

**Corporate Governance in the 2007-2008 Financial Crisis:  
Evidence from Financial Institutions Worldwide**

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# **Corporate Governance in the 2007-2008 Financial Crisis: Evidence from Financial Institutions Worldwide**

## **Abstract**

This paper investigates the role of corporate governance in the 2007-2008 financial crisis, using a unique dataset of 296 financial firms from 30 countries that were at the center of the crisis. Paradoxically, we find that while boards and shareholders appear to have executed their monitoring role by replacing poorly performing CEOs during the crisis, they also seem to have encouraged investments in subprime mortgage related assets that led to large losses during the crisis. Further exploration of the relation between governance and shareholder losses finds evidence consistent with shareholders having encouraged managers to take aggressive risks before the crisis, but does not find evidence consistent with boards having done so. Instead, our findings suggest that reputational concerns of board members explain why firms with more independent boards suffered from worse stock returns and recognized larger writedowns during the crisis. In particular, we find that firms with more independent boards were more likely to raise capital during the crisis, even though this came at a great cost to existing shareholders. In addition, we find that firms with more independent boards were more likely to disclose writedowns, which made it appear as if these firms recognized larger writedowns than other firms. Overall, our results are inconsistent with the losses during the financial crisis being the result of lax oversight by boards and investors. Rather, our results are consistent with risk-taking encouraged by shareholders and reputational concerns of directors having contributed to the losses.

# **Corporate Governance in the 2007-2008 Financial Crisis: Evidence from Financial Institutions Worldwide**

## **1. Introduction**

An unprecedented large number of financial institutions have collapsed or were bailed out by governments worldwide since the onset of the global financial crisis in 2007.<sup>1</sup> Many observers attribute these events to lax oversight by boards and investors (Kirkpatrick, 2008; Schapiro, 2009). However, while governance reforms are being considered to restore the stability of global financial systems, there is little empirical evidence on the role that corporate governance played in the financial crisis.<sup>2</sup> The purpose of this paper is to provide this empirical evidence.

We investigate the role of corporate governance in the financial crisis using a unique dataset comprised of 296 of the world's largest financial firms across 30 countries, for which we collect data on board characteristics, ownership structure, CEOs, firm performance, and risk-taking. We use a global sample because these firms were at the center of the financial crisis. Moreover, using a cross-country setting allows us to take advantage of variation in corporate governance characteristics that are fairly homogenous in some countries, but not in others.

Paradoxically, we find that while boards and shareholders appear to have executed their monitoring role by replacing poorly performing CEOs during the crisis, they also seem to have encouraged investments in subprime mortgage related assets that led to large losses during the crisis. In particular, we find that firms with more independent boards and greater institutional ownership were not only more likely to replace their CEOs for poor performance, but also experienced worse stock returns and recognized larger writedowns during the crisis period.

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<sup>1</sup>The list of casualties includes Bear Stearns, Citigroup, Lehman Brothers, Merrill Lynch (in the U.S.), HBOS and RBS (in the U.K.), and Dexia, Fortis, Hypo Real Estate and UBS (in continental Europe).

<sup>2</sup>See "SEC to examine boards' role in financial crisis" (*Washington Post*, February 20, 2009), "Fed chief calls for scrutiny of executive pay policies" (*New York Times*, March 21, 2009)

A potential explanation for the latter finding is that boards and shareholders have encouraged managers to increase shareholder returns through aggressive risk-taking. Firms with stronger monitoring by boards and shareholders may have taken more risk before the crisis, because managers that have accumulated firm-specific human capital and enjoy private benefits of control tend to seek a lower level of risk than shareholders that do not have those skills and privileges (Laeven and Levine, 2008). We find mixed support for this explanation. In particular, while we find that firms with greater institutional ownership took more risk before the crisis, we do not find that firms with more independent boards did so. Thus, our findings are inconsistent with boards actively encouraging managers to take more risk in their investment policies before the onset of the crisis.

An alternative explanation for the relation between shareholder losses and board independence is that independent directors, out of concern for their reputations, pushed managers into taking actions during the crisis that resulted in worse stock returns and the recognition of larger writedowns. In particular, prior literature finds that outside directors hold fewer board seats after serving in companies that experienced financial distress and firms that were liquidated (Gilson, 1990; Harford, 2003). Therefore, outside directors have a significant incentive to ward off the negative reputational consequences of a bankruptcy by requiring firms to raise capital, even if this would be costly to existing shareholders during the crisis period. Raising capital during the crisis was costly because it sent a negative signal to the market that there were more losses to come (Myers and Majluf, 1984). In addition, reputational concerns gave independent directors an incentive to require management to disclose writedowns. Consistent with this alternative explanation, we find that firms with more independent boards were more likely to raise capital and that the association between stock returns and board independence becomes

insignificant once we exclude firms that raised capital during the crisis from our sample. Moreover, consistent with the relation between writedowns and board independence being driven by cross-sectional differences in disclosure policies, we find that after controlling for firm performance, firms with more independent boards were more likely to disclose writedowns during the crisis period. Thus, our results are consistent with independent directors' reputational considerations driving the relation between shareholder losses and board independence.

In addition to board independence and institutional ownership, we also examine the role of large shareholders (shareholders with more than 10% of a firm's voting rights) in the financial crisis. Consistent with control mechanisms being ineffective in disciplining poorly performing CEOs, we find that firms with large shareholders had lower CEO turnover-performance sensitivities during the crisis. In addition, consistent with large shareholders using their influence over management to maximize the value of their investments, we find that firms with large shareholders took more risk before the crisis, and were less likely to raise capital during the crisis period.

We also examine whether the crisis has had negative repercussions for outside board members. Consistent with board members being held accountable for the losses we find that outside board members were more likely to leave a firm's board if a firm suffered larger writedowns and directors were a member of the risk committee. Moreover, we find a positive association between director turnover and CEO turnover, which provides further evidence for investors holding not only managers, but also directors accountable for the losses.

Our paper adds to the current debate on the regulatory reform of financial institutions and contributes to the literature on corporate governance in several ways. First, we contribute to the current debate by providing a timely and comprehensive investigation of the 2007-2008 financial

crisis. While some of our findings have been documented in prior studies, such as the effect of board independence on CEO turnover-performance sensitivity, it is unclear whether the existing evidence can be applied to a crisis environment spanning the entire globe.<sup>3</sup> Given that the crisis is a momentous economic event of great public interest (Gorton, 2008), it is important to provide a comprehensive analysis on the role of corporate governance. To our knowledge, our study is the first that examines the role of corporate boards, institutional investors, and dominant shareholders in the 2007-2008 financial crisis using a global sample. Furthermore, we take a broader view of the role of corporate governance in the financial crisis than other concurrent papers by investigating various aspects of the crisis including CEO turnover, shareholder losses, capital raisings and financial disclosures during the crisis, and risk-taking prior to the crisis. For example, Beltratti and Stulz (2009) use a sample of 98 banks from 20 countries, but examine only how governance indices and bank regulation relate to bank performance during the crisis.

Second, our study complements prior studies on the role of corporate governance in a crisis setting. For example, prior studies find that stronger monitoring is associated with better performance during the 1997-1998 Asian financial crisis and highlight the importance of governance reform in this region (Johnson et al., 2000; Mitton, 2002). In contrast, our results find that strong monitoring is associated with worse performance during the 2007-2008 financial crisis and suggest that shareholder losses during the 2007-2008 financial crisis are not caused by lax oversight by boards and investors. Thus, our findings suggest that the implications of prior studies on crises in emerging markets do not extend to the 2007-2008 financial crisis.

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<sup>3</sup>There is a wide variation in CEO turnover rates across countries during the crisis. Examples of CEO turnover include Citigroup, Merrill Lynch, and Wachovia (in the U.S.), UBS (in Switzerland), and IKB Deutsche Industriebank (in Germany). However, CEOs of many other firms suffering substantial losses maintained their positions. See “Hall of shame” (*The Economist*, August 7, 2008).

Third, our study contributes to the corporate governance literature in general. For example, our study adds to the literature on the influence of corporate governance on risk-taking. Prior studies have examined the impact of large shareholders and managerial ownership on risk-taking by banks (Laeven and Levine, 2008). We complement this literature by finding that institutional investors have a significant impact on risk-taking by financial institutions. In addition, prior studies generally find that the market for directorships creates an alignment between director and shareholder interests, as reflected in the replacement of poorly performing CEOs and financial reporting transparency (Weisbach, 1988; Anderson et al., 2004). Our finding that firms with more independent boards were more likely to raise capital during the crisis period, even though this came at a significant cost to existing shareholders, suggests that directors' reputational concerns can create a misalignment between director and shareholder interests.

The remainder of the study proceeds as follows. Section 2 describes our data. Section 3 presents our main results. Section 4 provides additional analyses and section 5 concludes our study.

## **2. Sample and Data Description**

### **2.1 Time line**

We conduct our empirical analysis using data from January 2007 to September 2008. We begin our investigation period at the start of 2007 because this is generally regarded as the period when the market first realized the severity of the losses related to subprime mortgages (Ryan, 2008). We end our investigation period in the third quarter of 2008 for three main reasons: (1) The massive government bailouts were initiated from October 2008 onwards, and therefore we examine CEO turnover over the prior period in which it is driven mostly by internal corporate

governance mechanisms.<sup>4</sup> (2) In October 2008, changes in the International Financial Reporting Standards (IFRS) allowed financial institutions to avoid recognizing asset writedowns.<sup>5</sup> (3) At the end of the third quarter of 2008, regulators in several countries imposed short-selling bans on the stocks of many financial institutions.

## 2.2 Sample of financial firms

Our sample consists of 296 publicly-listed financial firms (banks, brokerage firms, and insurance companies) that were publicly listed at the end of December 2006 across 30 countries. We use the following criteria to compile our sample. First, we require firms to be covered in the *Compustat North America* or *Compustat Global* databases and have data on total assets, total shareholder's equity, earnings, and stock returns. Second, we limit our sample to firms that are covered by the *BoardEx* and *FactSet/Lionshares* databases.<sup>6</sup> Third, we restrict our sample to industries for which Bloomberg collected data on writedowns during the crisis period (i.e., financial industries including banks, brokers, and insurance companies). Fourth, we restrict our sample to firms with total assets greater than US \$10 billion because most of the debate focuses on large global financial institutions.<sup>7,8</sup>

## 2.3 Main variables

### *Measuring CEO turnover*

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<sup>4</sup>For example, the Troubled Asset Relief Program (TARP) was signed in October 2008. In some cases, governments insist on changes in top management as a condition for a company to receive a government bailout. See "RBS chiefs to be forced out under bailout deal" (*Telegraph*, October 8, 2008).

<sup>5</sup>The International Accounting Standards Board (IASB) issued amendments to the use of fair value accounting on financial instruments in October 2008 that allow companies to reclassify financial assets from market value based to historical cost based valuation.

<sup>6</sup>We exclude six delisted U.K. financial firms because FactSet/Lionshares have incomplete share register data for these companies.

<sup>7</sup>We delete four Puerto Rican financial firms to ensure that our results are not confounded by the 2006 budget crisis in Puerto Rico.

<sup>8</sup>This restriction also ensures that we do not miscode small firms with material writedowns as not having writedowns because Bloomberg limits its coverage to firms with cumulative writedowns exceeding US \$100 million.



We use biographic information on individual executives from *BoardEx* to determine the identity of the CEO for each firm. *BoardEx* contains detailed biographic information on individual executives and board members of approximately 12,000 publicly listed firms in nearly 50 countries and its coverage for international firms is unparalleled by any other data provider. Following DeFond and Hung (2004) and Fernandes et al. (2008), we use the term “CEO” (Chief Executive Officer) to refer to the top executive of financial institutions, even though firms in some countries tend to use other titles (such as “managing director” or “chairman of the management board”). To ensure that we selected the top executive for each firm, we verified the data in *BoardEx* using annual reports and other company reports obtained from *Mergent Online*.

We code a firm as having experienced CEO turnover if the top executive left the firm during the period January 2007 to September 2008.<sup>9</sup> We exclude 19 cases in which the CEO remained at the firm until the firm delisted, because it is unclear whether these observations should be coded as turnover or non-turnover. Thus, our final sample for the CEO turnover tests consists of 277 financial firms.

Figure 1 plots the CEO turnover rates for financial versus non-financial firms from 2004-2008 worldwide. It shows that financial firms exhibited higher CEO turnover rates than those of non-financial firms in 2008, while in the 2004-2007 period the pattern was the opposite. Our data also suggest a wide cross-country variation in CEO turnover rates (results not tabulated). For example, five CEOs of the top ten financial firms (in terms of assets) in the U.S. were replaced during the sample period – namely, the CEOs of Citigroup, AIG, Fannie Mae, Merrill Lynch, and Wachovia. In contrast, there is no recorded CEO turnover among the top ten firms in France during this period.

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<sup>9</sup>We use executive departures as an indicator of CEO turnover, instead of CEO role changes, because we believe this to be a less ambiguous measure of forced turnover. In fact, 73% of the executives that lost the top positions also left the firm during our measurement period.

### *Measuring shareholder losses*

A unique feature of our setting is that shareholder losses of financial firms are well publicized during the crisis period. We use two variables to capture losses: (1) cumulative stock returns and (2) cumulative writedowns scaled by total assets. For the CEO turnover analysis, we measure these variables from the first quarter of 2007 until the earlier of (1) the quarter in which the CEO leaves the firm, or (2) the third quarter of 2008. For the test on shareholder losses, we measure these variables from the first quarter of 2007 until the third quarter of 2008. Data on stock returns are from *Compustat North America* and *Compustat Global*. Our data source for writedowns is the Bloomberg WDCI menu and it covers financial firms, namely banks, brokers, and insurance companies. Bloomberg collects the writedown data from regulatory filings, news articles, and company press releases (such as quarterly earnings announcements). We measure writedowns as negative figures so that the regression coefficients on writedowns can be compared to those on stock returns.

Figure 2 plots the magnitude of writedowns (in US \$billions) per quarter for all financial firms covered in Bloomberg. We classify writedowns into three categories: (1) losses related to mortgage-backed securities (“Mortgage-backed securities” – Bloomberg codes CDO, CMBS, MTGE, and SUB), (2) losses related to loan portfolios (“Loan portfolios” - COST), and (3) losses related to investments in other firms (“Investment in other firms” – CORP and OCI).<sup>10</sup>

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<sup>10</sup>The total magnitude of losses in all firms covered by Bloomberg is US \$ 1,073 billion for the period from the first quarter of 2007 to the fourth quarter of 2008. Bloomberg classifies writedowns into various groups based on company disclosure. The top thirteen groups (in terms of total magnitude of writedowns) are: *ABS* - Non-mortgage asset-backed securities, *CDO* - Collateralized debt obligations, *CDS* - Credit default swaps, *CMBS* - Commercial mortgage-backed securities, *CORP* - Corporate investment, *COST* - Credit costs/ loan charge offs, *LEV* - leveraged loans, *MTGE* - Mortgage-related securities, *MONO* - Monolines, *OCI* - Revaluation reserve/ other comprehensive income, *RES* - Uncategorized residential mortgage asset writedowns, *SUB* - Subprime residential mortgage backed securities, and *TRA* - Trading losses. In Figure 2, under “Mortgage-backed Securities” we only include the four major groups that are likely to be most directly related to mortgage-backed securities (CDO, CMBS, MTGE, and SUB). However, Figure 2 is a conservative estimate of losses related to mortgage-backed securities because other groups (such as *CDS*, *RES*, and *TRA*) can also include writedowns related to mortgage-backed securities.

The figure shows a spike in writedowns related to mortgage-backed securities in the fourth quarter of 2007, followed later on by an increase in writedowns related to investments in other firms (such as in Lehman Brothers or Icelandic banks). It also shows a steady increase in credit losses related to loan portfolios from the second quarter of 2007 to the third quarter of 2008.

There are advantages and disadvantages to the use of each of the loss measures. While stock returns capture the full extent to which the market believes the crisis has impacted shareholders, they also include expectations of future events (such as government intervention) that may disguise the true cost of the crisis. Writedowns are potentially a direct measure of how severe the crisis has impacted firms, but is imperfect, because managers have discretion over the recognition of writedowns. Given the pros and cons of each measure we conduct our analysis using both stock returns and writedowns.

### ***Measuring corporate governance***

We focus our analysis on firms' corporate boards and ownership structures, the two key firm-specific governance mechanisms (Denis and McConnell, 2003). We measure these corporate governance mechanisms as of December 2006 (i.e., prior to the onset of the crisis).

For boards of directors, we focus on board independence because this is one of the most extensively studied board characteristics (Weisbach, 1988; Denis and McConnell, 2003). We define *Board independence* as the percentage of independent directors. Using *BoardEx* data, we classify directors as "independent" if they are non-executive directors (i.e., not full-time employees).

For ownership structure, we focus on institutional ownership and large shareholders because prior studies suggest that they serve important disciplining and monitoring roles (Denis and McConnell, 2003; Gillan and Starks, 2007). We measure *Institutional ownership* as the

percentage of shares held by institutional money managers (e.g. mutual funds, pension plans, and bank trusts) using 13F filings for U.S. companies and *FactSet/Lionshares* for non-U.S. companies.<sup>11</sup> We measure *Large shareholder* as a dummy variable equal to 1 if a firm has a large owner with direct or indirect voting rights greater than 10%, using ownership data from Bureau van Dijk.<sup>12</sup> We choose the 10% cutoff based on prior studies such as Laeven and Levine (2008).

## 2.4 Summary statistics

Table 1 presents summary descriptive statistics by country.<sup>13</sup> It shows that the sample of 296 firms is relatively balanced between U.S. (125) and European (131) firms, and also reports 40 firms from other regions. In addition, the panel reports the frequency of CEO turnover, as well as average shareholder losses during the crisis period. It shows that approximately 21% of our sample firms experienced CEO turnover. The table also reports that a large decrease in share prices affected financial firms both in the U.S. (-32%) and Europe (-33%). While both U.S. and European firms were significantly affected by writedowns, the average writedowns were substantially higher in the U.S. (-1.36% of assets) than in Europe (-0.30% of assets). Finally, the table presents sample averages of the governance variables per country. Consistent with Adams and Mehran (2003) and Adams (2009), we find that the percentage of independent directors in U.S. financial firms is high (85%) relative to other studies that have typically focused on manufacturing firms. In Europe, board independence is generally lower. The table also shows that while U.S. and Canadian firms tend to have high institutional ownership, continental European firms tend to have large shareholders.

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<sup>11</sup>*FactSet/Lionshares* institutional ownership database captures 13-F equivalent institutional holding data for non-U.S. companies and has been used in prior studies such as Ferreira and Matos (2008).

<sup>12</sup>We exclude cases in which share holdings are aggregated across funds (such as funds belonging to the Fidelity management company) because these funds are supervised by different managers representing different shareholder groups.

<sup>13</sup>To mitigate the influence of outliers, we winsorize all continuous variables at the top and bottom 1% of their distributions.

Panel A of Table 2 shows descriptive statistics for variables used in our main analysis. Panel B of Table 2 reports the correlation matrix. The panel shows that our two proxies of shareholder losses are positively correlated with each other, with  $p < 1\%$  (two-tailed). Moreover, the panel shows that our proxies for shareholder losses are negatively correlated with CEO turnover, with  $p < 1\%$  (two-tailed). This finding is consistent with prior literature that finds an inverse relation between performance and CEO turnover (Barro and Barro, 1990).

### **3. Main Analysis**

#### **3.1 Corporate governance and the termination of poorly performing CEOs during the crisis period**

We start our analysis by examining the influence of corporate governance on CEO turnover during the crisis, because the most striking action that boards can take is the decision to remove a poorly performing CEO and therefore CEO turnover is an important indicator of the extent to which corporate boards and shareholders have performed their monitoring role during the crisis period (Weisbach, 1988). Based on prior literature we examine the influence of corporate governance on CEO turnover-performance sensitivity using a logit model regressing a dummy variable indicating CEO turnover on shareholder losses, corporate governance, an interaction term between the two, and variables controlling for CEO age and firm size (Weisbach, 1988; Lel and Miller, 2008). In addition, our regression model includes dummy variables indicating industry and country membership to ensure that our results are not driven by unobservable industry and country fixed effects (Mitton, 2002). Our formal logit regression model is as follows:

$$CEO\ turnover = \alpha_0 + \beta_1(Loss) + \beta_2(Governance) + \beta_3(Loss * Governance) + \beta_4(Age\ dummy) + \beta_5(Firm\ size) + \beta_m(DIndustry) + \beta_n(DCountry) + \varepsilon \quad (1)$$

Where

*CEO turnover* = A dummy variable equal to 1 if the CEO left the firm from January 2007 to September 2008 (i.e., during the crisis period).

*Loss* = Shareholder losses as proxied by cumulative stock returns and cumulative writedowns, both measured from the first quarter of 2007 until the earlier of the quarter of the CEO's departure or the third quarter of 2008.<sup>14</sup>

*Governance* = Three corporate governance factors measured as of December 2006 (i.e., just prior to the start of our sample period). These three factors are: (1) board independence, percentage of directors whose primary affiliation is not with the firm, (2) institutional ownership, percentage of shares owned by institutional investors, and (3) large shareholders, a dummy variable equal to 1 if a firm has a large owner with voting rights greater than 10%, and 0 otherwise.

*Age dummy* = A dummy variable equal to 1 when the CEO is 60 years and older, and 0 otherwise.

*Firm size* = Natural log of total market value of assets, measured as market value of equity plus book value of liabilities as of December 2006.

*DIndustry* = Dummy variables indicating industry membership, based on 3-digit SIC.

*DCountry* = Dummy variables indicating countries.

Our main variables of interest are the interactions between shareholder losses and corporate governance. Because of the problems with interpreting interaction terms in non-linear models described by Ai and Norton (2003), we compute the corrected marginal effect for every observation and then report the average interactive effect and its significance. In addition, to control for dependence in the error terms for firms in the same country, we use robust standard errors clustered by country.

Prior literature finds that CEO turnover is more sensitive to performance for firms with greater board independence (Weisbach, 1988) and larger institutional ownership (Parrino et al., 2003). This is because independent boards and institutional investors have strong incentives to maximize shareholder returns, and are therefore more willing to challenge the CEO in light of

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<sup>14</sup>We use a different accumulation window for shareholder losses for each firm with CEO turnover because using the same accumulation window across all firms (from January 2007 to September 2008) would bias our results towards finding support for the prediction that corporate governance helps discipline poorly performing CEOs. This is because incoming CEOs are likely to be more aggressive with recognizing writedowns, right after they assume their new position.

company losses and remove the CEO if necessary. Institutional investors can exercise their influence on corporate decisions through direct activism (Gillan and Starks, 2007) or indirect discipline by “voting with their feet” (Parrino et al., 2003).

In contrast, the literature is ambiguous with respect to the influence of large shareholders on CEO turnover. On the one hand large shareholders have a significant amount of wealth at stake, creating a strong incentive to monitor (Laeven and Levine, 2008). On the other hand, large shareholders often have other relationships with the firm, such as inter-company strategic alliances, and as a consequence can possess interests other than shareholder value maximization. If large shareholders align managers to pursue these other interests, they could insulate managers from outside pressure (LaPorta et al., 1999; Denis and McConnell, 2003). Consistent with this ambiguity, some studies find stronger CEO turnover-performance sensitivities for firms with large shareholders (Volpin, 2002) while other studies find weaker CEO turnover-performance sensitivities for these firms (Denis and Denis, 1994).

If boards and shareholders failed to perform their monitoring role, as suggested by some observers, we expect to find that board independence and institutional ownership have no influence on the relation between CEO turnover and performance. Thus in this case we would expect the average interactive effects to be insignificant. However, if corporate governance was not broken at these institutions, we expect that the turnover-performance sensitivity is higher for firms with greater board independence and higher institutional ownership (Weisbach, 1988; Parrino et al., 2003).

Table 3 presents the results of the CEO turnover-performance analysis. For the sake of clarity, we include the predicted signs of the interactive effects between losses and corporate governance based on prior literature. Columns (1)-(4) show the regression results when using

stock returns to capture shareholder losses, and columns (5)-(8) show the results of using writedowns as a measure of shareholder losses. Columns (1) and (5) present baseline regression results in which we examine the main effect of shareholder losses on CEO turnover, columns (2)-(4) present the results of interacting stock returns with corporate governance (respectively board independence, institutional ownership, and our large shareholder indicator), and columns (6)-(8) present the results of interacting writedowns with corporate governance.

The results presented in columns (2) and (3) show that the average interactive effects between stock returns and corporate governance are significant and in the predicted direction for the interactions with board independence and institutional ownership. Thus, our results suggest that CEO turnover is more sensitive to stock returns for firms with more independent boards and greater institutional ownership. Column (4) shows that the average interactive effect between stock returns and the large shareholder indicator is positive and significant, suggesting that CEO turnover is less sensitive to stock returns for firms with large shareholders.

Column (5) of Table 3 shows that the main effect of writedowns is significantly related to CEO turnover, suggesting that firms with larger writedowns were more likely to replace their CEO regardless of their corporate governance characteristics. Consistent with corporate governance playing a less important role when firms experienced large writedowns, columns (6)-(8) show that only the interactive effect between writedowns and the large shareholder indicator is significant.

Overall, our CEO turnover analysis finds results consistent with boards and institutional investors performing their monitoring role with respect to the replacement of poorly performing CEOs during the crisis period. In contrast, we find that large shareholders increase managerial entrenchment and reduce the likelihood of replacing poorly performing CEOs. These findings



are in line with prior studies using different samples and based on non-crisis periods – such as Weisbach (1988) for the U.S., Renneboog (2000) for Belgium, and Dahya et al. (2002) for the U.K.

### 3.2 Governance factors and the shareholder losses during the crisis

We examine whether firms with strong external monitoring performed better or worse during the crisis by estimating an OLS model regressing shareholder losses during the crisis on our corporate governance variables. We use two proxies for the shareholder losses during the crisis period: (1) stock returns and (2) writedowns. We now measure shareholder losses from the first quarter of 2007 until the third quarter of 2008 for all firms in our sample. As in our previous analysis, we control for firm size and include industry and country dummies. In addition, we use robust standard errors clustered by country. Our formal regression model is as follows:

$$\begin{aligned} \text{Shareholder losses} = & \alpha_0 + \beta_1(\text{Governance}) + \beta_2(\text{Firm size}) + \beta_m(D\text{Industry}) + \\ & \beta_n(D\text{Country}) + \varepsilon \end{aligned} \quad (2)$$

Where

*Shareholder losses* = Cumulative stock returns or cumulative writedowns, both measured from the first quarter of 2007 until the third quarter of 2008.

See equation (1) for definitions of other variables.

If boards and shareholders have failed to monitor management, we expect to find no relationship between our measures of shareholder losses and corporate governance. Table 4 shows the results of regressing losses incurred during the crisis on the corporate governance factors. Inconsistent with a lack of monitoring by boards and shareholders having contributed to the crisis, we find that board independence and institutional ownership are associated with larger shareholder losses during the crisis, for both in terms of more negative stock returns and larger

writedowns.<sup>15</sup> Thus, both our turnover and shareholder losses results do not support the view that boards and shareholders at financial institutions have insufficiently monitored management. However, it remains unclear why firms subject to stronger external monitoring performed worse during the crisis. We explore this issue in the next section.

## **4. Additional Analyses**

### **4.1. Have boards and shareholders encouraged risk-taking prior to the crisis?**

Finding that shareholder losses are larger for firms with more independent boards and institutional ownership could suggest that boards and shareholders encouraged managers to increase shareholder returns by taking more risk. Prior literature argues that managers that have accumulated firm-specific human capital and enjoy private benefits of control tend to seek a lower level of risk than shareholders that do not have those skills and privileges (Laeven and Levine, 2008). One implication from this literature is that external monitoring by boards and shareholders will increase risk-taking by alleviating this problem.<sup>16</sup>

If shareholders and boards have encouraged managers to increase shareholder returns through aggressive risk-taking, we expect firms with stronger external monitoring by boards and shareholders to have taken more risk before the crisis. We investigate this conjecture by examining the association between a firm's expected default probability (EDF, hereafter) and our corporate governance factors. EDF is computed by Moody's KMV CreditMonitor implementation of Merton's (1974) structural model. It uses financial statement data, equity

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<sup>15</sup>Since our sample contains a high proportion of firms with zero writedowns we perform a sensitivity test in which we use a Tobit model to examine the relation between writedowns and corporate governance. Our analysis (not tabulated) finds results consistent with those reported in Table 4. Specifically, the coefficients on board independence and institutional ownership are negative and significant at  $p < 1\%$  (two-tailed).

<sup>16</sup>Citigroup CEO Chuck Prince famously said "When the music stops, in terms of liquidity, things will be complicated. But as long as the music is playing, you've got to get up and dance. We're still dancing." (*Financial Times*, July 9, 2007).

market information, and proprietary data on the empirical distribution of defaults to estimate the probability that a firm will default within one year, which in Moody's KMV scale ranges from 0.01% to 35%.<sup>17</sup> Following Covitz and Downing (2007), we use the log of EDF (as of December 2006, prior to the crisis) in our analysis. Because our EDF measure is subject to the criticism that the market underestimated the extent of mortgage and subprime related risks taken by financial firms before the crisis as evidenced by the sharp market correction that took place in 2007-2008, we also use the change in EDF (from January 2007 to September 2008) to capture the portion of pre-crisis risk-taking that was not anticipated by the market.

Panel A of Table 5 presents the descriptive statistics of our risk-taking measures: logEDF (as of December 2006) and  $\Delta$ EDF (Q1/2007-Q3/2008).<sup>18</sup> Panel B of Table 5 reports the results of regressing pre-crisis risk-taking on corporate governance. The panel shows that the coefficients on institutional ownership and the large shareholder indicator are positive and significant in both models, with  $p < 10\%$  (two-tailed). In contrast, the coefficient on board independence is insignificant in both models. Thus, our results are consistent with shareholders having encouraged managers to maximize shareholder returns through risk-taking, but are inconsistent with boards having encouraged risk-taking. Thus, it remains unclear why board independence is associated with large shareholder losses during the crisis period. We explore this issue in the next section.

#### **4.2. Do independent directors' reputational concerns explain the relation between board independence and shareholder losses?**

An alternative explanation for the association between board independence and shareholder losses is that independent board members, out of concern for their reputation, have pushed

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<sup>17</sup>We thank Shisheng Qu at Moody's KMV for providing us the EDF data.

<sup>18</sup>The number of observations for our risk-taking regressions is smaller because of the additional data requirement on EDF.

managers into taking actions during the crisis period that lead to worse stock returns and the recognition of larger writedowns. In particular, reputational concerns could have induced independent board members to demand management to raise capital and recognize the asset writedowns that their firms incurred.

Fama and Jensen (1983) note that important incentives for outside directors to monitor come from reputational effects in the market for directorships. According to this reputation argument, directors that establish reputations as good monitors should be rewarded with additional board seats, while lax monitors should be disciplined with a reduction in board seats. Consistent with this argument, prior literature finds that outside directors hold fewer board seats after serving in companies that experienced financial distress and firms that were liquidated (Gilson, 1990; Harford, 2003). Therefore, outside directors have a significant incentive to ensure that their firms avoid bankruptcy even if this would be at a significant cost to existing shareholders.

Raising capital during the crisis was costly because it sent a negative signal to the market that there were more losses to come (Myers and Majluf, 1984). If reputational concerns drove independent board members to push managers into raising capital during the crisis, we expect firms with more independent boards to be more likely to raise capital during the crisis. We test this prediction by estimating a logit model regressing a dummy variable indicating capital raising on our governance variables. The capital raisings variable, based on Bloomberg's WDCI function, includes the issuance of both equity and debt securities. In addition, we control for a firm's stock returns during the crisis period to ensure that our results are not driven by worse performing firms. As in our prior analyses we control for firm size and include industry and country fixed effects.

$$\begin{aligned} \text{Capital raising} = & \alpha_0 + \beta_1 (\text{Governance}) + \beta_2 (\text{Stock returns}) + \beta_3 (\text{Firm size}) + \\ & \beta_m (D\text{Industry}) + \beta_n (D\text{Country}) + \varepsilon \end{aligned} \quad (3)$$

Where

*Capital raising* = A dummy variable equal to 1 when a firm raised capital during the crisis period (including both equity and debt securities), and 0 otherwise.

*Stock returns* = Cumulative stock returns from the first quarter of 2007 until the third quarter of 2008.

See equation (1) for definitions of other variables.

Panel A of Table 6 reports the result of this analysis. Consistent with our prediction, column (1) in the panel shows that firms with more independent boards were more likely to raise capital during the crisis period. Although not the focus of this test, column (1) of Table 6 also shows that the coefficient on large shareholder is negative and significant. This evidence is consistent with large shareholders exerting their influence over management to block the firm from raising capital during the crisis period. Controlling shareholders may have done so, because the issuance of capital during the crisis period would come at a significant cost to existing shareholders. Thus, large shareholders could simply have protected the value of their investment, which was beneficial to all existing shareholders.

In addition, to corroborate our conjecture that an increased propensity to raise capital during the crisis period drives the inverse relation between stock returns and board independence, we exclude firms that raised capital during the crisis and repeat the analysis of Table 4, in which we examine the relation between stock returns and board independence. If our conjecture is correct, we expect the coefficient on board independence to become insignificant.

Column (2) of Panel A presents results of this test. As predicted, it shows that once we eliminate firms that raised capital during the crisis period from our sample, the association between stock returns and board independence becomes insignificant. Thus, the evidence presented in Panel A of Table 6 is consistent with outside directors' reputational concerns driving the inverse relation between stock returns and board independence during the crisis period.

Reputational concerns can also explain the relation between writedowns and board independence. Prior literature suggests that reputational concerns induce outside directors to demand more effective disclosures from management. For example, Anderson et al. (2004) find evidence consistent with debtors being concerned about board of director characteristics that influence the integrity of financial accounting reports. Because Bloomberg is unable to record writedowns for firms that do not prominently disclose their subprime mortgage related writedowns, the relation between writedowns and board independence could simply be driven by firms with more independent boards being more transparent about asset impairments and credit losses during the crisis period. To test this conjecture, we estimate the following logit model:

$$\text{Disclosure of writedowns} = \alpha_0 + \beta_1(\text{Governance}) + \beta_2(\text{Stock returns}) + \beta_3(\text{Firm size}) + \beta_m(D\text{Industry}) + \beta_n(D\text{Country}) + \varepsilon \quad (4)$$

Where

*Disclosure of writedowns* = A dummy variable equal to 1 for firms for which Bloomberg recorded a writedown during our sample period, and 0 otherwise.

*Stock returns* = Cumulative stock returns from the first quarter of 2007 until the third quarter of 2008.

See equation (1) for definitions of other variables.

Consistent with our conjecture, Panel B of Table 6 shows that firms with more independent boards were more likely to disclose a writedown during our sample period. Thus, our results are consistent with reputational concerns also driving the relationship between writedowns and board independence. Although not the focus of this test, the table also shows that firms with greater institutional ownership are more likely to disclose writedowns. This evidence is consistent with prior research that suggests institutional investors prefer investing in firms that have superior financial disclosures (Bushee and Noe, 2000).

In summary, the results in Table 6 are consistent with directors' reputational concerns driving the relation between shareholder losses and board independence. Moreover, finding that a higher propensity to raise capital explains why firms with more independent boards experienced worse

stock returns suggests that reputational concerns can misalign the interests of directors with those of shareholders.

#### **4.3. Turnover of independent directors**

This section examines whether losses during the crisis had negative repercussions for outside board members. The large losses at financial firms could have been perceived by investors as being caused by a lack of oversight by directors, and therefore could have repercussions for these directors, especially if they were responsible for overseeing risk management.<sup>19,20</sup> While some prior studies find that director turnover increases around corporate failure events (Gilson, 1990; Srinivasan, 2005), some do not find such an association (Agrawal et al., 1999). If investors attribute the losses to a lack of oversight from outside directors, we expect that outside directors are more likely to leave boards of firms that experienced larger losses during the crisis. However, if investors attribute the losses to bad managerial decisions and view the role of directors as confined to replacing poorly performing CEOs, we do not expect such an association. Thus, it is an empirical question whether director turnover is related to the losses.

To examine the influence of the financial crisis on director turnover, we use a logit model regressing independent director turnover on losses, risk committee membership, and CEO turnover. We use data from *BoardEx* on board composition and focus on turnover of independent directors (i.e., not full-time employees) because their primary function is to discipline and monitor managers. We include a dummy variable indicating risk committee membership because we expect the negative reputational repercussions of the crisis to be most severe for members of risk committees. In addition, we include a dummy variable indicating CEO turnover because if

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<sup>19</sup>The SEC recently announced plans to investigate the performance of boards of financial firms leading up to the crisis ("SEC to Examine Board's Role in Financial Crisis", *Washington Post* February 20, 2009).

<sup>20</sup>Some members of risk committees were among first board members to be replaced during the crisis. For example, Citigroup replaced its audit and risk committee chair following a shareholder campaign ("Citigroup Names New Board Committee Chairs", *RiskMetrics Group*, July 25, 2008).

investors held not only managers, but also directors responsible for the losses, we expect a positive association between director turnover and CEO turnover. Finally, as in our previous analyses, we include variables controlling for age, firm size, and industry and country fixed effects. Our formal regression model is as follows:

$$\begin{aligned} \text{Director turnover} = & \alpha_0 + \beta_1(\text{Loss}) + \beta_2(\text{Risk committee}) + \beta_3(\text{CEO turnover}) + \\ & \beta_4(\text{Age dummy 1}) + \beta_5(\text{Age dummy 2}) + \beta_6(\text{Firm size}) + \\ & \beta_m(\text{DIndustry}) + \beta_n(\text{DCountry}) + \varepsilon \end{aligned} \quad (5)$$

Where

*Director turnover* = A dummy variable equal to 1 if an independent board member left the firm from January 2007 to September 2008.<sup>21</sup>

*Risk committee* = A dummy variable equal to 1 if a board member was a member of a board committee with a name that is suggestive of a responsibility related to the monitoring of risk (e.g., risk committee, investment committee).<sup>22</sup>

*CEO turnover* = A dummy variable equal to 1 if a CEO departs the firm, and 0 otherwise.

*Age dummy 1* = A dummy variable equal to 1 if the age of a director is between 65-70 years old.

*Age dummy 2* = A dummy variable equal to 1 if the age of a director is greater than 70.

See equation (1) for definitions of other variables.

Table 7 presents the results of the director turnover analysis. Panel A presents a univariate analysis of director turnover partitioned by risk committee membership and CEO turnover. The panel shows that outside directors were more likely to leave a board if they were a member of the risk committee or the firm experienced CEO turnover.

Panel B of Table 7 presents the results from the regression analysis. Consistent with outside board members being held accountable for the losses their firms incurred, column (3) of Panel B shows that the coefficient on writedowns is negative and significant at  $p < 1\%$  (two-tailed). In addition, consistent with directors being forced to leave their boards, Panel B shows that director turnover was higher for members of the risk committee in columns (2) and (4) and at firms with

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<sup>21</sup>Similar to our CEO turnover analysis, we drop observations when directors remain on the board until their firm delists.

<sup>22</sup>We include committees with names containing words such as “risk” and “investment,” but not “audit,” because audit committees’ primary responsibility is to oversee financial reporting.



CEO turnover in column (2). Overall, our results are consistent with the financial crisis having had negative repercussions for outside board members at troubled financial institutions.

## **5. Conclusions**

This paper investigates the role of corporate governance in the financial crisis at 296 of the world's largest financial firms. A key finding of our paper is that firms with more independent boards and institutional ownership were not only more likely to replace their CEOs for poor performance during the crisis period, but also suffered larger losses. Thus, although boards and shareholders appear to have executed their monitoring role as measured by replacing poorly performing CEOs, they also appear to have encouraged investments in subprime mortgage related assets before the crisis that led to significant losses during the crisis period.

Further exploration of the latter result finds evidence consistent with shareholders having pushed managers into maximizing shareholder value by taking more risk, but does not find support for boards having actively encouraged managers to do so. Specifically, we find that pre-crisis risk-taking is positively associated with institutional ownership and the presence of large shareholders, but not with board independence. An alternative explanation for the association between board independence and shareholder losses is that independent board members, out of concern for their reputation, have pushed managers into taking actions during the crisis period that led to worse stock returns and the recognition of larger writedowns. Consistent with this alternative explanation we find that firms with more independent boards were more likely to raise capital, which came at significant cost to existing shareholders, and more likely to disclose writedowns during the crisis period. Thus, our results are consistent with independent directors'

reputational considerations driving the relation between shareholder losses and board independence.

We also examine whether the crisis has had negative repercussions for outside board members. Consistent with board members being held accountable for the losses we find that outside board members were more likely to leave a board if their firms suffered larger writedowns, they were a member of the risk committee, or their firm experienced CEO turnover.

Overall, our results are inconsistent with the losses during the financial crisis being the result of lax oversight by boards and investors. Rather, our results are consistent with risk-taking encouraged by shareholders and reputational concerns of directors having contributed to the losses.

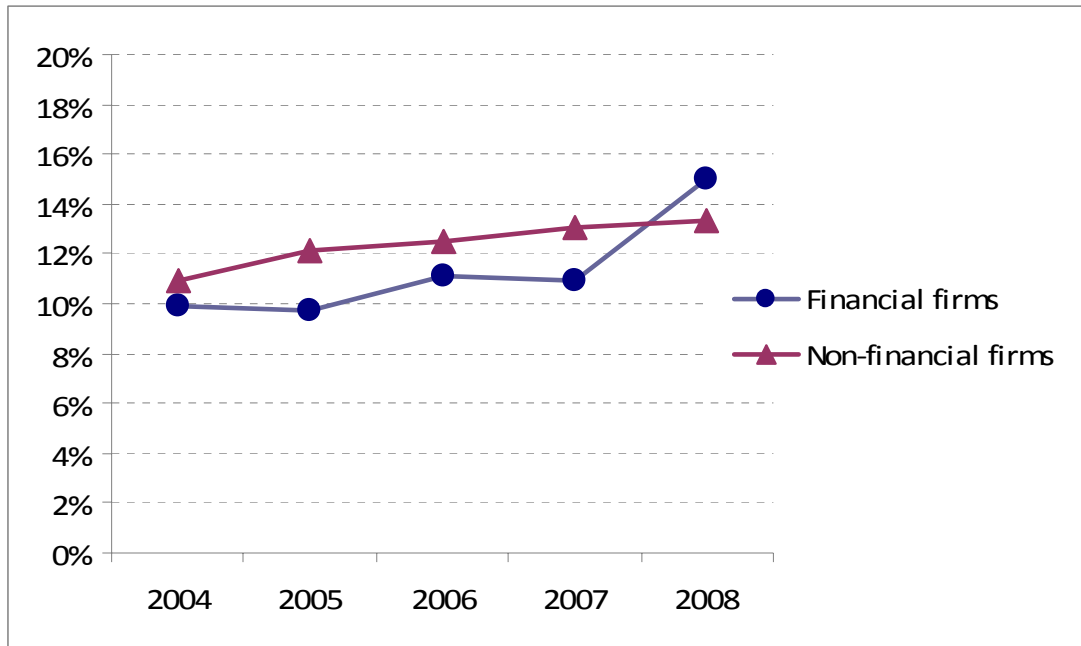
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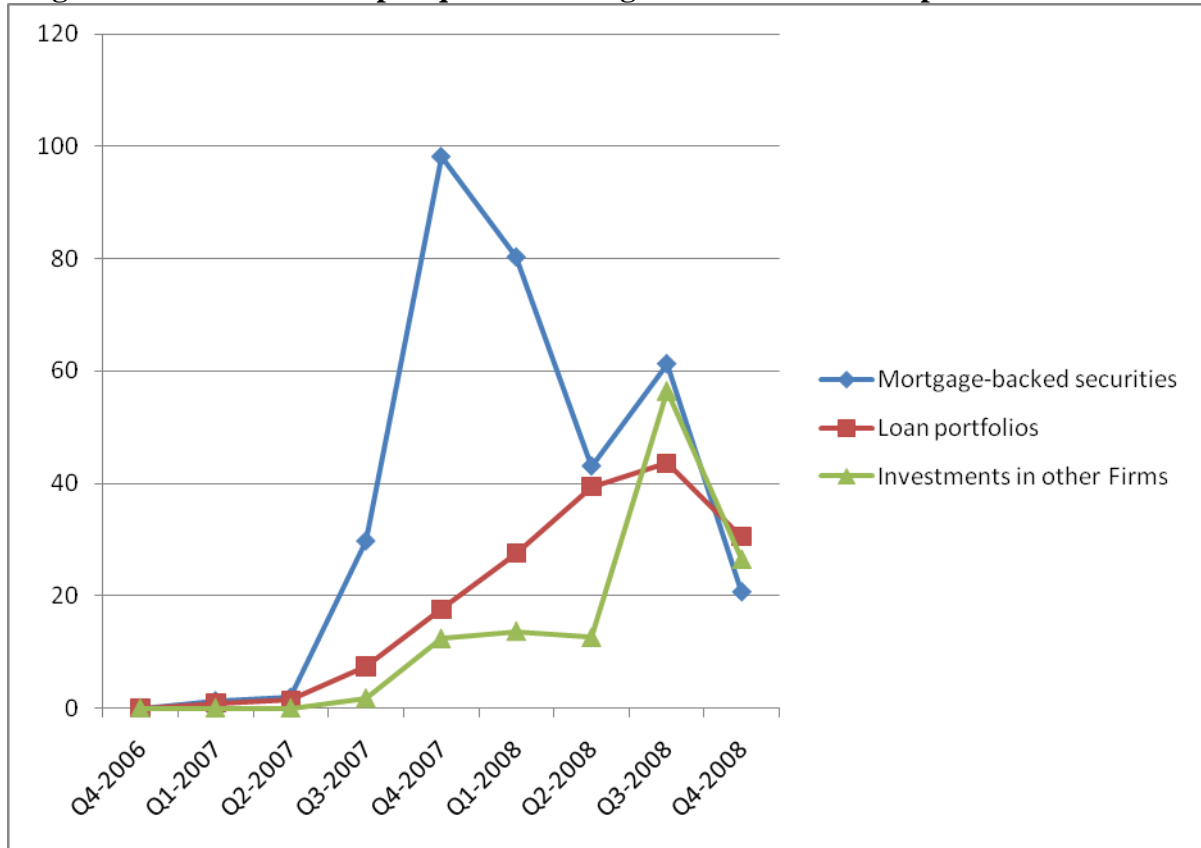
**Figure 1**  
**CEO turnover rates for financial versus non-financial firms from 2004-2008**



This figure presents CEO turnover rates for financial and non-financial firms worldwide, based on data from all firms in *BoardEx* with market capitalizations greater than US \$100 million. Financial firms are defined as in our main sample. We classify a firm as having experienced turnover during a year when its top executive at the end of the year is different from the previous year.

**Figure 2**

**Magnitudes of writedowns per quarter during the 2007-2008 crisis period**



This figure plots the magnitudes of writedowns (in US \$billion) per quarter for all financial firms covered in Bloomberg by three categories: (1) losses associated with mortgage-backed securities (“CDO/CMBS/MTGE/SUB”), (2) losses related to loan portfolios (“COST”), and (3) losses related to investments in other firms (“CORP/OCI”).

**Table 1**  
**Summary descriptive statistics by country**

Region	Country	N of firms	Q1/2007-Q3/2008			December 2006		
			% CEO turnover	Avg stock returns	Avg writedowns	Avg board independence	Avg institutional ownership	% large shareholder
America	U.S.	125	23%	-32%	-1.36%	85%	67%	30%
	Canada	13	8%	3%	-0.35%	87%	48%	23%
	Other America	5	0%	-20%	-3.04%	85%	79%	0%
	<i>Sub-total America</i>	<i>143</i>	<i>21%</i>	<i>-29%</i>	<i>-1.32%</i>	<i>85%</i>	<i>66%</i>	<i>29%</i>
Europe	Germany	19	22%	-28%	-1.11%	71%	17%	74%
	Italy	19	22%	-31%	-0.02%	82%	13%	58%
	U.K.	17	24%	-36%	-0.27%	63%	63%	29%
	Switzerland	15	33%	-16%	-0.45%	92%	26%	40%
	France	9	0%	-33%	-0.26%	85%	33%	67%
	Spain	9	11%	-32%	-0.04%	75%	12%	78%
	Greece	7	14%	-40%	0.00%	71%	13%	57%
	Netherlands	6	50%	-33%	-0.41%	68%	32%	100%
	Ireland	5	25%	-56%	-0.04%	68%	35%	0%
	Sweden	4	0%	36%	-0.04%	90%	58%	100%
	Belgium	3	0%	-37%	-0.32%	78%	17%	100%
	Denmark	3	0%	-41%	-0.00%	83%	24%	33%
	Portugal	3	33%	-48%	0.00%	71%	46%	67%
	Other Europe	12	17%	-38%	-0.03%	77%	17%	92%
	<i>Sub-total Europe</i>	<i>131</i>	<i>20%</i>	<i>-33%</i>	<i>-0.30%</i>	<i>77%</i>	<i>27%</i>	<i>61%</i>
Other	Australia	15	36%	-16%	-0.46%	85%	18%	33%
	Other countries	7	14%	9%	-0.04%	84%	43%	71%
<b>Total</b>		<b>296</b>	<b>21%</b>	<b>-29%</b>	<b>-0.80%</b>	<b>81%</b>	<b>46%</b>	<b>44%</b>

See Appendix A for variable definitions.



**Table 2**  
**Descriptive statistics and correlation analyses**

**Panel A: Descriptive statistics**

<b>Variable</b>		<b>N</b>	<b>Mean</b>	<b>Median</b>	<b>Std. dev.</b>
Discipline	CEO turnover	277	21%	0%	41%
Loss	Stock returns	296	-29%	-27%	33%
	Writedowns	296	-1%	0%	2%
Governance	Board independence	296	81%	85%	12%
	Institutional ownership	296	46%	48%	30%
	Large shareholder	296	44%	0%	50%
Controls	Age dummy	296	34%	0%	48%
	Firm size	296	11.29	11.04	1.42

**Panel B: Pearson correlation coefficients with p-values in parentheses**

<b>Variable</b>	<b>CEO Turnover</b>	<b>Stock returns</b>	<b>Writedowns</b>	<b>Board independence</b>	<b>Institutional ownership</b>	<b>Large shareholder</b>	<b>Age dummy</b>
<b>Stock returns</b>	-0.21 (0.00)						
<b>Writedowns</b>	-0.22 (0.00)	0.33 (0.00)					
<b>Board independence</b>	0.02 (0.75)	0.08 (0.17)	-0.09 (0.11)				
<b>Institutional ownership</b>	-0.03 (0.61)	-0.05 (0.41)	-0.05 (0.38)	-0.07 (0.26)			
<b>Large shareholder</b>	0.01 (0.86)	0.06 (0.32)	0.10 (0.08)	-0.18 (0.00)	-0.05 (0.35)		
<b>Age dummy</b>	0.08 (0.17)	0.04 (0.49)	0.00 (0.97)	-0.05 (0.43)	0.04 (0.47)	0.01 (0.83)	
<b>Firm size</b>	0.10 (0.09)	-0.16 (0.00)	-0.04 (0.47)	-0.05 (0.38)	-0.01 (0.81)	-0.14 (0.02)	-0.01 (0.83)

See Appendix A for variable definitions.

**Table 3**

**Logit regression of CEO turnover in financial firms on shareholder losses and corporate governance (N=277)<sup>a</sup>**

	Loss=Stock returns <sub>turnover</sub>				Loss= Writedowns <sub>turnover</sub>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>Loss</b>	0.37 [0.31]	12.53*** [3.05]	1.92 [1.07]	-0.62 [-0.50]	-8.35* [-1.65]	-25.61 [-0.32]	6.61 [0.16]	-26.92*** [-3.63]
<b>Governance</b>								
Board independence		-0.91 [-0.43]				2.95* [1.88]		
Institutional ownership			-1.00 [-1.44]				-0.55 [-0.68]	
Large shareholder				0.99** [2.10]				0.68 [1.63]
<b>Loss*governance</b>		-14.68*** [-3.53]	-3.03* [-1.72]	2.23*** [2.59]		23.29 [0.26]	-17.81 [-0.40]	45.00*** [5.58]
Age dummy	0.56*** [2.91]	0.74*** [3.41]	0.48** [2.43]	0.63*** [2.91]	0.64*** [3.09]	0.76*** [3.72]	0.63*** [3.19]	0.73*** [3.28]
Firm size	0.23** [2.28]	0.21** [2.00]	0.23** [2.33]	0.27*** [3.50]	0.18* [1.65]	0.17 [1.47]	0.21** [1.99]	0.21*** [2.73]
Industry fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Pseudo R-squared	0.10	0.14	0.11	0.12	0.10	0.11	0.1	0.12
<b>Predicted sign</b>	na	-	-	?	na	-	-	?
<b>Avg. interactive effect</b>		-2.09** [-2.20]	-0.50* [-1.84]	0.37** [2.16]		2.45 [0.15]	-2.89 [-0.36]	6.99*** [4.27]

<sup>a</sup>Z-statistics based on robust standard errors clustered by country are reported in brackets. \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% levels (two-tailed).

See Appendix A for variable definitions.

**Table 4****Regression of shareholder losses during crisis period on corporate governance (N=296)<sup>a</sup>**

	<b>Stock returns</b> <b>[Q1/2007-Q3/2008]</b>	<b>Writedowns</b> <b>[Q1/2007-Q3/2008]</b>
Board independence	-0.26** [-2.12]	-0.04** [-2.03]
Institutional ownership	-0.28*** [-3.20]	-0.01* [-1.71]
Large shareholder	-0.01 [-0.19]	-0.00 [-1.67]
Firm size	-0.02** [-2.09]	-0.00* [-1.71]
Industry fixed effects	yes	yes
Country fixed effects	yes	yes
Adjusted R-squared	0.19	0.19

<sup>a</sup>Z-statistics based on robust standard errors clustered by country are reported in brackets. \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% levels (two-tailed).

See Appendix A for variable definitions.

**Table 5**  
**Risk-taking and corporate governance**

**Panel A: Descriptive statistics on risk-taking**

Variable	N	Mean	Median	Std. dev.
logEDF [December 2006]	269	-3.16	-3.26	1.25
ΔEDF [Q1/2007-Q3/2008]	247	1.60	0.11	5.50

**Panel B: Regression of risk-taking on corporate governance<sup>a</sup>**

	logEDF [December 2006]	ΔEDF [Q1/2007-Q3/2008]
Board independence	0.74 [0.76]	2.91 [0.95]
Institutional ownership	1.45*** [4.54]	5.18** [2.28]
Large shareholder	0.32* [1.71]	1.71** [2.33]
Firm size	-0.21*** [-3.24]	-0.21 [-0.76]
Industry fixed effects	yes	yes
Country fixed effects	yes	yes
N	269	247
Adjusted R-squared	0.27	0.27

<sup>a</sup>Z-statistics based on robust standard errors clustered by country are reported in brackets. \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% levels (two-tailed).

See Appendix A for variable definitions.

**Table 6****The impact of board independence on capital raisings and writedown disclosure during the crisis<sup>a</sup>****Panel A: Logit regression with the dependent variable being capital raising and OLS regression with the dependent variable being stock returns**

	<b>Capital raising [Q1/2007-Q3/2008] (full sample)</b>	<b>Stock returns [Q1/2007-Q3/2008] (excl. 51 firms that raised capital)</b>
Board independence	5.03** [2.35]	-0.12 [-0.77]
Institutional ownership	-1.71 [-0.85]	-0.28*** [-2.94]
Large shareholder	-1.11*** [-3.43]	-0.02 [-0.71]
Stock returns [Q1/2007-Q3/2008]	-5.51*** [-5.90]	
Firm size	1.51*** [7.59]	0.00 [0.34]
Industry fixed effects	yes	yes
Country fixed effects	yes	yes
N	296	245
Pseudo R-squared/adjusted R-squared	0.56	0.20

**Panel B: Logit regression with the dependent variable being disclosure of writedowns**

	<b>Disclosure of Writedowns [Q1/2007-Q3/2008]</b>
Board independence	7.10*** [4.31]
Institutional ownership	1.78* [1.90]
Large shareholder	-0.29 [-0.71]
Stock returns [Q1/2007-Q3/2008]	-3.17*** [-6.92]
Firm size	1.61*** [8.61]
Industry fixed effects	yes
Country fixed effects	yes
N	296
Pseudo R-squared	0.50

<sup>a</sup>Z-statistics based on robust standard errors clustered by country are reported in brackets. \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% levels (two-tailed).

See Appendix A for variable definitions.

**Table 7**  
**Turnover of outside directors**

**Panel A: Test of differences in director turnover rates**

Variable	N	Mean	<i>p-value</i> <sup>a</sup>
Risk committee			
<i>Member risk committee</i>	646	24%	0.08
<i>Not member risk committee</i>	2,420	20%	
CEO turnover			
<i>CEO turnover</i>	631	29%	0.00
<i>No CEO turnover</i>	2,401	18%	

**Panel B: Logit regression with the dependent variable being turnover of independent board members<sup>b</sup>**

	Loss=Stock returns		Loss=Writedowns	
	(1)	(2)	(3)	(4)
Loss	-0.18 [-0.41]	-0.12 [-0.30]	-11.03*** [-3.43]	-8.44*** [-5.92]
Risk committee		0.27** [1.99]		0.27** [2.05]
CEO turnover		0.40** [1.95]		0.31 [1.42]
Age dummy 1	0.30** [2.10]	0.06 [0.98]	0.31** [2.08]	0.05 [0.95]
Age dummy 2	1.08*** [4.38]	0.33** [2.01]	1.10*** [4.63]	0.33** [2.00]
Firm size	0.07 [0.93]	1.16*** [4.28]	0.05 [0.86]	1.17*** [4.38]
Industry fixed effects	yes	yes	yes	yes
Country fixed effects	yes	yes	yes	yes
N	3,066	3,032	3,066	3,032
Pseudo R-squared	0.07	0.08	0.08	0.08

<sup>a</sup> p-values based on chi-squared tests in proportions.

<sup>b</sup> Z-statistics based on robust standard errors clustered by country are reported in brackets. \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% levels (two-tailed).

See Appendix A for variable definitions.

## Appendix A

### Variable definitions

Variables	Definitions	Measurement period	Data sources
<b><i>Discipline</i></b>			
CEO turnover	A dummy variable equal to 1 if a CEO departs the firm, and 0 otherwise	Q1/ 2007 – Q3/2008	BoardEx
Director turnover	A dummy variable equal to 1 if a independent board member departs the firm, and 0 otherwise	Q1/ 2007 – Q3/2008	BoardEx
<b><i>Loss</i></b>			
Stock returns	Cumulative stock returns	Q1/ 2007 – Q3/2008	Compustat
Writedowns	Cumulative accounting writedowns scaled by total assets	Q1/ 2007 – Q3/2008	Bloomberg/ Compustat
Stock returns_turnover	Cumulative stock returns	1Q/ 2007 until the earlier of the quarter of the CEO's departure or the end of the sample period (3Q/ 2008)	Compustat
Writedowns_turnover	Cumulative accounting writedowns scaled by total assets	1Q/ 2007 until the earlier of the quarter of the CEO's departure or the end of the sample period (3Q/ 2008)	Bloomberg/ Compustat
<b><i>Governance</i></b>			
Board independence	Percentage of directors whose primary affiliation is not with the firm	December 2006	BoardEx
Institutional ownership	Percentage of shares owned by institutional investors	December 2006	FacSet/ Lionshares
Large shareholders	A dummy variable equal to 1 if a firm has a large owner with direct and indirect voting rights greater than 10%, and 0 otherwise	December 2006	Bureau van Dijk
Risk committee	A dummy variable equal to 1 if a director is a member of the risk committee	December 2006	BoardEx

## Appendix A (continued)

Variables	Definitions	Measurement period	Data sources
<i><b>Risk-taking</b></i>			
EDF	Expected Default Frequency	December 2006	Moody's KMV
$\Delta$ EDF	Change in Expected Default Frequency	Q1/ 2007 – Q3/2008	Moody's KMV
<i><b>Capital raising and disclosure of writedowns</b></i>			
Capital raising	A dummy variable equal to 1 if a firm raises capital, and 0 otherwise	Q1/ 2007 – Q3/2008	Bloomberg
Disclosure of writedowns	A dummy variable equal to 1 if a firm discloses accounting writedowns, and 0 otherwise	Q1/ 2007 – Q3/2008	Bloomberg
<i><b>Controls</b></i>			
Firm size	Natural logarithm of market value of assets (in US \$million)	December 2006	Compustat
Age dummy	A dummy variable equal to 1 when the CEO is 60 years or older, and 0 otherwise	December 2006	BoardEx
Age dummy 1	A dummy variable equal to 1 when the director's age is larger than 65 but smaller than 70, and 0 otherwise	December 2006	BoardEx
Age dummy 2	A dummy variable equal to 1 when the director is 70 years or older, and 0 otherwise	December 2006	BoardEx