

## **LARGE CHANGES IN BOARD SIZE, CORPORATE GOVERNANCE AND FIRM VALUE**

**Yixi Ning\***, **Massoud Metghalchi\*\***, **Jonathan Du\*\*\***

### **Abstract**

We find that substantial changes in board size, either an increase or a decrease of three or more directors at one time, are permanent movements rather than temporary changes, but the large changes are followed by small reversal in the subsequent years. Empirical evidence shows that all types of directors (inside, affiliated, and independent) are strongly affected by board size expansions (or reductions). Large changes in board size provide a good opportunity for a firm to optimize its board structure by increasing board independence and retiring elder directors. Further analysis indicates that such substantial changes in board size are associated with more frequent board meetings, a higher likelihood of CEO transitions, and firm size expansions. However, we find no evidence that large decreases (or increases) in board size add (or destroy) firm value for shareholders in the long run.

**Keywords:** Board Size; Corporate Governance; Firm Value

*\*(Contact Author), School of Business Administration, University of Houston-Victoria, Sugar Land, TX 77479  
ningy@uhv.edu*

*\*\*School of Business Administration, University of Houston-Victoria, Sugar Land, TX 77479, metghalchim@uhv.edu*

*\*\*\*School of Business Administration, University of Houston-Victoria, Sugar Land, TX 77479  
duj@uhv.edu*

### **1. Introduction**

The corporate scandals in the past years have generated considerable debates about boards of directors and corporate governance. A firm's board of directors can help overcome agency problems arising from the separation of ownership and control through hiring, monitoring, firing, and setting appropriate compensation for top management (Jensen, 1993). The structure of a board of directors is, in part, determined by board independence and board size.<sup>20</sup>

The findings from prior studies are mixed regarding the relation between firm value and board size. Some finance studies find evidence consistent with the agency theory that a small board is related to better firm performance (e.g., Yermack, 1996; Gertner & Kaplan, 1996; Eisenberg, Sundgren, & Wells, 1998; Denis & Sarin, 1999). Under the consideration of coordination costs and free rider problems associated a large board, shareholders generally favor a smaller

board and, therefore, pressure companies to reduce board size (Gertner & Kaplan, 1996; Wu, 2000). Some management studies, however, have found a large board to be better for a firm (e.g., Gales & Kesner, 1994; Dalton, Daily, Johnson, & Ellstrand, 1999), which is consistent with resource dependency theory. The theory posits that a large board can provide access to more resources than can a small board. Thus, the theory provides a positive relation between board size and firm performance (e.g., Boyed, 1990; Dalton et al., 1999).

While the relation between board size and firm value has been examined extensively, few studies have explored the impact of large changes of board size on corporate governance and firm value. Yermack (1996) explores company stock return around the announcement dates of ten cases of large changes of board size and finds a positive abnormal return for five of six announcements of board-size reductions and negative returns for all four announcements of board-size expansions. The event study results support the notion that investors favor reductions in board size and react unfavorably to board expansions. But the paper analyzes only ten cases and does not examine the long-term effects of large board size changes on corporate governance systems and firm values. Denis and Sarin (1999) indicate that large changes in board structure result from the changes in business conditions and corporate restructurings. They define large changes in board size as either an increase or a decrease of at least three

<sup>20</sup> A number papers have demonstrated the role of independent directors in protecting shareholders' wealth (e.g., Weisbach, 1988; Rosenstein & Wyatt, 1990; Cotter, Shivdasani, & Zenner, 1997; Mayers, Shivdasani, & Smith, 1997; Tufano & Sevick, 1997). Other studies have focused on the relation between board size and firm performance (e.g., Lipton & Lorsch, 1992; Jensen, 1993; Yermack, 1996; Eisenberg, Sundren, & Wells, 1998; Dalton, Daily, Johnson, & Ellstrand, 1999; Ning, Davidson, & Zhong, 2007; Coles, Daniel, and Naveen, 2008).

directors at one time. They present evidence that most publicly-traded companies show only minor changes in board size from year to year, but large changes in board size are not unusual for U.S. listed firms.

Our study employs a sample of randomly-selected CRSP-listed firms with large changes in board size over the period from 1988 to 1999 to examine the long-term stability of board size following the initial movements. We also explore the following research questions in the study: what factors have caused the substantial changes in board size? How do the large size changes affect a company's board structure? How about the relationship between large changes of board size and firm value?

Consistent with Denis and Sarin (1999), we find significant evidence that large changes in board size are permanent rather than temporary changes. However, we find some evidence of a small reversal following large board size decreases and a significant reversal after large board size expansions, which is different from their findings.

Our study of the effect of large board size expansions or reductions on board structure, CEO characteristics, ownership structure, and firm characteristics provides strong evidence that all types of directors, including insiders, affiliated directors, and independent directors, are affected by substantial board size changes. Evidence shows that large board size changes, either increases or decreases, provide an excellent opportunity for a firm to optimize its board structure through increasing board independence and retiring the directors who are 62 or older. We also find that large changes in board size are closely related to a greater likelihood of CEO successions, the presence of a new CEO, and large increases in total assets.

Finally, we investigate short-term and long-term impact of large board size changes on firm value and firm performance. After examining nine years' Tobin's Q values from three years before the large changes (Year -3) to five years after the changes (Year 5), we find no evidence that large decreases (or large increases) in board size add (or destroy) firm value. Further robustness tests using various financial performance ratios (e.g., return on assets, sales over assets, and return on sales) obtain a similar conclusion, suggesting that firms may be motivated by more than just firm-value maximization when selecting board size due to the trade-off between costs and benefits associated with small and large boards (Ning, Davidson, & Wang 2007).

Our paper differs from prior studies in several significant ways. First, we employ a large number of randomly-selected CRSP listed firms over a period from 1988 to 1999 to examine the stability of board size following large changes, and we find that large changes are permanent, but followed by small reversals in the subsequent years. Second, we examine the changes of board, CEO, ownership, and firm-specific variables around the large board size

changes, which have not been explored in prior studies. Finally, we document the long-run impact of large board size change on the firm value measured by Tobin's Q and firm performance measured by various financial ratios.

We structure the paper into five sections. In section 2, we review previous studies and develop testable hypotheses. In Section 3, we present data and sample selections. Then we conduct empirical analysis of board size changes on corporate governance variables and firm value in Section 4. The summary and conclusions are in Section 5.

## **2. Literature Review**

### **2.1. The Stability of Board Size Following Large Changes**

Large changes in board size and board structure are often caused by a firm's large scale changes in ownership structure, CEO transitions, mergers and acquisitions, large scale restructurings of the firm's assets, or fundamental changes in business conditions (Yermack, 1996; Denis & Sarin, 1999); therefore, these large board size changes are expected to be permanent rather than temporary. Denis and Sarin (1999) document that many firms exhibit large changes in board size and these large changes are permanent movements rather than temporary changes. But most firms show only small changes in board size from year to year. Because large changes in board size are caused by the company's fundamental changes, our study will explore whether the large changes finally reverse during three years after the initial expansions or reductions and hypothesize:

*H<sub>1</sub>: Large changes, either large increases or large decreases, in board size are permanent movements rather than temporary changes.*

### **2.2. The Causes of Large Changes in Board Size**

Large changes in board size and board structure are often caused by a firm's large scale changes in ownership structure, CEO transitions, mergers and acquisitions, large scale restructurings of the firm's assets, or fundamental changes in business conditions (Yermack, 1996; Denis & Sarin, 1999)

*H<sub>2</sub>: Large changes in board size is caused by the company's fundamental changes, such as CEO succession and assets expansions.*

### **2.3. Large Changes in Board Size on Corporate Governance**

Many studies have documented that board of directors and other corporate governance variables are jointly determined. The variables that affect board characteristics are likely to be affected by these board variables simultaneously (Bhagat & Jefferis, 2002; Hermalin & Weisbach, 2003). Denis and Sarin (1999) present evidence that board size, board composition,

and inside ownership are endogenously determined. Yermack (1996) also documents that the proportion of outside directors is likely to be positively correlated with board size.

Firm-specific characteristics and other corporate governance (e.g., board, CEO, and ownership structure) have also been found to be closely related to board size (e.g., Gertner & Kaplan, 1996; Wu, 2000; Hermalin & Weisbach, 2003; Bakers & Gompers, 2003; Lehn, Patro, and Zhao, 2006; Ning, Davidson, & Zhong, 2007; Boone, Field, Karpoff, and Raheja, 2007; Linck, Netter, and Yang, 2008). Based on these findings, we argue that large movements in a firm's board size are related to significant changes in the firm's board structure, CEO characteristics, and ownership structure. Large changes in board size, either large increases or large decreases, provide a good opportunity for a firm to change its board size toward the target size zone.

We, therefore, hypothesize:

*H<sub>3</sub>: Large changes in board size provide a good opportunity for a firm to optimize its board through increasing the percentage of independent directors and retiring older directors.*

#### **2.4. Large Changes in Board Size on Firm Value**

Empirical findings are mixed regarding the relation between firm value and board size. While many finance studies provide evidence to support the agency theory that a small board is related to a higher firm value or better firm performance (e.g., Yermack, 1996; Gertner & Kaplan, 1996; Eisenberg, Sundgren, & Wells, 1998; Denis & Sarin, 1999), some management studies have found a large board to be better (e.g., Gales & Kesner, 1994; Dalton, Daily, Johnson, & Ellstrand, 1999), which seems consistent with resource dependency theory.

Lipton and Lorsch (1992) and Jensen (1993) argue that large boards can be costly. . When board size increases, agency problems in the boardroom increase simultaneously, and lead to more director free-riding problems, more coordination and communication problems, and more internal conflicts among directors (Eisenberg et al., 1998). What's more, a larger board is more likely to be controlled by the CEO and less likely for the board to control management, which leads to greater agency problems and costs. Empirical research has found consistent results supporting statistical inverse board size - firm value association. For example, Yermack (1996) employs a sample of large US publicly- traded firms from *Forbes 500* and finds a consistent and inverse association between firm value measured by Tobin's Q and the number of directors on the board. The inverse association holds even after controlling for firm size, growth opportunities, market performance, business diversification, board composition, and ownership structure. Eisenberg et al. (1998) further test the board-size effects on a sample of 879 midsize

and small Finnish firms. They confirm the findings of Yermack (1996) and find a consistent and negative correlation between board size and firm performance. Their findings are supported by a handful of studies (Zahra & Stanton, 1988; Walsh & Seward, 1990; Firstenberg & Malkiel, 1994; Daily & Dalton, 1994a, 1994b; Tufano & Sevick, 1997; Dann, Guercio, & Partch, 2000; Ning, Davidson, & Wang, 2007).

However, Resource dependency theory suggests that companies are better off with large boards. Each new board member brings both expertise and access to resources. Having more board members would provide the firm with greater expertise and greater access to resources, including access to markets, new and better technologies, and more external contacts. On the other hand, large boards are more likely to have directors with greater diversity in education and industry experience. This diversity allows the board members to provide management with high-quality advice (Zahra & Pearce, 1989). The resource dependency theory is supported by a number of management studies (Pfeffer, 1973; Chaganti, Mahajan, & Sharma, 1985; Booth & Deli, 1996; Dalton, Daily, Johnson, & Ellstrand, 1999).

We, therefore, hypothesize:

*H<sub>4</sub>: Large changes in board size add firm value in the long run.*

### **3. Data and Sample Selections**

Our sample period is from January 1, 1988 to December 31, 1999.<sup>21</sup> First, we identify all NYSE, NASDAQ, and AMEX firms that are listed in the Center for Research in Security Prices (CRSP) data files at the beginning of 1988. There are 7,086 of these firms. Second, we randomly choose 2,000 firms from the list. To make sure that there is at least one year of board data for each firm, we first delete the 209 firms that disappear from CRSP during the first year of the analysis (1988). From the remaining 1,791 firms, we proportionally select 26.5% of firms from each surviving-year category to construct the final sample. For example, in the 1,791 remaining firms, there are 164 firms that survive for only one or two years. We keep 26.5% of the 164 firms (43 firms) in our final sample. Similarly, there are 129 firms that survived for only two or three years, and we select the same proportion of the 129 firms (34 firms) for the final sample. We include these 34 firms for both years 1 and 2. We repeat the selection process for all other year categories. By keeping the surviving information

<sup>21</sup> There were a number of corporate governance failures in 2000 and later years, followed by the passage of the Sarbanes-Oxley Act (SOX) in 2002. The Sarbanes-Oxley act expanded SEC authority and requires companies to have audit committees to be comprised of independent directors with a member having financial expertise among other provisions. The stock exchanges have also issued new rules in order to reduce the previous free-market determination of corporate governance system. Therefore, we restrict the sample in this study to a period ending December 31, 1999.

of the panel of firms in each year category during the sample period from 1988 to 1999, we avoid survivorship bias. We obtain a sample of 473 U.S. publicly traded firms in the first year. This number decreases each year; only 208 firms survived over the entire 12-years period (see Exhibit 1). There are a total of 3,858 firm-years in the sample. We obtain approximately 3,550 firm-years' proxy statements filed with the Securities and Exchange Commission from Lexis-Nexis and Q-files.

Following Denis and Sarin (1999), we define large changes in board size as either an increase or a decrease of at least three directors at one time.<sup>22</sup> With this selection procedure, we finally identify a total of 88 large changes in board size over the 12-year sample period from 1988 to 1999. Among these 88 large changes, 33 are large increases of at least three directors at one time, and 55 are large decreases of three or more members at one time. The frequency distribution of the sample is shown in Table 1.

----- Insert Table 1 about Here -----

We obtained ownership, board of directors, and CEO data from the annual proxy statement. We categorize directors in the traditional manner as insiders, affiliated, and independent directors (Baysinger & Butler, 1985). Insiders are currently employees of the firms. Affiliated directors are identified as those that have substantial business relations with the firm, are related to insiders, or are former employees. For those who are neither insiders nor affiliated directors, we label independent directors. Finally, we obtain financial data from the COMPUSTAT database.

## 4. Empirical Results

### 4.1. The Permanence of Large Changes in Board Size

We explore the permanence of large changes in board size by examining whether large changes in board size are persistent following the changes. We track these firms for three years after the initial movements to observe whether the large changes in board size finally reverse during the period. The mean and median values of board size from the year prior to large changes in board size (Year -1) through the third year following the year of large changes (Year +3) are given in Table 2.

----- Insert Table 2 about Here -----

Figure 1 plots the mean and median values of board size over the five years from the Year -1 to Year +5..

<sup>22</sup>An alternative way to measure large changes in board is the percentage change in board size. We conduct robustness checks by defining large changes in board size as either an increase or decrease at least 25% of directors at one time, and we obtain quantitatively similar results.

----- Insert Figure 1 about Here -----

Both Table 2 and Figure 1 show that large changes in board size persist through year +3, supporting our expectation that large changes in board size are persistent movements rather than temporary changes. For the sample of firms with large expansions in board size, the mean differences are significantly positive between Year 0 and Year -1 ( $t = 9.59$ , significant at 0.001 level), Year +1 and Year -1 ( $t = 9.09$ , significant at 0.001 level), Year +2 and Year -1 ( $t = 5.61$ , significant at 0.001 level), as well as Year +3 and Year -1 ( $t = 4.58$ , significant at 0.001 level). We obtain similar findings for the firms with large board size reductions, the mean differences are significantly negative between Year 0 and Year -1 ( $t = -23.37$ , significant at 0.001 level), Year +1 and Year -1 ( $t = -11.54$ , significant at 0.001 level), Year +2 and Year -1 ( $t = -9.16$ , significant at 0.001 level), as well as Year +3 and Year -1 ( $t = -8.10$ , significant at 0.001 level). These findings strongly support the notion that large changes in corporate boards are permanent movements.

However, we also find evidence of a small reversal following large board size movements, especially for the firms with large expansions in board size, which is not consistent with Denis and Sarin (1999). They identified 129 large changes in board size from 1983 to 1992, but didn't find any median reversal following the large changes. We find that for firms with large increases in board size, the mean (median) value of board size was 10.82 (10) in Year -1 prior to the large changes. The board size dramatically increased to 15.03 (14) in Year 0, then partly reversed to 13.69 (12.5) in Year +1, 12.52 (12) in Year +2, and 12.89 (12) in Year +3. The  $t$  tests of mean board size reversal following the large board size expansions are significant at 0.01 or higher levels ( $t = -2.91, -4.73, -3.94$ , respectively). For firms with large decreases in board size, the mean (median) value of board size was 15.21 (15) in Year -1 prior to the large changes. The board size dramatically decreased to 11.61 (11) in Year 0, and 11.43 (10) in Year +1, then partly reversed to 12.31 (12) in Year +2, and 11.97 (12) in Year +3. The median number of directors for firms with either large increases or large reductions of board size in Year +2 and Year +3 is finally reversed to 12. But the  $t$  tests of mean board size reversal following large board size reductions are insignificant statistically.

### 4.2. Large Changes in Board Size on Board Structure and CEO Characteristics

To examine the influences of large board size changes on board structure and CEO characteristics, we compare the board and CEO variables before and after the large changes. The results are given in Table 3.

----- Insert Table 3 about Here -----

Panel A shows the impact of large board size movements on board structure. For the firms with large increases in board size, the average number of directors in all three categories increases significantly: inside directors ( $t=3.93$ , significant at 0.001 level); affiliated directors ( $t=1.78$ , significant at 0.1 level); and independent directors ( $t = 6.09$ , significant at 0.001 level). We find that only the proportion of independent directors increases from 67.03% in Year -1 to 68.73% after the change. The proportions of inside and affiliated directors on the board decrease, though the decreases are insignificant statistically ( $t=-1.04$  and  $-0.28$ , respectively). We obtain similar results for the firms with large board size reductions. The average number of inside directors, affiliated directors, and independent directors decrease simultaneously and significantly ( $t= -4.26$ ,  $-3.47$ , and  $-10.11$ , significant at 0.01 or higher levels). Although the number of independent directors decreases because of board size reductions, the proportion of independent directors on the board increases from 66.66% to 68.15% after large board size reductions. These findings suggest that when a firm expands or shrinks the size of its board, all types of directors will be affected, but board composition based on proportion criteria will not be affected significantly from a statistical perspective. On the other hand, large changes in board size, either expansions or reductions, offer the firm a good opportunity to make its board more independent, given the belief that independent directors are more likely to protect shareholder wealth and maximize firm value (Weisbach, 1988; Rosenstein & Wyatt, 1990; Cotter, Shivdasani, & Zenner, 1997; Mayers, Shivdasani, & Smith, 1997; Tufano & Sevick, 1997).

The t test results in Table 3 also show that companies intend to use the chance of large board size changes to retire directors over 62 years old. The percent of directors 62 years old or older decreases substantially either on the boards with large expansions in size ( $t=-3.17$ , significant at 0.01 level), or on the boards with large reductions in size ( $t=-1.81$ , significant at 0.10 level). This finding together with the changes of board independence support the notion that large changes in board size is a good chance for a company to improve its board structure through increasing board independence and adding more younger board members. There is also some evidence that changed boards meet more frequently ( $t=1.90$ , significant at 0.10 level) and construct more board committees ( $t=1.72$ , significant at 0.10 level), indicating that boards are more active after large board size restructures.

Panel B in table 3 shows some interesting findings regarding CEO characteristics. First, we find significant evidence that large changes in board size are associated with a higher level of CEO successions ( $t=1.98$ , significant at 0.10 level). The presence of a new CEO whose tenure is less than 3 years is also substantially higher following large board size expansions ( $t=1.98$ , significant at 0.10 level) and

reductions ( $t=2.18$ , significant at 0.10 level). Second, we find that the probability of a CEO holding the board chairman position (CEO duality) decreases when a board expands its size ( $t=-1.68$ , significant at 0.10 level), but increases when a board shrinks size ( $t =1.53$ ). However, we find no significant changes in CEO age, CEO ownership, CEO being a founder, and CEO involved in director selections around large movements in board size.

#### **4.3. Ownership and Firm Characteristics around Large Changes in Board Size**

We further explore a firm's ownership structure and firm-specific characteristics around the large expansions or reductions of board size, and show the results in Table 4.

----- *Insert Table 4 about Here* -----

We find that a firm with a higher inside ownership held by all directors and officers as a group (16.84%) is more likely to expand its board, and the board expansions further increase the inside ownership to 18.21% ( $t = 1.00$ , insignificant). On the other hand, a firm with a lower inside ownership (10.92%) is more likely to shrink its board, and the board size decreases further reduce the ownership to 10.02% ( $t = -1.71$ , significant at 0.10 level). Second, we find that a large movement in a firm's board size is generally associated with the company's large increases in total assets ( $t=2.24$  and  $1.14$ , respectively). However, we do not observe any significant changes in blockholdings, return on assets, market to book ratio, stock return, financial leverage (debt ratio), and capital expenditure (property, plant, and equipment to total assets) that can be closely related to the substantial board size changes.

#### **4.4. Large Changes in Board Size on Firm Value**

While a number of prior studies have documented an inverse board size - firm value association (e.g., Yermack, 1996; Gertner & Kaplan, 1996; Eisenberg, Sundgren, & Wells, 1998; Denis & Sarin, 1999), little research has been done regarding the short-run and long-run effects of large board size movements on firm value and firm performance. Our study intends to fill this gap. Following Yermack (1996), we use Tobin's Q<sup>23</sup> to measure firm value and report the mean and median values of Tobin's Q three years prior to and five years following the large changes in board size (from Year -3 to Year +5) in Table 5.

<sup>23</sup> Tobin's Q is calculated based on Chung and Pruitt (1994). We calculate Tobin's Q as the sum of the market value of equity and the book value of debt divided by the book value of assets. The book value of debt is the difference between the book value of assets and the book value of equity.

----- Insert Table 5 about Here -----

We further plot the mean and median values of board size over nine years around large board size changes in Figure 2.

----- Insert Figure 2 about Here -----

Both the results in Table 5 and Figure 2 indicate that firm value does not improve substantially following large board structure changes. We employ Wilcoxon Sign test of Tobin's Q values for five selected years, Year 0 vs. Year -3, Year 0 vs. Year -1, Year +1 vs. Year -1, Year +3 vs. Year -1, and Year +3 vs. Year -1, and find no significant evidence that firm value changes following large board expansions or reductions. The one-way ANOVA test of Tobin's Q across all nine years from Year -3 to Year +5 provides further evidence that both large decreases and increases in board size impose an insignificant impact on the value of the firm.

Additionally, we follow Yermack (1996) to use three additional financial variables (return on assets, sales over assets, and return on sales) to measure firm performance to conduct a robustness test of the results. Similarly, no significant evidence has been found that these financial ratios are significantly improved following large board size movements. This may provide some evidence supporting Ning, Davidson, and Wang (2007), who argue that firms are motivated by more than just firm-value maximization when selecting board size given the trade-off of the likely costs and benefits associated with small and large boards. A firm tends to adjust its board size to the target board size zone which is influenced by various industry and firm characteristics.

## 5. Conclusions

Several studies have been done regarding the statistical inverse relation of firm value and the number of directors on the firm's board (Yermack, 1996; Gertner & Kaplan, 1996; Eisenberg, Sundgren, & Wells, 1998; Denis & Sarin, 1999; Ning, Davidson, & Wang, 2007), but few studies investigate the impact of large changes in board size, defined as an increase or decrease at least three directors at one time, on the firm's board composition, CEO characteristics, ownership structure, firm characteristics, and firm value. Our study intends to fill this void using a randomly-selected sample of 88 companies with large changes of board size from 1988 to 1999 to explore the issue.

First, we find strong evidence that large changes in board size are persistent movements rather than temporary changes, which is consistent with Denis and Sarin (1999). However, we also find evidence of small reversals following large board size decreases and significant reversal after large increases in board size, which is different from their findings.

Second, we explore the changes of board structure, CEO, ownership, and firm characteristics around large board size changes, and find strong evidence that the number of directors of all types (inside, affiliated, and independent) moves in the same direction as the movements of board size. Large board size changes provide a good opportunity for a firm to improve its board structure through increasing board independence and make board members younger. Empirical evidence also shows that large changes in board size are associated with more board meetings and committees, a greater probability of CEO turnovers, the higher presence of a new CEO whose tenure is less than 3 years, and large increases in total assets. These findings provide further evidence supporting Yermack (1996) and Denis and Sarin (1999). They argue that large changes in board size often result from a firm's fundamental changes in business conditions, large changes in ownership structure, CEO transitions, or assets restructurings.

Finally, we delve into the issue of short-term and long-term effects of large changes of board size on firm value and firm performance. After examining nine years' Tobin's Q values from Year -3 to Year 5, we conclude that both large decreases and large increases in board size do not seem to add (or destroy) firm value measured by Tobin's Q. Further analysis of three financial ratios (return on assets, sales over assets, and return on sales) draw a similar conclusion. Firms may be motivated by more than just firm value-maximization when selecting board size. They consider the trade-off of benefits and costs associated with large boards (Ning, Davidson, & Wang, 2007). They have incentives to move their board size towards an optimal board size zone over time.

## References

1. Baker, M., and P. Gompers, 2003. The determinants of board structure and function at the initial public offering. *Journal of Law and Economics*, 46: 569-598.
2. Baysinger, B., and H. Butler, 1985. Corporate Governance and Board of Directors: Performance Effects of Changes in Board Composition. *Journal of Law, Economics, and Organization* 1: 101-124.
3. Bhagat, S., and R. Jefferies, 2002, *The Econometrics of Corporate Governance Studies*, MIT press, Boston.
4. Boone, A., L. Field, J. Karpoff, and C. Raheja, 2007. The determinants of corporate board size and composition: an empirical analysis. *Journal of Financial Economics* 85(1): 66-101.
5. Booth, J., and D. Deli, 1996. Factors affecting the number of outside directorships held by CEOs. *Journal of Financial Economics* 40: 81-104.
6. Boyed, B., 1990. Corporate linkages and organizational environment: a test of the resource dependence model, *Strategic Management Journal* 11: 419-430.
7. Chaganti, R., V. Mahajan, and S. Sharma, 1985. Corporate board size, composition, and corporate failings in retailing industry. *Journal of Management Studies* 22: 400-416.

8. Chung Kee H., and Stephen Pruitt, 1994. A simple approximation of Tobin's Q. *Financial Management* 23: 70-75.
9. Coles, J., N. Daniel, and L. Naveen, 2008. Boards: does one size fit all? *Journal of Financial Economics* 87(2): 329-356.
10. Cotter, J., A. Shivdasani, and M. Zenner, 1997. Do Independent Directors Enhance Target Shareholder Wealth During Tender Offers? *Journal of Financial Economics* 43: 195-218.
11. Daily, C., and D. Dalton, 1994a. Bankruptcy and corporate governance: the impact of board composition and structure. *Academy of Management Journal* 37: 1603-1617.
12. Daily, C., and D. Dalton, 1994b. Corporate governance and the bankrupt firm: an empirical assessment. *Strategic Management Journal* 15: 643-654.
13. Dalton, D., C. Daily, J. Johnson, and A. Ellstrand, 1999. Number of directors and financial performance: a meta analysis. *Academy of Management Journal* 42(6): 674-686.
14. Dann, L., D. Guercio, and M. Partch, 2000. Governance and boards of directors in closed-end investment companies. Working Paper, University of Oregon.
15. Denis, D., and A. Sarin, 1999. Ownership and Board Structures in Publicly Traded Corporations. *Journal of Financial Economics* 52: 187-224.
16. Eisenberg, T., S. Sundren, and M. Wells, 1998. Larger Board Size and Decreasing Firm Value in Small Firms. *Journal of Financial Economics*. 48:35-54.
17. Firstenberg, P., and B. Malkiel, 1994. The twenty-first century boardroom: who will be in charge? *Sloan Management Review* 36(1): 27-35.
18. Gales, L., and I. Kesner, 1994. An Analysis of the Board of Director Size and Composition in Bankrupt Organizations. *Journal of Business Research* 30(3): 271-282.
19. Gertner, R., and S. Kaplan, 1996. The Value-Maximizing Board. University of Chicago Working Paper.
20. Hermalin, B., and M. Weisbach, 2003. Boards of Directors as An Endogenously Determined Institutions: A Survey of the Economic Literature. *FRBNY Economic Policy Review*. 7-26.
21. Jensen, M. C., 1993. The Model Industrial Revolution, Exit, and The Failure of Internal Control Systems. *Journal of Finance*. 48:831-80.
22. Lehn, K., and S. Patro, and M. Zhao, 2006. Determinants of the size and structure of corporate boards: 1935-2000. *University of Pittsburgh working paper*.
23. Linck, J., J. Netter., and T. Yang, 2008. The Determinants of Board Structure. *Journal of Financial Economics* 87(2): 308-328.
24. Lipton, M., and J. Lorsch, 1992. A Modest Proposal for Improved Corporate Governance. *Business Lawyer*. 48(1): 59-67
25. Mayers, D., A. Shivdasani, and C. Smith, 1997. Board Composition and Corporate Control, Evidence from the Insurance Industry. *Journal of Business* 70: 33-62.
26. Ning, Y., W. Davidson, and J. Wang, 2007. Does Optimal Corporate Board Size Exist? An Empirical Analysis, University of Houston-Victoria Working Paper.
27. Ning, Y., W. Davidson, and K. Zhong, 2007. The Variability of Board Size Determinants: An Empirical Analysis. *Journal of Applied Finance*, Forthcoming
28. Pfeffer, J. 1973. Size, composition, and function of hospital boards of directors: the organization and its environment. *Administrative Science Quarterly* 18: 349-364.
29. Rosenstein, S., and J. Wyatt, 1990. Outside Directors, Board Independence, and Shareholder Wealth. *Journal of Financial Economics* 26: 175-184.
30. Shivdasani, A., and D. Yermack, 1999. CEO Involvement in the Selection of New Board Memebers: A Empirical Analysis. *Journal of Finance* 54: 1829-1854.
31. Tufano, P., and M. Sevick, 1997. Board Structure and Fee-Setting in the US Mutual Fund Industry. *Journal of Financial Economics* 46: 321-356.
32. Walsh, J., and J. Seward, 1990. On the efficiency of internal and external corporate control mechanisms. *Academy of Management Review* 15(3): 421-458.
33. Weisbach, M., 1988. Outside Directors and CEO Turnover. *Journal of Financial Economics* 20: 431-460.
34. Wu, Y., 2000. Honey, I Shrunk the Board. University of Chicago Working Paper
35. Yermack, D., 1996. Higher Market Valuation of Companies With a Small Board of Directors. *Journal of Financial Economics* 40:185-211.
36. Zahra, S., and J. Pearce, 1989. Boards of directors and corporate financial performance: a review and integrative model. *Journal of Management* 15: 291-334.

Figure 1: The Permanence of Large Changes in Board Size

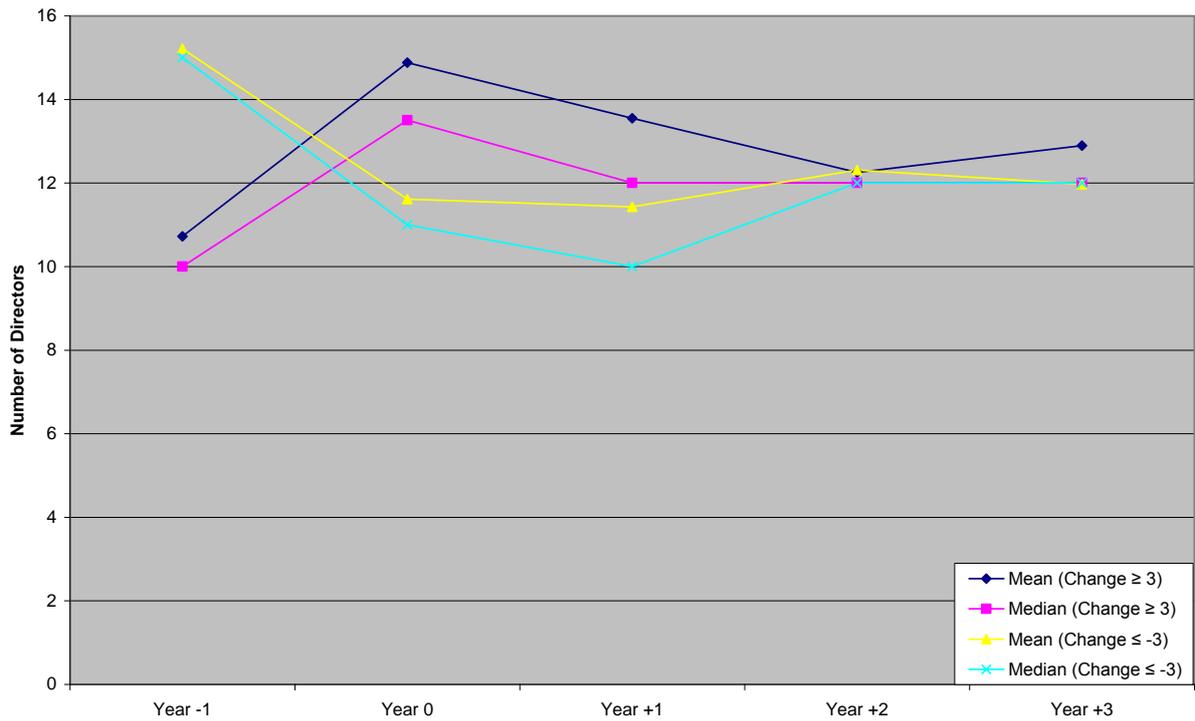
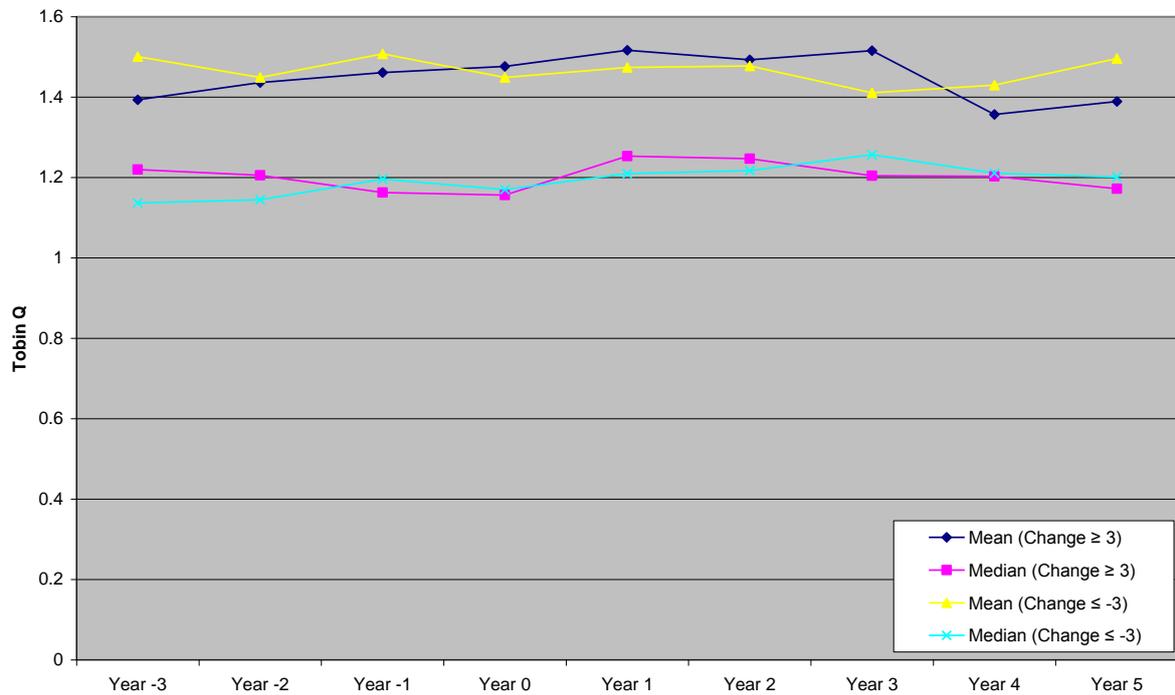


Figure 2: The Effects of Large Changes in Board Size on Firm Value



**Table 1.** Yearly Distribution of Large Changes in Board Size from 1988~1999

We first identify all CRSP-listed firms on January 1, 1988, and obtain a total of 7086 firms. Second, we randomly choose 2000 firms from this list. To make sure at there is at least one-year of board data for each firm, we delete the 209 firms that disappeared from CRSP in 1988. Then from the remaining 1791 firms, we proportionally select 26.5% of firms from each surviving-year category to construct the sample. The sample consists of 3858 firm-years over a 12-year period from 1988 to 1999. Following Denis and Sarin (1999), we define large changes in board size as either an increase or a decrease of at least three directors at one time, and identify a final sample of 88 firms with large changes in board size at one time.

Period	# of firms with large increase in board size	# of firms with large decreases in board size	Total
1988 ~ 1989	4	5	9
1989 ~ 1990	8	6	14
1990 ~ 1991	3	8	11
1991 ~ 1992	2	4	6
1992 ~ 1993	4	5	9
1993 ~ 1994	0	5	5
1994 ~ 1995	1	7	8
1995 ~ 1996	3	4	7
1996 ~ 1997	3	3	6
1997 ~ 1998	2	4	6
1998 ~ 1999	3	4	7
Total	32	56	88

**Table 2.** The Permanence of Large Changes in Board Size

The final sample consists of 88 large changes (32 large increases, and 56 large decreases) in board size over the 12-year period from 1988 to 1999. Following Denis and Sarin (1999), we define large changes in board size as either an increase or a decrease of at least three directors at one time.

	Large increases in board size			Large decreases in board size		
<i>Panel A: Summary Statistics</i>						
	<u>Mean</u>	<u>Median</u>	<u>S.D.</u>	<u>Mean</u>	<u>Median</u>	<u>S.D.</u>
<i>Year -1</i>	10.72	10.00	4.81	15.21	15.00	4.33
<i>Year 0</i>	14.88	13.50	5.99	11.61	11.00	4.10
<i>Year +1</i>	13.55	12.00	4.52	11.43	10.00	4.13
<i>Year +2</i>	12.25	12.00	4.82	12.31	12.00	3.44
<i>Year +3</i>	12.89	12.00	4.94	11.97	12.00	3.11
<i>Panel B: Tests of Board Size Changes</i>						
	<u>Mean difference</u>	<u>t statistic</u>		<u>Mean difference</u>	<u>t statistic</u>	
<i>Year 0 Vs. Year -1</i>	4.16	(9.59)***		-3.60	(-23.37)***	
<i>Year +1 Vs. Year -1</i>	2.68	(9.09)***		-3.64	(-11.54)***	
<i>Year +2 Vs. Year -1</i>	1.83	(5.61)***		-3.43	(-9.16)***	
<i>Year +3 Vs. Year -1</i>	2.04	(4.58)***		-3.55	(-8.10)***	
<i>Year +1 Vs. Year 0</i>	-1.48	(-2.91)**		-0.18	(-0.07)	
<i>Year +2 Vs. Year 0</i>	-1.90	(-4.73)***		0.17	(0.59)	
<i>Year +3 Vs. Year 0</i>	-1.74	(-3.94)***		0.03	(0.09)	

\*\*\*, \*\*, and \* denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

**Table 3.** Board of Directors and CEO Characteristics around Large Changes in Board Size

The final sample consists of 88 large changes in board size over the 12-year period from 1988 to 1999. We define large changes in board size as either an increase or a decrease of at least three directors at one time. *CEO duality* (= 1, if CEO is the chairman simultaneously); *CEO is founder* (= 1, if CEO is the founder of the company); *CEO succession* (= 1, if CEO succession occurs in the year); *Presence of new CEO* (= 1, if CEO tenure is 3 years or less), and *CEO involvement in director selection* (= 1, if CEO is involved in director selection). We define that CEO is involved in director selection if the board has a nominating committee and CEO serves in the committee, or if the board has no nominating committee (Shivdasani & Yermack, 1999).

	Large increases in board size				Large decreases in board size			
	Before-change	After-change	Changes	t-statistic	Before-change	After-change	Changes	t-statistic
<b>Panel A: Board Of Director</b>								
<i>Board meeting</i>	7.00	7.87	0.87	1.26	7.81	8.62	0.81	1.90*
<i>Number of inside directors</i>	2.19	2.90	0.71	3.93***	3.39	2.48	-0.91	-4.26***
<i>Number of affiliated directors</i>	1.26	1.61	0.35	1.78*	1.57	1.07	-0.50	-3.47***
<i>Number of independent directors</i>	7.45	10.58	3.13	6.09***	10.27	8.09	-2.18	-10.11***
<i>Percent of inside directors</i>	21.15	19.83	-1.32	-1.04	22.80	22.57	-0.23	-0.17
<i>Percent of affiliated directors</i>	11.88	11.43	-0.45	-0.28	10.47	9.44	-1.03	-0.85
<i>Percent of independent directors</i>	67.03	68.73	1.70	0.98	66.66	68.15	1.49	1.11
<i>% of directors (age ≥ 62 years)</i>	43.45	35.60	-7.85	-3.17***	41.06	38.32	-2.74	-1.81*
<i>Number of board committees</i>	3.50	3.66	0.16	1.72*	3.91	3.95	0.04	0.47
<b>Panel B: CEO Characteristics</b>								
<i>CEO age</i>	54.69	53.78	-0.91	-0.69	55.93	55.04	-0.89	-0.93
<i>CEO duality</i>	75.00	62.50	-12.50	-1.68*	62.50	71.43	8.93	1.53
<i>CEO is founder</i>	25.00	17.85	-7.15	-1.44	10.00	10.00	0.00	--
<i>CEO ownership (%)</i>	8.49	9.88	1.39	0.51	4.91	3.99	-0.92	-1.20
<i>CEO involved in director selection</i>	66.00	66.00	0.00	--	53.57	51.79	-1.80	-0.57
<i>CEO succession</i>	9.38	28.13	18.80	1.98*	16.07	19.64	3.60	0.47
<i>Presence of new CEO</i>	21.88	40.63	18.75	1.98*	32.14	44.64	12.50	2.18*

\*\*\*, \*\*, and \* denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

**Table 4.** Ownership Structure and Firm-specific Characteristics around Large Changes in Board Size

The final sample consists of 88 large changes in board size over the 12-year period from 1988 to 1999. We define large changes in board size as either an increase or a decrease of at least three directors at one time. Ownership data are obtained from annual corporate proxy statement, and financial data come from COMPUSTAT database.

	Large increases in board size				Large decreases in board size			
	Before-change	After-change	Changes	t-statistic	Before-change	After-change	Changes	t-statistic
<b>Panel A: Ownership Structure</b>								
<i>Ownership by officers/directors</i>	16.84	18.21	1.37	1.00	10.92	10.02	-0.90	-1.71*
<i>Percent of block holdings</i>	29.90	30.68	0.78	0.30	23.71	22.89	-0.82	-0.83
<b>Panel B: Firm Characteristics</b>								
<i>Total assets (\$M)</i>	12,276.43	13,672.97	1,396.54	2.24**	10,387.58	13,176.24	2,788.66	1.14
<i>Return on Assets (%)</i>	1.97	0.59	-1.38	-0.85	1.04	-0.17	-1.21	-1.18
<i>Market-to-book ratio</i>	2.27	2.23	-0.04	-0.17	2.41	1.53	-0.88	-1.35
<i>1-year stock return (%)</i>	16.94	10.03	-6.91	-0.80	8.66	3.85	-4.81	0.64
<i>Total debt to capitalization (%)</i>	68.58	59.47	-9.11	-1.13	65.23	17.09	-48.14	-0.95
<i>PP&amp;E to total assets (%)</i>	26.02	26.78	0.76	0.70	33.59	34.06	0.47	0.74

\*\*\*, \*\*, and \* denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

**Table 5.** The Effects of Large Changes of Board Size on Tobin's Q

The final sample consists of 88 large changes in board size over the 12-year period from 1988 to 1999. We define large changes in board size as either an increase or a decrease of at least three directors at one time. Tobin's Q is calculated based on Chung and Pruitt (1994). We calculate Tobin's Q as the sum of the market value of equity and the book value of debt divided by the book value of assets. The book value of debt is the difference between the book value of assets and the book value of equity.

	Large increases in board size			Large decreases in board size		
<i>Panel A: Descriptive Statistics</i>						
	<u>Mean</u>	<u>Median</u>	<u>S.D.</u>	<u>Mean</u>	<u>Median</u>	<u>S.D.</u>
Year -3	1.39329	1.21973	0.61471	1.50056	1.13655	0.86051
Year -2	1.43582	1.20547	0.66442	1.44846	1.14453	0.79635
Year -1	1.46069	1.16235	0.78866	1.50757	1.19587	0.90703
Year 0	1.47616	1.15601	0.99455	1.44892	1.17010	0.68914
Year +1	1.51649	1.25313	0.73005	1.47374	1.20965	0.77888
Year +2	1.49241	1.24656	0.87458	1.47744	1.21714	0.71161
Year +3	1.51513	1.20426	0.84079	1.41066	1.25662	0.49861
Year +4	1.35670	1.20266	0.50962	1.42946	1.21054	0.51992
Year +5	1.38915	1.17183	0.55720	1.49570	1.20107	0.66691
<i>Panel B: Wilcoxon test for the Selected Years</i>						
	<u>Wilcoxon</u>	<u>P value</u>		<u>Wilcoxon</u>	<u>P value</u>	
	<u>Z-score</u>			<u>Z-score</u>		
Year 0 Vs. Year -3	0.296	0.767		-1.206	0.228	
Year 0 Vs. Year -1	0.205	0.838		-0.307	0.759	
Year +1 Vs. Year -1	0.577	0.564		-0.939	0.347	
Year +3 Vs. Year -1	0.094	0.925		-0.277	0.782	
Year +5 Vs. Year -1	-0.448	0.654		-0.854	0.393	
<i>Panel C: One-way ANOVA test for All Years</i>						
	<u>F statistic</u>	<u>P value</u>		<u>F statistic</u>	<u>P value</u>	
Year -3 to Year +5	0.142	0.997		0.076	0.999	