firms may reap net benefits from improving governance structures. In such cases, the investment of additional firm resources in the monitoring function could yield increases in shareholder wealth.

Several recent empirical studies address this issue by examining investors' *initial* reaction to key legislative dates leading to the passage of the Sarbanes–Oxley Act. Chhaochharia and Grinstein (2007) and Hostak, Lys, Yang, and Carr (2013) indicate that firms possessing weaker governance structures are more likely to benefit from the passage of SOX, and Li, Pincus, and Rego (2008) find that firms engaging in higher levels of earnings management are more likely to benefit from the governance requirements of SOX. Zhang (2007), however, suggests that investors perceived that SOX would less adversely affect firms with greater shareholder rights, and Jain and Rezaee (2006) find that investors believed that more compliant firms would benefit from the passage of SOX. Overall, these findings support the idea that firms benefit differently from the provisions of

☆ Data: All returns and financial statement data are available from CRSP and Compustat, respectively. Corporate governance data are provided by the Corporate Library. Auditor data are available from Audit Analytics, analyst forecast data are available from I/B/E/S, and G Index scores are available from the Investor Responsibility Research Center (IRRC).

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SOX; however, the conflicting results do not provide conclusive evidence regarding the *expected* net cost or benefits of improvements in corporate governance mechanisms. Moreover, as Ahmed et al. (2010) point out, these event studies do not examine either the realized net costs for shareholders or the realized net benefits for individual firms.

While a firm's initial investment in the monitoring function could affect the net benefits or cost of governance changes, another factor that could be important is the size of the firm. Chhaochharia and Grinstein (2007) suggest that investors believed that some of SOX's provisions would impact firms differently based on the size of the firm. Specifically, they suggest that smaller, less compliant firms would be more adversely impacted, likely resulting from higher relative implementation costs. This assertion appears to be supported by the findings of Ahmed et al. (2010). Kinney and McDaniel (1989) also provide empirical evidence suggesting that the investment level of corporate governance may differ based on firm size. Specifically, they provide evidence that restating firms are smaller than their non-restating industry counterparts, further implying that under-investing in monitoring may be more pronounced in smaller firms. Their results, however, suggest that smaller firms with less initial investment in board governance structure may present the greatest opportunity to obtain economic benefits from additional investments in corporate governance. Together, these studies indicate that smaller firms with weaker initial investments in the board may bear more costs on a relative basis but that benefits accruing to these firms could outweigh those costs.

To test whether recent changes in companies' governance mechanisms are associated with realized net benefits or costs for individual firms, we examine the stock market reaction to changes in board structure over the twenty-four months following the signing of SOX into law on July 30, 2002.[1] We choose to use a long-horizon analysis because it has been demonstrated that investors appear not to fully assimilate information about complex evolving issues (e.g., Chen, Diltz, Huang, & Lung, 2011; Edmans, 2011; Yook, 2010).[2] To conduct our tests, we construct a new composite measure of board structure, called the Board Structure Index (BSI), using firms listed on the Board Analyst database.[3] We then regress 24 month buy-and-hold abnormal returns on changes in the BSI during our sample period.

Our results demonstrate that changes in the board of directors' structure are positively related to long-horizon abnormal returns for smaller firms (as measured by total assets) with a lower initial BSI. Conversely, we find no significant relation between governance changes and buy-and-hold abnormal returns for the remainder of our sample. These results suggest that, while the improvements in corporate governance mechanisms surrounding the Sarbanes–Oxley Act and the new NYSE and NASD listing rules provided net long-term benefits to the capital markets, their benefits exceeded the cost of structural improvements to the board of directors for only smaller, more weakly-governed firms. Moreover, investors appear to view changes to the governance structure of other firms as a trade-off between the benefits of improved monitoring and the cost of implementation.

We conduct three additional sensitivity tests to determine if our results are specific to the way in which changes in the BSI are measured. In our first two tests, we replace the change in BSI with two alternative measures designed to account for a firm's ability to change, and, in our final test, we replace the change in BSI with an alternative measure that represents a firm's relative change in governance. In each case, results are statistically similar to our initial findings.

These findings add to the growing literature on corporate governance and firm value. While our study is more closely related to the Chhaochharia and Grinstein (2007) paper, we extend this line of research in a number of ways. First, we use a long-window return that helps resolve many of the issues outlined earlier, and it better captures not only the costs but also the benefits of improvements in corporate governance mechanisms. Second, we find that, while small firms may have significant implementation costs, it appears that investors value these investments. Third, we have a larger consistent sample of firms. Prior research, because of research designs, performed many analyses using sample sizes of less than 500 firms.[4] Fourth, we develop a new composite measure of board structure to measure changes in governance mechanisms.

The remainder of this paper is organized as follows: Section 2 provides the theory and hypotheses development; Section 3 discusses the development of the Board Structure Index (BSI); Section 4 explains the methodology behind the development of buy-and-hold abnormal returns; Section 5 describes the sample selection; Section 6 presents the results; Section 7 presents additional tests; and Section 8 offers concluding remarks.

2. Theory and hypotheses development

The separation of ownership and control in modern corporations creates an agency relationship between the stockholders of a corporation and its managers. Assuming that both parties in the relationship are utility maximizers, managers will expend firm resources to the point at which the marginal utility derived from spending an additional dollar is equal to the marginal utility of his/her wealth reduction, while stockholders will attempt to limit the managers' ability to expend firm resources on non-pecuniary benefits to limit the reduction in their own wealth. Jensen and Meckling (1976) suggest that such managerial expenditures could decrease firm value. Stockholders, however, may monitor managers and limit their spending of firm resources on non-pecuniary benefits, thus increasing the firm's value.

Stockholders are, therefore, willing to expend resources on monitoring costs up to the point where the increase in wealth derived from the increase in firm value is just equal to the decrease in wealth due to additional monitoring expenditures. Since each firm differs in its manager's non-value maximizing activities, shareholders determine firm-specific optimal levels of monitoring.

While monitoring activities may take many forms, such as annual audits and the budgeting process, the board of directors has

[1] The Sarbanes–Oxley Act was signed into law on July 30, 2002. From this date, firms had 270 days to comply with the mandated audit committee independence standards. The SEC later issued its final rule concerning audit committee financial experts on January 24, 2003 with the rule being effective for fiscal years ending on or after July 15, 2003. The SEC then approved rule changes proposed by the NYSE and the NASD on November 11, 2003 with full implementation required by the first annual meeting following January 15, 2004 and no later than October 31, 2004.

[2] Another example of a complex, evolving law is the Dodd–Frank Act. This Act passed Congress on Friday, July 16, 2010 and yet, today, many of its provisions have yet to be operationalized, and firms are struggling to understand and respond to the law's still evolving requirements (Baram, 2011). In such cases, investors are unlikely to completely understand the ramifications on all elements of such legislation immediately upon its passage.

[3] Although our test period begins with the passage of SOX, our composite measure of board structure (BSI) includes certain improvements in corporate governance mechanisms that were not mandated by SOX or the revised stock exchange listing requirements (e.g., board size, percent of directors that own no stock in the company, percentage of institutional ownership, whether the CEO is also the Chairman, and whether directors' terms are staggered).

[4] Chhaochharia and Grinstein (2007) conduct a number of analyses, most of which have sample sizes fewer than 300 firms. A notable exception is the authors' analysis of director independence which has a sample size of 1101 firms. The sample used by Hostak et al. (2013) contains fewer than 200 firms, and the sample used by Jain and Rezaee (2006) contains fewer than 500 firms. To the contrary, Li et al. (2008) use a sample of 850 firms and Zhang (2007) uses a sample of 1224 firms.

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assumed the primary role of monitoring management's activities. Fama and Jensen (1983) suggest that the board is the company's apex of decision control due to diffuse shareholders' delegation of authority to it. While the board delegates much of its decision control to management, it retains ultimate control over managers, setting major policies and maintaining final authority over managerial employment and compensation levels.

Although boards retain ultimate authority in a firm and are charged with monitoring top management's decisions, the structure of the board influences the level to which it discharges this fiduciary duty. If board structure is such that a firm's insiders can unduly influence board decisions or gain control of the board, management may expropriate shareholder wealth (Fama, 1980). Therefore, firms must invest in recruiting and retaining the services of quality outside directors to ensure that the board functions properly. To achieve optimal results, firms' shareholders will then determine, based on a cost–benefit basis, an appropriate board structure.[5] Several recent studies lend support to this individual tailoring, suggesting that, based on various characteristics, shareholders will determine each firm's optimal board structure (Raheja, 2005; Coles et al., 2008; Linck et al., 2008; Duchin et al., 2010).

Large scandals at Enron and WorldCom, along with recent legislation and changes in listing standards, however, suggest that some firms may have failed to adequately invest in their board structure, exposing shareholders to unnecessary reporting risks. As a result, many firms that have previously underinvested in governance mechanisms have faced pressure, and in some cases been forced by new regulations, to alter their board structure to improve the board of directors' level of monitoring.

Consistent with this idea, Chhaochharia and Grinstein (2007), Hostak et al. (2013), and Li et al. (2008) present evidence that future benefits would be realized by firms previously under-investing in their corporate governance structure. Farber (2005) supports this idea, finding that improved corporate governance quality may increase firm value in firms having experienced fraud, a group of firms likely having less than optimal governance quality. Contrary to this position, Jain and Rezaee (2006) and Zhang (2007) suggest that more strongly governed firms would benefit or be less adversely affected by the push for improvement in corporate governance mechanisms because of the relatively small investment of firm resources required for these firms to make their corporate governance quality acceptable. Therefore, questions remain as to how implementing new governance mechanisms will affect individual firm value.

While the initial investment in a firm's monitoring mechanisms may affect the net realized benefit or cost of additional investments in the board, firm size may also matter. Chhaochharia and Grinstein (2007) suggest that investors believed that some of the SOX provisions, particularly the independence requirements and internal control provisions, would impact firms differently based on the size of the firm. Specifically, they suggest that smaller, less compliant firms would be more adversely impacted, likely resulting from higher relative implementation costs. Likewise, an advisory committee established in 2005 to examine the SOX provisions' effect on smaller public companies noted in its final report released on April 24, 2006, that small firms are, in general, distinctly different from large firms regarding their optimal investment level in corporate governance and concluded that small firms should have relief from certain SOX provisions (Securities and Exchange Commission (SEC), 2006). However, the committee found that many of the governance and disclosure rules for smaller public companies are working well and have had a positive impact on the quality of corporate governance and disclosure.

Kinney and McDaniel (1989) also provide empirical evidence suggesting that the investment level of corporate governance may differ based on firm size. Specifically, they provide evidence that restating firms are smaller than their non-restating industry counterparts, further implying that underinvesting in monitoring may be more pronounced in smaller firms. If so, additional investments in the board will result in greater economic benefits for these firms with less initial investment in their corporate governance. As a result of this discussion, we develop the following hypothesis (in alternative form):

H1. Improving overall board structure will have a greater effect on firm value for smaller companies with a poorer initial investment in board structure than on larger companies or companies with a strong initial investment in board structure.

3. Construction of Board Structure Index

To empirically examine how investors view implementing changes in governance mechanisms, we first develop a new composite measure of board structure. To construct this composite board governance score for each firm, we incorporate eight board characteristics and nine committee-level characteristics, three from each of the audit, compensation, and nominating committees (discussed in more detail in the following sections). The Board Structure Index, BSI, includes items indicating director quality and independence, the general power structure of the board and its committees, and the board's ability to shirk responsibilities. This score shares both positive and negative characteristics of the G index created by Gompers, Ishii, and Metrick (2003) in that it is easily reproduced, but that it also suffers from weighting each variable equally, thereby dampening each component's relative importance in influencing the monitoring function's efficiency. The two scores, however, are different in that the BSI focuses on the board's internal structure while the G index focuses on the balance of power between shareholders and management and includes a number of anti-takeover measures.[6] Additionally, and possibly more importantly, the BSI is determinable yearly while the G index can only be calculated every two years.[7]

The BSI is based on data from the Board Analyst database, much of which is derived from SEC proxy and U.S. tax filings and includes all firms in the S&P 500, mid-cap, and small-cap indices, as well as the Russell 1000 and all public companies listed in the Fortune 1000. For each U.S. firm in the Board Analyst database in July 2002 and July 2004, we assign a point value ranging from 0 to 1 to each variable composing the BSI and then sum across those variables to obtain the composite score. Therefore, the BSI for any company is between 0 and 17.

For non-continuous variables indicating either the presence or absence of a certain characteristic, we assign one point to the variable if its presence (absence) improves the board's ability or motivation to carry out the monitoring function; otherwise, we assign zero. For continuous variables, we rank all firms in our initial sample based on that variable, then classify the firms into deciles, assigning a point value ranging from 0.1 to 1.0 based on decile rank, with higher point assignments indicating improved monitoring ability. For example, all firms are ranked based on the percentage of independent outside directors serving on the full board in 2002 and then classified into deciles. Firms

[5] Free-rider issues may preclude shareholders from acting in unison in their best interest.

[6] The correlation between the BSI and the Gompers Index is 15.14% ($n = 1095$) in 2002 and 2.97% ($n = 1125$) in 2004. The correlation between the change in the BSI and the change in the Gompers Index is 8.52% ($n = 1078$). The correlation between the BSI and the Gompers Index in 2002 is significant at the 0.01 level; and the correlation between the change in the BSI and the change in the Gompers Index is, likewise, significant at the 0.01 level. As further indication of the differences between the two measures, we replace the change in the BSI with the change in the G Index as an independent variable in our first analysis (Table 3). The coefficient on the change in the G Index is significant ($t = 3.38$) after correcting for heteroskedasticity; however, the sign of the coefficient indicates that, overall, firms experience decreases in firm value for broadening shareholder rights.

[7] The advantage of constructing an annual index may not apply to all studies (e.g., including all event studies), but may be helpful in other settings.

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in decile ten (i.e., the decile with the highest percentage of independent, outside directors serving on the full board) are assigned one point, while firms in decile one (i.e., the decile with the lowest percentage of independent, outside directors serving on the full board) are assigned 0.1 point. A comprehensive example is provided in Appendix A.[8]

3.1. Director independence

The board of directors and its respective committees are charged with monitoring management's activities; however, the qualitative level of monitoring provided by the directors is related to the board's composition. Beasley (1996) and Dechow, Sloan, and Sweeney (1996) indicate that including greater proportions of outsiders on the board of directors improves the board's monitoring level, and Klein (2002) similarly finds that monitoring improves when the audit committee contains a higher percentage of outsiders. Recent changes to the listing service requirements additionally suggest that regulators expect independent nominating and compensation committees to improve the board's ability to monitor management. Thus, we include the percentage of independent, outside directors on the board in our measure of board structure, as well as variables indicating whether an insider sits on the audit, nominating, or compensation committees.

3.2. Power structure

The chairman of the board and the chairpersons of the board's various committees wield the greatest power. These board members control meeting agendas, as well as the information flow to other directors. In these circumstances, having the board and its most important committees chaired by independent, outside directors can separate the control of the board and its committees from management's influence. Outside directors can improve the board and its committees' ability to effectively monitor top management's decisions and actions and can increase the fairness of management compensation contracts. Therefore, we include in our score whether the chairman of the board and the chairpersons of the audit, nominating, and compensation committees are independent, outside directors.

Combining the duties of CEO and chairman of the board can also interfere with the board's ability to effectively execute its duties. The Commission on Public Trust and Private Enterprise (2003), which examined corporate governance practices in the wake of several corporate scandals, indicates that this overlap may be a problem and suggests as one of its specific best practices that firms separate the duties of CEO and chairman. In addition, Beasley (1996) and Dunn (2004) provide evidence that combining the powers and authority of the CEO and chairman into one position increases the likelihood of financial statement fraud. As a result, we include in our score a variable indicating whether the CEO also serves as chairman of the board.

3.3. Ability to shirk duties

The size of the board and its committees may affect the ability or willingness of directors to shirk their duties. Lipton and Lorsch (1992) and Jensen and Meckling (1993) suggest that directors who serve on large boards generally lack the ability to work together and to deal with complex information and are more easily controlled by the CEO. Conversely, board committees consisting of fewer than three members, the audit committee's minimum size requirement of both the NYSE and the Nasdaq (New York Stock Exchange (NYSE), 2013; The NASDAQ Stock Market LLC, 2013)[9] may not provide adequate monitoring of the management's activities. Consequently, we include board size as an indicator of the board's ability to effectively discharge its duties; and we include variables indicating whether the audit, nominating, and compensation committees contain three or more directors.

Classified boards may also allow directors to shirk responsibilities. Directors on classified boards are elected for staggered terms (i.e., one-third elected each year), making it more difficult for shareholders to take over the board via a proxy contest. Such restriction of shareholder discipline over the board can result in a suboptimal effort in monitoring management and has, therefore, been opposed by shareholders and governance activists. Consequently, we include in our score a variable indicating whether the board is classified.

The board of directors' diligence in monitoring management is likely to be further influenced by the presence of a governance policy. NYSE listing standards (New York Stock Exchange (NYSE), 2013) now require listed firms to develop governance guidelines to address such issues as director qualification and responsibilities, access to management and independent advisors, continuing education, and an annual performance evaluation of the board. In the absence of such guidelines or policies, boards are unlikely to attempt to improve director quality and independence and to increase information flow to board members. Consequently, directors of firms not having governance policies in place may lack specific guidance and training that could improve monitoring quality.

Institutional investors' ownership of firms also likely affects the directors' ability to shirk duties. Del Guercio and Hawkins (1999) and Gillan and Starks (2000) suggest that institutional investors can influence the board of directors and promote change within the board. As a result, a greater percentage of ownership by institutional investors likely reduces director shirking.

Finally, the investment of personal wealth by directors in the stock of their board's company likely influences their willingness to shirk responsibilities. The National Association of Corporate Directors (National Association of Corporate Directors (NACD), 2001, 14) indicates that directors owning no stock in the company on whose board they sit are unlikely to have incentives in common with shareholders. Thus, higher percentages of non-owner directors on boards may imply that members will be less diligent in carrying out their duties.

4. Methodology

Prior research has demonstrated that, in certain cases, these newly mandated investments in board structure would lead to improvements in overall firm value. Jain and Rezaee (2006) find that abnormal returns surrounding key legislative events increasing (decreasing) the probability of passing the Sarbanes–Oxley Act were significant and positive (negative), and Li et al. (2008) show that abnormal returns surrounding important SOX events were, likewise, significant and positive. These studies, however, like others investigating returns data on key dates surrounding the passage of SOX, examine only the *initial* reaction to the regulatory changes mandated by the Act on an overall sample, rather than the long-term wealth effects associated with implementing governance changes initiated by the new regulations. As a result, these event studies are not able to determine whether SOX imposed net costs for shareholders or created net benefits

[8] The weightings placed on the inputs into our BSI measure are somewhat subjective and thus open to criticism. Specifically, some may be concerned that 9 of the 17 inputs are related to the various committees of the board. To address this concern, we combine the 9 committee-related variables into 3 variables and conduct our analyses using a revised BSI measure that includes only 11 inputs, 3 of which relate to the committees. Our results are qualitatively unchanged. These new variables are equal to 1 if the committee has an independent chair and a size of 3 or more members. We thank an anonymous reviewer for suggesting this additional analysis.

[9] Rule 5605 in the current NASDAQ Stock Market Rules replaced Rule 4350 in the predecessor NASD manual. The predecessor manual, as it existed on July 31, 2006, can be accessed at: http://www.cchwallstreet.com/NASDAQ/pdf/predecessor_rule_text.pdf.

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for individual firms (Ahmed et al., 2010). Chhaochharia and Grinstein (2007) also find issues with using these types of event date studies, which led to their use of a long event window to examine the *initial* effects of SOX rule announcements on firm value. In addition, the exact event dates associated with the voluntary and mandated improvements in corporate governance mechanisms surrounding the passage of SOX are difficult to isolate, and it has been demonstrated that investors appear not to fully assimilate information about complex evolving issues (e.g., Edmans, 2011; Yook, 2010; Chen et al., 2011). As a result, we choose to employ a long-horizon event window in our analysis.

To test whether further investments in the board of directors result in the firms' economic gains, we calculate buy-and-hold abnormal returns (BHARs) for each company in our sample and test whether actual changes in board structure, as measured by the BSI, are statistically correlated with BHARs. Barber and Lyon (1997) argue that, in such a setting, the use of BHARs is appropriate for two reasons. First, simple cumulative abnormal returns are biased predictors of BHARs and could result in erroneous inferences. Secondly, even if inferences using cumulative abnormal returns are reasonable, the magnitude of the abnormal returns over the event horizon can be misstated.

Unfortunately, calculating buy-and-hold abnormal returns presents other problems. Barber and Lyon (1997) and Kothari and Warner (1997) suggest that BHARs may be misspecified due to new listing and rebalancing biases. Lyon, Barber, and Tsai (1999), however, indicate that these biases can be eliminated through carefully constructing reference portfolios. We, therefore, follow Lyon et al. (1999) in constructing reference portfolios based on size.[10]

We begin developing reference portfolios by using all NYSE, Nasdaq, and AMEX firms contained in the monthly returns file created by the Center for Research in Security Prices (CRSP) and calculate each company's market value of equity as of June 30, 2002. Firms with missing market values of equity are dropped from the study. We then form size deciles for all NYSE firms in our population and place all AMEX and Nasdaq firms into the appropriate deciles based on their market value of equity. Since the smallest size decile contains a large number of firms after including the AMEX and Nasdaq companies, we further partition it into quintiles, resulting in fourteen portfolios based solely on size.

We then calculate the return on each reference portfolio by compounding the return for each security within the portfolio; equally weighting the compounded return; and, finally, summing across all securities within the portfolio:

$$R_p = \sum_{i=1}^{ns} \frac{\left[\prod_{t=1}^{24}(1+R_{it})\right]-1}{n_s}, \tag{1}$$

where R_{it} is the return on security i in month t and n_s is the number of securities contained in the reference portfolio at the formation date. Using Eq. (1) to calculate reference portfolio returns eliminates investments in newly listed firms, as well as the need to rebalance the portfolio monthly. Thus, a passive buy-and-hold strategy is achieved in which misspecification of returns due to rebalancing and new listing bias is eliminated.An issue with Eq. (1), however, is the placement of investment proceeds in firms that delist subsequent to the formation date. To maintain our passive buy-and-hold strategy, we assume that the proceeds are invested in an equally weighted reference portfolio by replacing the missing monthly returns of the delisted securities with the mean monthly return of the portfolio.

Next, we calculate the buy-and-hold return over our event horizon for each firm in our sample:

$$R_{BH,i} = \left[\prod_{t=1}^{24}(1+R_{it})\right]-1. \tag{2}$$

We then calculate the BHAR for each firm by taking its buy-and-hold return and subtracting the buy-and-hold return of its corresponding size reference portfolio:

$$BHAR_i = R_{BH,i} - R_p \tag{3}$$

Before testing our main hypothesis, we first analyze the relation between improvements in board structure and BHARs from August 2002 to July 2004 for our overall sample using the following regression using standard control variables used in prior research:

$$BHAR_i = \alpha + \beta_1 \Delta BSI_i + \beta_2 \Delta ROE_i + \beta_3 \Delta Sales_i + \beta_4 \Delta Audit_i + \beta_5 BMV_i + \beta_6 Size_i + \beta_7 Big4_i + \beta_8 Restate_i + \varepsilon_i \tag{4}$$

where:

ΔBSI_i = change in the composite measure of board structure for firm i over our event period;
ΔROE_i = change in net income (Compustat variable *ib*) scaled by lagged total equity (Compustat variable *seq*) for firm i over our event period;
$\Delta Sales_i$ = change in net sales (Compustat variable *sale*) scaled by lagged total assets (Compustat variable *at*) for firm i over our event period;
$\Delta Audit_i$ = 1 if firm i is identified by Audit Analytics as having changed auditors during the sample period, else 0;
BMV_i = book value of firm i (Compustat variable *ceq*) divided by its market value (from CRSP: price per share multiplied by number of shares outstanding) as of December 31, 2003;
$Size_i$ = log of the market value of equity of firm i (from CRSP: price per share multiplied by number of shares outstanding) as of December 31, 2003;
$Big4_i$ = 1 if firm i is identified by Audit Analytics as having engaged a Big 4 auditor during either 2002 or 2004, else 0;
$Restate_i$ = 1 if firm i is identified by the General Accounting Office (GAO) (2006) as having restated earnings during the sample period, else 0; and
ε_i = the residual for firm i over our event period.

In addition to ΔBSI, we control for several factors that may be related to buy-and-hold abnormal returns. Farber (2005) includes ΔROE, *BMV*, and *Size* as control variables and finds that they are positively related to buy-and-hold returns in his cross-sectional model.[11] Abarbanell and Bushee (1998) discover that concepts of fundamental analysis can be used to predict future abnormal returns. Specifically, they find that future sales signals, which are calculated as the percentage change in sales less the percentage change in inventory, are positively related to buy-and hold abnormal returns. In addition, Weber and Willenborg (2003) present evidence that suggests larger auditors provide audit opinions that are better forecasts of stock returns in the IPO market. Johnson and Lys (1990) further find that auditor changes affect returns negatively. Finally, Palmrose, Richardson, and Scholz (2004) find that restatements are associated with significant, negative abnormal returns.

[10] We additionally calculate BHARs using reference portfolios based on both size and industry. While constructing reference portfolios in this manner causes 385 of our sample firms to have reference portfolios with fewer than 8 companies, results of analyses are qualitatively similar to those presented in the paper.

[11] Farber (2005) used ΔROA rather than ΔROE in his model. Using ΔROE improves our results slightly; however, our overall conclusions are unchanged when using ΔROA. We thank an anonymous reviewer for suggesting this change.

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As a result of these discussions, we include ΔROE, *BMV*, *Size*, $\Delta Sales$, and *Big4* as control variables in our model and expect a positive relation with buy-and-hold abnormal returns, while we include $\Delta Audit$ and *Restate* as control variables and expect a negative relation with buy-and-hold abnormal returns.

Since investors may react differently to improvements in board structure based on company size and the level of initial investment in the monitoring function, we test our main hypothesis by examining the relation between long-horizon abnormal returns and changes in board structure for our sample firms based on initial BSI and size using the following model:

$$\begin{aligned} BHAR_i = {} & \alpha + \beta_1 \Delta BSI_i + \beta_2 \Delta BSI * Governance + \beta_3 \Delta BSI * Large \\ & + \beta_4 \Delta BSI * Governance * Large + \beta_5 ROE_i + \beta_6 \Delta Sales_i \\ & + \beta_7 \Delta Audit_i + \beta_8 BMV_i + \beta_9 Size_i + \beta_{10} Big4_i + \beta_{11} Restate_i \\ & + \beta_{12} Governance_i + \beta_{13} Large_i + \beta_{14} Governance * Large + \varepsilon_i \end{aligned} \quad (5)$$

where:

$Governance_i = 1$ if firm *i* has a strong governance structure in 2002, else 0;[12]

$Large_i = 1$ if firm *i* has total assets (Compustat variable *at*) greater than the sample median, else 0; and all other variables are defined as above.

To determine the effect of a change in the BSI on buy-and-hold abnormal returns for each category of firms (i.e., strong vs. weak governance and large vs. small firms), we combine parameter estimates obtained from estimating Eq. (5). Specifically, the results for each category of firms reported in Section 6 are calculated as follows:

$$\begin{aligned} \text{Small/weak} &= \beta_1, \\ \text{Small/strong} &= \beta_1 + \beta_2, \\ \text{Large/weak} &= \beta_1 + \beta_3, \text{ and} \\ \text{Large/strong} &= \beta_1 + \beta_2 + \beta_3 + \beta_4. \end{aligned}$$

5. Sample selection and summary statistics

5.1. Sample selection

The construction of our board-structure index begins with all firms listed on the Board Analyst database on July 31, 2002 and on July 31, 2004, an initial sample of 1397 firms.[13] All decile determinations used in calculating component scores are based on this complete sample; however, 204 companies with insufficient data for calculating the composite score are dropped. Finally, we remove 41 firms due to missing Compustat data. Our final sample includes 1152 firms. Table 1 contains sample selection details.

5.2. Summary statistics

Column 2 of Panel A in Table 2 reports descriptive statistics on buy-and-hold abnormal returns; the BSI levels as of July 31, 2002 and 2004 and control variables for our sample firms. The mean buy-and-hold abnormal return for our sample is 0.67% and is not statistically different from zero, while our sample firms improved mean BSI scores from 9.38 to 10.86 over the sample period. Summary statistics (not reported) indicate that this change in the mean BSI score over our sample period is significantly different from zero at the 0.01 level. These firms likewise had mean growth in ROE of 1.00% while experiencing a mean reduction in sales of 1.63%. In addition, 6.86% of our firms changed auditors during our sample period, and 96.88% of our sample firms engaged a Big 4 auditor during our sample period, while 9.33% announced a restatement. Finally, our sample firms had a mean market value of equity of $7.328 billion, indicating that our sample is generally composed of larger, more stable firms.

Table 1
Sample determination.

	n
All firms listed on Board Analyst in both 2002 and 2004	1397
Less:	
Firms with insufficient data to calculate BSI	204
Firms with missing data items	41
Final sample size	1152

Columns 3–6 of Panel A in Table 2 report descriptive statistics for each category of firms based on initial BSI score and total assets. Mean buy-and-hold abnormal returns for these categories range between −1.22% for large firms with strong initial governance and 3.61% for small firms with weak initial board structure; however, mean BHARs are not significantly different from zero for any category of firms. Summary statistics (not reported) indicate that both small and large firms with weak initial investments in governance structures substantially changed ($p < 0.001$ in both cases) their board structure following the passage of the Sarbanes–Oxley Act and that the gap between the mean BSI scores of firms partitioned by initial monitoring investment narrowed during the sample period. While this gap narrowed, tests of means (not reported) indicate that significant differences remain between the mean BSI of firms partitioned by initial monitoring investment at the close of our sample period. Tests of means, which are not reported, further show that the reported firm categories generally differ regarding the control variables except for *BMV* and *Restate*.

6. Results

Table 3 presents results from estimating Eq. (4) using the full sample of firms. The model is significant at the 0.01 level, as evidenced by its F-statistic ($F = 4.62$), while the variation in the independent variables explains 20.38% of the variation in buy-and-hold abnormal returns. The regression results, corrected for heteroskedasticity following White (1980), indicate that the coefficient on ΔBSI is positive and significant at the 0.05 level. In addition, the coefficients of control variables other than $\Delta Audit$ and *Restate* are positive and significant, implying that investors generally react positively to characteristics indicative of the firm's health. The coefficient on ΔBSI indicates that the average firm in our sample receives an economically significant increase in buy-and-hold abnormal returns of 2.8% when improving their BSI score by one point, holding all else equal. This finding suggests that, on an overall basis, investors value implementing improvements in board structure and that our sample firms may not be optimally investing in this important monitoring mechanism. This result is consistent with the overall findings of Jain and Rezaee (2006) and Li et al. (2008).

Our descriptive statistics suggests, however, that not all firms similarly invest in the board of directors. As a result, investors may not value improvements to the overall board structure of individual firms equally. Thus, we use indicator variables to classify firms by both their initial investment in board structure and firm size as measured on July 31, 2002, and estimate Eq. (5). Results presented in Table 4, Panel A indicate that our model is highly significant ($F = 3.53$) and that the variation in buy-and-hold abnormal returns explained by the variation in the independent variables is 22.08%. Results, corrected for heteroskedasticity following White (1980),

[12] A firm is classified as having a strong (weak) governance structure if its BSI is greater than or equal to (less than) the median BSI of all firms for which the index can be calculated.

[13] The Sarbanes–Oxley Act was signed into law on July 30, 2002. Governance changes were implemented after this date and continued until October 31, 2004, when NYSE and NASD regulatory changes were required to be implemented.

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Table 2
Descriptive statistics of returns, levels of Board Structure Index, and control variables for the overall sample and firms grouped by total assets and BSI as of July 31, 2002.

Variable	Overall	Small/weak	Small/strong	Large/weak	Large/strong
No. of observations	1152	342	234	244	332
Pct. of observations	100%	29.7%	20.3%	21.2%	28.8%
BHAR	0.0067	0.0361	−0.0086	0.0057	−0.0122
BSI_2002	9.3781***	7.1699***	11.2624***	7.6803***	11.5726***
BSI_2004	10.8588***	9.7868***	11.7902***	10.1463***	11.8301***
ΔROE	0.010	0.021	0.010	0.017	−0.006
ΔSales	−0.0163*	−0.0004	0.0216	−0.0495**	−0.0349**
ΔAudit	0.0686***	0.1023***	0.0556***	0.0697***	0.0422***
BMV	0.5805***	0.6400***	0.5885***	0.5523***	0.5342***
MVE	7,328.16***	983.0317***	1190.4840***	10,900.00***	15,600.00***
Big4	0.9688***	0.9386***	0.9786***	0.9713***	0.9910***
Restate	0.0903***	0.0789***	0.1026***	0.0615***	0.1145***

*,**,*** Significant at the .1, .05, and .01 levels, respectively, based on two-tailed tests.

also reveal that the coefficients on the variables *ΔAudit* and *Restate* remain insignificantly different from zero, while the coefficients on the variables *ΔROE*, *ΔSales*, *BMV*, *Log MVE*, and *Big4* are positive and significant.

Table 4, Panel B reports the effect of a change in the Board Structure Index on buy-and-hold abnormal returns partitioned by initial investment in board structure and total assets. These results indicate that a one-point increase in the BSI for smaller firms with a weak initial board structure is associated with a statistically significant increase (at the 0.05 level) in buy-and-hold abnormal returns of 6.2%. In contrast, our results indicate no significant relation between changes in the BSI and buy-and-hold abnormal returns for other categories of firms,[14, 15] These findings suggest, at least for our sample of firms, that investors value improvements in board structure only for smaller firms that have relatively weak initial board structure. These findings further suggest that investors view changes to other firms' corporate governance structures as a trade-off between the benefits of improved monitoring and the costs of implementing changes to the board of directors.

7. Additional tests

Using the raw changes in BSI fails to take into account a firm's potential for change. As a result, we conduct two separate sensitivity analyses to account for this improvement potential. In the first, we replace *ΔBSI* with the percentage change in BSI, while in the second we replace *ΔBSI* with the change in BSI weighted by the possible change in BSI (17, the highest possible score on the BSI, less the firm's BSI score in 2002). We then re-estimate Eq. (5) and combine parameter estimates from each analysis to calculate the respective effect for each category of firms. Results reported in Table 5, Panel A, Columns 3 and 4 are generally consistent with those presented in Table 4, Panel A. Results presented in Table 5, Panel B, Columns 3 and 4 indicate that the percentage change in BSI and the weighted change in BSI are positive and significant at the 0.05 level (one-tailed test), respectively, for smaller firms with weaker initial governance structures. Our results also indicate that neither the percentage change in BSI nor the weighted change in BSI is significant (one-tailed test) for the other categories of firms. As a result, our inferences regarding *ΔBSI* and our categories of firms are robust to these alternative measures of the change in board structure over our sample period.

Using the raw changes in BSI may also overestimate actual changes in corporate governance *relative to other firms*. As a result, we replace *ΔBSI* with *ΔBSI_Decile*, a variable indicating the number of deciles that a firm's BSI changes relative to its initial decile ranking in 2002. We then re-estimate Eq. (5) and calculate the effect of a change in BSI relative to other firms on buy-and-hold abnormal returns for each category of firms. Results reported in Table 5, Panel A, Column 5 are qualitatively consistent with those presented in Table 4, Panel A. Results presented in Table 5, Panel B, Column 5 indicate that for small companies with weak governance, the effect of a change in the decile of BSI score is positive and significant at the 0.05 level (one-tailed test), while the effect for the other categories of companies is not significant (one-tailed test). Consequently, our results regarding *ΔBSI* and our categories of firms are also robust to this definition of a firm's level of change in its overall board structure.

8. Conclusion

Responding to several large corporate accounting scandals, Congress passed the Sarbanes–Oxley Act of 2002, which the NYSE

Table 3
Regression of sample firms' long-run buy-and-hold abnormal returns for two-year sample period on changes in the Board Structure Index over the same period.

Variable	Predicted sign	Dependent variable: *BHAR*	
		Coefficient	t-Stat[+]
Intercept	?	−1.526	−4.07***
ΔBSI	+	0.028	2.12**
ΔROE	+	0.104	1.29*
ΔSales	+	0.715	2.81***
ΔAudit	−	0.017	−0.23
BMV	+	0.611	2.30**
Log_MVE	+	0.108	4.47***
Big4	+	0.316	2.40***
Restate	−	0.153	1.46
n		1152	
F statistic		4.62	
Prob. > F		<0.001	
R^2		20.38%	

*, **, ***Significant at the .1, .05, and .01 levels, respectively, based on one-tailed tests for variables that we predict an expected difference and two-tailed tests for variables that we do not predict an expected difference.

[+] Indicates robust standard errors used to correct for problems with heteroskedasticity.

[14] We also conduct our analyses using the one-year and three-year event periods following the passage of SOX. We find that, when using Eq. (4) to examine the one-year and three-year event windows, *ΔBSI* is positive and significant at the 0.10 level, respectively (one-tailed test). When examining the one-year and three-year event windows using Eq. (5), we find that the change in the BSI is significant at the 0.10 level (one-tailed test) for small firms with weak initial corporate governance; however, our results become insignificant for the three-year event window following the passage of SOX.

[15] We additionally examine Eq. (5) using BHARs calculated over the 26 month period beginning in June 2002 and the 25 month period beginning in July 2002. Results are qualitatively similar to those presented in Table 5.

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Table 4
Regression of sample firms' long-run buy-and-hold abnormal returns for two-year sample period on changes in the Board Structure Index grouped by beginning size and BSI over the same period.

Variable	Predicted sign	Dependent variable: *BHAR*	
		Coefficient	t-Stat[a]
Panel A: Regression results			
Intercept	?	−1.923	−4.29***
ΔBSI	+	0.062	1.79**
*ΔBSI * Governance*	−	−0.058	−1.45*
*ΔBSI * Large*	−	−0.062	−1.56*
*ΔBSI * Governance * Large*	−	0.068	1.48
ΔROE	+	0.098	1.23
ΔSales	+	0.704	2.89***
ΔAudit	−	−0.043	−0.55
BMV	+	0.639	2.42***
Log_MVE	+	0.164	4.95***
Big4	+	0.314	2.35***
Restate	−	0.159	1.54
Governance	?	0.089	1.06
Large	?	−0.105	−1.16
*Governance * Large*	?	−0.160	−1.43
n	1152		
F statistic	3.53		
Prob. > F	<0.001		
R^2	22.08%		

Panel B: Cumulative effect of a change in BSI for each beginning size/BSI sub-group and the corresponding joint test of hypotheses.

Sub-group	Predicted sign	Coefficient	F-stat
Small/weak(β_1)	+	0.062	3.21**
small/strong($\beta_1 + \beta_2$)	+	0.004	0.05
Large/weak($\beta_1 + \beta_3$)	+	0.001	0.00
Large/strong($\beta_1 + \beta_2 + \beta_3 + \beta_4$)	+	0.011	0.71

*,**,*** Significant at the .1, .05, and .01 levels, respectively, based on one-tailed tests for variables that we predict an expected difference and two-tailed tests for variables that we do not predict an expected difference.

[a] Indicates robust standard errors used to correct for problems with heteroskedasticity.

Table 5
Regression of sample firms' long-run buy-and-hold abnormal returns for two-year sample period on alternative measures of the change in the Board Structure Index grouped by beginning assets and BSI over the same period.

Variable	Predicted sign	Dependent variable: *BHAR Alt_BSI*:		
		Pct_ΔBSI coefficient[a]	*Wt_ΔBSI* coefficient[a]	*ΔBSI_Decile* coefficient[a]
Panel A: Regression results				
Intercept	?	−1.928***	−1.873***	−1.832***
ΔAlt_BSI	+	0.376**	0.389**	0.043**
*ΔAlt_BSI * Governance*	−	−0.316	−0.319*	−0.034*
*ΔAlt_BSI * Large*	−	−0.417**	−0.219*	0.025*
*ΔAlt_BSI * Governance * Large*	−	0.453	−0.066	0.008
ΔROE	+	0.098	0.098	0.099
ΔSales	+	0.697***	0.706***	0.701***
ΔAudit	−	−0.043	−0.045	−0.048
BMV	+	0.640***	0.644***	0.645***
Size	+	0.163***	0.167***	0.168***
Big4	+	0.333***	0.315***	0.307**
Restate	−	0.162	0.169	0.169
Governance	?	0.077	0.011	−0.030
Large	?	−0.099	−0.269***	−0.270***
*Governance * Large*	?	−0.165	0.001	0.018
n		1152	1152	1152
F statistic		3.44	3.18	3.21
Prob. > F,		<0.001	<0.001	<0.001
R^2		22.18%	21.89%	21.99%

Panel B: Cumulative effect of a change in BSI for each beginning asset/BSI sub-group and alternative measure of the change in BSI.

Sub-group	Predicted sign	*Alt_BSI*:		
		Pct_ΔBSI coefficient[a]	*Wt_ΔBSI* coefficient[a]	*ΔBSI_Decile* coefficient[a]
Small/weak(β_1)	+	0.376**	0.389**	0.043**
Small/strong($\beta_1 + \beta_2$)	+	0.060	0.069	0.009
Large/weak($\beta 1 + \beta_3$)	+	−0.041	0.170	0.018
Large/strong ($\beta_1 + \beta_2 + \beta_3 + \beta_4$)	+	0.096	0.084	−0.008

*,**,*** Significant at the .1, .05, and .01 levels, respectively, based on one-tailed tests for variables that we predict an expected difference and two-tailed tests for variables that we do not predict an expected difference.

[a] Indicates robust standard errors used to correct for problems with heteroskedasticity.

and Nasdaq followed by revising their respective listing standards. These measures, which initiated changes in governance structures, were designed to improve the board of directors' ability to monitor management and, thereby, protect investors from similar corporate failures. However, increasing expenditures on the monitoring mechanism, in addition to other SOX-related expenses, imposed a significant financial burden on many firms, especially smaller firms (Ahmed et al., 2010).

To determine whether firms realized net benefits from investing in the board of directors, we use the Board Analyst database to construct a composite measure of board structure (BSI) and test whether economic benefits accrue to firms that increase their BSI. We find that BSI improvements result in economically significant abnormal returns accruing to those firms in our sample with weak initial board structures and fewer total assets, while no such relation is found for other categories of firms partitioned on these measures. These results suggest that smaller, weakly-governed firms may have indeed failed to sufficiently invest in the board of directors, and, as a result, the benefits derived from improved monitoring are greater than the costs of making additional investments in the board. For other firms, however, investors do not view these changes to the monitoring mechanism as either providing net realizable benefits or imposing net realizable costs.

Our study's limitations include using a composite measure of board structure. Our index not only equally weights each component, thus masking its relative importance, but also may have omitted certain important board-structure measures that may be significantly related to our dependent variable. Finally, the use of buy-and-hold abnormal returns presents some econometric and interpretational issues.

Future research might further investigate the benefits of public policy changes that lead to changes in board structure. A better understanding of this relation could result in more efficient market mechanisms and better policy design. In addition, those firms that improve board structure to become minimally compliant with newly implemented policies may prove to be interesting subjects for future studies.

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Appendix A

Calculation of Board Structure Index for Coca-Cola (KO) for 2002.

Director Independence	Y/N	Decile	Points	
%independent directors		5	0.5	
AC independent	N		0	
CC independent	Y		1	
NC independent	N		0	
Total				1.5
Power structure				
Non-executive chairman	N		0	
CEO is	Y		0	
Independent AC chairman	Y		1	
Independent CC chairman	y		1	
Independent NC chairman	N		0	
Total				2.0
Ability to shrink				
Classified	Y		0	
Board size		10	0.1	
%directors with no stock		7	0.4	
Governance policy	N		0	
%owned by institutional owner		4	0.4	
AC size 3 or more	Y		1	
CC size 3 or more	Y		1	
NC size 3 or more	Y		1	
Total				3.9
Board Structure Index				7.4

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