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Do corporate boards affect firm performance? New evidence from the financial crisis

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Do corporate boards affect firm performance? New evidence from the financial crisis

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Abstract

This study uses the current financial crisis as a quasi-experiment to examine whether and to what extent corporate boards affect the performance of firms. Using cumulative stock returns over the crisis to measure of firm performance, we find that board independence, as traditionally defined, does not significantly affect firm performance. However, when we re-define independent directors as outside directors who are less connected with current CEOs, a measure we call *true independence*, there is a positive and significant relationship between this measure and firm performance. Second, *outside financial experts* are important for firm performance. Third, board meeting frequencies, director attendance behaviors, and director age also affect firm performance during the crisis. Overall, our results suggest that firm performance during a crisis is a function of firm-level differences in corporate boards.

JEL Classification: G01; G30; G34

Keywords: Financial crisis; Boards of directors; Firm performance; True independence

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1. Introduction

The impact of corporate governance on firm performance has received considerable attention in the economic and finance literature in recent years. This increased attention has been motivated by the financial scandals that rocked the US economy in the early part of this decade. Despite the proliferation of studies, there is still much debate as to the relationship between firm performance and boards of directors, which are arguably the main component of corporate governance (e.g., Fama and Jensen, 1983; Hermalin and Weisbach, 2003; Adams and Ferreira, 2007).¹ In this paper, we use the recent credit crisis to build on this line of research by examining whether and to what extent corporate boards affect firm performance during the current financial crisis.

Several authors (e.g., Johnson et al., 2000; Mitton, 2002) present evidence indicating that corporate governance is of first-order importance in determining firm performance during crises. In general, the authors attribute this importance to two factors. The first is that expropriation by managers is likely to become more severe during these periods because the expected return on investment falls. The second is that during crises, the quality of corporate governance is likely to attract more scrutiny. Thus, any preexisting weaknesses are more visible, thereby leading to a flight to quality and an ensuing decline in firms' stock prices.

The motivation for focusing on the board of directors is as follows. First, corporate boards are one of the, if not the most important, internal corporate governance mechanisms that monitor and advise management in fulfilling the mandate to protect shareholder interests (e.g., Fama and Jensen, 1983; Hermalin and Weisbach, 2003; Adams and Ferreira, 2007; and Harris and Raviv, 2008). This role should be especially

¹ For surveys of corporate boards, see Hermalin and Weisbach (2003) and Adams et al. (2008).

important during periods of crises. For instance, Mace (1971) states that, “directors serve as a source of advice and counsel, serve as some sort of discipline device, and act in crisis situations.” Hermalin and Weisbach (1998) point out that in a booming economy, boards tend to be reactive because good firm performance increases CEOs’ bargaining power and reduces board independence. However, in an economic downturn, boards become more proactive and independent as the bad firm performance reduces CEOs’ negotiation power.

Second, in fulfilling its mandate, a key function of the board is the reviewing and guiding the firm’s risk-management policy. In light of the fact that managerial excessive risk-taking behavior has been cited as one of the major causes of the current financial crisis, it indicates that in many companies, both financial and non-financial, boards failed to set up appropriate risk strategies and monitor managers’ risk-taking behavior in a timely and effectively manner (Kirkpatrick, 2009). Thus, although weak corporate boards may not be the direct trigger of the current crisis, corporate board practices could affect the extent to which firms are vulnerable to the financial crisis.

Third, although substantial empirical research exists on the relationship between corporate boards and firm performance, especially on the effects of board independence on firm performance, the results are still mixed.² One often-cited reason for the mixed results is that a significant number of these studies fail to account for the endogeneity that arises from the joint determination of board structure and firm value (Hermalin and Weisbach, 2003). The current financial crisis, which is generally thought of as the most

² For example, several studies find no significant association between board independence and firm performance (e.g., Baysinger and Butler, 1985; Hermalin and Weisbach, 1991; Mehran, 1995; and Bhagat and Black, 2001), but others find board independence negatively affects firm performance (e.g., Agrawal and Knoeber, 1996; and Barnhart and Rosenstein, 1998).

serious crisis since the Great Depression, represents an exogenous shock to most individual firms. Therefore, by testing the impacts of boards of directors immediately before the external shock on the changes in firm performance during the crisis, we can to a large extent mitigate the endogeneity concern.

Based on the monitoring and advising roles of corporate boards we hypothesize that, during the crisis, firms with high-quality boards experience significantly smaller losses than firms with low-quality boards. Because board independence and financial experts on boards have received considerable attention from both the academic community and policymakers, and both of them have been widely cited as important indicators of board quality (e.g., the 2002 Sarbanes-Oxley Act (SOX)), in this paper we mainly focus on board independence and financial experts on boards.

However, boards of directors have multiple facets. Aside from board independence and financial experts on boards, prior studies find that other board characteristics, such as board size, board duality, board diversity, and board shareholdings also affect board efficacy and firm performance (e.g., Shivdasani, 1993; Yermack, 1996; Shivdasani and Yermack, 1999; Guner et al., 2008; Adams and Ferreira, 2009). Consequently, we also provide supplemental tests on the relationship between firm performance and other board characteristics.

Our sample is composed of 876 S&P 1500 nonfinancial companies that have data on board and firm characteristics. We use OLS regressions to estimate several different specifications, where the dependent variable is the cumulative stock returns during the crisis period and the independent variables are different board and firm characteristics

that are typically used in empirical research that examine the relationship between board structure and firm performance.

We draw three broad conclusions from our findings. First, traditional board independence (the percentage of outsiders on the board) is not sufficient for board efficacy. We find no significant relationship between traditional board independence and firm performance during the crisis. However, when we define independent directors as outside directors who preceded the current CEO, a group we call “true independence”, we find a significant and positive relationship between this true independence and firm stock performance. These findings provide support for Zajac and Westphal, 1996; Hermalin and Weisbach, 1998; Shivdasani and Yermack, 1999; and others who argue that CEOs usually try to be involved in the selection process of new directors to reduce board independence and maintain their control power. Our results further suggest that not all outside directors are equally effective monitors. That is, simply defining outside directors as independent directors as is customary in the literature does not capture the varied degrees of independence among outside board members.

Second, the financial expertise of directors is also important for firm performance during the current crisis. We find that the presence of outside financial experts rather than inside financial experts drives the positive association between financial experts on boards and firm performance. These findings support arguments in Kirkpatrick, 2009; Defond et al., 2005; and in SOX that outside financial experts provide a better understanding of financial information that is important for effective board oversight. The results are also consistent with more recent studies that emphasize the importance of the advising role that outside directors play (e.g., Adams and Ferreira, 2007; Agrawal and

Knoeber, 2001; and Coles et al., 2008).³ The insignificant relationship between inside financial experts and firm performance indicates that being an insider constrains the monitoring effectiveness of inside financial executives.

Third, we find that several other board characteristics are also important for firm performance during the crisis. For instance, firm stock performance is positively related to the number of board meetings and the frequency with which directors attend these board meetings, consistent with Adams and Ferreira (2009), who, among others, argue that board meetings and the attendance at these meetings are important channels through which directors obtain firm-specific information and fulfill their monitoring role. Finally, we find that director age is positively related to firm performance, indicating that during times of crises, experience is a valuable resource to shareholders.

We further test the robustness of our results by using different time windows of the crisis, an accounting measure of firm performance, different proxies for firm-specific risk, a reduced sample only including firms with no director changes during the crisis. We also address several potential econometric issues in our data, such as endogeneity, multicollinearity, measurement error, outlier and correlation of errors due to the interdependence of returns. Our results are robust to all these tests.

Prior to the crisis, we expect corporate boards to have less evident impact on changes in firm performance. When the economy is good, the expected expropriation is relatively small (Lemmon and Lins, 2003) and boards tend to be reactive (Hermalin and Weisbach, 1998). In addition, investors may pay less attention to the quality of corporate governance when investment opportunities are plentiful (Mitton, 2002). Consistent with

³ Note that this becomes especially important during periods such as the financial crisis. Another possible benefit, which is discussed later, is that financial experts, especially those from banks, may help the firm gain relatively easier access to external funds during the crisis (e.g., Guner et al., 2008; Ciamarra, 2006).

this view, we find that most board characteristics, including both true independence and financial expertise, do not significantly affect firms' stock performance prior to the crisis.

Our study is related to the literature on the relationship between corporate governance and firm performance during financial crises. For example, Johnson et al. (2000), Mitton (2002), and Lemmon and Lins (2003) use the East Asian financial crisis to examine how country-level legal protection, firm-level disclosure quality, outside ownership concentration, diversification, and management ownership affect firm performance during crisis periods. Our study differs from them in several important ways. First, corporate governance has different aspects and their impacts on firm performance are not homogenous. Although prior studies find certain governance mechanisms have significant influences on firm-level performance during a crisis, they do not imply that other governance mechanisms have the same impacts on firm performance. Our study is the first one to investigate how the quality of corporate boards, which are thought to be the most important internal governance mechanism, affects firm performance during a crisis. The findings in our paper complement those of Mitton (2002) and Lemmon and Lins (2003) by showing that firm-level differences in corporate boards also play an important role in determining changes in firm performance during crisis periods in general and in particular to the current crisis.

Second, a significant difference of our paper compared to the others is that, most prior studies that test the relationship between corporate governance and firm performance during crisis periods use the East Asian financial crisis as the natural experiment and test the relation on a multiple-country level.⁴ Our study uses the current

⁴ One exception is Baek et al. (2004), which examine the impact of corporate governance on Korean firm performance during the East Asian financial crisis.

financial crisis and focuses on only U.S. public companies thereby avoiding complications brought about by the impact of country effects.

More recently, an emerging literature begins to examine how different country-level and bank-level governance mechanisms affect bank performance during the current financial crisis (e.g., Beltratti and Stulz, 2009; Fahlenbrach and Stulz, 2009; and Fernandes and Fich, 2009). Our study differs from them as we focus on nonfinancial companies. Corporate governance of financial institutions is different for financial institutions and their findings cannot be directly generalized to nonfinancial companies (e.g., Adams and Mehran, 2003; and Andres and Vallelado, 2008). In addition, as the current crisis originates from the financial industry, whether and to what extent it is an exogenous shock to financial companies is unclear.

Our paper also adds to the literature that addresses the efficacy of the board of directors. Our results indicate that not all outside directors are equally effective monitors and that simply treating all outside directors as independent directors does not capture the variation of independence among outside directors. In addition, our result on the outside financial experts confirms the importance of the monitoring and advising *abilities* of boards for their efficacy, and provides evidence to support SOX requirements about financial experts on boards. Overall, our study indicates that directors' characteristics significantly impact firm performance and therefore, should be accounted for in studies that examine board effectiveness.

Finally, prior studies on the relationship between different board structures or characteristics or both on firm performance typically face the daunting task of correcting for the endogenous nature of the relationship. In this paper, we focus on the effect of

corporate boards on the changes in firm value precipitated by a shock to the firm's investment opportunities. As such, our analysis avoids most of the issues regarding the endogeneity of board structure and firm performance that characterize most of the previous literature, and provides a relatively clear test on the relationship between corporate boards and firm performance.

The remainder of the paper is structured as follows. Section 2 contains the sample description, describes variables used in the analysis, and presents summary statistics. The results of univariate tests are in Section 3. Section 4 reports the multivariate tests results and conducts robustness checks. The final section provides conclusions.

2. Sample selection, variable descriptions and summary statistics

2.1. Sample selection

Monthly stock data comes from the Center for Research in Security Prices (CRSP). The primary valuation measure is the firm's cumulative stock return over the crisis period. Figure 1 shows the movement of the S&P 1500 composite stock index from January 2007 to December 2009. It indicates that there is a continuous decline from October 2007 through March 2009, where it bottomed out and then experienced an upturn. Given this evidence, we choose October 2007 as the beginning point and March 2009 as the ending point. We think this measurement period is long enough to reflect the impact of the external shock on firm value. However, as several other papers use different time periods, we experimented with several starting and ending points. The results are all robust to different time windows of the crisis.

[Insert Figure 1 here]

Information on corporate boards is from the Investor Responsibility Research Center (IRRC). The IRRC board data cover S&P 500, S&P Midcap 400, and S&P Small Cap 600 companies.⁵ It provides detailed information about each director, such as the director's name, title, affiliation, age, tenure, sex, ethnicity, directorship, and shareholdings.

Accounting and other firm-specific data is from the Compustat database, CEO information is from ExecuComp, and the Gompers et al. (2003) governance index (G-index) is also from IRRC. Because subprime mortgages are always cited as the origin of the current financial crisis, it is unclear to what extent that the current financial crisis is an exogenous shock to financial institutions. Thus, we exclude financial companies (SIC=6000-6999) from our sample. After merging the various data sources, the final sample contains 876 observations for nonfinancial companies.

2.2. Variable descriptions

2.2.1. Stock performance measure

Similar to Johnson et al. (2000), Mitton (2002), Lemmon and Lins (2003), Baek et al. (2004), Beltratti and Stulz (2009), and Fahlenbrach and Stulz (2009), we use cumulative stock returns (buy-and-hold returns) over the crisis period (from October 2007 to March 2009) as the primary measure of firm performance. We compute crisis period cumulative stock returns as follows:

⁵ The S&P 1500 covers about 85% of the U.S. equities market.

$$Crisis_Period_Return = (1 + R_{i,Oct2007})(1 + R_{i,Nov2007})(1 + R_{i,Dec2007}) \cdots (1 + R_{i,Mar2009}) - 1 \dots (1)$$

where $R_{i,t}$ is the monthly return of firm i at time t . For robust checks, we also construct cumulative stock returns using different beginning dates such as July 2007 and different ending dates such as December 2008.

2.2.2. Measures of corporate boards

It has long been recognized that board independence plays a significant role in monitoring management effectively (e.g., Fama, 1980; Fama and Jensen, 1983). SOX and the new listing rules for NYSE and NASDAQ incorporate this idea and require firms to increase the representation of outside directors on corporate boards and committees. Following prior studies, we define an independent director as a board member who is not a past or present employee of the firm and who is not affiliated with the firm through business ties or family ties. Board independence is measured as the ratio of outside board members to board size.

In this paper, motivated by prior studies, such as Mace (1971), Hermalin and Weisbach (1998), Zajac and Westphal (1996) and Shivdasani and Yermack (1999), which show that CEOs always try to involve in selecting new directors to reduce board independence and increase their control power, we propose a new measure of board independence, called “true independence.” We refer a true independent board member as an outside director whose selection is not influenced by the current CEO, and we define true independence at the company level as the ratio of true independent board members to board size. We argue that this true independence is a better measure of board

independence than the traditional measure in terms of capturing the variation of independence of outside board members. We will discuss this measure in details in Section 4.

Financial expertise of directors is another important factor that could affect board efficacy. Financial experts can provide a better understanding of financial information (Kirkpatrick, 2009), provide valuable financial advice to management (Francis et al., 2009), and to some extent help firms access external funds (Guner et al., 2008). Those functions could be more important during the financial crisis. Fernandes and Fich (2009) find that financial expertise of banks' outside directors is positively related to the stock performance of financial institutions during the current crisis. Thus, the second set of testing variables is financial expertise of directors.

Although the Sarbanes-Oxley Act requires audit committees to include at least one financial expert, it does not set forth a strict definition of financial expert.⁶ Similar to Anderson et al. (2004) and Guner et al. (2008), we separate the sample's financial experts into insider financial experts and outside financial experts. Insider financial experts include the companies' CFOs, accountants, treasurers, and VPs of finance. Outside financial experts refer to outside directors with backgrounds in commercial banking, investment banking, hedge funds, mutual funds, insurance, corporate law, accounting, auditing, etc.

⁶ SOX provides guidelines for deciding who is a financial expert. The five key qualities in the law include: 1) understands Generally Accepted Accounting Principles (GAAP) and financial statements; 2) is experienced in preparing or auditing financial statements of comparable companies; 3) has experience accounting for estimates, accruals, and reserves; 4) understands internal accounting controls; and 5) understands the functions of an audit committee.

Extant studies find certain relations between board efficacy and other board characteristics, such as board size (Yermack, 1996; Coles et al., 2008), board duality (Dalton et al. 1998; Coles et al., 2001), the presence of female directors (Adams and Ferreira, 2009), board meeting frequencies (Vafeas, 1999), board meeting attendance problems (Adams and Ferreira, 2009), director age (Shivdasani and Yermack, 1999), director tenure (Vafeas, 2003), directorship (Ferris et al., 2003; Perry and Peyer, 2005), and board shareholdings (Shivdasani, 1993; Bhagat et al., 1999). Therefore, in this paper, we also provide supplemental tests on the relationship between those board characteristics and firm performance during the crisis.

2.2.3. Control variables

Following prior studies, such as Mitton (2002), Lemmon and Lins (2003), and Baek et al. (2004), we control for several risk factors that might affect firms' stock performance. The first one is firm size, measured by the logarithm of total assets.⁷ The second is leverage, measured as the ratio of total liabilities to total assets. The third one is the market-to-book ratio, measured as the market value of equity to the book value of equity. The last risk-control variable, Beta, is calculated by regressing a firm's monthly stock returns five years before the crisis period on the corresponding NYSE/AMEX/NASDAQ Value-Weighted Index from CRSP. We require at least 12 months of return data prior to October 2007 to compute beta. We also include prior ROA, measured as EBIT to total assets, to control for prior firm performance; other variables include CEO tenure to control for CEO entrenchment, number of segments to control for the firm's diversification situation, and G-index (Gompers et al., 2003) to control for

⁷ The results are robust when using market value as the measure of firm size.

overall firm governance. To avoid spurious correlation among these variables and firm performance during the crisis, we measure them at the end of the firm's 2006 fiscal year. Finally, we estimate our regressions using indicator variables for a firm's primary one-digit SIC code to control for industry differences. We also try to use two-digit SIC code and the results are quantitatively unchanged.

2.3. Summary statistics

Table 1 provides means, standard deviations, and minimum and maximum values for firm performance, as well as board- and firm-specific variables. As expected, Table 1 shows that firms performed poorly during the crisis, with cumulative stock returns approaching negative 44%, on average.

[Insert Table 1 here]

Figure 2 compares firm performance before and during the crisis. Panel A of Figure 2 shows that although most firms in the sample suffered disproportionately in terms of stock market declines, they performed reasonably well in the year prior to the crisis. The average cumulative stock return during the pre-crisis period is 17%. We also find that stock price volatility in the crisis period is twice that of the pre-crisis period.

[Insert Figure 2 here]

Panel B of Figure 2 provides additional details about individual firm performance before and during the crisis. Before the crisis, 625 companies have positive cumulative stock returns and 251 companies have negative stock returns. In contrast, during the crisis about 829 companies have negative returns and only 47 companies have positive returns. Thus, for most firms the current financial crisis is a serious exogenous shock that has significantly lowered stock returns.

The average board size in our sample is 9.14, with a minimum of four directors and a maximum of 18. The average board independence is about 78% and varies widely across our sample, ranging from 33% to 100%. This is consistent with Linck et al. (2008), which suggests that corporate boards have become more independent after SOX. We find that the average true independence is about 60% and varies across our sample.⁸ The results indicate that about 18% of outside directors are selected by the current CEO. In our sample, about 70% firms have CEOs that are also chairmen of the board.

Table 1 also shows that about 57% of sample firms have at least one financial expert on boards. Among them, 13% are inside financial experts and about 43% are outside financial experts. About 69% firms have at least one woman on the board. The number of board meetings per year display significant variation, ranging from three to twenty-five times per year with an average, of about eight board meetings per year. In our sample, the average director age is 61, and the average director tenure is about 11 years and has 0.78 additional outside director memberships. On average, each board owns about eight percent of the outstanding shares of the firm.

⁸ The correlation between board independence and true independence is 0.338.

Table 1 also shows that there is substantial variation in firm characteristics in our sample. For example, firm size ranges from \$43 million to \$673,321 million, and leverage ranges from 0 to 0.956.

3. Univariate statistics on board structure and firm value during the crisis

Our primary hypothesis is that, all else equal, firms with higher-quality boards should exhibit smaller declines in firm value during the crisis. To provide some preliminary evidence on this hypothesis, Table 2 provides univariate comparisons of cumulative stock returns during the crisis for firms with different board structures or characteristics.

[Insert Table 2 here]

We partition the full sample into different sub-samples based on the median values of the board variables. If the variable is an indicator variable, we separate the sample based on whether the dummy equals 1 or 0.

As discussed, board independence is considered one of the most important factors in board effectiveness. Thus, we first partition the full sample into two subsamples based on board independence (median value is 0.80). We find that the mean return is -0.436 for the firms with board independence below the median, and it is -0.446 for firms with board independence above the median. Notably, no difference between these two subsamples seems to exist with regard to firm performance during the crisis. This is not

surprising given the extant empirical studies find there is no relationship between these two.

Accordingly, we further separate the full sample into two sub-samples based on the board's true independence (median value is 0.66). Here the mean return is -0.458 for the firms with board true independence below the median, and it is -0.428 for firms with board true independence above the median. The mean difference of 0.030 is significant at the 10% level, suggesting that firms with more true independent boards perform better than firms with less true independent boards. The result provides some preliminary evidence that board independence is in fact important for board effectiveness during the crisis, and that the traditional measure of board independence is very noisy at capturing the degree of independence of the boards.

Next, we separate the full sample into two subsamples based on whether the board has at least one financial expert. We find that the average stock return is -0.419 for firms with financial experts, but it is -0.472 for firms without financial experts. The mean difference of 0.053 is significant at the 1% level, suggesting that firms with financial experts on their boards perform much better than firms without financial experts on their boards. The result provides preliminary evidence of the importance of this financial expertise during the crisis.

We further assess the effect of board size on firm performance. We divide the full sample into two subsamples (based on the median size of 9). We find that the average stock return is -0.419 for companies with large boards, but it is -0.457 for the small-board sample. The mean difference of 0.038 is significant at the 5% level, suggesting that firms with small boards perform worse than firms with large boards. This is somewhat

surprising given that several authors (e.g., Yermack, 1996) argue that small boards tend to be much more effective than large boards.

We also separate the full sample into two subsamples based on whether the CEO is also the chairman of the board. We find no difference between duality and nonduality boards with regard to firm performance during the crisis.

Finally, we divide our sample into subsamples based on other board characteristics. The results show that firms with female directors perform better than firms without these kinds of directors, and firms with older directors perform better than firms with younger directors.

In summary, the results of the univariate tests suggest that traditional board independence has no impact on firm performance, while our new measure of board independence is positively related to firm performance. The results also suggest that some other board factors, such as financial experts, board size, gender and age also affect firm performance during the crisis. In the next section, we go to multivariate analysis and further investigate how board characteristics affect firm stock performance in a multivariate environment.

4. Multivariate analysis of the boards and firm value during the crisis

To further assess the impact of corporate board characteristics on firm stock price performance during the crisis, we estimate the following multivariate regression model:

$$\begin{aligned}
Crisis_Period_Return = & \alpha + \beta_1(Board_Variables) + \beta_2(Firm_Size) + \beta_3(Leverage) \\
& + \beta_4(M/B) + \beta_5(ROA) + \beta_6(CEO_Tenure) + \beta_7(Segment) \\
& + \beta_8(Beta) + \beta_9(G_Index) + \beta_{10}(Industry_Dummies) + \varepsilon \quad .(2)
\end{aligned}$$

where the variables reflect previously described characteristics and circumstances.

4.1. Board independence and firm performance

We first test how board independence and board true independence affect firm performance during the crisis. The results of these regressions are in Table 3.

[Insert Table 3 here]

We report the traditional board independence regression in Column 1. The estimated coefficient on board independence is statistically insignificant, indicating that board independence (the ratio of outsiders to total directors) does not affect firm stock performance, at least during the crisis. The results are consistent with the univariate tests and with most prior studies that find no significant relationship between board independence and firm performance (e.g., Baysinger and Butler, 1985; Hermalin and Weisbach, 1991; Mehran, 1995; Bhagat and Black, 2001).

In theory, shareholders select directors, who in turn monitor management on their behalf. However, there is a long-standing criticism that, in practice, directors are not selected by stockholders but by the CEOs they are supposed to monitor. Mace (1971) discusses anecdotal evidence of CEOs exercising authority in selecting nominees for the board. Hermalin and Weisbach (1998) present a model of the bargaining game between

CEO power and board independence, which compromises the effectiveness of the board. Additionally, Shivdasani and Yermack (1999) find that the stock market reaction to outside directors' appointment is, on average, significantly lower when the CEO is involved in director selection. They conclude that by being intricately involved in selecting new directors, CEOs reduce the pressure on themselves from active monitoring by the directors. Zajac and Westphal (1996) also discuss how powerful CEOs try to select passive boards to reduce board independence and the control power of boards.

Based on this line of research, we conjecture that if a CEO chooses an outside director, the director's incentive and ability to monitor is significantly reduced. In this case, we designate these directors as not “truly independent directors.”

To control for this situation and to identify directors who are truly independent, we define a director as being “truly independent” if he/she is not elected by the current CEO.⁹ We contend that an outside director would have significantly more power and a higher incentive to monitor the CEO if the CEO were not involved in his/her selection. As such, we categorize independent directors into those who are “truly independent directors” and those who are not. The variable *true independence* corresponds to the number of “truly independent directors” divided by board size.

In Column 2 of Table 3, we use a binary variable, *True Independent Board*, which equals 1 if the majority of board members are truly independent directors and 0 otherwise, to measure board true independence. The estimated coefficient is 0.052 and is significant at the 5% level, indicating that the cumulative stock return for firms with truly

⁹ Landier et al. (2005) use a similar approach to construct a variable called “independent from the CEO”, which refers to a top executive who joined the firm before the current CEO was appointed. They find a positive relationship between this “independent inside executive” and firm performance.

independent director-dominated boards is 0.052 higher than for firms without truly independent director-dominated boards.

In Column 3 of Table 3, we include *true independence* as the measure of board independence. The estimated coefficient on *true independence* is 0.092 and is significant at the 1% level. This result indicates that if a firm changes its board from a 25th percentile true independent board to a 75th percentile true independent board, its stock return increase about 0.046, an effect that is economically meaningful. The result also suggests that true independence may be a better measure to capture board independence than the measure that is traditional used.

With regard to firm control variables, consistent with our expectations, we find that highly leveraged firms suffer more during the crisis compared to small firms and less leveraged firms. Firms with higher growth opportunities before the shock experience a smaller drop in equity value during the crisis. Also, prior *ROA*, *Beta*, and *G-index* are all negatively related with firm stock performance. The results are consistent with prior studies, such as Mitton (2002), Lemmon and Lins (2003), Baek et al. (2004), and Gompers et al. (2003).

In sum, the results in Table 3 indicate that the traditional measure of board independence is contaminated by the effect of the CEO, and therefore it does not reflect the extent to which outside directors are “truly independent.” Once we modify the traditional measure by accounting for the CEO's role in capturing directors, we find a positive and significant relationship between board independence and firm performance.

4.2. Financial experts on boards and their impacts on firm performance

Corporate boards are often criticized for lacking the financial expertise necessary to be effective (e.g., Kirkpatrick, 2009). An implication of this is that, in general, most boards as they are currently constructed do not understand and therefore cannot control the level of financial risk in a timely and effective manner. In this section, we test whether directors' financial expertise affects firm performance during the crisis.

We conjecture that financial experts play an important role in preventing firms' losses during the crisis for three reasons. First, a better understanding of financial numbers can help the board oversee the management (Kirkpatrick, 2009). Second, directors with professional financial knowledge may provide valuable advice to management during the crisis (Francis et al., 2009). Third, financial experts, especially those from financial institutions, may help firms access external funds more easily (e.g., Guner et al., 2008; Ciamarra, 2006). We test our conjectures in Table 4.

[Insert Table 4 here]

Column 1 of Table 4 shows the results of using a dummy variable that equals 1 if the director is a financial expert and 0 otherwise as the testing variable. The estimated coefficient on this indicator variable is 0.034 and is significant at the 5% level. The coefficient estimate indicates that the stock returns for firms with financial experts on their boards are, on average, about 0.034 higher than those of firms without financial experts on their boards. The results support the conjecture that having financial experts on the board can help prevent losses during the crisis.

We further separate the sample's financial experts into insider financial experts and outside financial experts. Although inside financial experts could have the same monitoring and advising abilities as outside financial experts, their insider positions might mitigate their effectiveness. Column 2 of Table 4 shows how the presence of inside financial experts affects firm performance. The testing variable is a dummy variable, *inside financial experts*, that equals 1 if there is an inside CFO, accountant, treasurer, or vice president of finance sits on the board. Consistent with our expectation, the estimated coefficient of *inside financial experts* is negative and insignificant, suggesting that the presence of inside financial experts has no impact on firm performance during the crisis.

Column 3 of Table 4 contains results where we use a dummy variable that equals 1 if an outside director is a financial expert and 0 otherwise as the testing variable. The estimated coefficient on this indicator variable is 0.052 and is significant at the 1% level. The coefficient estimate indicates that the stock returns for firms with outside financial experts are, on average, about 0.052 higher than those for firms without outside financial experts. The results are also consistent with the findings by Fernandes and Fich (2009) which show that financial experience of the banks' outside directors is positively related to the financial institutions' stock performance during the current crisis.

Column 4 of Table 4 presents the results of including the absolute number of outside financial experts as an explanatory variable. Consistent with the conjecture, the estimated coefficient is positive (0.037) and significant at the 1% level. The result further confirms the positive relationship between firm performance and outside financial experts.

Column 5 shows the results using the ratio of financial experts on the board as the measure of the relative size of financial experts. The estimated coefficient is 0.309 and is

significant at the 1% level. If a firm changes from the 25th percentile to the 75th percentile in this measure, its stock returns increase about 0.15, which is economically significant.

In sum, Table 4 shows that outside financial experts rather than inside financial experts are important for firm performance during the financial crisis. The professional financial knowledge of outside financial experts could enhance their monitoring abilities. Outside financial experts might also provide invaluable advice to the board and to the firm, subsequently helping firms suffer less from the crisis. They might also help firms access external funds, which is very important during the crisis period.

4.3. Which one matters: True independence or financial expertise?

So far, we find that board true independence and outside financial expertise affect firm performance positively during the crisis period. However, a true independent director could also be an outside financial expert, and an outside financial expert could also be a true independent director. This raises a question of which one really matters.

To isolate better the impact of one on another, we exclude outside financial experts from the true independent directors' sample, and exclude true independent directors from the outside financial experts' sample.¹⁰ By doing so, the new measures of true independence and outside financial expertise do not contaminate each other.

Columns 1 and 2 of Table 5 show the results of rerunning the regressions using the new measures of true independence and outside financial expertise as the testing variables. Column 1 shows that the estimated coefficient of the new *true independence* is

¹⁰ Excluding financial experts does not significantly affect the value of true independence, because the absolute number of financial experts is relatively small compared to the number of all true independent directors. However, the number of outside financial experts is reduced about 43% when we exclude true independent directors from the sample.

0.070 and is significant at the 5% level. The economic magnitude is slightly lower than in Column 2 of Table 3 (0.092), but it is still meaningful. In Column 2, the estimated coefficient of outside financial expertise is 0.049 and is significant at the 1% level. The economic magnitude is very similar to that in Column 3 of Table 5 (0.052). Overall, the results in Table 5 show that both true independence and outside financial expertise are beneficial for firms.

[Insert Table 5 here]

Are truly independent outside financial experts more valuable than those who are not truly independent outside financial experts? To answer this question, we rerun Model 2 of Table 5 but using use a reduced sample that only includes firms with outside financial experts. Thus, the coefficient of the dummy variable *outside financial expert* captures the incremental effects of having outside financial experts who are not truly independent compared to those that have truly independent outside financial experts. The insignificant result in Column 3 of Table 6 shows that there is no difference between these two groups of outside financial experts. A substitutive relation seems to exist between true independence and outside financial expertise. In other words, outside directors—whether truly independent or financial experts—could enhance board efficacy and thereby firm performance during the crisis.

4.4. Other board characteristics and firm performance

In this section, we test whether other board characteristics affect firm performance during the crisis. The first testing variable is board size. The role of size in board effectiveness is ambiguous and we could not predict the relationship between board size and firm performance.¹¹ In Column 1 of Table 6, we use *Log (board size)* as the testing variable. The estimated coefficient is insignificant, indicating that board size does not affect firm stock performance during the crisis. The results seems inconsistent with Jensen (1993) and Yermack (1996), who argue that small boards are more effective and can increase firm performance. However, it is consistent with more recent studies such as Boone et al. (2007), Linck et al. (2008), and Coles et al. (2008), which show that the impact of board size on performance is environment-specific and not a general phenomenon.

[Insert Table 6 here]

Duality refers to a board leadership structure in which the CEO fulfills the functions of both the CEO and the chairman of the board of directors. Shivdasani and Yermack (1999) find that duality leads to managers being more entrenched and more likely to manipulate earnings. In Column 2, we test whether duality affects firm performance. Although the estimated coefficient is negative, it is not significant at the

¹¹ For example, Jensen (1993) argues that small boards are more effective because of the high coordination costs and free rider problems associated with large boards. Yermack (1996) detects a negative relationship between board size and firm performance. However, Singh and Harianto (1989) and Klein (2002) suggest that large boards might enhance corporate governance by reducing CEO domination and by providing broader services. Recent work by Boone et al. (2007), Coles et al. (2008) and Linck et al. (2008) argue that the optimal board size should depend on firm-specific traits, such as firm size, age and complexity of business.

traditional level. Thus, board duality does not exhibit a significant impact on stock performance during the crisis. The result is consistent with Dalton et al. (1998).

In Column 3 of Table 6, we test whether the presence of female directors affects firm stock returns. Adams and Ferreira (2009) find that women directors are more effective than men when it comes to monitoring management, but they do not significantly affect firm performance. The results in Column 3 also show that the presence of female directors does not affect firm performance during the financial crisis.

Prior studies find that board meetings are beneficial to shareholders. For example, Conger et al. (1998) suggest that board meeting time is an important resource in improving the effectiveness of boards. Vafeas (1999) find that operating performance improves following years of abnormal board activity and suggests that board meeting frequency is an important dimension of board operations that enhance corporate governance. Thus, we expect that board meeting activity is an important channel through which directors can obtain firm-specific information, monitor management, and determine strategic responses to different events. Column 4 of Table 6 addresses this issue. We find that board meeting frequency is positively related to stock performance. Economically, one additional board meeting increases stock returns about 0.019. The result suggests that board meetings are an important attribute of board efficacy during the crisis.

Attendance behavior is important from a governance perspective because it is the primary channel through which directors obtain the necessary information to carry out their duties (Adams and Ferreira, 2009). If directors do not attend board meetings regularly, it is difficult for them to obtain information about the firm and monitor or

advise management. Lipton and Lorsch (1992) point out that a lack of time to carry out board duties is a common problem among directors, evidenced by poor attendance at board meetings. During the crisis period, we therefore expect that firms characterized by poor board attendance would perform significantly worse than those with better attendance. Column 5 shows the results of testing this conjecture; they are consistent with the expectation. The estimated coefficient is -0.051 and significant at the 10% level, indicating that firms with poor board attendance at meetings perform significantly worse than those with good attendance during the crisis.

The effect of directors' age on board efficacy and firm performance is ambiguous. On one hand, age can be a good proxy for business experience and the degree of conservatism, which may be important for solving problems and taking risk-averse actions before and during the crisis. On the other hand, old directors may not catch up with new information and technology as easily as young directors do, which may be important in dealing with unexpected and new problems during the crisis. Also, old directors may be less flexible when dealing with unexpected events. Column 6 of Table 6 contains the results of examining the relationship between the director age and firm performance. The coefficient on age is positive and is marginally significant, which supports the notion that during times of crises, director experience is of significant value to shareholders.

The expertise hypothesis suggests that a long-term director has more experience, commitment, and competence because he or she has important knowledge about the firm and its business environment. On the other hand, the management-friendliness hypothesis suggests that seasoned directors are more likely to befriend, and less likely to monitor,

managers (Vafeas, 2003). Lipton and Lorsch (1992) recognize that lead directors may attempt to usurp some of the CEO's functions through time, and they therefore advocate term limits for directors. Thus, *a priori* we cannot predict the relationship between board tenure and firm performance. In Column 7 of Table 6, we test the relation empirically. We find there is no significant relationship between director tenure and firm performance.

The relationship between the number of directorships on board effectiveness is also unclear. Fama and Jensen (1983) and Perry and Peyer (2005) argue that firms that look for highly qualified directors might prefer directors who serve on other boards, because multiple appointments can signal director quality. Kaplan and Reishus (1990) and Ferris et al. (2003) find that successful directors are also more likely to receive more offers to serve on other boards. However, the "busy director" hypothesis argues that too many board assignments might dissipate board members' time and attention, thereby undermining their ability to monitor management. The financial and academic press also raise this issue by pointing out that directors who take on too many directorships are spread too thinly, thereby confounding their abilities to attend meetings and therefore to monitor and advise management. Column 8 of Table 6 shows the results of testing how directorship affects firm performance. The insignificant coefficient indicates directorship has no impact on firm performance, at least during the financial crisis period.

One element that reflects the incentives of directors to monitor management actively is board shareholdings. Jensen and Meckling (1976) argue that equity ownership among directors creates powerful incentives to monitor management. Shivdasani (1993) and Bhagat et al. (1999) among others provide empirical support for the notion that financially invested board members create boards that are more effective. Consistent with

this line of research, we expect a positive relationship between board shareholdings and board effectiveness. Column 9 of Table 6, however, shows no significant relationship between director shareholdings and firm stock performance during the crisis period.

4.5. Robustness checks

The prior individual tests indicate that several board characteristics affect firm stock performance during the financial crisis period. Including all these factors into a single regression focuses the analysis on their incremental explanatory power but raises the multicollinearity concern. Thus, we test whether multicollinearity problems exist for the regression. The average variance inflation factor (VIF) is 1.84 and the highest for any regressor is 4.38, which is well below the threshold indicator of 10. Thus, multicollinearity is not a serious issue in this regression.

[Insert Table 7 here]

The regression results are in Column 1 of Table 7. After combining the variables into a single regression, we find that most of the results in the prior regression specifications still hold. The results also show little collinearity among the testing variables, as the economic magnitudes of most testing variables change very little and they retain their significance when combined.¹²

Beltratti and Stulz (2009) and Fahlenbrach and Stulz (2009) define July 2007 as the beginning of the current crisis. Figure 1 also shows that stock price has a jump in July 2007, although it is followed by an upward in August and September 2007. In Column 2

¹² Because only 214 observations exist for *board meeting*, *board meeting* is not in the regression.

of Table 7, we change the time window of the crisis to begin on July 2007. Our results are robust to defining cumulative returns over this longer period.¹³ Although the magnitude of some coefficients decreases somewhat, all key variables retain significance.

Baek et al. (2004) and Beltratti and Stulz (2009) also use accounting profitability as the performance measure in their studies. In Column 3 of Table 7, we provide a robustness check by using cumulative return on assets (ROA) during the crisis period as an alternative measure of firm performance. Similar to Beltratti and Stulz (2009), we define crisis period cumulative ROA as the cumulative quarterly net income from 2007Q3 to 2009Q1 divided by the total assets at the end of 2007Q2. We rerun Model 1 of Table 7 but use cumulative ROA as the performance measure. Again, we find that our two main variables, board true independence and financial expertise, as still significantly positively related to accounting profitability,. However, both board age and board attendance behavior become insignificant here. Baek et al. (2004) attribute this inconsistency to two major reasons. One is the weak correlation between ROA and stock returns.¹⁴ Another is that accounting based measure of performance is subject to earnings management, especially during crisis periods. Therefore, it is not a reliable measure of firm performance.

As discussed, the unexpected shock of the current financial crisis allows us to isolate the effects of corporate boards on firm value more clearly. When economy is good, on one hand, the expected expropriation by managers is relatively small and is already reflected in current prices (Lemmon and Lins, 2003). On the other hand, as Hermalin and Weisbach (1998) point out, boards tend to be reactive rather than proactive during good

¹³ We also use December 2008 as the ending of the crisis, and the results are similar.

¹⁴ The correlation between cumulative stock returns and cumulative ROA is 0.384.

times because good firm performance increases CEO power. Thus, all these imply that the effects of corporate boards on firm value should be less evident prior to the crisis.

Column 4 of Table 7 reports regression that corresponds to Column 1 of Table 7, but the dependent variable is now the cumulative stock return over a one-year period preceding the crisis (October 2006 to September 2007).¹⁵ Consistent with expectations, we find most board characteristics, such as true independence and financial expertise, have no impact on firm stock performance during the pre-crisis period.¹⁶ A negative relation only exists between the presence of female directors and firm value, which is consistent with Adams and Ferreira (2009). These pre-crisis results provide further evidence that the results we document during the crisis period are not spurious.

4.6. Additional econometric issues

The first econometric issue is the potential endogeneity of board variables. Hermalin and Weisbach (1998) point out that board variables are not exogenous and are jointly determined with firm value. If it is the case, then the estimated coefficients are inconsistent and the direction of causality is unclear. We mitigate the endogeneity issue in several ways. First, we examine the board structure changes from 2005 to 2006. If corporate boards could anticipate the crisis, we expect that at least some board structures should be changed dramatically. For example, boards of directors could reduce their shareholdings to prevent future losses. In addition, boards could increase their meeting frequencies to deal with the upcoming crisis. However, the results in Table 8 show that there are no significant differences between 2005 and 2006 in terms of all testing board

¹⁵ The results are similar when we use 18 month pre-crisis period (March 2006 to September 2007).

¹⁶ We also find that traditional board independence has no significant impact on company performance during the pre-crisis period.

variables, indicating that the current financial crisis is an unexpected event to most boards of directors. Second, we measure all board variables at the end of 2006, which is before the beginning of the crisis, while we measure firm performance as the changes in firm value during the crisis. Thus, concerns about endogeneity should be mitigated.

[Insert Table 8 here]

Another possibility is that the changes of board structure during the crisis impact firm stock performance during the crisis, which makes our results hard to interpret. To deal with this issue, we first examine the board structure changes from 2006 to 2008. Again, we do not find significant changes of our main board variables, such as board independence, board true independence, financial expertise, board age, board attendance behavior and board shareholdings. Second, we trace each board of directors of our sample firms from 2006 to 2008. We construct a reduced sample in which we only include firms that have no single board member change from 2006 to 2008. For 876 sample firms, 280 firms have no any changes of directors. We rerun Model 1 of Table 7 using this reduced sample. The results are in Column 1 of Table 9. We find that our main findings in earlier tables all hold when using this reduced sample. The economic magnitudes of most coefficients are higher than those in full sample regressions. This reduced sample test isolates the impact of board changes during the crisis on the identified relationship and further mitigates the endogeneity concerns.

[Insert Table 9 here]

There are two possible problems associated with one of our independent variables Beta. One is the measurement error in Beta because it is a generated regressor from historical market model. Second is that it captures more firms' systematic risk instead of firm-specific risk premium. To deal with these two issues, we first run an errors-in-variables regression to check how low the measurement reliability of Beta could affect our main results materially. We assume that Beta falls to measurement reliability of 0.9 before the results are materially affected.¹⁷ The results are reported in Column 2 of Table 9. We find the main results hold when Beta has a reliability of 0.9, indicating that our findings are not sensitive to the measurement error of Beta.

To more precisely capture firm-specific risk before the crisis, we use idiosyncratic risk as an alternative measure of risk. We first regress a firm's monthly stock return five years before the crisis period on the corresponding NYSE/AMEX/NASDAQ Value-Weighted Index from CRSP. Then we use the standard deviation of the error term from the market model to measure idiosyncratic risk. We rerun Model 1 of Table 7 but use idiosyncratic risk instead of Beta as the measure of firm risk. The results are in Column 3 of Table 9. We find that the main results still hold when controlling for idiosyncratic risk. The economic magnitude of board true independence is even higher than that in Model 1 of Table 7. Consistent with the expectation, we detect a very strong negative relationship between idiosyncratic risk and firm performance during the crisis.

To further isolate the noise in Beta measurement, we use S&P long-term debt rating at the end of 2006 from Compustat to measure firm-specific risk factor. Of the 876 nonfinancial companies, 544 have S&P long-term debt ratings. We construct a variable

¹⁷ Using 0.8 criterion yields similar results.

Rating, which is a score that ranges from 1 to 7. One indicates an AAA rating, 2 indicates an AA rating, 3 indicates an A rating, 4 indicates a BBB rating, 5 indicates a BB rating, 6 indicates a B, and 7 indicates a worse than B rating. We rerun Model 1 of Table 7, but use debt rating as the measure of risk factor. The results are in Column 4 of Table 9. Again, we find that *True Independence* and *Ratio of Outside Financial Expert* are still both positively related to firm stock performance.

We further investigate whether a few observations with extreme stock returns drive the results. The results are robust when we truncate the data at the 1st and 99th percentiles of the returns and board variables. We also perform a median regression that estimates the effect of explanatory variables on the median cumulative stock returns, conditional on the values of explanatory variables. The results also hold. Therefore, we conclude that our results are not driven by outliers.

A final econometric issue that we consider is the correlation of errors because of the interdependence among returns in calendar time. Following Mitton (2002), we address this issue by running simulated regressions of the actual returns on several randomly generated independent variables. In 10,000 repetitions, the coefficients on the hypothetical variables are significant at the 1% level 0.8% of the time, at the 5% level 3.7% of the time, and at the 10% level 6.2% of the time. The simulation results indicate that the correlation of errors is not a serious problem in our data.

5. Conclusion

In this paper, we test whether and how different board characteristics affect firm performance during the current financial crisis. Using cumulative stock returns during the

crisis period as the measure of firm performance, we find that the traditional measure of board independence does not significantly affect firm performance. However, by redefining independent directors as outside directors who are less influenced by current CEOs, a positive and significant relationship appears between this “true independence” and firm performance. The results suggest that not all outside directors are equally effective monitors and that CEO influence compromises the traditional definition of board independence. Future studies of boards of directors should account for these CEO "captures" of board members.

In addition, we find that outside financial experts are important for firm performance, suggesting that financial experience of outside directors is important for board efficacy. Finally, we find that several other board factors, such as board meeting frequency, director attendance behaviors, and director age, affect firm performance during the crisis. Overall, these results suggest that firm stock performance during a crisis is a function of firm-level differences in corporate boards.

The findings in our paper further our understanding of the crisis and support the policy recommendation that firms should build a strong governance system to protect shareholder wealth. However, from the policymakers' perspective, the proper role of corporate boards and the optimal board structure are still debatable issues. The results in our paper, especially those relating to “true independence,” should be of use to policymakers.

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Figure 1: S&P 1500 Index during the financial crisis

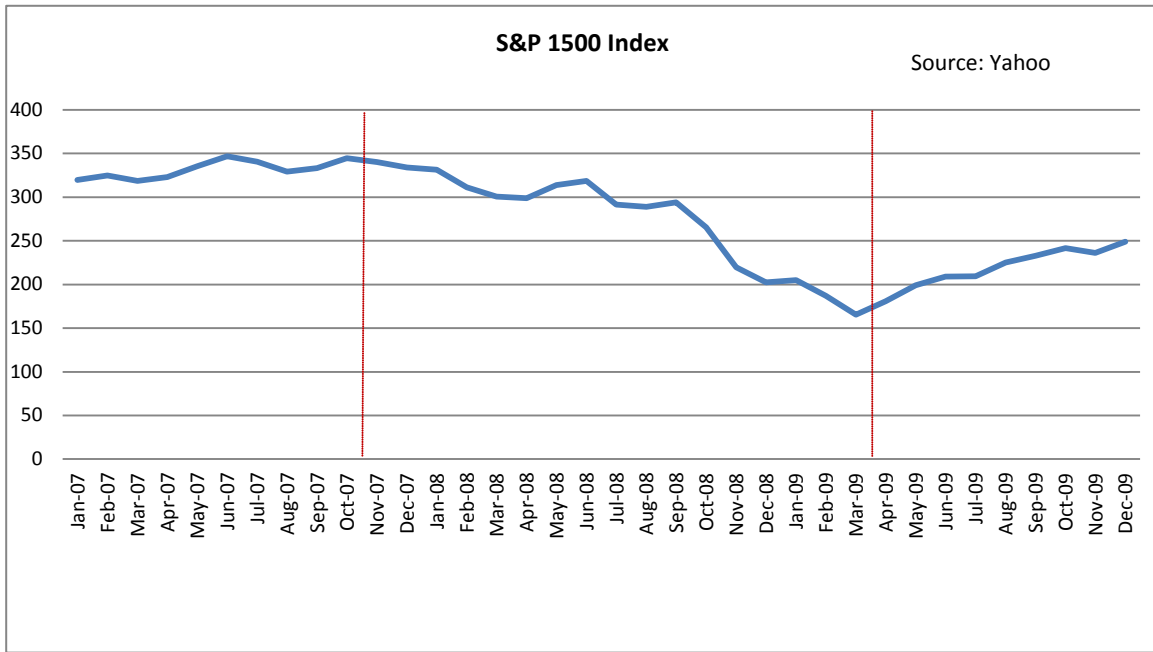
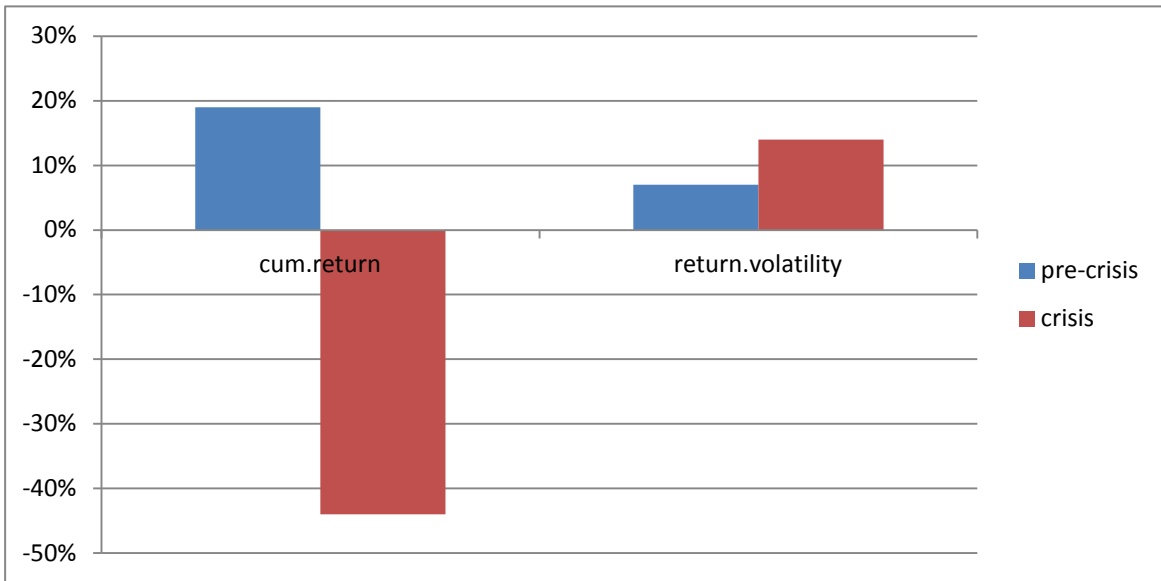


Figure 2: Comparison of firm performance between pre-and during- the crisis

Part A: Cumulative stock returns and return volatility before and during the crisis



Part B: Number of S&P firms with positive or negative stock returns before and during the crisis

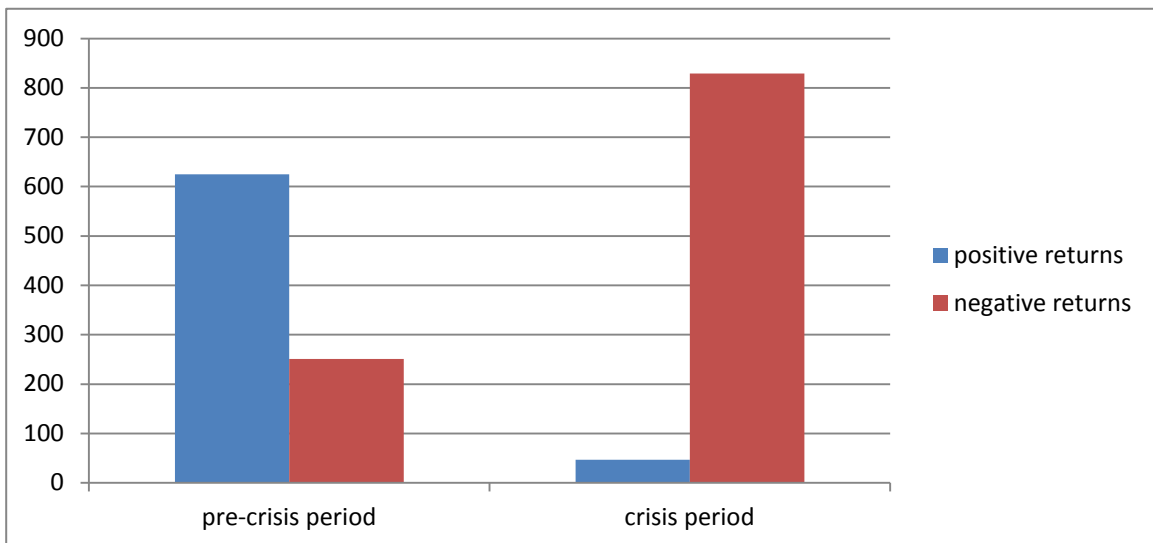


Table 1: Summary Statistics

This table provides summary statistics for the data employed in our analysis. The data set contains 876 nonfinancial firms. *Cum. Returns (Crisis)* is the cumulative stock returns during the financial crisis (October 2007 to March 2009). *Cum. Returns (Pre-crisis)* is the cumulative stock returns before the crisis (October 2006 to September 2007). *Return Volatility (Crisis)* is the standard deviation of stock returns during the crisis. *Return Volatility (Pre-crisis)* is the standard deviation of stock returns before the crisis. *Independence* is the ratio of outside board members to board size. An independent director is a board member who has not been an employee of the firm and who is not affiliated with the firm through business ties or family ties. *True Independence* is a ratio of true independent outside members to board size. A true independent outside member is an outside director who is not selected by the current CEO. *Board Size* is the total number of directors on a board. *Duality* is a dummy variable that equals 1 if the CEO is also the chairman of the board and 0 otherwise. *Financial Expert (Dummy)* indicates whether a financial expert is on the board. *Inside Financial Expert (Dummy)* indicates whether an inside financial expert (CFO, accountant, treasurer, or VP of finance) is on the board. *Outside Financial Expert (Dummy)* indicates whether there is an outside financial expert on the board. *Number of Outside Financial Expert* is the absolute number of outside financial experts on the board. *Ratio of Outside Financial Expert* is the ratio of outside financial experts to board size. *Woman Director (Dummy)* equals 1 if a female director is on the board and 0 otherwise. *Number of Board Meeting* denotes the frequency of board meetings for a given year. *Attendance Problem (Dummy)* equals 1 if at least one director attended fewer than 75% of board meetings in a year and 0 otherwise. *Board Shareholding* is the proportion of total shares held by total board members. *Director Age* is the average age of all directors on the board. *Director Tenure* is the average number of years that directors serve on the board. *Directorship* is the average number of outside board memberships directors hold. *Assets* are the total assets of a firm. *Leverage* is the ratio of total liabilities to total assets. *Market-to-Book Ratio* is the market value of equity to the book value of equity. *ROA* is the ratio of EBIT to total assets. *CEO tenure* is the number of years the executive has been CEO of the firm. *Segment* is the number of two-digit SIC codes in which the firm operates. *G-index* is the Gompers et al. (2003) governance index score. *Beta* is calculated by regressing a firm's monthly stock returns five years before the crisis on the corresponding NYSE/AMEX/NASDAQ Value-Weighted Index from CRSP. All board and firm variables are measured at the end of fiscal year 2006.

| Variables | Obs. | Mean | Std. Dev. | Min. | Max. |
|------------------------------------|------|----------|-----------|--------|------------|
| Stock Performance | | | | | |
| Cum. Returns (Crisis) | 876 | -0.442 | 0.286 | -0.982 | 0.684 |
| Cum. Returns (Pre-crisis) | 876 | 0.197 | 0.302 | -0.768 | 3.978 |
| Return Volatility (Crisis) | 876 | 0.141 | 0.062 | 0.038 | 0.611 |
| Return Volatility(Pre-crisis) | 876 | 0.073 | 0.029 | 0.021 | 0.211 |
| Board Independence | | | | | |
| Independence | 876 | 0.777 | 0.113 | 0.333 | 1.000 |
| True Independence | 876 | 0.601 | 0.271 | 0.000 | 0.941 |
| Financial experts on boards | | | | | |
| Financial Expert (Dummy) | 876 | 0.567 | 0.516 | 0.000 | 1.000 |
| Inside Financial Expert (Dummy) | 876 | 0.133 | 0.368 | 0.000 | 1.000 |
| Outside Financial Expert (Dummy) | 876 | 0.434 | 0.499 | 0.000 | 1.000 |
| Number of Outside Financial Expert | 876 | 0.674 | 0.893 | 0.000 | 5.000 |
| Ratio of Outside Financial Expert | 876 | 0.075 | 0.101 | 0.000 | 0.667 |
| Other Board Characteristics | | | | | |
| Board Size | 876 | 9.142 | 2.166 | 4.000 | 18.000 |
| Duality | 876 | 0.701 | 0.599 | 0.000 | 1.000 |
| Woman Director (Dummy) | 876 | 0.689 | 0.463 | 0.000 | 1.000 |
| Number of Board Meeting | 214 | 8.060 | 3.920 | 3.000 | 25.000 |
| Attendance Problem (Dummy) | 876 | 0.083 | 0.276 | 0.000 | 1.000 |
| Board Shareholding | 876 | 0.077 | 0.161 | 0.000 | 1.000 |
| Director Age | 876 | 61.157 | 3.729 | 46.000 | 73.833 |
| Director Tenure | 876 | 10.955 | 3.663 | 1.000 | 29.143 |
| Directorship | 876 | 0.786 | 0.525 | 0.000 | 2.636 |
| Firm Characteristics | | | | | |
| Assets | 876 | 8391.951 | 30025.010 | 42.624 | 673321.000 |
| Leverage | 876 | 0.194 | 0.161 | 0.001 | 0.956 |
| M/B | 876 | 1.842 | 1.375 | 0.325 | 12.442 |
| ROA | 876 | 0.154 | 0.088 | -0.367 | 0.670 |
| CEO Tenure | 876 | 8.264 | 7.854 | 1.000 | 40.000 |
| Segment | 876 | 3.549 | 2.068 | 1.000 | 11.000 |

| | | | | | |
|---------|-----|-------|-------|-------|--------|
| G-Index | 876 | 9.260 | 2.405 | 2.000 | 18.000 |
| Beta | 876 | 1.067 | 0.544 | 0.029 | 3.748 |

Table 2: Univariate comparisons

This table presents univariate tests of firm performance during the crisis for different board structures. *Cum. Returns (Crisis)* is the cumulative stock returns during the financial crisis (October 2007 to March 2009). *Independence* is the ratio of outside board members to board size. An independent director is a board member who has not been an employee of the firm and who is not affiliated with the firm through business ties or family ties. *True Independence* is a ratio of true independent outside members to board size. A true independent outside member is an outside director who is not selected by the current CEO. *Board Size* is the total number of directors on a board. *Duality* is a dummy variable that equals 1 if the CEO is also the chairman of the board and 0 otherwise. *Financial Expert (Dummy)* indicates whether a financial expert is on the board. *Woman Director (Dummy)* equals 1 if a female director is on the board and 0 otherwise. *Number of Board Meeting* denotes the frequency of board meetings for a given year. *Attendance Problem (Dummy)* equals 1 if at least one director attends fewer than 75% of board meetings in a year and 0 otherwise. *Board Shareholding* is the proportion of total shares held by total board members. *Director Age* is the average age of all directors on the board. *Director Tenure* is the average number of years that directors serve on the board. *Directorship* is the average number of outside board memberships directors hold. All board variables are measured at the end of fiscal year 2006. The means of the differences between the variables for subsamples and T-statistics are reported. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

| | Below Median (or Dummy=0) | | Above Median (or Dummy=1) | | Difference | T-Value |
|----------------------------|---------------------------|-----------------------|---------------------------|-----------------------|------------|---------|
| | N | Cum. returns (crisis) | N | Cum. returns (crisis) | | |
| Independence | 414 | -0.436 | 462 | -0.446 | -0.010 | [0.50] |
| True Independence | 404 | -0.458 | 472 | -0.428 | 0.030* | [1.73] |
| Financial Expert (Dummy) | 379 | -0.472 | 497 | -0.419 | 0.053*** | [2.90] |
| Board Size | 515 | -0.457 | 361 | -0.419 | 0.038** | [2.05] |
| Duality (Dummy) | 408 | -0.441 | 468 | -0.442 | -0.001 | [0.08] |
| Woman Director (Dummy) | 274 | -0.482 | 602 | -0.423 | 0.059*** | [3.04] |
| Number of Board Meeting | 110 | -0.438 | 104 | -0.415 | 0.023 | [0.47] |
| Attendance Problem (Dummy) | 801 | -0.437 | 75 | -0.484 | -0.047 | [1.44] |
| Board Shareholding | 431 | -0.454 | 445 | -0.429 | 0.025 | [1.39] |
| Director Age | 403 | -0.459 | 473 | -0.426 | 0.033* | [1.86] |
| Director Tenure | 429 | -0.441 | 447 | -0.442 | -0.001 | [0.12] |
| Directorship | 439 | -0.437 | 437 | -0.446 | -0.009 | [0.58] |

Table 3: Board Independence and firm stock performance during the crisis

This table presents OLS regression results for the effect of board independence and true independence on firm stock performance. The dependent variable is the cumulative stock returns during the financial crisis (October 2007 to March 2009). *Independence* is the ratio of outside board members to board size. An independent director is a board member who has not been an employee of the firm and who is not affiliated with the firm through business ties or family ties. *True Independence* is a ratio of true independent outside members to board size. A true independent outside member is an outside director who is not selected by the current CEO. True Independence Board is a dummy variable that equals 1 if a board has more than 50% of directors who are true independent outside members, and 0 otherwise. *Log (Assets)* is the logarithm of the total assets of a firm. *Leverage* is the ratio of total liabilities to total assets. *M/B* is the market value of equity to the book value of equity. *ROA* is the ratio of EBIT to total assets. *CEO Tenure* is the number of years the executive has been CEO of the firm. *Segment* is the number of two-digit SIC codes in which the firm operates. *Beta* is calculated by regressing a firm's monthly stock returns five years before the crisis period on the corresponding NYSE/AMEX/NASDAQ Value-Weighted Index from CRSP. *G-index* is the Gompers et al. (2003) governance index score. All variables are measured at the end of fiscal year 2006. We estimate our regressions using indicator variables for a firm's primary one-digit SIC code to control for industry differences. Heteroskedasticity robust t-statistics are in parentheses. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

| | (1) | (2) | (3) |
|---------------------------------|---------------------|---------------------|---------------------|
| Board Structure | | | |
| Independence | 0.030 [0.39] | | |
| True Independence Board (Dummy) | | 0.052** [2.53] | |
| True Independence | | | 0.092*** [2.65] |
| Firm Characteristics | | | |
| Log (Assets) | 0.006 [0.96] | 0.001 [0.07] | 0.001 [0.04] |
| Leverage | -0.267*** [4.59] | -0.272*** [4.74] | -0.267*** [4.64] |
| M/B | 0.032*** [3.51] | 0.033*** [3.59] | 0.033*** [3.65] |
| ROA | -0.266** [2.07] | -0.253** [1.99] | -0.252** [1.98] |
| CEO Tenure | 0.001 [0.80] | 0.001 [1.36] | 0.001 [1.38] |
| Segment | -0.003 [0.66] | -0.004 [0.78] | -0.003 [0.73] |
| Beta | -0.181*** [9.62] | -0.180*** [9.64] | -0.180*** [9.58] |
| G-index | -0.004 [1.18] | -0.006* [1.67] | -0.006* [1.66] |
| Control For | | | |
| Industry Effect | Y | Y | Y |
| Observations | 876 | 876 | 876 |
| Adjusted R-squared | 0.20 | 0.21 | 0.21 |

Table 4: Financial experts on boards and firm stock performance during the crisis

This table presents OLS regression results for the effect of financial experts on firm stock performance. The dependent variable is the cumulative stock returns during the financial crisis (October 2007 to March 2009). *Financial Expert (Dummy)* indicates whether a financial expert is on the board. *Inside Financial Expert (Dummy)* indicates whether an inside financial expert (CFO, accountant, treasurer, or VP of finance) is on the board. *Outside Financial Expert (Dummy)* indicates whether an outside financial expert is on the board. *Number of Outside Financial Expert* is the absolute number of outside financial experts on the board. *Ratio of Outside Financial Expert* is the ratio of outside financial experts to board size. *Log (Assets)* is the logarithm of total assets of a firm. *Leverage* is the ratio of total liabilities to total assets. *M/B* is the market value of equity to the book value of equity. *ROA* is the ratio of EBIT to total assets. *CEO Tenure* is the number of years the executive has been CEO of the firm. *Segment* is the number of two-digit SIC codes in which the firm operates. *Beta* is calculated by regressing a firm's monthly stock returns five years before the crisis period on the corresponding NYSE/AMEX/NASDAQ Value-Weighted Index from CRSP. *G-index* is the Gompers et al. (2003) governance index score. All variables are measured at the end of fiscal year 2006. We estimate our regressions using indicator variables for a firm's primary one-digit SIC code to control for industry differences. Heteroskedasticity robust t-statistics are in parentheses. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

| | (1) | (2) | (3) | (4) | (5) |
|---|---------------------|---------------------|---------------------|---------------------|---------------------|
| <i>Financial experts on boards</i> | | | | | |
| Financial Expert (Dummy) | 0.034** [2.08] | | | | |
| Inside Financial Expert (Dummy) | | -0.005 [0.25] | | | |
| Outside Financial Expert (Dummy) | | | 0.052*** [3.14] | | |
| Number of Outside Financial Expert | | | | 0.037*** [3.87] | |
| Ratio of Outside Financial Expert | | | | | 0.309*** [3.63] |
| <i>Firm Characteristics</i> | | | | | |
| Log (Assets) | 0.005 [0.92] | 0.005 [0.91] | 0.005 [0.84] | 0.005 [0.85] | 0.007 [1.21] |
| Leverage | -0.269*** [4.69] | -0.270*** [4.64] | -0.270*** [4.75] | -0.282*** [4.93] | -0.280*** [4.89] |
| M/B | 0.032*** [3.59] | 0.032*** [3.52] | 0.032*** [3.63] | 0.032*** [3.61] | 0.032*** [3.58] |
| ROA | -0.253** [1.98] | -0.266** [2.07] | -0.247* [1.96] | -0.243* [1.90] | -0.245* [1.91] |
| CEO Tenure | 0.001 [0.98] | 0.001 [0.94] | 0.001 [1.01] | 0.001 [1.04] | 0.001 [1.04] |
| Segment | -0.003 [0.73] | -0.003 [0.66] | -0.003 [0.66] | -0.003 [0.59] | -0.002 [0.53] |
| Beta | -0.181*** [9.69] | -0.181*** [9.63] | -0.181*** [9.72] | -0.180*** [9.69] | -0.181*** [9.70] |
| G-index | -0.004 [1.19] | -0.004 [1.26] | -0.004 [1.16] | -0.004 [1.24] | -0.004 [1.14] |
| <i>Control For</i> | | | | | |
| Industry Effect | Y | Y | Y | Y | Y |
| Observations | 876 | 876 | 876 | 876 | 876 |
| Adjusted R-squared | 0.21 | 0.20 | 0.21 | 0.21 | 0.21 |

Table 5: Which one matters: True independence or outside financial expertise?

This table presents OLS regression results for the effect of true independence and outside financial expertise on stock performance. The dependent variable is the cumulative stock returns during the financial crisis (October 2007 to March 2009). *True Independence* is a ratio of true independent outside members to board size. A true independent outside member is an outside director who is not selected by the current CEO (excluding outside financial experts). *Outside Financial Expert (Dummy)* indicates whether an outside financial expert is on the board (excluding true independent directors). *Log (Assets)* is the logarithm of total assets of a firm. *Leverage* is the ratio of total liabilities to total assets. *M/B* is the market value of equity to the book value of equity. *ROA* is the ratio of EBIT to total assets. *CEO Tenure* is the number of years the executive has been CEO of the firm. *Segment* is the number of two-digit SIC codes in which the firm operates. *Beta* is calculated by regressing a firm's monthly stock returns five years before the crisis period on the corresponding NYSE/AMEX/NASDAQ Value-Weighted Index from CRSP. *G-index* is the Gompers et al. (2003) governance index score. All variables are measured at the end of fiscal year 2006. We estimate our regressions using indicator variables for a firm's primary one-digit SIC code to control for industry differences. Heteroskedasticity robust t-statistics are in parentheses. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

| | (1) | (2) | (3) |
|--|----------------------|----------------------|--|
| | (Full Sample) | (Full Sample) | (Firms with Outside Financial Expertise) |
| Board Structure | | | |
| True Independence (Excluding outside financial experts) | 0.070** [1.99] | | |
| Outside Financial Expert (Dummy) (Excluding truly independent directors) | | 0.049*** [2.85] | 0.014 [0.44] |
| Firm Characteristics | | | |
| Log (Assets) | 0.001 [0.19] | 0.006 [1.01] | 0.005 [0.53] |
| Leverage | -0.268*** [4.64] | -0.277*** [4.81] | -0.151* [1.74] |
| M/B | 0.033*** [4.23] | 0.032*** [4.10] | 0.043*** [3.25] |
| ROA | -0.259** [2.16] | -0.269** [2.25] | -0.067 [0.36] |
| CEO Tenure | 0.001 [1.23] | 0.001 [0.79] | -0.001 [0.76] |
| Segment | -0.003 [0.68] | -0.003 [0.56] | 0.001 [0.07] |
| Beta | -0.181*** [10.25] | -0.183*** [10.41] | -0.195*** [7.44] |
| G-index | -0.005 [1.47] | -0.004 [1.12] | 0.001 [0.14] |
| Control For | | | |
| Industry Effect | Y | Y | Y |
| Observations | 876 | 876 | 414 |
| Adjusted R-squared | 0.21 | 0.21 | 0.22 |

Table 6: Other board characteristics and firm stock performance during the crisis

This table presents OLS regression results for the effect of other board characteristics on firm stock performance. The dependent variable is the cumulative stock returns during the financial crisis (October 2007 to March 2009). *Log (Board Size)* is the logarithm of total number of directors on a board. *Duality* is a dummy variable which equals one if the CEO is also the chairman of the board, and zero otherwise. *Woman Director (Dummy)* equals 1 if a female director is on the board and 0 otherwise. *Number of Board Meeting* indicates the frequency of board meetings for a given year. *Attendance Problem (Dummy)* is a dummy variable that equals 1 if at least one director attends fewer than 75% of board meetings in a year and 0 otherwise. *Director Age* is the average age of all directors on the board. *Director Tenure* is the average number of years that directors serve on the board. *Directorship* is the average number of outside board memberships directors hold. *Board Shareholding* is the proportion of total shares held by total board members. *Log (Assets)* is the logarithm of total assets of a firm. *Leverage* is the ratio of total liabilities to total assets. *M/B* is the market value of equity to the book value of equity. *ROA* is the ratio of EBIT to total assets. *CEO Tenure* is the number of years the executive has been CEO of the firm. *Segment* is the number of two-digit SIC codes in which the firm operates. *Beta* is calculated by regressing a firm's monthly stock returns five years before the crisis period on the corresponding NYSE/AMEX/NASDAQ Value-Weighted Index from CRSP. *G-index* is the Gompers et al. (2003) governance index score. All variables are measured at the end of fiscal year 2006. We estimate our regressions using indicator variables for a firm's primary one-digit SIC code to control for industry differences. Heteroskedasticity robust t-statistics are in parentheses. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Board Characteristics | | | | | | | | | |
| Log (Board Size) | 0.005 [0.11] | | | | | | | | |
| Duality | | -0.018 [1.06] | | | | | | | |
| Woman Director (Dummy) | | | 0.013 [0.67] | | | | | | |
| Number of Board Meeting | | | | 0.019*** [3.28] | | | | | |
| Attendance Problem (Dummy) | | | | | -0.051* [1.88] | | | | |
| Director Age | | | | | | 0.224* [1.67] | | | |
| Director Tenure | | | | | | | 0.012 [0.44] | | |
| Directorship | | | | | | | | 0.008 [0.48] | |
| Board Shareholding | | | | | | | | | 0.024 [0.43] |
| Firm Characteristics | | | | | | | | | |
| Log (Assets) | 0.005 [0.75] | 0.006 [1.04] | 0.004 [0.67] | 0.003 [0.22] | 0.006 [1.01] | 0.005 [0.83] | 0.005 [0.95] | 0.004 [0.60] | 0.005 [0.96] |
| Leverage | -0.270*** [4.65] | -0.270*** [4.66] | -0.269*** [4.63] | -0.362*** [3.39] | -0.269*** [4.67] | -0.264*** [4.61] | -0.268*** [4.62] | -0.271*** [4.69] | -0.268*** [4.62] |

| | | | | | | | | | |
|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| M/B | 0.032*** | 0.032*** | 0.033*** | 0.034** | 0.032*** | 0.033*** | 0.032*** | 0.032*** | 0.032*** |
| | [3.52] | [3.52] | [3.52] | [2.34] | [3.47] | [3.63] | [3.56] | [3.50] | [3.54] |
| ROA | -0.266** | -0.261** | -0.268** | -0.286 | -0.260** | -0.266** | -0.269** | -0.267** | -0.266** |
| | [2.07] | [2.04] | [2.08] | [1.15] | [2.03] | [2.09] | [2.09] | [2.08] | [2.08] |
| CEO Tenure | 0.001 | 0.001 | 0.001 | -0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| | [0.94] | [1.02] | [0.99] | [0.30] | [0.84] | [0.57] | [0.68] | [1.00] | [0.80] |
| Segment | -0.003 | -0.003 | -0.003 | -0.009 | -0.003 | -0.004 | -0.003 | -0.003 | -0.003 |
| | [0.68] | [0.69] | [0.68] | [1.10] | [0.75] | [0.79] | [0.67] | [0.70] | [0.69] |
| Beta | -0.181*** | -0.182*** | -0.180*** | -0.206*** | -0.180*** | -0.177*** | -0.180*** | -0.182*** | -0.181*** |
| | [9.46] | [9.68] | [9.39] | [5.09] | [9.55] | [9.40] | [9.49] | [9.73] | [9.58] |
| G-index | -0.004 | -0.004 | -0.004 | -0.001 | -0.004 | -0.004 | -0.004 | -0.004 | -0.004 |
| | [1.26] | [1.15] | [1.32] | [0.10] | [1.26] | [1.32] | [1.31] | [1.29] | [1.12] |
| <i>Control For</i> | | | | | | | | | |
| Industry Effect | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Observations | 876 | 876 | 876 | 214 | 876 | 876 | 876 | 876 | 876 |
| Adjusted R-squared | 0.20 | 0.20 | 0.20 | 0.30 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |

Table 7: Corporate boards and firm performance during the crisis: All variables combined

This table presents robustness-check results for the effects of all board characteristics on firm stock performance. The dependent variable is the cumulative stock returns and cumulative ROA during the financial crisis. Crisis period cumulative ROA is defined as the cumulative quarterly net income from 2007Q3 to 2009Q1 divided by the total assets at the end of 2007Q2. *True Independence* is a ratio of true independent outside members to board size. A true independent outside member is an outside director who is not selected by the current CEO. *Board Size* is the total number of directors on a board. *Duality* is a dummy variable that equals 1 if the CEO is also the chairman of the board and 0 otherwise. *Ratio of Outside Financial Expert* is the ratio of number of outside financial experts to board size. *Woman Director (Dummy)* is a dummy variable that equals 1 if a female director is on the board and 0 otherwise. *Number of Board Meeting* is the frequency of board meetings for a given year. *Attendance Problem (Dummy)* equals 1 if at least one director attends fewer than 75% of board meetings in a year and 0 otherwise. *Board Shareholding* is the proportion of total shares held by total board members. *Director Age* is the average age of all directors on the board. *Director Tenure* is the average number of years that directors serve on the board. *Directorship* is the average number of outside board memberships directors hold. *Log (Assets)* is the logarithm of total assets of a firm. *Leverage* is the ratio of total liabilities to total assets. *M/B* is the market value of equity to the book value of equity. *ROA* is the ratio of EBIT to total assets. *CEO Tenure* is the number of years the executive has been CEO of the firm. *Segment* is the number of two-digit SIC codes in which the firm operates. *Beta* is calculated by regressing a firm's monthly stock returns five years before the crisis period on the corresponding NYSE/AMEX/NASDAQ Value-Weighted Index from CRSP. *Idiosyncratic Risk* is the residual volatility estimated from the market model. *Rating* is a score that ranges from 1 to 7, with 1 indicating an AAA rating, 2 indicating an AA rating, 3 indicating an A rating, 4 indicating a BBB rating, 5 indicating a BB rating, 6 indicating a B, and 7 indicating a worse than B rating. *G-index* is the Gompers et al. (2003) governance index score. All variables are measured at the end of fiscal year 2006. We estimate our regressions using indicator variables for a firm's primary one-digit SIC code to control for industry differences. Heteroskedasticity robust t-statistics are in parentheses. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

| | (1) | (2) | (3) | (4) |
|-----------------------------------|-----------------------|-----------------------|---------------------|--------------------------|
| | Cum. Returns (Crisis) | Cum. Returns (Crisis) | ROA (Crisis) | Cum. Returns(Pre-Crisis) |
| | (Oct 2007-Mar 2009) | (Jul 2007-Mar 2009) | (Oct 2007-Mar 2009) | (Oct 2006-Sep 2007) |
| Board Characteristics | | | | |
| True Independence | 0.107*** [2.87] | 0.095** [2.52] | 0.047* [1.77] | -0.037 [0.80] |
| Log (Board Size) | -0.017 [0.34] | 0.002 [0.04] | -0.022 [0.71] | 0.032 [0.50] |
| Duality | -0.012 [0.73] | -0.011 [0.69] | 0.010 [0.85] | -0.013 [0.63] |
| Ratio of Outside Financial Expert | 0.339*** [3.92] | 0.252*** [2.88] | 0.117* [1.89] | -0.114 [0.89] |
| Woman Director (Dummy) | 0.010 [0.45] | -0.008 [0.37] | -0.010 [0.61] | -0.065** [2.27] |
| Less Attendance (Dummy) | -0.051* [1.95] | -0.045* [1.71] | -0.012 [0.61] | -0.016 [0.47] |
| Director Age | 0.302* [1.94] | 0.278* [1.70] | 0.124 [1.11] | -0.062 [0.29] |
| Director Tenure | 0.012 [0.36] | 0.017 [0.56] | 0.027 [1.19] | -0.029 [0.73] |
| Directorship | -0.006 [0.33] | 0.008 [0.45] | 0.012 [0.99] | 0.020 [0.84] |
| Board Shareholding | 0.057 [1.03] | 0.002 [0.04] | -0.043 [1.38] | -0.085 [1.02] |
| Firm Characteristics | | | | |
| Log (Assets) | 0.003 [0.46] | 0.011 [1.44] | 0.007 [1.30] | 0.004 [0.35] |
| Leverage | -0.265*** [4.80] | -0.316*** [5.65] | -0.064 [1.42] | -0.185** [2.20] |
| M/B | 0.034*** [3.85] | 0.050*** [5.27] | 0.041*** [3.76] | -0.002 [0.18] |
| ROA | -0.225* [1.78] | -0.416*** [3.54] | 0.405** [2.44] | -0.138 [0.64] |

| | | | | |
|---------------------------|-----------|-----------|-----------|--------|
| CEO Tenure | 0.001 | 0.001 | 0.001 | -0.001 |
| | [0.53] | [0.69] | [0.50] | [0.35] |
| Segment | -0.004 | -0.004 | 0.002 | 0.009 |
| | [0.81] | [0.75] | [0.49] | [1.54] |
| Beta | -0.168*** | -0.187*** | -0.099*** | -0.013 |
| | [8.94] | [10.12] | [6.35] | [0.51] |
| G-index | -0.005 | -0.006* | -0.003 | -0.006 |
| | [1.31] | [1.68] | [1.13] | [1.18] |
| <i>Control For</i> | | | | |
| Industry Effect | Y | Y | Y | Y |
| Observations | 876 | 876 | 830 | 876 |
| Adjusted R-squared | 0.22 | 0.22 | 0.27 | 0.04 |

Table 8: Univariate comparison of board structure between 2005 and 2006

This table presents univariate tests of board structure between 2005 and 2006. *Independence* is the ratio of outside board members to board size. An independent director is a board member who has not been an employee of the firm and who is not affiliated with the firm through business ties or family ties. *True Independence* is a ratio of true independent outside members to board size. A true independent outside member is an outside director who is not selected by the current CEO. *Board Size* is the total number of directors on a board. *Duality* is a dummy variable that equals 1 if the CEO is also the chairman of the board and 0 otherwise. *Financial Expert (Dummy)* indicates whether a financial expert is on the board. *Woman Director (Dummy)* equals 1 if a female director is on the board and 0 otherwise. *Number of Board Meeting* denotes the frequency of board meetings for a given year. *Attendance Problem (Dummy)* equals 1 if at least one director attends fewer than 75% of board meetings in a year and 0 otherwise. *Board Shareholding* is the proportion of total shares held by total board members. *Director Age* is the average age of all directors on the board. *Director Tenure* is the average number of years that directors serve on the board. *Directorship* is the average number of outside board memberships directors hold. The means of the differences and T-statistics are reported. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

| | 2005 | 2006 | Differences | T-value |
|----------------------------------|--------|--------|-------------|---------|
| Independence | 0.728 | 0.777 | 0.049 | [1.15] |
| True Independence | 0.596 | 0.601 | 0.005 | [0.36] |
| Board Size | 9.183 | 9.142 | -0.041 | [0.51] |
| Duality (Dummy) | 0.729 | 0.701 | -0.028 | [1.34] |
| Outside Financial Expert (Dummy) | 0.430 | 0.434 | 0.004 | [0.33] |
| Woman Director (Dummy) | 0.682 | 0.689 | 0.007 | [0.51] |
| Number of Board Meeting | 7.669 | 8.060 | 0.391 | [1.01] |
| Attendance Problem (Dummy) | 0.079 | 0.083 | 0.004 | [0.32] |
| Board Shareholding | 0.081 | 0.077 | -0.004 | [0.35] |
| Director Age | 60.960 | 61.157 | 0.197 | [1.15] |
| Director Tenure | 10.237 | 10.955 | 0.718 | [1.34] |
| Directorship | 0.768 | 0.786 | 0.018 | [0.69] |

Table 9: Additional robustness checks

This table presents robustness-check results for the effects of all board characteristics on firm stock performance. The dependent variable is the cumulative stock returns during the financial crisis (October 2007 to March 2009). *True Independence* is a ratio of true independent outside members to board size. A true independent outside member is an outside director who is not selected by the current CEO. *Board Size* is the total number of directors on a board. *Duality* is a dummy variable that equals 1 if the CEO is also the chairman of the board and 0 otherwise. *Ratio of Outside Financial Expert* is the ratio of number of outside financial experts to board size. *Woman Director (Dummy)* is a dummy variable that equals 1 if a female director is on the board and 0 otherwise. *Number of Board Meeting* is the frequency of board meetings for a given year. *Attendance Problem (Dummy)* equals 1 if at least one director attends fewer than 75% of board meetings in a year and 0 otherwise. *Board Shareholding* is the proportion of total shares held by total board members. *Director Age* is the average age of all directors on the board. *Director Tenure* is the average number of years that directors serve on the board. *Directorship* is the average number of outside board memberships directors hold. *Log (Assets)* is the logarithm of total assets of a firm. *Leverage* is the ratio of total liabilities to total assets. *M/B* is the market value of equity to the book value of equity. *ROA* is the ratio of EBIT to total assets. *CEO Tenure* is the number of years the executive has been CEO of the firm. *Segment* is the number of two-digit SIC codes in which the firm operates. *Beta* is calculated by regressing a firm's monthly stock returns five years before the crisis period on the corresponding NYSE/AMEX/NASDAQ Value-Weighted Index from CRSP. *Idiosyncratic Risk* is the residual volatility estimated from the market model. *Rating* is a score that ranges from 1 to 7, with 1 indicating an AAA rating, 2 indicating an AA rating, 3 indicating an A rating, 4 indicating a BBB rating, 5 indicating a BB rating, 6 indicating a B, and 7 indicating a worse than B rating. *G-index* is the Gompers et al. (2003) governance index score. All variables are measured at the end of fiscal year 2006. We estimate our regressions using indicator variables for a firm's primary one-digit SIC code to control for industry differences. Heteroskedasticity robust t-statistics are in parentheses. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

| | (1) | (2) | (3) | (4) |
|-----------------------------------|---|-----------------------------------|-------------------------------------|------------------------------|
| | Reduced Sample Without Board Changes | Errors-in-variables Regression | Idiosyncratic Risk Measures Risk | Debt Rating Measures Risk |
| Board Characteristics | | | | |
| True Independence | 0.162** [2.47] | 0.104*** [3.00] | 0.110*** [2.83] | 0.182** [2.08] |
| Log (Board Size) | 0.090 [1.13] | -0.020 [0.44] | -0.013 [0.26] | 0.071 [0.70] |
| Duality | -0.022 [0.73] | -0.013 [0.81] | -0.009 [0.54] | -0.005 [0.15] |
| Ratio of Outside Financial Expert | 0.382** [2.57] | 0.334*** [4.16] | 0.386*** [4.29] | 0.342** [2.00] |
| Woman Director (Dummy) | 0.027 [0.68] | 0.004 [0.21] | 0.024 [1.08] | 0.023 [0.47] |
| Less Attendance (Dummy) | -0.086* [1.72] | -0.050* [1.73] | -0.058** [2.13] | -0.112* [1.82] |
| Director Age | 0.436* [1.71] | 0.264* [1.73] | 0.454*** [2.82] | 0.532* [1.75] |
| Director Tenure | 0.017 [0.30] | 0.009 [0.29] | 0.017 [0.50] | 0.017 [0.25] |
| Directorship | -0.020 [0.52] | -0.002 [0.12] | -0.025 [1.35] | -0.024 [0.64] |
| Board Shareholding | 0.126 [1.11] | 0.052 [0.97] | 0.07 [1.18] | 0.031 [0.28] |
| Firm Characteristics | | | | |
| Log (Assets) | 0.004 [0.28] | 0.003 [0.43] | 0.005 [0.60] | 0.007 [0.69] |
| Leverage | -0.398*** [3.94] | -0.277*** [4.83] | -0.202*** [3.57] | -0.188** [2.23] |
| M/B | 0.047*** [3.04] | 0.035*** [4.56] | 0.032*** [3.33] | 0.031*** [3.22] |
| ROA | -0.493** [2.46] | -0.271** [2.27] | -0.093 [0.66] | 0.028 [0.11] |
| CEO Tenure | 0.002 | 0.001 | 0.001 | -0.003 |

| | | | | |
|---------------------------|-----------|-----------|-----------|-----------|
| | [0.76] | [0.63] | [0.26] | [1.11] |
| Segment | -0.014 | -0.004 | -0.004 | -0.001 |
| | [1.62] | [0.87] | [0.80] | [0.15] |
| Beta | -0.096*** | -0.199*** | | |
| | [3.06] | [9.35] | | |
| Idiosyncratic Risk | | | -1.116*** | |
| | | | [4.14] | |
| Rating | | | | -0.127*** |
| | | | | [7.05] |
| G-index | -0.007 | -0.005 | -0.004 | -0.006 |
| | [0.99] | [1.47] | [0.99] | [0.77] |
| <i>Control For</i> | | | | |
| Industry Effect | | | | |
| Observations | 280 | 876 | 876 | 544 |
| Adjusted R-squared | 0.20 | 0.26 | 0.19 | 0.23 |

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