ESSAYS IN CORPORATE GOVERNANCE

By

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To my family members, for their unconditional love and support

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CHAPTER I

AGENCY PROBLEMS OF CORPORATE PHILANTHROPY

1. Introduction

This study investigates corporate charitable contributions, an important form of discretionary corporate expenditures. While corporate charitable contributions are frequent and often substantial,[1] there is no clear evidence in the literature on whether these expenditures have positive effects on firm revenues or performance or on shareholder wealth. Proponents assert that corporate giving is consistent with shareholder value maximization since it is a channel for firms to promote their image to customers and to enhance their standing with regulatory agencies and legislators (Navarro, 1988; Brown, Helland and Smith, 2006). Counter-arguments suggest that corporate giving can often reflect conflicts of interests between shareholders and managers, where managers support their personal preferences toward charities with corporate funds or enhance their personal reputation and social networks.[2] Because it is difficult to measure the benefits that accrue to a firm from charitable contributions, these decisions can reflect the personal preferences of corporate managers and thus, substantially depart from firm value and shareholder wealth maximization. The ambiguity surrounding the benefits of corporate giving has attracted the attention of the popular media (see Monks and Minow, 2004) and prompted legislators and government agencies to call for greater disclosure of contributions where a connection to company executives or directors exists (see Appendix 1.A and Securities and Exchange Commission, 1992).

[1] Total U.S. corporate giving in 2010 is $15.29 billion (Giving USA 2011 report).

[2] The classic example of corporate giving was at Occidental Petroleum where the founder, Armand Hammer, decided to build his own museum funded by the company, now known as the Armand Hammer Museum of Art and Culture Center or the Hammer Museum. In the case of one shareholder suit, Occidental agreed to limit the spending to $60 million for the construction of the museum and $35 million more for an annuity to be paid over 30 years. See Monks and Minow (2004) for more details.

Although several studies evaluate these competing hypotheses by focusing on the associations between corporate charitable contributions and other explanatory variables, no existing study has measured the relation between these contributions and the private preferences of CEOs, assessed the impact of corporate giving on company valuation or performance, or analyzed the channels through which corporate giving affects firm value. By addressing these issues, this study helps to identify the relative importance of these two alternative hypotheses concerning corporate giving decisions.

Our analysis begins with a multivariate analysis of the associations between corporate giving and measures of firm profit motives and agency theory. Our findings offer limited support for the conventional idea that corporate giving is profit-enhancing. Specifically, when we model the likelihood of corporate philanthropy as a function of a firm's profit motive, CEO attributes and corporate governance variables, we find insignificant coefficient estimates for variables related to profit motives. However, modeling the determinants of amount of charitable giving, we find significant associations with measures of a firm's intellectual property investment, visibility, and membership in a highly regulated industry. Although existing theoretical and empirical studies, e.g., Navarro (1988), consider advertising one of the main motivations for corporate giving, our results fail to support the predicted relation between corporate giving and a firm's propensity to advertise. On the other hand, we uncover substantial evidence supporting agency theory. More specifically, Jensen and Meckling (1976) predict that CEO private benefits should be positively related to their tastes and preferences, but negatively related to their firm ownership levels. Consistent with Jensen and Meckling (1976), we find that CEO charity connections – a measure of CEO's personal preference for charity – increase the likelihood and the amount of corporate giving by 21.4% and 1.5% respectively, whereas CEO ownership reduces the likelihood and the amount of giving by 40% and 3% respectively.

We use the 2003 dividend tax cut as a natural experiment to provide an exogenous source of variation about key CEO attributes. This tax reform reduced the individual dividend tax rate from a maximum rate of 35% to 15% (Chetty and Saez, 2005) and thus increased the cost of CEOs pursuing their private preferences toward charitable giving that reduces a firm's share value, especially when CEO ownership levels are high. Consistent with the implication of this Tax Reform Act for CEO incentives, we find that corporate giving significantly declines after 2003, and this effect becomes stronger as CEO ownership increases.

In further analysis, we test whether corporate giving is incrementally beneficial for a sample of firms with relatively large expenditures on advertising and R&D, as these firms are often assumed to benefit most from charitable contributions. We find no evidence to support this corporate giving incentive: in fact the relationships with advertising and R&D expenditures are statistically insignificant, while CEO ownership and personal charity connections remain significant in explaining a firm's level of corporate giving. On the other hand, we identify a more muted effect of CEO ownership and a more pronounced effect of charity connections in subsamples of firms where managers are entrenched or able to avoid board discipline. These results indicate that although agency problems of corporate giving are widespread, they are more severe in firms exhibiting weaker corporate governance.

To measure which hypothesis has the most explanatory power, we next explore how corporate giving affects firm value through its impact on cash holdings. Cash generally represents an important proportion of a firm's total asset, enabling firms to make investments without having to access external capital markets. Therefore, cash holding helps avoid transaction costs and asymmetric information costs associated with external financing. However, such corporate liquidity comes at a price. Cash reserves may provide funds for managers to invest in projects that offer private benefits, but destroy shareholder value (Jensen and Meckling, 1976). As a result, shareholders may discount the dollar value of cash retained by corporations that make larger

charitable contributions, and impose a greater discount on the cash holdings of firms having weaker board oversight. Using the methodology developed by Faulkender and Wang (2006), we find that corporate giving has a substantial impact on firm value through its impact on cash: the estimated marginal value of cash is 8.1 cents lower if a firm raises its corporate giving from the sample median to the 75th percentile level. For firms with non-independent boards where board oversight is expected to be weaker, the negative impact of corporate giving on firm value more than doubles. These findings are consistent with the argument that shareholders anticipate the misuse of cash reserves at giving companies, and therefore place a lower value on them.

To provide a more direct and causal link between corporate giving and shareholder wealth, we (again) use the 2003 Tax Reform Act as a natural experiment. Earlier, we found that corporate giving declines after 2003. Now, we examine whether subsequent reductions in corporate giving lead to dividend increases. Specifically, by focusing on firms that make charitable contributions in 2002, we investigate how changes in charitable contributions affect dollar dividends in 2004. We find that a $1 million reduction in corporate giving after the tax-cut year is associated with at least $5.3 million increase in dividends. Thus, our experiment shows that dividend (or alternatively, shareholder wealth) increases following the Tax Reform Act of 2003, consistent with senior managers reducing their consumption of the private benefits of control.

Having documented that corporate giving represents an agency problem, we conduct a series of tests to address why and how corporate giving destroys firm value. First, we examine whether corporate giving offers opportunities for managerial rent extraction by investigating the frequency and level of corporate contributions to charities where CEOs hold positions as trustees, directors or advisors (henceforth, CEO-affiliated charities). We find that approximately two out of three firms contribute to CEO-affiliated charities. Moreover, the average cost to a company from such contributions is larger than the combined costs of CEO corporate jet use and other

perks (Yermack, 2006) and is comparable to a CEO's promised cash severance payments (Rusticus, 2006). Furthermore, CEO-affiliated charities decline if CEO financial interests are more aligned with the interests of shareholders. These findings suggest that corporate giving is not solely determined by firm value maximization, but instead is a channel that serves managerial private interests. Second, we conduct an event study of the first disclosure by a corporation of "charity awards" to gauge how investors perceive charitable contributions where the charities have ties to company executives and directors. In revising the disclosure rules on compensation in 1992, the SEC recognized such awards as a form of compensation and mandated that firms report them in proxy statements. We document a three day cumulative abnormal return (CAR) of -0.87% (*p*-value = 0.014) for firms that report charity awards for the first time during 1993 – 2010. This wealth loss exceeds the nominal value of the announced charitable award programs, suggesting that shareholders reduce their assessment of the quality of a firm's overall governance or for expected future contributions on these announcements.

Third, we separately analyze the determinants of annual corporate giving to charities and contributions to charitable foundations to evaluate the seriousness of an agency problem associated with these two channels of corporate giving. Foundations are tax-exempt nonprofits that receive irreversible donations from their sponsoring companies. The critical factor for these foundations is the separation between the economic affairs of shareholders and those of foundations.[3] This separation negates any shareholder claim on any donations transferred to the foundations, and therefore poses a classic agency problem for firms that make charitable contributions through foundations. In further empirical analysis, we find that giving to foundations increases with both a CEO's charity connections and weaker corporate governance, while annual giving to charities increases with stronger corporate governance. These results

[3]Consider the case of Lehman Brothers Foundation, for example. Although its sponsoring company was liquidated in 2008, the foundation still exists under the name of The Neuberger Berman Foundation. In the year of liquidation, the foundation had a market value of assets of $23.4 million, which was not distributed to company shareholders. As of November 2012, the foundation still uses that asset for philanthropic reasons.

suggest that the adverse impact of corporate giving on firm value is largely due to large irrevocable donations to corporate charitable foundations.

Thus far our results indicate that CEOs realize personal benefits from corporate giving. However, these benefits could still be part of an optimal compensation contract. Specifically, if boards reduce manager compensation for any corporate contributions that benefit them, then this evidence would weaken the case for the agency hypothesis.[4] So in our fourth line of analysis, we study the relation between CEO compensation and corporate giving. Because corporate giving is endogenous in the specified CEO compensation regression, we employ an instrumental variables framework to identify a causal effect rather than just an association.[5] By using natural disasters in the state where a firm's headquarter is located as an instrument for corporate giving, we document that a 10% increase in giving is associated with a $523,500 rise in CEO compensation. This result contradicts the prediction of the optimal contracting hypothesis and indicates that the probability of a company paying excess CEO compensation is significantly higher when these companies have larger amounts of corporate giving.

The last round of analysis studies a specific channel of entrenchment that aims to help explain the above relationship between corporate giving and excess CEO compensation. Cespa and Cestone (2007) argue that CEOs use corporate resources strategically to build ties with stakeholders to receive favorable treatment during future contract renewal or turnover decisions, but we propose that a more direct form of entrenchment occurs if CEOs allocate firm donations to accommodate independent director charitable interests.[6] Specifically, we examine whether charitable causes supported by corporate giving overlap with independent director charitable interests and then evaluate the effect of this alignment on CEO compensation. Consistent with the

[4]This is in the spirit of Fama's (1980) ex post settling up argument, under which boards would adjust compensation downward for corporate contributions that benefit managers.
[5]An endogenously determined level of CEO power could affect the relation between CEO compensation and corporate giving.
[6]This analysis is motivated by the giving practices at Enron. Lay's foundation (named after the company CEO, Kenneth Lay) and the Enron corporate foundation jointly donated money to research centers that employed two members of Enron's board, John Mendelson and Charles LeMaistre.

agency hypothesis, we find a 69% overlap with the interests of independent directors, indicating that a strategic use of corporate giving is to serve independent director charity interests and thereby strengthen their ties to a CEO. In further regression analysis, we find that this particular alignment of charitable interest is positively associated with excess CEO compensation. These results suggest that CEOs allocate corporate charitable contributions to advance their own interests.

While our evidence is consistent with the predictions of agency theory, it is likely that in many instances corporate giving does benefit shareholders. However, such cases appear to be less frequent and the benefits are more indirect and difficult to measure, while these contributions definitely represent a direct cost to shareholders. Taken together, the results of this study document another important mechanism for managerial rent extraction and entrenchment.

The remainder of this study is organized as follows. The next section presents a brief overview of theories of corporate philanthropy and develops predictions for our two main competing hypotheses. Section 3 presents sample construction and a description of the data. Section 4 presents empirical results and robustness tests. Section 5 concludes.

2. Theories and hypotheses

We consider two theories of corporate giving. The first theory posits that corporate giving is motivated by shareholder wealth maximization, whereas the second views corporate giving as a manifestation of private benefits of control. The following subsections present these theories and describe variables used to test each theory.

2.1. Profit maximization theory

The profit motive perspective on corporate giving is based on the assumption that corporate giving improves company financial performance, leading to the following hypothesis:

H1 (a): Corporate giving is positively related to financial performance.

Two popular ways to measure financial performance are operating performance and stock price performance. To test the above hypothesis, we focus on stock returns because operating performance is backward looking and is frequently considered a determinant of corporate giving (see Petrovits, 2006 and Galaskiewicz, 1997). In addition, the endogeneity issue of corporate giving is less of a problem when the dependent variable of a regression analysis is a market-based measure. Short-term stock returns also reflect investor reactions to firm announcements related to corporate giving. Furthermore, we use the changes in dividends around a major reduction in personal taxes to gauge the impact of corporate giving on shareholder wealth.

In one model of corporate giving consistent with shareholder wealth maximization, Navarro (1988) specified three dimensions of corporate giving, namely revenue enhancement, cost reduction, and tax minimization. Revenue enhancement represents corporate philanthropy that is part of an overall advertising strategy designed to promote a firm's image to raise demand for a firm's product. This perspective predicts a positive relation between a firm's giving-to-sales ratio and its propensity to advertise. Under a cost reduction scenario, firms can use charitable contributions to reduce expected costs of government regulatory and enforcement actions. Because firms that rely more heavily on intangible assets or intellectual property and firms in highly regulated and out-of-favor industries are more vulnerable to regulatory and litigation costs, they have greater incentives to maintain a good public image and thus make larger charitable contributions. Lastly, Navarro (1988) argues that the existence of a corporate tax rate does not

affect the level of corporate giving since a marginal corporate income tax rate only transforms the firm's profit function linearly.[7]

Some corporate social responsibility actions can be viewed as similar to making corporate charitable contributions. Corporate social responsibility (CSR) literature makes several predictions about when firms pursue CSR actions, which are rooted in firm profit enhancement or shareholder wealth maximization. For example, Bernea, Heinkel and Kraus (2008) argue that the marginal impact of CSR expenditures is greater for firms in out-of-favor industries, suggesting a greater level of social expenditures for firms in these industries. Similarly, Benabou and Tirole (2010) propose a greater prevalence of investor-demanded CSR practices among more visible firms.[8] These arguments lead to the following hypothesis:

H2 (a): Corporate giving is positively related to a firm's advertising level, intellectual property investment, general visibility, and sales in out-of-favor industries, but is insensitive to the corporate tax rate.

To test this hypothesis empirically, we construct several variables that serve to proxy for the firm's profit motive. Following Navarro (1988) and Brown, Helland and Smith (2006), we formulate *ad-to-sales* and *R&D-to-sales* ratios to measure a firm's propensity to advertise and its intellectual property investment, respectively. We define *assets (log)*, *number of employees (log)*, and *number of shareholders (log)* to measure a firm's overall visibility and indicator variables for *sin* and *non-environmentally-friendly* industries to identify its presence in out-of-favor industries. We also include indicator variables for industries that are expected to make larger charitable contributions for several reasons. *Financial*, *regulated* and *pharmaceutical* industries face strong regulatory oversight, so giving is a cost reduction motive since it may result in more favorable regulatory treatment. On the other hand, image is an important asset for *retail* industries, so firms

[7]However, company-sponsored foundations can help firms optimally time tax deductions for charitable contributions. That is, firms are able to record larger deductions if they transfer contributions to foundations when their marginal tax rate is high. The empirical literature (see Table 3 in Petrovits, 2006) however finds a weak positive relation between foundation giving and corporate tax rates, probably because the costs overweigh the benefits.

[8]Fisman, Heal and Nair (2006) also predict more giving in competitive industries, but they fail to empirically support their claim.

in these industries are likely to contribute more to charities out of a revenue enhancement motive. To measure corporate tax rate, we define *marginal tax rate* following Graham and Mills (2008).[9] Appendix 1.C contains the definitions of these variables.

2.2. Agency theory

Looking at corporate giving as an agency problem, assumes that such giving does not yield greater revenue or lower costs, but instead represents a diversion of corporate resources, which reduces firm value on a dollar for dollar basis. Corporate giving can also be symptomatic of broader governance problems at the firm. These arguments lead to the following hypothesis:

H1 (b): Corporate giving is negatively related to financial performance.[10]

In their seminal paper, Jensen and Meckling (1976) consider agency costs as a necessary element in any agency relation. They observe that when the owner-managers reduce their firm ownership below 100%, incentives increase for utility-maximizing managers to consume more corporate resources. Thus, a clear prediction of their model is that the private benefits of corporate giving will vary inversely with CEO ownership. Jensen and Meckling (1976) also note that "agency costs … will depend on the tastes of managers, [and] the ease with which they can exercise their own preferences" (p. 328). So, private benefits of corporate giving should be positively related to a CEO's personal preference for charity and negatively related to the strength of a firm's corporate governance, which places constraints on exercising CEO preferences. The agency theory view also predicts a positive relation between corporate giving and corporate tax rate, as the cost to managers of corporate giving declines with corporate tax rates.

The CSR literature also offers agency theoretic motivations for corporate giving. For example, Cheng, Hong and Shue (2011) argue that managers with a low ownership stake invest

[9]We thank Professor John R. Graham for generously providing data on marginal tax rates.
[10]For reasons discussed earlier, we use stock returns to measure company performance and dividend changes to gauge the impact of corporate giving on shareholder wealth.

more in CSR activities (pet projects in their model). These arguments lead to the following hypothesis:

H2 (b): Corporate giving is positively related to a CEO's personal preference for charity and the corporate tax rate, but negatively to a CEO's fractional ownership of the firm and the strength of its corporate governance.

To measure a CEO's personal preference for charity, we define a variable called *CEO charity connection* that takes the value of one if the CEO is personally affiliated with nonprofit organizations and zero otherwise.[11] To measure a manager's fractional ownership, we define *CEO ownership* as the sum of the CEO's percentage of stock ownership and the percentage of shares exercisable from options times the option's delta, which is the first derivative of the Black-Scholes option value with respect to stock price.

Following Jensen (1993), Yermack (1996), Hermalin and Weisbach (1998), and Bebchuk, Cohen and Ferrell (2009), we consider board size, board independence, CEO-chairman duality, the E-index and director ownership in the firm as factors that affect a firm's governance structure. *Board size* is the logarithm of total number of directors on the board, while the *independent board* indicator takes the value of one if independent directors represent at least 70% of the board.[12] The *E-index* is the sum of six antitakeover defense indicators: that take a value of one for firms with staggered boards, limits on shareholder bylaw amendments, poison pills, golden parachutes, supermajority requirements for mergers, and supermajority requirements for charter amendments. Lastly, *director ownership* is the sum of director percentage shareholdings in the company. Appendix 1.C presents the definitions of the variables.

[11]A separate literature that focuses on individual charitable contributions finds that social connectedness plays an important role (see List and Price, 2008). While these studies consider individual backgrounds such as race as measures of connectedness, we opt for CEO participation in nonprofit organizations. Thus, our measure should be a cleaner proxy to assess an individual's preference for charity.

[12]We consider a high cut-off for the surge in board independence after SOX.

3. Sample

3.1. Data

We focus on the Fortune 500 companies as of April 17, 2006 and hand-collect giving data from the National Directory of Corporate Giving (NDCG). To ensure accuracy, the NDCG only includes corporate giving that are verified by companies themselves or compiled from reliable public records based on 440-PF filings with the IRS for foundation giving.[13] For direct giving, these are voluntarily disclosed by the corporations to the public or to the NDCG upon its request. Using all directories between 1997 and 2007 to construct a database that spans the period 1996 to 2006, we collect data on corporate contributions to charities and foundations. We then

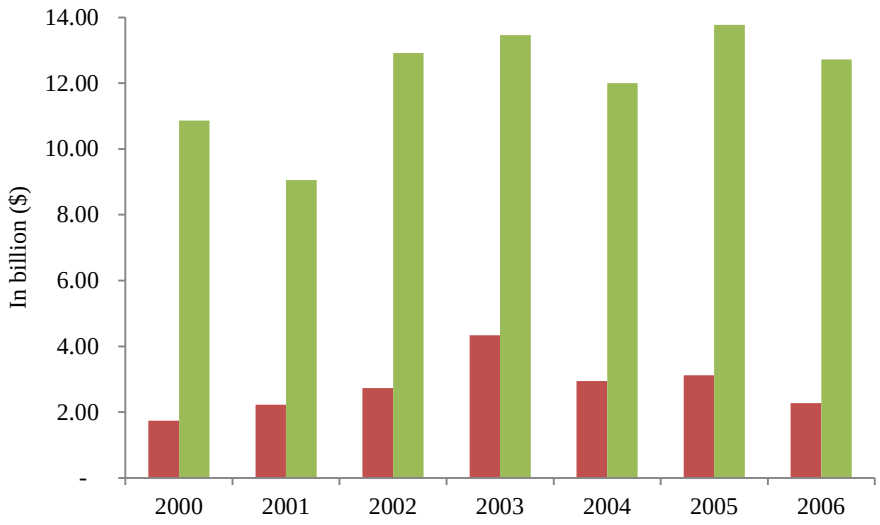

Figure 1.1: Charitable contributions in the USA
Charitable contributions of Fortune 500 firms and all corporations in the USA. Data on Fortune 500 firms is collected from the National Directory of Corporate Giving, while data on all corporate contributions is from the Giving USA reports.

[13]Corporate giving data from NDCG includes grants to individuals, employee matching gifts and in-kind gifts. The individual items are often not separately available.

add these amounts to obtain total contributions (see Appendix 1.B for details). Figure 1.1 shows that Fortune 500 firms contribute a significant percentage of the total corporate charitable contributions.[14] This percentage ranges from 16% in 2000 with 238 Fortune 500 contributing firms to 32.2% in 2003 with 351 Fortune 500 contributing firms. We hand match firm-level contributions data with PERMNOs and GVKEYs (company identification numbers in CRSP and Compustat, respectively) for all our sample firms.

We next require that all necessary data be available in CRSP, Compustat, Execucomp, and RiskMetrics. In particular, firm assets, sales, leverage, number of employees and shareholders, advertising and R&D expenses, return on assets (ROA), Tobin's q, free cash flow, and Fama-French 48 industry classifications are taken from Compustat. One-year cumulative stock returns and volatility are taken from CRSP. Information on CEO shares, exercisable options, unexercisable options, and total compensation is from Execucomp, while information on board size and its independence, ownership of independent directors, CEO-chairman duality, and the E-index is from RiskMetrics.

Of the companies in the Fortune 500 universe, we identify 32 private firms without the necessary data. After removing these companies and merging all databases with the hand-collected contribution data, the final sample has 2,421 firm-years representing 406 firms over the 1996-2006 sample period.

3.2. Descriptive statistics

Panel A and B of Table 1.1 present the distribution of giving and its determinants, most of which are explained in Section 2. We consider two additional measures of CEO attributes and several other firm characteristics. Additional CEO attributes are based on reputation, because reputational damage from being identified by the media may exceed any gain that a highly

[14]In Figure 1.1, we exclude the first four years of our sample because of data availability. Total corporate contributions data is not available before 1997 while NDCG directories were not issued in 1998 and 2000.

reputed CEO can accrue from corporate giving.[15] Following Milbourn (2003), we define *tenure* and *outside appointment* to measure a CEO's tenure with the company and outside recruitment status, respectively. Firm-level control variables include *asset/employee*, *leverage*, *ROA*, *Tobin's q*, and a *free cash flow indicator*. *Leverage* can also be thought of as a governance variable that mitigates the problems associated with free cash flows (Jensen, 1986), while also creating a creditor monitor. Detailed descriptions on the formulation of these variables are provided in Appendix 1.C.

Panel A of Table 1.1 reports that the average amount of corporate giving to charities for our sample firms, including firms making no contributions, is $2.5 million per year while the average amount of corporate donations transferred to foundations is $6.5 million per year. Adding these two sources, the total amount of corporate giving is $9 million per year, slightly less than the amount documented in Brown, Helland and Smith (2006).[16]

For CEO attributes, we find that 71% of the Fortune 500 CEOs are connected with nonprofits or charitable organizations. This suggests that most CEOs have active interests in charities. The typical CEO has stock and option ownership of 1.8%, which is slightly higher than that reported by Yermack (2006), who only consider stock ownership. In addition, the typical CEO has worked for the firm for 17 years and is likely to be recruited internally. We find that only 21.5% CEO appointments are made from outside the firm, similar to that reported in Milbourn (2003).

Turning to the firm's corporate governance, the median company has a board with 11 members, a majority of whom are independent, and a CEO who is chairman of the board. The firm also has an average of two out of six major antitakeover provisions included in the Bebchuk-

[15]For example, when a pro-life activist group boycotted Berkshire Hathaway, its CEO Warren E. Buffett cancelled its corporate giving program, which through its funding to the Buffett Foundation frequently supported organizations that promoted population control. Source: The Chronicle of Philanthropy (July 24, 2003).

[16]The difference could be due to stricter data collection procedure of this paper (see Appendix 1.B). Excluding firms making no charitable contributions, the average amounts of corporate giving to charities and to a firm's sponsored foundation are $22.8 million and $12.3 million, respectively.

Table 1.1
Descriptive statistics

Summary statistics and industry distribution of Fortune 500 firms during 1996 to 2006. Variable definitions are presented in the Appendix 1.C. ***, ** and * denote statistical significance based on two sides tests at the 1%, 5% and 10% level, respectively. Total number of firm-year observations is 2,421.

Panel A: Summary statistics

Variable	10^{th}	25^{th}	Mean	Median	75^{th}	90^{th}
Program contribution (million)	0	0	2.470	0	0	0.185
Foundation contribution (million)	0	0	6.514	0.046	4.000	13.525
Total contribution (million)	0	0	8.984	0.406	5.480	17.600
CEO attributes						
CEO charity connection	0	0	0.714	1	1	1
Ownership (%)	0.142	0.318	1.760	0.666	1.477	3.333
Tenure (years)	3	7	18.022	17	28	35
Outside appointment	0	0	0.215	0	0	1
Governance variables						
Board size	8	9	11.252	11	13	15
Independent board	0	0	0.575	1	1	1
Director ownership (%)	0.002	0.022	0.778	0.072	0.226	0.746
CEO-chairman duality	0	1	0.873	1	1	1
E-index	0	1	1.575	2	2	3
Profit maximizing variables						
Ad-to-sales	0	0	0.012	0	0.013	0.040
R&D-to-sales	0	0	0.020	0	0.019	0.062
Assets (log)	7.928	8.527	9.481	9.381	10.233	11.278
Number of employees (log)	2.116	2.717	3.416	3.401	4.078	4.812
Number of shareholders (log)	1.068	2.166	3.231	3.329	4.223	5.204
Marginal tax rate	0.300	0.347	0.333	0.350	0.350	0.355
Firm characteristics						
Leverage	0.025	0.071	0.182	0.148	0.268	0.370
ROA	0.035	0.084	0.135	0.127	0.184	0.236
Tobin's q	1.058	1.168	1.902	1.455	2.139	3.237
Free cash flow indicator	0.000	1.000	0.863	1.000	1.000	1.000

Panel B: Industry distribution

Name	No.	% of sample	Name	No.	% of sample
Agriculture	3	0.12%	Shipbuilding, Railroad equipment	7	0.29%
Food	84	3.47%	Defense	8	0.33%
Soda	12	0.50%	Precious metals	5	0.21%
Beer	34	1.40%	Non-metallic & industrial metal mining	7	0.29%
Smoke	13	0.54%	Coal	6	0.25%
Toys	8	0.33%	Oil	103	4.25%
Fun	0	0.00%	Utilities	224	9.25%
Printing and Publishing	21	0.87%	Communication	60	2.48%
Consumer goods	71	2.93%	Personal services	8	0.33%
Apparel	23	0.95%	Business services	101	4.17%
Healthcare	30	1.24%	Computers	79	3.26%
Medical equipment	34	1.40%	Electronic equipment	92	3.80%
Pharmaceutical products	73	3.02%	Measuring and control equipment	13	0.54%
Chemicals	76	3.14%	Business supplies	60	2.48%
Rubber and Plastic products	0	0.00%	Shipping containers	9	0.37%
Textiles	7	0.29%	Transportation	63	2.60%
Construction materials	31	1.28%	Wholesale	100	4.13%
Construction	57	2.35%	Retail	260	10.74%
Steel works	32	1.32%	Restaurants, hotels, motels	44	1.82%
Fabricated products	0	0.00%	Banking	152	6.28%
Machinery	87	3.59%	Insurance	142	5.87%
Electrical equipment	27	1.12%	Real estate	0	0.00%
Automobiles and trucks	57	2.35%	Trading	36	1.49%
Aircraft	34	1.40%	Other	28	1.16%

Panel C: Univariate comparisons of giving and non-giving firms						
	Contribution = 0		Contribution > 0		Difference	p-value of difference
	Mean	Std. dev.	Mean	Std. dev.		
CEO attributes						
CEO charity connection	0.565	0.496	0.815	0.388	-0.250***	0.000
Ownership (%)	2.179	4.03	1.471	3.67	0.708***	0.000
Tenure (years)	17.293	11.99	18.524	11.97	-1.231**	0.013
Outside appointment	0.231	0.42	0.204	0.40	0.027	0.120
Governance variables						
Board size	10.673	2.57	11.651	2.53	-0.978***	0.000
Independent board	0.545	0.50	0.596	0.49	-0.051**	0.013
Director ownership (%)	1.070	4.97	0.577	3.33	0.493***	0.007
CEO-chairman duality	0.857	0.35	0.884	0.32	-0.027*	0.053
E-index	1.580	1.11	1.572	1.13	0.008	0.868
Profit maximizing variables						
Ad-to-sales	0.010	0.02	0.014	0.03	-0.004***	0.000
R&D-to-sales	0.018	0.04	0.022	0.05	-0.004*	0.062
Assets (log)	9.084	1.15	9.754	1.36	-0.670***	0.000
Number of employees (log)	3.133	0.98	3.610	1.09	-0.477***	0.000
Number of shareholders (log)	2.804	1.58	3.525	1.52	-0.721***	0.000
Marginal tax rate	0.329	0.06	0.335	0.06	-0.006**	0.013
Firm characteristics						
Leverage	0.185	0.14	0.180	0.14	0.005	0.442
ROA	0.133	0.07	0.136	0.08	-0.003	0.288
Tobin's q	1.816	1.06	1.961	1.39	-0.145***	0.004
Free cash flow indicator	0.840	0.37	0.879	0.33	-0.039***	0.008
Number of observations	987		1434			
% of observations	40.77%		59.23%			

Cohen-Ferrell (2009) *E-index*. In addition, directors together hold 0.78% stock ownership of a typical sample company.

Turning to firm attributes, the average sample company has approximately 29,500 employees, 24,000 shareholders, $13.11 billion of assets, and an average marginal tax rate of 33%. Moreover, it annually spends 1.2% and 2.0% of sales on advertising and R&D expenses, respectively. These statistics are similar to those documented in Brown, Helland and Smith (2006). Moreover, the average company has a leverage ratio of 18.2%, an ROA of 13.5% and a Tobin's q of 1.9, while approximately 14% of the free cash flow observations in the sample are negative. Panel B of Table 1.1 shows the distribution of firms across the Fama-French 48 industry classification scheme. We find that Fortune 500 firms are clustered across retail (10.7%), utilities

(9.3%), banking (6.3%), insurance (5.9%), oil (4.3%), business services (4.2%), and wholesale industries (4.1%).

Panel C of Table 1.1 presents univariate comparisons between giving and non-giving firms. Giving firms, which represent 59.2% of the sample, have greater visibility when measured by asset size and the number of employees or shareholders. In addition, these firms spend a greater fraction of their sales on advertising and R&D expenses. These results are consistent with the profit maximization theory. On the other hand, a significantly greater percentage of CEOs in giving firms have preferences for charitable contributions as measured by CEO charity connections. These CEOs have lower (stock and option) ownership, are less likely to be recruited from outside the firm, and are more likely to be board chairmen. These firms are also characterized by larger boards (although slightly more independent), lower ownership of directors, and higher Graham and Mills (2008) measure of marginal corporate tax rates. Moreover, a greater percentage of these firms have positive free cash flows. These facts are consistent with the agency cost theory and suggest potential governance or agency problems in giving firms.

4. Empirical results

4.1. Determinants of corporate giving

This section evaluates the profit maximization and agency cost theories of corporate giving by focusing on firm-level data. We estimate the following regression:

$$Corporate\ giving_{i,t+1} = \alpha + \beta.(profit\ motives_{i,t}) + \gamma.\ (CEO\ attributes_{i,t}) + \delta.(governance_{i,t}) + \zeta.X_{i,t} + y_t + \varepsilon_{i,t}, \quad (1)$$

where *profit motives*, *CEO attributes*, and *governance* are as described in the previous section.[17] The subscripts *i* and *t* refer to firm and year, respectively. The vector *X* includes firm level characteristics while y_t denotes the year fixed effects.

We report the results of logit and tobit specifications to assess the likelihood and the amount of corporate giving, respectively. To standardize giving data across firms, we follow Navarro (1988) and divide corporate giving by company sales. We then take the natural logarithm of one plus scaled corporate giving to address the right skewness of giving data. Since giving is a small fraction of sales, we also multiply the logarithmic function by 10^3. Therefore, the dependent variable in the tobit specification is log(1 + corporate giving / sales) x 10^3, which we designate as the giving ratio. For the tobit models, this corporate giving ratio is (left) censored at zero.

Panels A and B of Table 1.2 present the results of the logit and tobit regressions, respectively. The first two models of each panel test the profit maximization and agency theories separately, while the third model jointly investigates which theory is more descriptive of the data. In the last column of both panels, the marginal effects of logit and tobit regressions are presented based on model 3. We find that the likelihood and the amount of corporate giving decline with more shareholder aligned CEOs and increase with a CEO's personal preference for a particular charity. Specifically, a 10% increase in *CEO ownership* from its sample mean reduces the likelihood of giving by 40% and the giving ratio (conditional on being positive) by 3%, whereas *CEO charity connection* increases them by 21.5% and 1.5%, respectively.[18] Other CEO attributes, i.e., *tenure* and *outside appointment*, do not have significant explanatory power to explain the likelihood or the amount of corporate giving with sufficient statistical significance.

[17]For profit motives, we consider two additional variables. Since Compustat has missing data for advertising and R&D expenses, we define two indicator variables, i.e., *ad indicator and R&D indicator*, that take the value of zero if the data is missing and one otherwise (Flannery and Rangan, 2006).

[18]The coefficient estimates of *CEO ownership* and *CEO ownership*^{2} have opposite signs, implying a diminishing marginal effect of *CEO ownership* on corporate giving. We calculate that the sign changes at about 14.07% ownership level.

Table 1.2
Corporate giving decisions

The sample considers corporate giving of Fortune 500 firms during 1996 to 2006. We use logit and tobit regressions to explain firm's likelihood and amount of giving, respectively. All regressions are estimated with an intercept term. Robust standard errors are clustered at the firm level. ***, ** and * denote statistical significance based on two sides tests at the 1%, 5% and 10% level, respectively. Variable definitions are in Appendix 1.C.

Panel A: Logit models of corporate giving							
	Dependent variable: Corporate giving = 1						
	Model 1		Model 2		Model 3		
	Estimates	*p*-value	Estimates	*p*-value	Estimates	*p*-value	dy/dx
CEO attributes							
CEO charity connection			1.031***	0.000	0.890***	0.000	0.215
CEO ownership (%)			-0.240***	0.000	-0.170***	0.003	-0.040
CEO ownership^2			0.008***	0.000	0.006***	0.004	0.001
Tenure (years)			0.006	0.419	0.003	0.668	0.001
Outside appointment			0.159	0.450	0.133	0.536	0.031
Governance							
Board size			0.060	0.105	0.001	0.982	0.000
Independent board indicator			0.034	0.804	-0.004	0.979	-0.001
Director ownership (%)			-0.029	0.248	-0.018	0.427	-0.004
CEO-chairman duality			-0.020	0.915	-0.176	0.364	-0.041
E-index			0.036	0.632	0.126	0.110	0.030
Profit maximizing variables							
Ad-to-sales	3.224	0.443			2.948	0.489	0.699
Ad indicator	-0.190	0.383			-0.155	0.483	-0.037
R&D-to-sales	0.760	0.746			0.827	0.733	0.196
R&D indicator	0.158	0.490			0.061	0.793	0.015
Assets (log)	0.269**	0.032			0.200	0.129	0.047
Number of employees (log)	0.284**	0.013			0.282**	0.016	0.067
Number of shareholders (log)	0.134**	0.038			0.060	0.358	0.014
Marginal tax rate	0.596	0.505			0.668	0.478	0.158
Firm characteristics							
Leverage	0.597	0.398	0.560	0.410	0.647	0.378	0.153
ROA	1.386	0.344	0.460	0.751	1.101	0.448	0.261
Tobin's q	0.083	0.298	0.149*	0.085	0.120	0.155	0.028
Free cash flow indicator	0.126	0.483	0.121	0.510	0.082	0.655	0.020
Asset/employee	0.000	0.675	0.000	0.582	0.000	0.752	0.000
Industries							
Financial	0.504	0.210	0.642*	0.074	0.658	0.113	0.145
Regulated	-0.066	0.858	-0.304	0.293	-0.129	0.731	-0.031
Pharmaceuticals	-0.151	0.774	-0.244	0.599	-0.378	0.482	-0.092
Retail	0.217	0.437	0.232	0.334	0.275	0.320	0.064
Sin	0.798	0.313	0.651	0.419	0.672	0.427	0.144
Non-environmentally-friendly	0.419	0.233	0.150	0.654	0.314	0.390	0.072
Year fixed effects	Yes		Yes		Yes		
Log likelihood	-1466.435		-1449.097		-1406.175		
Pseudo R^2	0.104		0.111		0.137		
Observations	2421		2413		2413		

Panel B: Tobit models of corporate giving							
	Dependent variable: Corporate giving ratio = log(1 + corporate giving / sales) x 10^3						
	Model 1		Model 2		Model 3		
	Estimates	*p*-value	Estimates	*p*-value	Estimates	*p*-value	dy/dx
CEO attributes							
CEO charity connection			1.022***	0.000	0.881***	0.000	0.015
CEO ownership (%)			-0.265***	0.000	-0.197***	0.000	-0.003
CEO ownership^2			0.009***	0.000	0.007***	0.000	0.000
Tenure (years)			0.002	0.786	0.001	0.905	0.000
Outside appointment			-0.095	0.666	-0.133	0.557	-0.002
Governance							
Board size			0.048	0.144	0.013	0.724	0.000
Independent board indicator			0.065	0.623	-0.001	0.993	0.000
Director ownership (%)			-0.034	0.185	-0.023	0.303	0.000
CEO-chairman duality			0.194	0.292	0.032	0.854	0.001
E-index			0.075	0.391	0.165*	0.073	0.003
Profit maximizing variables							
Ad-to-sales	0.410	0.922			0.390	0.921	0.006
Ad indicator	0.028	0.901			0.065	0.763	0.001
R&D-to-sales	5.881*	0.053			6.045**	0.044	0.100
R&D indicator	0.152	0.593			0.044	0.869	0.001
Assets (log)	0.189*	0.087			0.117	0.296	0.002
Number of employees (log)	0.089	0.356			0.087	0.367	0.001
Number of shareholders (log)	0.177**	0.011			0.099*	0.097	0.002
Marginal tax rate	0.120	0.888			0.085	0.915	0.001
Firm characteristics							
Leverage	0.838	0.208	0.575	0.319	0.902	0.167	0.015
ROA	2.201	0.114	0.674	0.631	1.777	0.186	0.029
Tobin's q	0.164	0.147	0.289**	0.014	0.204*	0.073	0.003
Free cash flow indicator	0.168	0.364	0.076	0.685	0.135	0.449	0.002
Asset/employee	0.000	0.752	0.000	0.918	0.000	0.574	0.000
Industries							
Financial	1.028**	0.024	0.932***	0.006	1.133**	0.014	0.019
Regulated	0.066	0.842	-0.124	0.593	0.030	0.926	0.000
Pharmaceuticals	1.847*	0.057	2.182**	0.035	1.641*	0.082	0.027
Retail	0.358	0.265	0.291	0.301	0.418	0.211	0.007
Sin	0.557	0.258	0.372	0.431	0.516	0.328	0.009
Non-environmentally-friendly	0.298	0.289	0.071	0.772	0.207	0.449	0.003
Year fixed effects	Yes		Yes		Yes		
Log likelihood	-3786.802		-3757.987		-3734.286		
Observations	2421		2413		2413		
Left censored observations	987		980		980		

In contrast to previous studies (Navarro, 1988; Brown, Helland, and Smith, 2006), we find that the *ad-to-sales* ratio, one of the main variables associated with the profit maximization hypothesis, is insignificant. This variable is only significant in models where robust standard errors are not clustered at the firm level.[19] We also find that firms in *sin* and *non-environmentally-*

[19]The result suggests a strong time-varying firm effect, which may be due to the sample construction. In contrast to previous studies, this study is based on NDCG database and considers more firms and a wider time range. Moreover, it

friendly industries do not give more, which is evidence that does not support the prediction that firms in the out-of-favor industry gives more (Bernea, Heinkel, and Kraus, 2008). However, there is some evidence consistent with the value maximization hypothesis. For example, firms that are relatively visible (Benabou and Tirole, 2010), invest more in R&D (Brown, Helland and Smith, 2006), and firms in *financial* and *pharmaceutical* industries are associated with more giving. However, these results are not robust as the statistical significance of these variables is not stable across different regression specifications in Panels A and B of Table 1.2. Lastly, consistent with the profit maximization theory, we find that the coefficient of the *marginal tax rate* is insignificant.

Governance variables have little success in explaining the likelihood and the amount of corporate giving. Only the *E-index* is found to increase the giving ratio statistically. However, its economic effect is much lower than that of *CEO charity connection*. Finally, most firm level control variables (except *Tobin's q*) do not predict corporate giving successfully.

4.1.1. A natural experiment

A common critique of the above finding is that CEO attributes, especially ownership, are endogenously determined. In this section, we address this issue using a natural experiment. We use the 2003 dividend tax cut, which reduced the tax rates on the dividend income of individuals. Specifically, the dividend tax rate was reduced from the highest rate of 35% to 15% (Chetty and Saez, 2005). Since a manager's choice of private benefits is positively affected by the individual income tax and negatively to her share ownership in the firm, the Tax Reform Act increased the cost of pursuing private benefits, especially for managers with high ownership in the firm.[20]

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considers total contributions while previous studies (e.g., Brown, Helland, and Smith, 2006) consider cash contributions.

[20]Consider that a manager has the following value function. $V \equiv \lambda(1-e)(1-\tau_c)(1-\tau_d) + \alpha e - {}^{\gamma e^2}/_{2}$, where λ is her fractional ownership, e is discretionary expenses, τ_c is corporate income tax, τ_d is individual income tax, $\alpha \in [0,1]$ is a manager's fraction of gains from discretionary expenses, and $\gamma \in [0,1]$ is the quality of governance. Solving this

Table 1.3
A natural experiment using the 2003 individual dividend tax cut

The sample considers corporate giving of Fortune 500 firms during 1996-2002 and 2004-2006. It excludes year 2003 corporate giving data as the tax reform was officially signed into law at the end of May 2003. Regressions include all independent variables of Table 1.2, an intercept term and year fixed effects, all of which are suppressed for brevity. $Post_{2003}$ takes the value of 1 for the year 2003 and onwards (2003 being the dividend tax cut year) and 0 otherwise. $Post_{2002}$ is similarly defined. Panel B considers firms with CEO charity connections (model 1) and firms with higher than sample mean dividend distributions (model 2). Robust standard errors are clustered at the firm level. ***, ** and * denote statistical significance based on two sides tests at the 1%, 5% and 10% level, respectively. Variable definitions are in Appendix 1.C.

Panel A: CEO ownership

	Dependent variable: Corporate giving ratio = log(1+corporate giving/sales) x 10^3					
	2003 dividend tax cut			Placebo		
	Estimates	*p*-value	dy/dx	Estimates	*p*-value	dy/dx
$Post_{2003}$	-0.081	0.618	-0.001			
$Post_{2002}$				-0.093	0.619	-0.001
CEO ownership (%) x $Post_{2003}$	-0.088**	0.034	-0.001			
CEO ownership (%) x $Post_{2002}$				-0.050	0.308	-0.001
CEO ownership (%)	-0.154**	0.012	-0.002	-0.158**	0.030	-0.002
CEO ownership^2	0.006***	0.003	0.000	0.006***	0.006	0.000
Log likelihood	-3255.186			-3256.271		
Observations	2067			2067		
Left censored observations	833			833		

Panel B: Dividend payouts and CEO charity connections

	Dependent variable: Corporate giving ratio = log(1+corporate giving/sales) x 10^3					
	CEO charity connections (1)			Dividend payouts (2)		
	Estimates	*p*-value	dy/dx	Estimates	*p*-value	dy/dx
$Post_{2003}$	-0.053	0.769	-0.001	0.086	0.852	0.000
CEO ownership (%) x $Post_{2003}$	-0.035	0.348	-0.001	-1.217**	0.035	-0.011
CEO ownership (%)	-0.138**	0.035	-0.003	1.212	0.112	0.011
CEO ownership^2	0.005***	0.011	0.000	-0.217	0.145	-0.002
Log likelihood	-2443.155			-996.600		
Observations	1475			491		
Left censored observations	466			141		

In Panel A of Table 1.3, we compare corporate charitable contributions before and after 2003 as a function of *CEO ownership*. The main variable of interest is *CEO ownership* x $post_{2003}$, where $post_{2003}$ is the post-tax reform variable. We include $post_{2003}$ as a separate variable in addition to year fixed effects.[21] Consistent with the implication of this tax reform, we find that corporate giving declines after 2003, and this effect is stronger as CEO ownership increases. This

function w.r.t. e gives $e^* = [\alpha - \lambda(1-\tau_c)(1-\tau_d)]/\gamma$. Therefore, we obtain $\partial e^*/\partial \tau_d = \lambda(1-\tau_c)/\gamma > 0$, and $\partial^2 e^*/\partial \tau_d \partial \lambda = (1-\tau_c)/\gamma > 0$.

[21]Results are similar when we consider the experiment without year fixed effects.

is an economically important effect where the impact of *CEO ownership* on corporate giving increases by 50% after 2003. In model 2, we repeat the analysis with a placebo period where the event year is assumed to be 2002 rather than 2003. The insignificant coefficient of *CEO ownership* x $post_{2002}$ reinforces the result from model 1. In both models, the coefficient of the $post_{2003}$ or $post_{2002}$ is negative, although not statistically significant.

A possible concern with the natural experiment is that our results may be due to confounding macroeconomic effects occurring contemporaneously with the 2003 Tax Reform Act. To address this concern, we conduct an analysis of two subsamples where tax effects are predicted to be stronger or weaker and not differentially affected by concurrent economy-wide changes. So, we should expect an estimate of *CEO ownership* x $post_{2003}$ that is similar to the estimate in the whole sample under the cynical view, but a different estimate if the Tax Reform Act has had a distinct impact on corporate giving.

Specifically, in Panel B we test the incremental effect of ownership after the Tax Reform Act in subsamples of firms with CEO charity connections or with high dollar dividend payouts. The 2003 Tax Reform Act would have a less pronounced impact on corporate charitable contributions if the marginal benefits of corporate giving for CEOs with charity connections continue to exceed the cost of their private benefits. On the other hand, the effect of the Tax Reform Act should be more pronounced for firms that pay large dividends. Consistent with the predictions, model 1 shows that the coefficient of *CEO ownership* x $post_{2003}$ is not statistically significant, suggesting that the incremental effect of ownership after the individual dividend tax cut is less pronounced for CEOs who have preferences for charity.

For firms that distribute dividends that exceed the sample average, we document in model 2 a large negative coefficient of *CEO ownership* x $post_{2003}$, which is also statistically significant. This result indicates that the main effect of *CEO ownership* after the Tax Reform Act is driven by

large dividend-paying firms, as these firms are more likely to realize the benefits of the Tax Reform Act by substituting more dividends in place of corporate giving.

4.1.2. Subsample analyses

In this subsection, we consider subsamples of firms based on whether they are prone to governance problems or are likely to benefit from corporate giving to measure the incremental effect of CEO incentives or profit motives, respectively.

First, we consider subsamples of firms with stronger or weaker governance structures based on managerial entrenchment (Bebchuk, Cohen, and Ferrell, 2009) and board independence (Hermalin and Weisbach, 1998). This analysis predicts more (less) severe agency problems associated with corporate giving in samples of firms where shareholder rights are at risk (upheld). Panel A of Table 1.4 presents the results. In the first model, which considers firms with three or more antitakeover defenses, we find a more pronounced positive effect of *CEO charity connection* and a muted (positive, but statistically insignificant) effect of *CEO ownership*. Moreover, corporate giving in this sample increases with the *E-index* and decreases with *director ownership*. In contrast, for firms with fewer than three antitakeover defenses, the effects of *CEO charity connection* and *CEO ownership* are similar in magnitude to the earlier results in model 3 of Panel B, Table 1.2. The third and fourth regression models in Panel A examine the subsample of firms without and with independent boards respectively. Results based on this governance criterion are similar to those based on the *E-index*. Taken together, subsample analysis suggests that agency problems of corporate giving are a broad based problem, but are more serious in poorly governed firms.

Second, in Panel B of Table 1.4 we consider firm observations with non-missing data on advertising and R&D expenses as these firms are thought to benefit most from corporate giving.

The marginal effects of *CEO charity connection* and *CEO ownership* are 1.6% (*p*-value = 0.004) and 0.26% (*p*-value = 0.071), which are similar to their estimates considering the whole sample.

Table 1.4
Subsample analyses based on firm governance and profit motives

The sample considers corporate giving of Fortune 500 firms during 1996 to 2006. Regressions include all independent variables of Table 1.2, an intercept term and year fixed effects, all of which are suppressed for brevity. Robust standard errors are clustered at the firm level. ***, ** and * denote statistical significance based on two sides tests at the 1%, 5% and 10% level, respectively. Variable definitions are in Appendix 1.C.

Panel A: Subsamples based on managerial entrenchment and board independence

	Dependent variable: Corporate giving ratio = log(1 + corporate giving / sales) x 10^3							
	E-index ≥ 3		E-index < 3		Board independence = 0		Board independence = 1	
	Estimates	*p*-value	Estimates	*p*-value	Estimates	*p*-value	Estimates	*p*-value
CEO attributes								
CEO charity connection	1.279**	0.016	0.756***	0.000	1.052***	0.000	0.648***	0.006
CEO ownership (%)	0.052	0.823	-0.181***	0.000	-0.103*	0.057	-0.277***	0.009
CEO ownership^2	-0.023***	0.256	0.006***	0.000	0.004**	0.015	0.006	0.163
Tenure (years)	0.017***	0.539	0.000	0.981	-0.007	0.491	0.004	0.754
Outside appointment	0.251*	0.610	-0.062	0.769	-0.272	0.322	-0.086	0.761
Governance								
Board size	0.065	0.550	-0.004	0.917	0.047	0.337	-0.019	0.679
Independent board indicator	0.573	0.199	-0.165	0.225				
Director ownership (%)	-0.049*	0.096	-0.020	0.399	-0.010	0.745	-0.027	0.269
CEO-chairman duality	0.382	0.591	-0.026	0.876	-0.067	0.752	0.179	0.465
E-index	0.682*	0.091	0.108	0.221	0.054	0.558	0.249*	0.066
Log likelihood	-910.981		-2718.026		-1429.520		-2260.879	
Observations	535		1878		1024		1389	
Left censored obs.	213		767		446		534	

Panel B: Subsample of firms with positive advertising and R&D expenses

	Dependent variable: Corporate giving ratio = log(1 + corporate giving / sales) x 10^3	
	Advertising and R&D expenses > 0	
	Estimates	*p*-value
CEO attributes		
CEO charity connection	1.867***	0.009
CEO ownership (%)	-0.308	0.108
CEO ownership^2	0.009	0.146
Tenure (years)	-0.045	0.198
Outside appointment	-0.986	0.219
Governance		
Board size	-0.271	0.113
Independent board indicator	0.176	0.718
Director ownership (%)	0.030	0.757
CEO-chairman duality	0.018	0.977
E-index	-0.089	0.732
Profit maximizing variables		
Ad-to-sales	-6.312	0.419
R&D-to-sales	6.346*	0.090
Assets (log)	-0.149	0.723
Number of employees (log)	0.970**	0.049
Number of shareholders (log)	0.021	0.912
Marginal tax rate	0.013	0.997
Log likelihood	-741.658	
Observations	386	
Left censored observations	123	

In addition, we find that *ad-to-sales* and *R&D-to-sales* ratios, the two main variables of the value maximization theory, are statistically insignificant. These results cast further doubt on the claim that corporate giving is positively related to firm profit maximization or equivalently shareholder wealth creation.

Overall, the results of Table 1.2, 1.3 and 1.4 are more consistent with the hypothesis that corporate giving is a manifestation of agency problem and are inconsistent with corporate giving being motivated by firm value maximization.

4.2. Corporate giving and financial performance

4.2.1. Equity value of corporate cash holdings

To measure the impact of corporate giving on firm value through its impact on cash holding, we build our analysis on Faulkender and Wang (2006). They regress yearly excess stock returns, $r_{i,t}$ - $R^B_{i,t}$, on changes in firm's cash holdings, ΔC_{it} , and other control variables and designate the coefficient of changes in cash as a measure of the value investors place on an additional dollar of liquid assets. Faulkender and Wang (2006) find that the marginal value of cash declines with larger cash holdings, higher leverage, better access to capital markets and a firm's preference for cash dividends over stock repurchases. We augment their model with a measure corporate giving. Specifically, we estimate the following regression:

$$r_{i,t} - R^B_{i,t} = \alpha + \beta.(\textit{corporate giving ratio}_{i,t}) + \gamma.(\Delta C_{it}/M_{i,t-1} \text{ x } \textit{corporate giving ratio}_{i,t}) + \delta.(\Delta C_{it}/M_{i,t-1}) + \theta'.X_{i,t} + \varepsilon_{i,t}. \quad (2)$$

The dependent variable in equation (2) is firm *i*'s excess stock return over fiscal year *t*. As in Faulkender and Wang (2006), we calculate excess returns by deducting the Fama-French size and book-to-market portfolio returns ($R^B_{i,t}$) from the firm's raw stock returns ($r_{i,t}$). As an alternative

measure, we also calculate excess returns by subtracting the portfolio returns for the firm's Fama-French 48 industry ($R^{Ind}_{i,t}$) from the raw stock returns. [22]

The explanatory variables are *corporate giving ratio* which is defined as log(1 + corporate giving / sales) x 10^3, $\Delta C_{i,t}$ which represents the changes in cash from year *t-1* to *t*, and $M_{i,t-1}$ which is the l-year lagged market value of equity. Consistent with Faulkender and Wang (2006), the vector *X* includes changes in earnings (ΔE_t), changes in net assets (ΔNA_t), changes in R&D (ΔRD_t), changes in dividend (ΔD_t), changes in interest (ΔI_t), 1-year lagged cash holdings (C_{t-1}), leverage (L_t), and net equity and debt financing (NF_t). All of these latter variables except leverage are scaled by $M_{i,t-1}$. Vector *X* also includes interactions of changes in cash with cash holding and leverage. The main coefficient of interest in (2) is γ, which is expected to be negative if corporate giving entails inefficient use of cash and offers managers an opportunity to extract greater rents.

Panels A and B of Table 1.5 present summary statistics and regression results, respectively. Summary statistics are based on the Fortune 500 firms for which data is available in Compustat and CRSP. Because the sample focuses on larger firms, the summary statistics in Panel A are somewhat different from those of Faulkender and Wang (2006). For example, in this sample the change in cash divided by market value of equity at the beginning of fiscal year has a mean (median) of 2.8% (0.6%), whereas in Faulkender and Wang (2006), it has mean (median) of 0.4% (-0.01%).

Panel B presents regression results, which are based on two alternate formulations of excess returns. Model 1 defines excess returns by subtracting the Fama-French size and book-to-market portfolio returns from firm raw stock returns, whereas model 2 defines excess returns by deducting the Fama-French 48 industry portfolio returns from the firm's raw returns. Examining

[22]We consider the universe of Fortune 500 firms to calculate average industry returns based on the argument that they constitute the sample of closest comparables. Later in robustness tests, we also consider the universe of firms listed in NYSE, AMEX and NASDAQ exchanges. These results are very similar.

Table 1.5
Equity value of cash holdings and corporate giving

The sample considers corporate giving of Fortune 500 firms during 1996 to 2006. All variables except leverage are scaled by 1-year lagged market value of equity, M_{t-1}. The regression specifications, including variable constructions, follow along the lines of Faulkender and Wang (2006). Corporate giving ratio is equal to log(corporate giving / sale) x 10^3. Regressions in Panel B controls for Fama-French 48 industry and year fixed effects, and are estimated with an intercept term. Robust standard errors are clustered at the firm level. ***, ** and * denote statistical significance based on two sides tests at the 1%, 5% and 10% level, respectively. Variable definitions are in Appendix 1.C.

Panel A: Descriptive statistics

Variable	10th	25th	Mean	Median	75th	90th
$r - R^B$	-0.609	-0.356	-0.121	-0.122	0.075	0.298
$r - R^{Ind}$	-0.336	-0.172	-0.014	-0.027	0.117	0.295
ΔC_t	-0.051	-0.010	0.028	0.006	0.038	0.108
C_{t-1}	0.008	0.022	0.226	0.061	0.155	0.417
ΔE_t	-0.055	-0.009	0.012	0.009	0.030	0.080
ΔNA_t	-0.143	-0.007	0.156	0.047	0.180	0.567
ΔRD_t	0.000	0.000	0.000	0.000	0.000	0.003
ΔI_t	-0.007	-0.002	0.001	0.000	0.002	0.010
ΔD_t	0.000	0.000	0.001	0.000	0.002	0.005
L_t	0.026	0.072	0.186	0.154	0.274	0.377
NF_t	-0.100	-0.043	0.015	-0.007	0.034	0.143

Panel B: OLS with industry and year fixed effects

Dependent variable (model):	$r - R^B$ (1)		$r - R^{Ind}$ (2)	
	Estimates	*p*-value	Estimates	*p*-value
Corporate giving ratio$_t$ x ΔC_t	-0.197	0.021**	-0.199	0.007***
Corporate giving ratio$_t$	0.006	0.205	0.005	0.068*
C_{t-1} x ΔC_t	-0.153	0.001***	-0.128	0.000***
L_t x ΔC_t	-0.018	0.961	-0.125	0.720
ΔC_t	0.797	0.000***	0.690	0.001***
ΔE_t	0.654	0.000***	0.522	0.000***
ΔNA_t	0.027	0.170	0.028	0.103
ΔRD_t	-0.092	0.961	0.799	0.644
ΔI_t	-1.450	0.035**	-1.126	0.073*
ΔD_t	1.410	0.285	0.472	0.688
C_{t-1}	0.068	0.028**	0.038	0.178
L_t	-0.115	0.125	-0.065	0.351
NF_t	-0.219	0.004***	-0.208	0.003***
Adjusted R^2	30.66%		8.14%	
Observations	2671		2671	

Panel B, the coefficient of the corporate giving interacted with the change in cash is negative and highly statistically significant in both specifications of the firm's excess stock returns. The relation is also economically important. For example, in model 1 the equity value of cash is approximately 8.1 cents lower if a firm changes its total giving from the sample median to the 75th percentile level. Untabulated analysis shows that the impact of corporate giving on firm value more than doubles, from -$0.081 to -$0.199, for a sample of firms with non-independent boards

where board oversight is expected to be weaker. These results suggest that managers extract private benefits from corporate cash holdings when firms make charitable contributions. Because investors perceive such benefits negatively, they place a lower value on each extra dollar of cash the company holds. This finding is consistent with the hypothesis that corporate giving reduces a firm's financial performance. Other explanatory variables in Panel B have similar signs and explanatory power to those documented in Faulkender and Wang (2006).

In the above analysis, corporate giving is set equal to zero if firms do not disclose direct giving voluntarily and do not contribute through their foundations. Doing so may not be inappropriate if non-reporting firms contribute negligible amounts or do not contribute at all in reality. This is a likely assumption because 1) the NDCG database only contains charitable contributions that are verified by the companies themselves or complied from reliable public records and 2) contribution recipients are typically tax-exempt institutions that must disclose revenue sources in the IRS's Form 990-PF, which is available for public inspection. [23] Nevertheless, we perform two robustness tests to validate the earlier findings. First, we assign the sample median or average value for the *corporate giving ratio* whenever it is missing. Results of this analysis are similar to the earlier findings. For example, the coefficient of the interaction term between *corporate giving ratio* and $\Delta C_{it}/M_{i,t-1}$ is -0.197 (*p*-value = 0.022) when stock returns are adjusted for size and book-to-market portfolio returns (i.e., model 1) and missing corporate giving values are replaced with their sample median. Second, since there is substantial uncertainty as to whether a firm contributes or not, whenever *corporate giving ratio* is missing, we exclude these observations. In the reduced sample of 1,541 firm-year observations, the results continue to be similar to the main analysis. For example, the coefficient of the interaction term is -0.192 (*p*-value

[23]When collecting data, we find that firms use direct giving very infrequently. For example, Coca-Cola contributed $37.48 million and $7.52 million in 2003 and 2004 respectively, and Microsoft contributed $107.12 million and $246.90 million in 1998 and 2002 respectively. For these firms, it is reasonable to assign zero direct giving for the other years.

= 0.036) for size and book-to-market adjusted stock returns. These additional robustness checks also suggest that sample selection issues are less problematic for our firm performance analysis.

4.2.2. Dividends and corporate giving

In subsection 4.1.1, we find that corporate giving declines after the 2003 Tax Reform Act. However, we do not investigate whether subsequent reductions in corporate giving lead to increased dividend payments. We perform this analysis in this section. Specifically, we specify a dividend regression model similar to Chetty and Saez (2004), except that we add the firm's charitable contributions and its interaction with the $post_{2003}$ indicator variable. Under an agency theoretic view of corporate giving, the interaction term *total contributions ($)* x $post_{2003}$ is predicted to have a negative coefficient in this specification.

Table 1.6
Dividends and corporate giving

The sample focuses on Fortune 500 firms that make charitable contributions in year 2002. Sample years include two years around the 2003 Tax Reform Act. All regression variables are in millions of dollars. Regressions are estimated with an intercept term. Standard errors are robust to heteroskedasticity. ***, ** and * denote statistical significance based on two sides tests at the 1%, 5% and 10% level, respectively.

	Dependent variable: Dividends ($)			
	Model 1		Model 2	
	Coefficients	*p*-value	Coefficients	*p*-value
$Post_{2003}$	109.057*	0.100	-47.790	0.331
Total contributions ($)	17.442***	0.000	10.288***	0.001
Total contributions ($) *$post_{2003}$	-8.930**	0.042	-5.373*	0.072
After tax earnings ($)			0.154**	0.016
Total assets ($)			0.002***	0.002
Adjust R^2	0.238		0.638	
Observations	668		668	

By focusing on firms that make charitable contributions in 2002, Table 1.6 shows how changes in contributions affect dollar dividends after 2003. Specifically, we find that the coefficient of *total contributions ($)* x $post_{2003}$ is negative and statistically significant in models with and without control variables, consistent with the agency theory prediction. Economically, a $1 million reduction in corporate giving after the Tax Reform Act is associated with $5.3 million

to $8.9 million increase in dividends. Therefore, our experiments are consistent with the 2003 dividend tax cut having a significant impact on curbing managerial consumption of private benefits and provide support that dividend increases after the 2003Tax Reform Act in part reflect a reduction in managerial consumption of private benefits of control.

Turning to the control variables, we see in regression model 2 that they have signs consistent with prior research and are generally statistically significant. Similar to Chetty and Saez (2004), we find that the coefficient of $post_{2003}$ is positive and statistically significant only when the regression model excludes the control variables.[24] We do find that the coefficients of *total contributions ($)* and its interaction with the $post_{2003}$ indicator continue to be statistically significant.

4.3. The channels of value destruction

Thus far the evidence suggests that corporate giving is a manifestation of agency problem that is instrumental in reducing firm value. In this section, we examine the specific channels through which corporate giving destroys firm value.

4.3.1. CEO-affiliated contributions

CEO-affiliated contributions refer to the amount of money a firm contributes to nonprofit organizations where the CEO is a director, trustee, advisor, or hold some other official position. The following analysis requires the names of CEO-affiliated charities and the amount of corporate contributions to these charities during the CEO's tenure in office. The primary data sources for CEO affiliated charities are the biographical sections of annual reports, Businessweek and Forbes. The main data source for the charity names and levels of corporate giving is the Foundation Directory Online database, which is available from 2004. This database tracks all

[24]Chetty and Saez (2005) argue that high dividend paying firms are extremely concentrated, making the estimate of the tax response fragile when control variables are added.

donations distributed by firm-sponsored foundations, but includes only limited amount of donations distributed to charities by corporations as disclosure is voluntary. Therefore, a caveat of this analysis is that the calculated affiliated contribution would underestimate the actual affiliated contribution. Because this two-way data matching is labor intensive, we focus on Fortune 100 CEOs as of 2006.[25]

Table 1.7 presents the evidence on CEO affiliated corporate giving. Panel A reports that about 82% of CEOs are affiliated with one or more nonprofit organizations while 62% (or 76% conditional on a nonprofit affiliation) distribute firm donations to their affiliated organizations, indicating that corporate contributions to CEO-affiliated charities are widespread. Panel B examines whether such contributions are economically large. We find that the average (total) affiliated contribution is $2.5 ($154.4) million during a CEO's tenure between 2004 and 2010, which equals 15.7% (15.7%) of average (total) annual CEO compensation and represents an annual cost to the corporation of approximately $675,000. Comparing this result with existing studies, we find that such contributions are greater than the combined costs of corporate jet use and other perks (see Table 2 in Yermack, 2006) and similar in magnitude to CEO personal donations through their family foundations (Yermack, 2009) and CEO cash severance payments (Rusticus, 2006).[26] In Panel C, we estimate a tobit regression of CEO-affiliated contributions on CEO attributes, firm size and industry indicator variables. The analysis indicates more affiliated giving in firms where CEO ownership is low or equivalently, where CEO financial interests are less aligned with shareholders. The regression results also suggest more CEO-affiliated giving in relatively larger firms and firms in the regulated industry.

[25]To illustrate data collection on affiliated contributions, consider the case of Mr. Miles D. White, the CEO of Abbott Laboratories. Mr. White is on the board of trustees at The Field Museum in Chicago, the Museum of Science and Industry, the Lyric Opera of Chicago, Joffrey Ballet of Chicago, The Culver Educational Foundation, Art Institute of Chicago, and Northwestern University. After indentifying these affiliated nonprofits, we search the Foundation Directory Online database to check whether they receive donations from Abbott. We find that all nonprofits except The Culver Education Foundation received a total of $15.2 million from 2003 to 2010.

[26]Yermack (2009) reports that CEOs and chairmen donate an average of $1.7 million through their family foundations over the two and a half year period, whereas Yermack (2006) documents annual perk consumption of $216,000 that includes jet use, financial counseling, car transportation, club fees, etc.

Table 1.7
Firm contributions to charities affiliated with CEOs

CEO-affiliated charities refer to nonprofits where CEOs hold positions of directors, trustees, advisors, etc. Affiliated donations indicate firm donations directed to CEO-affiliated charities. Data on CEO-affiliated nonprofits is collected from annual reports, Businessweek and Forbes. Data on affiliated donations are extracted from the Foundation Directory Online database. The sample considers CEOs of 2006 Fortune 100 firms during their tenure between 2004 and 2010. Panel C estimates a tobit regression of CEO-affiliated corporate giving on CEO attributes and other control variables. Robust standard errors are clustered at the firm level. ***, ** and * denote statistical significance based on two sides tests at the 1%, 5% and 10% level, respectively. Variable definitions are in Appendix 1.C.

Panel A: CEO affiliations with nonprofit organizations

	Number	Percentage
Total number of CEOs	105	100.00
CEOs with affiliated organizations (a)	86	81.90
CEOs with affiliated donations (b)	65	61.90
(b)/(a)		75.58

Panel B: Magnitude of affiliated contributions

	Obs.	Dollar value	Mean	Std
Affiliated donations ($mil) (a)	63	154.44	2.45	4.55
Average CEO compensation ($mil) (b)	63	982.53	15.60	6.95
(a)/(b)		15.72%	15.72%	

Panel C: Regression analysis of CEO affiliated contributions

	Dependent variable: Affiliated corporate giving ('000)		
	Estimates		*p*-value
CEO attributes			
CEO stock ownership	-2.702	**	0.031
Tenure (years)	-21.136		0.347
Outside appointment	-485.513		0.391
Control variables			
Assets (log)	521.917	*	0.067
Financial	1240.391		0.111
Regulated	1259.598	*	0.063
Pharmaceuticals	1821.895		0.118
Retail	-40.330		0.945
Sin	277.512		0.693
Non-environmentally-friendly	334.091		0.585
Log likelihood	-1815.437		
Observations	514		
Left censored observations	326		

In summary, the evidence on CEO-affiliated contributions documents a new form of rent extraction. Earlier studies document rent extraction through, for example, excessive compensation (Bebchuk and Fried, 2004), option backdating (Heron and Lie, 2007), and the use of a corporate jet (Yermack, 2006). Although CEO-affiliated contributions are economically large and managers accrue private benefits from these contributions, which together raise clear

conflict-of-interest concerns, currently the SEC does not require firms to disclose this information to shareholders.

4.3.2. Charity awards

As a part of its proxy reform rules on compensation, the SEC mandated that public firms disclose the names of executives and directors associated with charitable awards or legacy programs beginning in October 1992. We use the data generated by this reporting change to study how shareholders reacted to charity awards. If shareholders believe that firms can attract desirable executives and board members who are instrumental in safeguarding their interests, we would expect stock price to react positively. Alternatively, if shareholders perceive that charity awards are symptomatic of waste and entrenched boards, we would expect a negative stock price performance when firms report charity awards in proxy statements for the first time after 1992.

Since the SEC's EDGAR web site reports proxy statements from 1994, we rely on microfiche files stored at Vanderbilt University for the year 1993 to gather data on proxy filing dates. In our sample of Fortune 500 firms, 53 firms disclose charity awards for at least one director during 1993 – 2010. We focus on these companies to study the stock price reactions when a charity award is first disclosed to shareholders.[27]

Abnormal stock returns are presented in Figure 1.2 and Table 1.8. We use a firm's proxy filing date as the event day. If a firm files a preliminary proxy statement before the final filing, then the preliminary statement filing date is used (Yermack, 2006). Firm-level abnormal returns are calculated using standard event-study methodology with a Fama-French-Carhart four factor model. Figure 1.2 presents average CARs for the ten trading days (or two weeks) prior to the

[27]Research on executive compensation and managerial rent extraction frequently scrutinize proxy statement disclosures for questionable items. For example, Fich and Shivdasani (2005) study stock option plans of outside directors, Wei and Yermack (2011) analyze CEO inside debt, and Yermack (2006) examines CEO personal use of corporate jets. Yermack (2006) also finds that proxy statement release dates on average lead to a weakly positive rise in share price, probably because managers strategically disclose favorable news in these documents.

event day through to ten trading days after the event. The abnormal returns for the sample are distributed around zero up to the proxy filing date and then begin to trend downward.[28] The mean

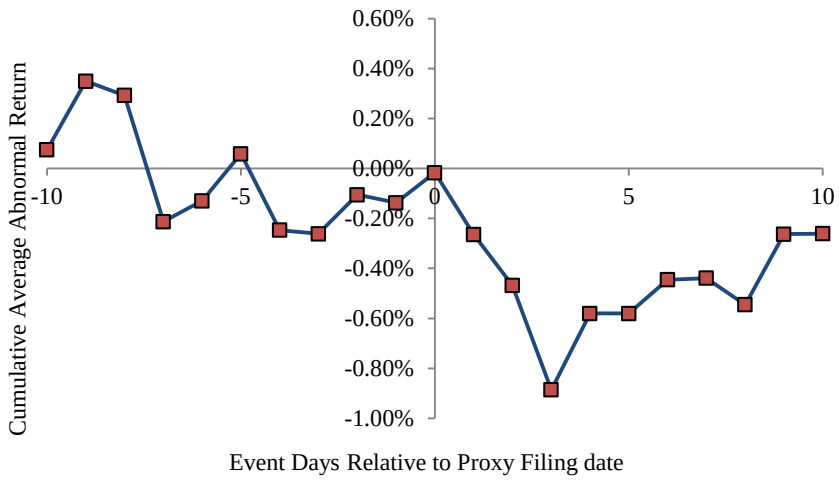

Figure 1.2: Stock market reactions to charity awards

Cumulative average abnormal returns for the first disclosure of charity awards. The sample consists of 53 firms whose proxy statements are investigated during 1993 – 2010. Abnormal returns are calculated using the Fama-French-Carhart four factor model.

CAR over [+1, +3] window period, as shown in Panel A of Table 1.8, is -0.87% and is statistically significant with a *p*-value of 0.014. In untabulated analysis, we exclude nine firms that made other major news announcements over [-4, +4] window period and find a three day CAR of -1.11% (*p*-value = 0.003).[29] These results indicate that shareholders react negatively to insider-affiliated giving. The economic loss far exceeds the value of charitable award programs and is likely to indicate the market's revised assessment of the quality of a firm's governance (particularly, board effectiveness).

In Panel B of Table 1.8, we present regression analysis of stock price reactions to charity awards as a function of *CEO ownership* and a firm's classified board status. We document a

[28]Yermack (2009) also documents price declines on event day one when investigating shareholder stock returns around the dates of executive stock gifts.

[29]Major news includes new director appointment, elimination of classified board and cumulative voting, debt issuance, tender offer, introduction of two stock classes, downward earnings revision by analysts, quarterly loss, and sale of a portion of the business.

statistically significant negative estimate for the *CEO ownership* variable, indicating that negative reactions to charity awards are mitigated if CEO interests are relatively more aligned with shareholder interests.

Table 1.8
Stock price reactions at the first disclosure of charity awards

Panel A presents mean cumulative abnormal returns of 53 firms that disclose charity awards for the first time during 1993 – 2010. Abnormal returns are calculated using standard event-study methodology with a Fama-French-Carhart four factor model. The event date zero is the firm's proxy filing date with the SEC. Panel B shows regression analysis of firm-level CARs as a function of an intercept, CEO ownership and a firm's classified board status.

Panel A: Event study results

Event window	Observations	Mean CAR	*t*-Statistic	*p*-Value
[1, 3]	53	-0.869%	-2.466	0.014

Panel B: OLS regression analysis with CARs

	Estimate	*p-value*
CEO ownership	-0.971**	0.044
Classified board	-0.005	0.604
Adjusted-R^2	4.55%	
Observations	53	

4.3.3. Donations to charities versus donations to company-sponsored foundations

Firms can contribute to charities or alternatively transfer donations to their sponsored foundations. In both cases, firms are not required by the SEC, state or federal laws to disclose giving information (Kahn, 1997). However, foundations are obligated to report to the IRS all data regarding their activities annually on Form 990-PF, which is available for public scrutiny. Thus, databases (Foundation Directory online and NDCG) on foundation giving contain complete information on contributions transferred to foundations. Data on individual firm's direct giving is from the NDCG directory, since it only reports contributions that are verified by companies themselves or compiled from reliable sources. With this data, we examine the intensity of agency problems in the two channels of corporate giving.

Agency problems are likely to be more severe for contributions transferred to foundations for several reasons. First, company-sponsored foundations cannot redistribute its assets back to

Table 1.9
Donations transferred to foundations and donations to charities

The sample considers corporate giving of 2006 Fortune 500 firms during 1996 to 2006. All regressions include an intercept term. Robust standard errors are clustered at the firm level. ***, ** and * denote statistical significance based on two sides tests at the 1%, 5% and 10% level, respectively. Variable definitions are in Appendix 1.C.

Dependent variables:	Model 1: Program giving = log(1 + prog. cont. / sales) x 10^3			Model 2: Foundation giving = log(1 + found. cont. / sales) x 10^3		
	Estimates	*p*-value	dy/dx	Estimates	*p*-value	dy/dx
CEO attributes						
CEO charity connection	0.236	0.604	0.001	0.788***	0.000	0.019
CEO ownership (%)	-0.473***	0.010	-0.003	-0.136***	0.007	-0.003
CEO ownership^2	0.015***	0.005	0.000	0.004***	0.006	0.000
Tenure (years)	0.045***	0.012	0.000	-0.004	0.673	0.000
Outside appointment	0.960*	0.060	0.006	-0.237	0.293	-0.006
Governance						
Board size	-0.116	0.174	-0.001	0.032	0.314	0.001
Independent board indicator	0.624*	0.082	0.004	-0.097	0.409	-0.002
Director ownership (%)	0.067*	0.080	0.000	-0.049*	0.060	-0.001
CEO-chairman duality	0.970**	0.043	0.006	-0.035	0.821	-0.001
E-index	0.080	0.631	0.000	0.161*	0.059	0.004
Profit maximizing variables						
Ad-to-sales	10.857	0.187	0.067	-2.307	0.570	-0.056
Ad indicator	0.494	0.301	0.003	-0.048	0.803	-0.001
R&D-to-sales	7.935	0.138	0.049	3.719	0.185	0.090
R&D indicator	-0.472	0.344	-0.003	0.136	0.605	0.003
Assets (log)	0.581*	0.076	0.004	0.050	0.634	0.001
Number of employees (log)	0.201	0.372	0.001	0.042	0.627	0.001
Number of shareholders (log)	-0.118	0.332	-0.001	0.114**	0.048	0.003
Marginal tax rate	-0.784	0.720	-0.005	-0.060	0.934	-0.001
Firm characteristics						
Leverage	0.074	0.960	0.000	0.743	0.231	0.018
ROA	-0.677	0.845	-0.004	1.496	0.239	0.036
Tobin's q	0.184	0.354	0.001	0.176*	0.092	0.004
Free cash flow indicator	0.747	0.106	0.005	0.043	0.801	0.001
Asset/employee	0.000	0.193	0.000	0.000	0.910	0.000
Industries						
Financial	0.248	0.789	0.002	1.022**	0.022	0.025
Regulated	0.683	0.387	0.004	-0.062	0.838	-0.002
Pharmaceuticals	0.558	0.631	0.003	1.089	0.183	0.027
Retail	-0.805	0.154	-0.005	0.514	0.121	0.012
Sin	-1.171	0.218	-0.007	0.658	0.154	0.016
Non-environmentally-friendly	0.161	0.824	0.001	0.102	0.696	0.002
Year fixed effects	Yes			Yes		
Log likelihood	-1109.857			-3196.803		
Observations	2413			2413		
Left censored observations	2151			1129		

company or its shareholders, so any foundation donations represent a loss of firm assets for uncertain future returns, which can harm shareholders. Second, the economic and accounting effects of foundation giving do not occur simultaneously. The economic effect of foundation giving takes place when foundations contribute to charities, whereas the accounting effect takes

place when firms transfer donations to foundations. This difference offers opportunistic managers an opportunity to time the transfer of funds to foundations by managing corporate earnings (Petrovits, 2006). Third, monitoring activities in foundations are performed by the representatives of sponsoring firms (Fama and Jensen, 1983). Absent residual claimants and external monitoring, but with considerable control over foundations (Carter and Werbel, 2002), managers are likely to use foundation assets in ways that are not consistent with value maximization, i.e., to benefit their preferred charities. Finally, the public may discount the firm's contributions, given that a firm is only indirectly involved in the actual distribution of charitable giving, so the positive publicity gains are likely to be small.

Table 1.9 presents the results of firms participating in direct giving and foundation giving where these two forms of giving are separately analyzed in two separate tobit regressions following the specification in equation (1). The model 1 estimates show that firms with more reputable CEOs (in terms of *tenure* and *outside appointment*) and better governance structures (*independent board indicator* and *director ownership*) are more likely to donate directly to charities annually. Moreover, we find that CEO charity interests are not likely to be associated with a firm's choice of direct giving recipients. On the other hand, model 2 reports that in firms where CEOs have charity interests and weaker corporate governance exists (*director ownership* and the *E-index*), management tends to engage in foundation giving. Interestingly, the marginal effects of *CEO ownership* are similar for both direct and foundation giving. Taken together, this evidence indicates that transfers of corporate resources to foundations are more prone to agency conflicts than publicly disclosed donations to charities.

4.3.4. Corporate giving and CEO compensation

The evidence uncovered thus far is consistent with managerial rent extraction as a motivation for corporate giving. However, this argument may be weakened if firms adjust the

compensation contracts of the senior executives benefitting from corporate charitable contributions (Fama, 1980). To explore this question, we estimate the following fixed effect model of the relation between CEO compensation and corporate giving.

$$log(CEO\ compensation_{it}) = \alpha + \beta.(corporate\ giving_{it}) + \gamma.X_{it} + f_i + y_t + \varepsilon_{it}\ , \qquad (3)$$

where *i* and *t* refer to firm and year, respectively. For the dependent variable, we calculate the natural logarithm of CEO compensation (total of salary, bonus, restricted stocks, Black-Scholes value of stock options, long-term incentives, etc.) to reduce the right skewness in the variable. The main explanatory variable of interest is *corporate giving*, which is described earlier. The covariate *X* is a vector consisting of firm-level characteristics (*logarithm of assets*, *stock return*, *ROA*, *volatility*), CEO attributes (*tenure as CEO* and *outside appointment*), and firm-level governance characteristics (*board size*, *independent board indicator*, *director ownership*, and the *E-index*). The terms f_i and y_t refer to firm and year fixed effects, respectively.

The main problem with this specification is that corporate giving is highly endogenous. For example, suppose that the level of CEO excess compensation is a good measure of CEO power. Under the managerial power hypothesis, firm contributions are determined by CEO compensation, a situation that raises reverse causality issues. To mitigate this concern, an instrumental variables (IV) model is estimated with three exogenous instrumental variables measured at the state level in the firm's headquarters state. The instruments are the state level density of high net worth individuals, average individual charitable contributions as a fraction of gross income, and recent natural disasters in the firm's headquarters state, all of which are described below.

Firms and individuals are two alternate sources of charity contributions. Since the density of high net worth individuals and their individual contributions at the state-level are likely to reduce the demand for corporate giving without directly affecting CEO compensation, we use them as instrumental variables. Following Becker, Cronqvist and Fahlenbrach (2010), we collect

data on the number of high net worth individuals from the Statistics of Income program at the IRS and calculate the state level density for every year in the sample.[30] Data on individual contributions is collected from the National Center for Charitable Statistics (NCCS). It provides state level average gross income (AGI) and average charitable giving data as reported on the IRS tax return Form 1040, Schedule A, by households who itemize deductions. NCCS provides data on AGI and average charitable giving for 1997 and 2004-2006. We replace missing year data by observations in the nearest year where data is available. We then divide state level average individual contributions by state level AGI. We find that these two instruments have a correlation of approximately 0.2.

4.3.4.1. Natural disasters as an instrumental variable

For the third instrument, we focus on natural disasters. Firms often donate generously after disasters. For example, our sample of firms donated over $223 million within the first month of hurricane Katrina. A firm's visibility, headquarter location, and whether its operations are interrupted are likely to affect the likelihood of its giving after natural disasters. This source of exogenous variation affects corporate giving without directly influencing CEO compensation. Therefore, natural disasters are likely to satisfy the relevancy and exclusion requirements of an instrumental variables approach.

Natural disasters that generate damages of at least $500 million in the affected states are treated as significant events. We collect this data from the Center for Research on the Epidemiology of Disasters (CRED) at the Université Catholique de Louvain. Panel A of Table 1.10 presents information on the types of natural disasters, total damages, and the number of affected states. Droughts, earthquakes, extreme temperatures, floods, storms and wildfires are six

[30]This source reports state level data on high net worth individuals for 1995, 1998 and 2001. In 1995, net wealth ranges from $0.6 to $10 million. For the latter two years, the lower limit is increased to $1.0 million and the ceiling is removed.

different types of natural disasters having total damages ranging from $3.6 billion in 2000 to $157.53 billion in 2005 (when hurricane Katrina affected the Gulf coast area). These disasters affected a minimum of 6 and a maximum of 34 states during 1996-2007. The state of New York is not included among the affected states in 2001 since the events associated with 9/11 represented a terrorist attack rather than natural disaster.[31]

Table 1.10
CEO compensation and corporate giving

Panel A presents the descriptive statistics of natural disasters across USA states during 1996 to 2006. This panel presents information on natural disaster types, its monetary damages and the states it affected. Panel B to D present results on instrumental variables approach, which mitigates the endogeneity problem of corporate giving. The sample considers 2006 Fortune 500 firms during 1996 to 2006. Both stages of regressions consider firm and year fixed effects, and are estimated with an intercept term. We define giving ratio as log(1 + corporate giving / sales) x 10^3. Robust standard errors are clustered at the firm level. ***, ** and * denote statistical significance based on two sides tests at the 1%, 5% and 10% level, respectively. Variable definitions are in Appendix 1.C.

Panel A: Natural disasters

Year	Type of natural disasters	Total value of damage (in $mil)	Number of states affected
1996	Flood, storm	6,100	25
1997	Flood, storm	8,000	27
1998	Extreme temperature, storm	12,880	24
1999	Drought, extreme temperature, storm	12,860	33
2000	Drought, Wildfire	3,600	19
2001	Earthquake, storm	8,000	8
2002	Drought, flood, storm	9,200	19
2003	Storm, wildfire	17,970	27
2004	Flood, storm	55,300	28
2005	Storm	157,530	6
2006	Flood, storm	4,400	19
2007	Flood, storm, wildfire	7,800	34

To identify firms whose contributions are likely to be affected by disasters, we define a variable called *natural disaster* that takes the value of one if natural disasters occur in a given year in the state where the firm's headquarters is situated. We interact this variable with end-of-the-year firm size and firm performance measures to identify how both visible firms and firms that are not operationally affected contribute to these natural disaster causes, respectively. Of course, the timing of the corporate giving after natural disasters is important to define. Many firms contribute immediately after natural disasters while others participate in the later rebuilding

[31]However, our results are robust to the inclusion of 9/11.

of community infrastructure. To consider both of these possibilities, we assume that natural disasters occurring in the fourth quarter of a year will affect a firm's contribution both in the current and the following year. A drawback of this IV method is that it relies for its power on the set of firms that are headquartered in states affected by natural disasters.

4.3.4.2. First-stage regressions

We first match the instruments with each firm's headquarters state. We hand-collect historical data on firm headquarters from the NDCG. We then estimate the following specification as the first stage regression.

$$log(corporate\ giving_{it}) = a + b'.(Z_{it}) + c.X_{it} + f_i + y_t + u_{it}, \qquad (4)$$

where Z is a vector of instruments: *density of high net worth people*, *individual contributions/AGI,* and *natural disaster*. Other variables and notations are as described earlier. For a firm with given characteristics, CEO attributes, and governance structures, these instruments are likely to add exogenous variation to the average corporate giving.

Panel B of Table 1.10 presents regression estimates of total corporate giving and separately on program giving and foundation giving. Although the *density of high net worth people* and *individual contributions/AGI* ratio have anticipated signs, they are not statistically significant. However, *natural disaster* is negative and highly significant, implying that firms contribute less when the state affected by a natural disaster also houses the firm's headquarters. This suggests that the firm operations are disrupted and that we need to control for this outcome.

Many arguments can be offered in favor of this result. Firms reduce community assistance programs if their operations are adversely affected, if they expect sales declines, etc. On the other hand, operationally unaffected firms that are headquartered in a state hit by a disaster are likely to contribute more. Specifically, we find that a 10% increase in ROA of a firm

Table 1.10 (Continued)
CEO compensation and corporate giving

Panel B: First stage, fixed effect regressions

	Model 1 Total giving ratio		Model 2 Program giving ratio		Model 3 Foundation giving ratio	
	Estimates	*p*-value	Estimates	*p*-value	Estimates	*p*-value
Density of high net worth people	-2.535	0.261	-1.223	0.402	-1.316	0.443
Individual contribution/AGI	-0.119	0.332	-0.105	0.191	-0.014	0.888
Natural disaster	-1.796***	0.006	-1.001*	0.052	-0.798**	0.043
Natural disaster * log(assets)	0.160**	0.011	0.087*	0.058	0.073*	0.080
Natural disaster * ROA	3.327**	0.015	1.917*	0.057	1.414*	0.063
Natural disaster * Stock return	-0.169	0.174	-0.051	0.604	-0.118	0.156
Log(assets)	-0.285**	0.050	-0.051	0.599	-0.234**	0.022
Stock return	0.146*	0.091	0.032	0.384	0.114	0.112
ROA	-1.610	0.220	-1.588*	0.059	-0.027	0.972
Volatility	0.993	0.456	0.878	0.231	0.115	0.913
Tenure as CEO	0.006	0.432	0.005	0.169	0.001	0.832
Outside appointment	-0.066	0.496	-0.035	0.476	-0.031	0.608
Board size	0.000	0.989	-0.001	0.925	0.001	0.934
Independent board indicator	-0.032	0.701	0.053	0.266	-0.085	0.158
Director ownership (%)	0.006	0.125	0.003	0.102	0.002	0.450
E-index	0.049	0.419	0.038	0.375	0.010	0.825
Adjusted R^2	43.51%		19.89%		55.31%	
Observations	2381		2381		2381	

Panel C: Second stage, fixed effect regressions

	Model 1 Total compensation		Model 2 Total compensation		Model 3 Total compensation	
	Estimates	*p*-value	Estimates	*p*-value	Estimates	*p*-value
Total giving ratio (predicted)	0.352*	0.080				
Program giving ratio (predicted)			0.638*	0.071		
Foundation giving ratio (predicted)					0.744*	0.096
Log(assets)	0.312*	0.065	0.242	0.227	0.389***	0.004
Stock return	0.068	0.664	0.085	0.572	0.050	0.761
ROA	0.656	0.680	1.070	0.449	0.176	0.924
Volatility	-1.656	0.176	-1.850	0.145	-1.401	0.230
Tenure as CEO	-0.007	0.192	-0.008	0.163	-0.006	0.242
Outside appointment	0.219***	0.003	0.217***	0.004	0.221***	0.003
Board size	-0.008	0.497	-0.007	0.527	-0.009	0.464
Independent board indicator	-0.036	0.661	-0.081	0.432	0.016	0.796
Director ownership (%)	-0.005	0.389	-0.005	0.376	-0.005	0.410
E-index	0.045	0.434	0.038	0.518	0.054	0.338
Adjusted R^2	56.56%		56.56%		56.55%	
Observations	2381		2381		2381	

Panel D: Distribution of log(total compensation), total compensation is in thousand dollars

	10^{th}	25^{th}	Mean	Median	75%	90%
log(tdc1)	7.614	8.250	8.775	8.813	9.930	9.996

in a state hit by a disaster raises the total giving ratio by 33.3%. Firm visibility in the disastrous state has a meaningful, but lower economic impact. In the next two columns of Panel A, we estimate similar regressions but consider program and foundation giving separately to identify the relative impacts on the two forms of corporate giving. The evidence suggests that program giving

is more generous following natural disasters. Relative to program giving, foundation giving falls to a greater extent (by 25.5%).[32] In addition, firms not adversely affected by disasters are likely to be 35.6% more responsive with program giving.[33] This result on program giving is consistent with the views of industry experts, and is suggestive of the strength of *natural disaster* as an instrument.[34]

4.3.4.3. Second-stage regressions

The predicted values of corporate giving are used to estimate the CEO compensation model specified by equation (3). Panel C of Table 1.10 presents the results for CEO compensation. In all three statistical models, the estimated coefficients of corporate giving are positive, ranging from 0.35 to 0.74, and are consistently statistically significant at the 10% level or better. The lowest coefficient estimate implies a 3.5% rise in CEO compensation for a 10% increase in the predicted total corporate giving. For the same increase in total corporate giving, we estimate that CEO compensation increases by 8.09% (3.5%/43.5%, where 43.5% is the adjusted R^2 of the first-stage regression). Economically, a 10% increase in total corporate giving raises CEO compensation by $523,542 (from its mean $6.5 million). This evidence contradicts optimal contracting hypothesis and supports the managerial power hypothesis, which states that CEOs have power to extract excess rents. The fact that a marginal increase in foundation giving (model 3) raises CEO compensation by a greater amount suggests that managerial agency problems are more serious at firms that contribute directly to foundations. This supports our earlier findings on donations transferred to company-sponsored foundations. Consistent with existing studies, we also find that CEO compensation is significantly and positively related to

[32]We calculate the difference between the coefficients of *natural disaster* in model 2 and 3 in Table 1.10, and divide the difference by the smaller estimated coefficient. That is (1.001-0.798)/0.798=25.45%.
[33]Here, we consider (*natural disaster* x *ROA*) and calculate (1.92-1.41)/1.41=35.6%.
[34]For example, Mr. Matthew Nelson, Managing Director at the Council on Foundations, said that "companies have the ability to respond to immediate needs, such as disasters, because they can get volunteers from employees, match donations and give away product". Source: The Wall Street Journal (Dec 10, 2007).

CEO's outside recruitment status and firm size. Other control variables are insignificant after controlling for the predicted level of corporate giving. In summary, the evidence in this section substantiates Bebchuk and Fried's (2004) managerial power hypothesis and shows corporate giving can represent a form of rent extraction.

4.3.5. Board member charitable interests and corporate giving

In this section, we analyze the relation between independent director charity interests and corporate giving. The existing literature suggests that managers build reputation with stakeholders through the use of corporate giving and CSR activities. For example, Galaskiewicz (1985, 1997) finds that CEOs make valuable connections with local elites when their firms make charitable contributions, and Cespa and Cestone (2007) assert that CEOs use CSR activities strategically to build relations with social and environmental activists, who offer CEOs favorable treatment during future turnover decisions. We argue that a more direct form of entrenchment occurs when CEOs strategically allocate firm donations to serve independent director charitable interests. For this purpose, we analyze whether the charities supported by corporate giving match independent director charitable interests and then evaluate the effect of this alignment on CEO compensation. This analysis is similar in spirit to Hwang and Kim (2009), who find that a CEO's social ties with independent directors result in excessive CEO compensation. The analysis here differs from theirs in the sense that this study considers the social ties that are created by corporate giving.

Due to data limitations, we focus on Fortune 500 firms during 2005-2006 and obtain information on independent directors' charitable affiliations from the proxy statements filed in these two years.[35] Results examining the link between independent director charity interests and corporate giving causes are presented in Panel A of Table 1.11. We find that 64% of independent directors with charitable affiliations are associated with educational institutions, 47% with

[35]We exclude CEOs and non-independent directors for this analysis.

Table 1.11

Alignment of independent director interests with causes supported through corporate giving

Information on independent directors' charity interests for Fortune 500 firms is retrieved from 2005 and 2006 proxy statements. The sample is conditional on positive director charity affiliations. The causes of corporate giving exceeding $1 million are based on philanthropic activities during 2005-2006. The source of this information is the Foundation Directory Online database. The fixed effect (industry) regressions in Panel B control for all control variables in Panel C, Table 1.10 as well as year fixed effects. The sample in Panel B considers firms with independent boards (model 1) and non-independent boards (model 2) separately. Robust standard errors are clustered at the firm level. ***, ** and * denote statistical significance based on two sides tests at the 1%, 5% and 10% level, respectively.

Panel A: Director interests and corporate giving causes

Interests of independent directors		Corporate giving causes (first three)	
Purpose	% of directors	Purpose	% of firms
Agriculture/food	0.00	Agriculture/food	1.05
Animals/wildlife and environment	11.81	Animals/wildlife and environment	2.53
Arts & culture	22.15	Arts & culture	18.11
Civil/human rights	10.34	Civil/human rights	0.63
Community development and employment	4.64	Community development and employment	4.63
Crime/law enforcement	1.05	Crime/law enforcement	0.00
Education	63.71	Education	32.42
Health centers and research institutes	25.53	Health centers and research institutes	3.79
Housing/shelter	1.69	Housing/shelter	2.11
Health and human services	3.80	Health and human services	28.00
International/foreign affairs	14.35	International/foreign affairs	5.05
Philanthropic organizations	46.62	Philanthropic organizations	23.58
Recreation	7.38	Recreation	0.63
Religion	2.95	Religion	0.42
Research centers & think tanks	18.35	Research centers & think tanks	1.05
Safety/disasters	1.48	Safety/disasters	1.47
Science/social science	4.85	Science/social science	1.47
Youth development	12.24	Youth development	3.37

Match between the interests of directors and the first three causes supported through corporate giving is 68.80%.

Panel B: Fixed effect (industry) regressions with a year indicator

	Model 1 Total compensation		Model 2 Total compensation	
	Estimates	*p*-value	Estimates	*p*-value
Director supported cause	0.295**	0.035	0.145	0.372
Controls	Yes		Yes	
Industry fixed effects	Yes		Yes	
Adjusted R^2	26.45%		77.51%	
Observations	564		177	

different types of philanthropic organizations, 22% with arts and culture, etc. For the same set of firms, we identify individual firm's top three charitable causes receiving corporate contributions of at least $1 million in 2005 and 2006 using the Foundation Directory Online database. Of all firms making charitable contributions, 32% contribute to educational institutions, 28% contribute to health and human services, 24% contribute to philanthropic organizations, and 18% support

arts and culture as one of their top three charity recipients. After combining these two data sources, we find a match between a firm's director interests and a firm's top three causes receiving charitable contributions for 68.8% of the sample of corporations making charitable contributions.

We evaluate the effect of the link between independent director charitable interests and corporate contributions on CEO compensation in Panel B of Table 1.11 for two years where data is available (2005 and 2006) to assess whether corporate giving benefits CEOs. Specifically, we regress CEO compensation on *director supported cause* by considering a sample of firms with and without independent boards. *Director supported cause* takes the value of one if the causes of corporate giving match at least one independent director's charity interests, and zero otherwise. If CEOs do not benefit from pursuing independent director causes, we would expect no association between compensation and *director supported cause*. Contrary to this prediction, we find in model 1 of Panel B that the coefficient estimate of this variable is positive and statistically significant (p-value = 0.035) for the sample of firms with independent boards. However, we do not find similar result for model 2, which considers firms without independent boards. Thus, our increased entrenchment story is only applicable to firms with independent boards, as it should be. This evidence suggests a strategic use of corporate giving to build social ties between the CEO and independent directors, which compromises director independence and leads to further CEO benefits such as excess compensation.

4.4. Robustness

As robustness checks, we re-estimate all of the regression specifications with Compustat, CRSP, RiskMetrics and Execucomp data winsorized at the 1% and 99% level. The statistical significances of *CEO charity connection* and *CEO ownership* remain unchanged from the logit and tobit regression models reported in Table 1.3. Moreover, there is evidence of a greater impact

of *CEO ownership* on contributions transferred to foundations (relative to the model 2 of Table 1.9). We also estimate a cross-sectional model of the amount of corporate giving by averaging the dependent and independent variables from Table 1.2 over the sample period. Our results continue to support the agency theory hypothesis. In further robust analysis, we exclude firms in the financial industry as these firms often sponsor local charities as a form of advertising. We find a more pronounced effect of *CEO ownership* on corporate giving in the reduced sample of 2,083 firm-year observations.

We also consider whether a firm has dual class shares, a CEO who founded the firm or who is a member of the founding family, a completely independent nominating committee, and an independent director-blockholder as additional corporate governance measures.[36] The analysis yields statistically insignificant coefficients for all of these measures. We also replace the *independent board indicator* with the percentage of board independence and a firm's *E-index* with its classified board status. These control variables also yield insignificant coefficient estimates.

The evidence on equity value of cash holdings is re-evaluated taking two different approaches. First, excess returns are calculated from the Fama-French 48 industry portfolio returns where the whole Compustat universe of firms is used. The coefficient of $\Delta C_{it}/M_{i,t-1}$ *x corporate giving ratio*$_{i,t}$ (γ) is -0.203 and remains significant with a p-value of 0.011. Second, it could be argued that unobserved risk components of giving firms are different from those of firms that do not give to charitable causes. We re-estimate the regression model of excess returns with firm fixed effects to control for unobserved idiosyncratic risks. The estimated coefficient γ is -0.17 and is significant with a p-value of 0.026.

Finally, the compensation regressions in Table 1.10 are re-estimated using winsorized data. We document a 1.94% (versus 3.52% when data is not winsorized) increase in CEO

[36]CEO-founder data is hand-collected, while the remaining data is drawn from RiskMetrics. A director-blockholder is a director who owns at least 5% of the firm's stock.

compensation for a 10% increase in the predicted total corporate giving. This implies that the coefficient of corporate giving in the CEO compensation regression is influenced by very large corporate charitable contributions.

5. Conclusion

This study clearly shows that CEOs gain from corporate giving. The data indicates that 62% of firms contribute to CEO-affiliated charities, with more affiliated contributions in firms where CEO financial interests are less aligned with shareholders. CEOs opportunistically transfer contributions to foundations, and this transfer reduces shareholder cash flow rights. Furthermore, CEOs substitute cash dividend increases for corporate giving when a dividend tax cut increases a CEO's cost of consuming private benefits of control. CEOs also use corporate giving strategically to support charities that are aligned with independent director interests. Various forms of regression analysis confirm that corporate giving is not purely a firm value maximizing tool, but is a manifestation of managerial agency problem where managers have considerable influence on how and where corporate contributions are channeled. Such forms of corporate giving serve the interests of CEOs by compromising the independence of the board and result in lower stock returns.

The results in this study shed doubt on principal-agent models where both principals and agents have ambiguous objectives for discretionary spending where public disclosure is not required. One implication of this study is that an SEC requirement to promptly disclose insider-affiliated corporate giving could benefit outside minority shareholders. Several avenues of research remain unexplored. First, many firms have employee matching grant programs while others do not. Do such programs enable firms to hire and retain higher quality employees? If yes, then does this increase firm profitability? Or are matching programs part of a long held tradition

that corporations are reluctant to change? Second, legal professionals tend to differentiate corporate giving from CSR activity while many companies “claim to have embraced CSR and then point to the glossy reports of their company foundation to demonstrate the degree of their commitment” (Altschuller, 2010). Future research could examine whether shareholders understand such distinctions and demand firms to pursue activities which better position them competitively.

Appendix 1.A: List of legislatorial proposals for corporate giving disclosure

There have been several efforts by legislators to enforce disclosure of corporate giving data. We list such events below.

i. Republican Congressman Paul Gillmor introduced H.R. 944 and H.R. 945 to the House of Representatives in 1997. This bill excluded disclosure requirements for contributions made to educational institutions and local charities. However, this bill empowered shareholders to vote on corporate giving.

ii. After the collapse of Enron, WorldCom and other companies, some policymakers tried to enforce stringent disclosure requirements on corporate giving. Consequently, the first draft of the Sarbanes-Oxley Act of 2002 passed by the House required firms to disclose such information (Petrovits, 2006).

iii. On February 13, 2002, Paul Gillmor again introduced a bill, H.R. 3745. This bill required disclosure requirements for substantial contributions made to insider-affiliated charities.

iv. Later in February 2002, Democrat John LaFalce introduced H.R. 3818 that restricts firms from providing charitable contributions to any group affiliated with directors. This bill also required information disclosure for officers and their immediate family members if they sit on the boards of nonprofit organizations, independent of whether the organization received any charitable contributions from these firms.

v. Eventually, corporate giving disclosure clauses were added in the Corporate and Auditing Accountability, Responsibility and Transparency Act (CAARTA), sponsored by Republican Michael Oxley. Faced with opposition from the Council on Foundations and the Independent Sector, this aspect of firm disclosure was dropped in the final version of the Sarbanes-Oxley Act (Cohen, 2002).

Appendix 1.B: Criteria for coding of corporate giving data

We maintain the following criteria for coding purposes.

i. If the directory only reports information on a firm's giving program or its foundation without stating the amount of giving, the contribution through program or foundation is recorded as zero.

ii. A firm may have several foundations which can transfer money among themselves. Since such transfers are not new donations, we exclude them from the total amount of money foundations receive in a year.

iii. Company-sponsored public foundations are not included as they usually have other donors and the total amount of giving for a specific firm cannot be easily separated from that of others.

Appendix 1.C: Definition of variables

Variable	Definitions
	Determinants of corporate giving decisions
CEO charity connection	Equals 1 if the CEO is related to nonprofit organizations, e.g., academic institutions, arts and culture, animal/wildlife and environment organizations, nonprofit charitable organizations, civil rights organizations, think tanks, and research centers. Source: biographical sections of annual reports, Businessweek, Forbes and www.nndb.com.
CEO ownership	$\frac{No.\ of\ CEO\ shares}{Total\ shares\ outstanding} + \frac{No.\ of\ CEO\ options}{Total\ shares\ outstanding} * delta.$ Calculation follows Core and Guay's (1999) methodology.
Tenure	The current fiscal year minus the year when the CEO joined the company. Source: Execucomp; when missing, Businessweek and www.nndb.com.
Outside appointment	Equals 1 if the CEO is recruited from outside.
Board size	The logarithm of total number of board members.
Independent board indicator	Takes the value of 1 if at least 70% of board members are independent. The calculation omits gray or linked directors.
Director ownership	The summation of share ownership by all directors at a firm.
CEO-chair duality	An indicator variable that takes the value of 1 if CEO is also the chairman and 0 otherwise.
E-index	This is as defined in Bebchuk, Cohen and Ferrell (2009) and comprises of classified board, limits to shareholder bylaw amendments, poison pill, golden parachute, supermajority requirements for mergers, and charter amendments.
Ad-to-sales	Advertising expenses / sales.
Ad indicator	Equals 0 if the data is missing in Compustat and 1 otherwise.
R&D-to-sales	R&D expenses/sales.
R&D indicator	Equals 0 if the data in Compustat is missing and 1 otherwise.
Asset	Log(1 + firm's asset) where firm asset is expressed in millions.
Number of employees	Log(1 + number of employees) where the number of employees is in thousands.
Number of shareholders	Log(1 + number of shareholders) where the number of shareholders is in thousands.
Marginal tax rate	Simulated corporate marginal tax rates. See Graham and Mills (1998) for detail.
Leverage	Total long-term debt / assets.
ROA	Operating income before depreciation/assets.
Tobin's q	(Total assets – total common equity + annual closing price (fiscal) x common shares outstanding) / total assets.
Free cash flow	Income before extraordinary items + depreciation and amortization – capital expenditure.

Free cash flow indicator	Equals 1 if free cash flow is greater than 0.
Assets-to-employee	Assets/number of employees.
Financial industry	Banking + insurance + trading.
Regulated industry	Utilities + communication.
Pharmaceutical industry	Medical equipments + pharmaceutical products.
Sin industry	Beer & liquor + tobacco products + defense.
Retail industry	Food products + consumer goods + apparel + retail.
Non-environmentally-friendly industry	Steel works + non-metallic and industrial metal mining + coal + petroleum and natural gas + SICs between 0800 and 0899 (forestry) + 2810 and 2819 (industrial inorganic chemicals) + 2400-2439 (lumber and wood products).
$Post_{2003}$	Equals 1 for years 2003 to 2006 (dividend tax cut years) and 0 otherwise.
	CEO compensation and corporate giving
Total giving ratio	Log(1 + corporate giving / sales) x 10^3. Program and foundation giving ratios are similarly calculated.
Total compensation	Log(TDC1) where TDC1 = salary + bonus + restricted stocks + stock options (Black-Scholes value) + long-term incentives + others.
Density of high net worth people	State level density of individuals with net wealth of at least $1 million.
Individual contribution/AGI	State level itemized charitable contributions (as reported on the IRS tax return Form 1040) divided by state level average gross income.
Natural disaster	Equals 1 if natural disasters occur in the firm's headquarters state. We consider natural disasters generating damage of at least $500 million in the same calendar year or the last quarter of the prior year.
Log(assets)	Log(1 + firm's asset) where firm asset is expressed in millions.
ROA	Operating income before depreciation/assets.
Stock return	The cumulative stock return during the year.
Volatility	1-year variance of stock returns.
Tenure as CEO	Equals current year – appointment year as CEO.
Outside appointment	An indicator variable that takes the value of 1 if the CEO is recruited from outside. If CEO's joining year precedes the year of employment as CEO, we calculate outside as 1.
Board size	The logarithm of total number of board members.
Independent board indicator	Takes the value of 1 if at least 70% of board members are independent. The calculation omits gray or linked directors.
Director ownership	The summation of share ownership by all directors at a firm.
E-index	This is as defined in Bebchuk, Cohen and Ferrell (2009) and comprises of classified board, limits to shareholder bylaw amendments, poison pill, golden parachute, supermajority requirements for mergers, and charter amendments.
	Corporate giving and the value of cash

r	Cumulative stock returns over a year.
R^B	Fama-French size and book-to-market matched yearly portfolio returns. Source: Kenneth French's website.
R^{Ind}	Fama-French 48 industry portfolio returns.
ΔC_t	Changes in cash..
C_{t-1}	Level of cash.
ΔE_t	Changes in earnings before extraordinary items.
ΔNA_t	Changes in net assets.
ΔRD_t	Changes in R&D.
ΔI_t	Changes in interests.
ΔD_t	Changes in common dividends.
L_t	All debt / Market value of total assets.
NF_t	New equity issues + Net new debt issues.

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CHAPTER II

OFFICERS' FIDUCIARY DUTIES AND ACQUISITION OUTCOMES

1. Introduction

Fiduciary duties for CEOs and senior executives (henceforth jointly referred to as "officers"), together with shareholder lawsuits, are considered one of the corporate governance mechanisms that align the interests of officers and shareholders (Becht, Bolton and Röell, 2003). Yet the literature on officers' fiduciary duties (OFDs) has received very little attention. Johnson and Millon (2005) and Thomas and Wells (2011) argue that corporate officers in the U.S. often hold corporate board memberships for which they owe fiduciary duties in their capacity as directors, so a lawsuit against a board for the breach of fiduciary duties generally includes officers. This overlapping responsibility of corporate officers restrained the need to develop a separate theory of officers' fiduciary duties and left the legal role of officers unrecognized.[37] As a consequence, most public firms provided their officers in-house legal counseling in their capacity as directors, but not in their capacity as officers (Garvis and Johnson, 2009). This omission caused officers to underestimate their personal liability exposure.

A recent Delaware case law has revived our attention by elucidating officers' distinct fiduciary duties.[38] In *Gantler v. Stephens* (2009), the Delaware Supreme Court held that officers owe the same fiduciary duties of care and loyalty as do directors.[39] Such ratification is legally

[37]Until recently, the Chancery Court, which is one of Delaware's three constitutional courts, did not have jurisdiction over officers who were not directors (see Johnson and Millon, 2005).

[38]From time to time, Congress, the SEC, the NYSE and the NASDAQ have also imposed rules on the functions of officers and directors. However, these rules either do not distinguish the duties of officers and directors or are imposed at the same time, making it difficult to identify the significance of OFDs.

[39]The court ruling is available at http://courts.state.de.us/opinions/download.aspx?ID=116710. Although Delaware court clarified officers' fiduciary duties in *Gantler v. Stephens*, it is yet to decide whether officers should be more exposed to liability for breach of fiduciary duties than corporate directors (*Hampshire Group, Limited v. Kuttner*,

important because officers are not eligible for exculpation for monetary damages for breach of fiduciary duties as are directors. In addition, officers do not enjoy protections of company indemnifications or the coverage of liability insurance for breach of loyalty.[40, 41] Consequently, officers are liable for court settlements, substantial attorney fees, and bear the risk of unemployment or underemployment for wrongful conduct. By improving the corporate governance structure, this court decision (the Rule) reduces conflicts of interest between officers and shareholders, especially at firms where officers are entrenched, or equivalently, firms where officers are protected from market discipline. This leads to the following hypothesis on OFDs: *Since the Rule increases their liability exposure and awareness of fiduciary duties, ceteris paribus, officers insulated from market discipline are less likely to consider value-decreasing corporate decisions after the court ruling on OFDs.*

Employing this 2009 legal event as a natural experiment, I evaluate the importance of officers' fiduciary duties on the efficiency of major corporate investment decisions. Specifically, I compare the merger and acquisition (M&A) performance of firms with entrenched officers to that of firms with non-entrenched officers before and after the court ruling on OFDs. Because it is widely regarded as an indisputable form of entrenchment, I use the presence of a classified board to measure whether a firm has entrenched officers (see for example Faleye, 2007 and Kadyrzhanova and Rhodes-Kropf, 2011).

I expect M&A transactions to provide the cleanest and strongest test of the court ruling on OFDs for several reasons. First, they are among the largest corporate investment decisions where transaction data is a matter of public record. Second, acquisitions are long-term

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2010). There is also an ongoing unresolved academic discussion on this issue (see for example Hamermesh and Sparks, 2005, and Johnson, 2005).

[40]An exculpatory agreement excludes officers or directors from the legal liability (e.g., compensation to shareholders) after they have caused some damages, whereas an indemnity agreement covers their liability when sued by shareholders.

[41]Directors also do not enjoy coverage of indemnifications or liability insurance for breach of loyalty. However, the business judgment rule provides a strong line of defense to independent directors, making it extremely difficult for shareholders to prove disloyalty (Becht, Bolton and Röell, 2003). Further, it was uncertain after the *Gantler* case whether the protections of business judgment rule would be extended to company officers (Thomas and Wells, 2011).

discretionary investments that intensify the agency conflicts between officers and shareholders. For example, Jensen (1986) states that officers endowed with free cash flow engage in empire building. Lang, Stulz and Walkling (1991) test this hypothesis and find that firms with surplus cash but low investment opportunities undertake value-destroying acquisitions. Third, officers' liability exposure from violation of fiduciary duties in M&A transactions should be relatively substantial compared to their personal wealth.

I also expect the court ruling to affect all firms with entrenched management regardless of their state of incorporation, because a majority of states (i) model their corporate laws on the precedents set by Delaware and (ii) do not extend exculpatory protections to officers, similar to Delaware.[42, 43] Moreover, this ruling was one of the rare cases where the Delaware Supreme Court reversed and remanded the Court of Chancery's dismissal of claims against the defendant officers and directors, instigating considerable debate and analysis about the Rule's implications within the legal community. Therefore, it is likely that M&A legal counselors would advise CEOs, CFOs and senior executives of firms across all states about officers' heightened level of personal liability after the Rule. This line of reasoning is similar to Edmans, Fang and Zur's (2011) view that the "threat of governance, not just actual governance, can discipline [officers]".

Using a sample of 1,441 M&A transactions (including 499 transactions after the Rule), I find that firms where officers are insulated from market discipline experience greater acquisition efficiencies after the legal event than firms where officers are not protected from market discipline. Specifically, acquisitions initiated after the court decision by firms with classified boards generate an additional 1.5% abnormal bidder stock return. For the average (median) acquirer with a classified board, this increased abnormal stock return corresponds to a gain of $77 ($40) million in shareholder value. This result is obtained after controlling for time-variant deal

[42]For example, Romano (2006) notes that vast majority of states adopted Delaware's version of limited liability charter amendments within a short period of time.
[43]Seven states that allow exculpatory provisions for officers are Louisiana, Maryland, Nevada, New Hampshire, New Jersey, Utah and Virginia (Follett, 2010).

features, firm characteristics and year effects as well as time-invariant industry and firm effects, so it measures the incremental effect of OFDs. Furthermore, the result is robust in a sample where firms with classified boards are matched to firms without such boards on different observable firm characteristics, providing strong support for the hypothesis on OFDs.

In further analysis, I find that announcement effects are even stronger for several subsets of acquirers with classified boards where officers do not have access to liability insurance, bear greater wealth risk, face less product market competition, are insulated from the market for corporate control, or are able to avoid board monitoring (1.6%, 2.2%, 2.6%, 2.6%, and 2.2%, respectively). These results are consistent with my hypothesis since the incentive to increase acquisition efficiencies is higher for officers in those subsets of firms. I also find that acquirers with classified boards engage in more synergistic acquisitions (as measured by the weighted acquirer plus target abnormal announcement-period returns), but do not pay higher premiums after the Rule. I again interpret this result as consistent with my hypothesis as it reflects a restraint on value-decreasing investment decisions.

I next seek to understand the sources of value creation after the Rule. Amihud, Lev and Travlos (1990) and Faccio and Masulis (2005) argue that officers who value control will be reluctant to dilute their shareholdings, and therefore have incentives to select cash financing over stock financing for acquisitions. In the context of this article, the court ruling is expected to reduce entrenched officers' willingness to preserve control (since it improves corporate governance structure and reduces private benefits of control), and as such, I expect the use of cash financing to decline. In the empirical analysis, I find that acquirers with entrenched officers do use less cash to finance the payment after the Rule.

As diagnostic tests, I examine whether the directors' and officers' (D&O) liability insurance premium and the frequency of acquisitions change in response to the court ruling on OFDs. If the Rule significantly increased officers' liability exposure among firms with entrench

officers, its implication would be impounded in the liability insurance premium and the frequency of value-reducing acquisitions of these firms. Consistent with the predictions, Figure 2.1 shows that D&O insurance premium (as a fraction of acquisition transaction value) was the same across firms with and without classified boards before the Rule, whereas it was higher after the Rule for both groups of firms. Moreover, firms with classified boards experienced 42% greater increase in liability insurance premium after the Rule than firms without classified boards, suggesting that firms with entrenched officers perceived a greater level of liability exposure after the court decision on OFDs. This result provides confidence in the validity of my identification strategy, which argues that officers' liability exposure in some firms, but not all, increased at a greater pace after the Gantler court ruling.

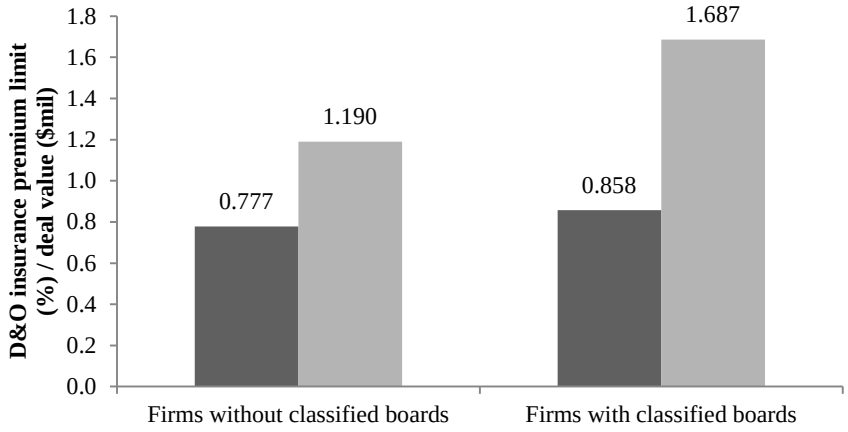

Figure 2.1: Directors' and officers' liability insurance premium

Directors' and officers' liability insurance premium limit as a fraction of deal size between January 2004 and June 2012. The sample consists of 367 firms for which SDC and RiskMetrics report insurance premiums and classified board statuses, respectively. The darker (lighter) column presents insurance premium before (after) the court ruling on OFDs.

For acquisition frequency, I find that relative to the pre-Gantler period, firms with entrenched officers completed 27% fewer acquisitions of public targets (which are unambiguously associated with negative announcement-period abnormal stock returns)

semiannually than firms without entrenched officers in the post-Gantler period. Figure 2.2, which plots the frequency of acquisitions as a percentage of total number of firms, shows a clear parallel trend before the Rule. For firms with classified boards, the sharp decline in the percentage numbers following the court ruling suggests that these firms avoided value-reducing acquisitions of public targets.

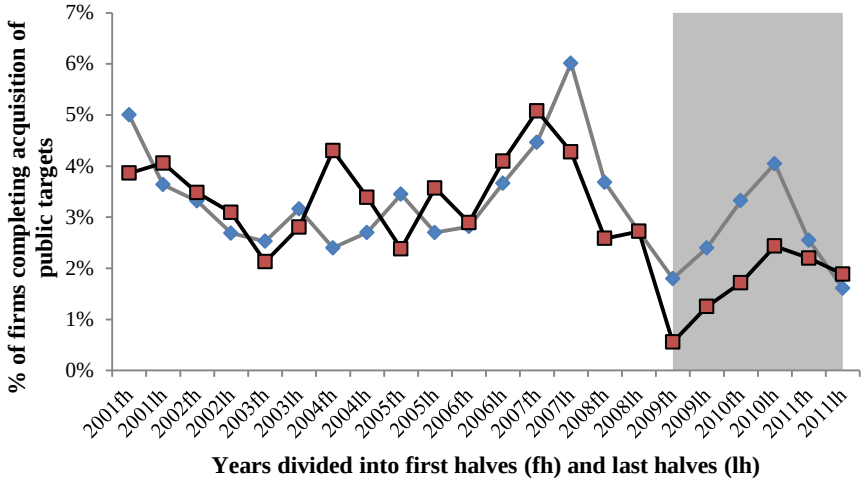

Figure 2.2: Frequency of value-reducing acquisitions
Frequency of acquisitions as a percentage of total number of firms between 2001 and 2011. The graph consists of 1,058 acquisitions of public targets made by firms in the RiskMetrics database. The darker (lighter) line shows the percentage numbers for firms with (without) classified boards. The shaded region represents the post-Rule period.

Overall results of this study make two major contributions to the literature on corporate governance. First, it is the first empirical study that examines the effect of officers' fiduciary duties on an important corporate decision. Existing studies, in contrast, do not separate officers' duties from those of directors.[44, 45] Second, this paper contributes to the literature that examines

[44]For example, Becker and Strömberg (forthcoming) take advantage of a 1991 Delaware case law, which ruled that directors owe fiduciary duties to all stakeholders (including creditors) when firms operate in the vicinity of insolvency, to assess the conflicts between debtholders and shareholders. Related studies on liability insurance also do not discriminate between the duties of officers and directors (see for example Lin, Officer and Zou, 2011).

how different disciplinary mechanisms interact. In particular, it demonstrates that a firm is more likely to benefit from OFDs if it has officers who (i) are not board members and thus, do not have access to D&O insurance, (ii) have substantial wealth risk, (iii) face less product market competition, (iv) are protected from the market for corporate control, or (v) are able to avoid board monitoring. Several other studies also report evidence that corporate governance mechanisms do not act in isolation. For example, Cremers and Nair (2005) find that external and internal governance mechanisms (as measured by antitakeover provisions and equity ownership, respectively) play a complementary role in explaining the long-term abnormal stock returns, and Giroud and Mueller (2011) find that firms in noncompetitive industries benefit more from good corporate governance (as measured by antitakeover defenses) than do firms in competitive industries. This study is also related to Bebchuk and Cohen (2005), Faleye (2007), and Bereskin and Cicero (forthcoming) as it analyzes the effect of classified boards on corporate value/decisions. Aside from providing evidence on the effectiveness of officers' fiduciary duties, a broader implication of this analysis is that state court decisions affect the way resources are allocated in the economy.

The remainder of this paper is organized as follows. Section 2 describes the role of officers in corporate governance and the court ruling in *Gantler v. Stephens*. Section 3 explains sample construction while Section 4 describes key variables and their summary statistics. Section 5 presents the empirical results. Section 6 concludes.

2. Officers' fiduciary duties and the court decision in *Gantler v. Stephens*

An agency relation explains how officers fit into the standard model of corporate governance. Officers owe fiduciary duties as agents of the corporation where any breach of duties

[45]A separate literature on law and finance argues that corporate insiders in non-common law countries extract a greater level of rents than their counterparts in common law countries. However, this literature does not distinguish the duties of officers and directors.

creates a legal claim belonging to shareholders, the principal. In companies with widely-dispersed ownership, shareholders elect a board of directors who are responsible for monitoring officers' duties. However, boards are often captured by officers, and therefore cannot perform their monitoring role (see for example Bebchuk and Fried, 2004; Bertrand and Mullainathan, 2001; Garvey and Milbourn, 2006 and Morse, Nanda and Seru, 2011). In such instances where a firm's governance structure is relatively weak, shareholder lawsuits against officers can provide an effective corporate governance mechanism to discipline officers.

Empirically, however, officers do not appear to be sued in their capacity within the firm (Johnson and Millon, 2005; Thomas and Wells, 2011). One main reason is that CEOs and senior executives in the U.S. often hold board memberships (see Faleye, 2007 and Kim and Lu, 2011 for CEO-chairman duality, and Masulis and Mobbs, 2011 for non-CEO insider-directors), for which they owe fiduciary duties in their capacity as directors. So, a lawsuit against a board usually includes senior officers. Such overlapping responsibilities of director-officers left the legal role of officers unrecognized. In fact, the Chancery Court did not have jurisdiction over officers until January 2004, and therefore could not process legal charges against officers who were not directors.[46] Because of this legal shortcoming, the main focus of shareholder lawsuits was based on the breach of directors' fiduciary duties. As a consequence, firms provided director-officers legal counseling in their capacity as directors, but not in their capacity as officers (Gravis and Johnson, 2009).

In reality, legal action for breach of directors' fiduciary duties is of limited use. Exculpatory provisions, indemnification clauses and liability insurance provide layers of protections to directors, limiting their company-specific liability exposure. On the other hand, officers are neither exculpated from monetary damages for breach of fiduciary duties nor protected by company indemnifications and liability insurance for breach of loyalty. Hence,

[46]Del. Code Ann. tit. 10 § 3114(b) (2012). Also see Johnson and Millon (2005) and Follett (2010) for a discussion.

shareholder lawsuits against officers could be an effective corporate governance mechanism if OFDs are legally recognized.

The 2009 Delaware Supreme Court decision in *Gantler v. Stephens* has resolved this legal impasse. The Gantler case involved shareholder-plaintiffs of First Niles who alleged, among other things, that its directors, CEO and chairman (William L. Stephens), and a non-director officer (Lawrence Safarek) breached their fiduciary duties by self-servingly sabotaging an opportunity to sell the company. The complaint particularly focused on two bidders, Cortland Bancorp and First Place Financial Corp., for which the board authorized the management to conduct the due diligence process. After reviewing Cortland's request, Stephens and Safarek agreed to provide the due diligence materials, but never did. Subsequently, Cortland withdrew its offer. Although Stephens resisted to provide the due diligence materials to First Place, he finally submitted them after Cortland had withdrawn its offer. First Place proceeded with the due diligence and raised its offer twice. Although First Niles's financial advisor recommended that the revised offers were within an acceptable range, its board voted to reject the bid in a special meeting without any discussion or deliberation. After the vote, the board discussed Stephens's privatization plan that was later approved.

The defendants argued that the complaint should be dismissed because the alleged facts were legally deficient to overcome the business judgment rule. In 2008, the Chancery Court credited defendants' arguments and dismissed the suit. It also concluded that more stringent standards, i.e., enhanced security and entire fairness, did not apply. In reviewing the decision, the Delaware Supreme Court decided that defendants' facts were sufficient to establish that the board acted disloyally, which rebuts the business judgment presumption. Most importantly, the Supreme Court held that "officers of Delaware corporations, like directors, owe fiduciary duties of care and loyalty, and . . . the fiduciary duties of officers are the same as those of directors". As a result, the Supreme Court reviewed officers' and directors' conduct separately and found

substantial facts for breach of duties in both cases under the stringent entire fairness standard. Stephens was accused for violation of his fiduciary duties as an officer and a director, whereas Safarek was accused in his capacity as an officer.

The Gantler case received widespread attention in the legal community. Because corporate officers in most states are not shielded by the exculpatory provision, legal counselors were advised to inform their officers the increased level of liability exposure (Reese, 2009; Kaufer and Radell, 2009). Many academics also debated whether officers would be able to invoke some of the protective rules available to directors, e.g., the business judgment rule (see Thomas and Wells, 2011; Garvis and Johnson, 2009). In addition, it was not decided whether officers should be more exposed to liability for breach of fiduciary duties than directors. Overall, the case clarified OFDs but created a lot of uncertainty about how differently courts would treat officers from directors, attracting attention from corporate officers, legal scholars and practitioners, liability insurance providers, etc.

3. Data

I extract the acquisition sample from the SDC's U.S. Merger and Acquisition database. The sample period spans from January 2001 to December 2011. Following existing studies (e.g., Moeller, Schlingemann and Stulz, 2005, Masulis, Wang and Xie, 2007 and Harford, Humphery-Jenner and Powell, forthcoming), I consider public, private and subsidiary targets and maintain the following sampling criteria:

i. The acquisition is completed.

ii. The acquirer controls less than 50% of the target at the announcement date and obtains 100% after.

iii. The deal value is equal to or greater than $1 million and must exceed 1% of acquirer's market value of equity measured 11 trading days before the announcement.

iv. The acquirer has accounting data in Compustat, stock return data in CRSP, and governance data in RiskMetrics. [47]

To compare acquisition efficiencies for the same set of firms, I also require that firms complete acquisitions both before and after the Rule. Moreover, I exclude any firm that changes its classified board status during the sample period, as it is difficult for this set of firms to identify whether the acquisition outcomes are different because of the Rule or whether they are different because of the changes in classified board status. These screening criteria yield a sample that includes 1,441 takeovers made by 326 U.S. acquirers.

Table 2.1 presents the summary statistics by announcement year. Because I consider a more extended time period before the Rule to increase the likelihood of finding takeover decisions made by firms that acquire after the Rule, the number of acquisitions over the 2009 to 2011 period is relatively high. The average market value of acquirers is $9.8 billion, which is higher than $5.6 billion over the 1990 to 2003 period in Masulis, Wang and Xie (2007) and $8.1 billion over the 1992 to 2007 period in Yim (forthcoming). However, the median relative deal size (5%) is similar to that reported in Masulis, Wang and Xie (2007).

4. Variables and summary statistics

4.1. Classified board

As discussed earlier, the Gantler decision improves a firm's contracting environment by discouraging entrenched officers to undertake value-destroying activities. In this study, I consider

[47] Following Gompers, Ishii and Metrick (2003) and Masulis, Wang and Xie (2007), the sample excludes firms with dual-class common stocks because governance structures of dual-class firms are not comparable with those of single-class firms.

Table 2.1
Acquisitions by announcement year

The sample consists of 1,441 U.S. mergers and acquisitions between 2001 and 2011. Acquisitions are made by firms that complete transactions before and after the Rule, do not change classified board status, and are covered by the RiskMetrics database.

Year	Percentage of sample	Number of acquisitions	Mean acquirer market value ($mil) (Median)	Mean deal value ($mil) (Median)	Mean relative size (Median)
2001	4.7	68	5,546	938	0.20
			(2,407)	(213)	(0.08)
2002	6.4	92	7,221	325	0.11
			(2,770)	(112)	(0.04)
2003	6.0	86	11,514	553	0.09
			(2,184)	(134)	(0.05)
2004	7.6	110	5,245	1,051	0.17
			(2,306)	(148)	(0.05)
2005	7.4	107	7,381	750	0.12
			(3,106)	(150)	(0.05)
2006	9.1	131	11,054	1,610	0.11
			(3,236)	(166)	(0.04)
2007	13.1	189	13,203	640	0.11
			(2,350)	(125)	(0.04)
2008	9.0	130	7,287	599	0.14
			(2,387)	(116)	(0.04)
2009	9.2	132	13,262	892	0.14
			(3,049)	(248)	(0.05)
2010	14.1	203	11,468	690	0.11
			(2,924)	(210)	(0.06)
2011	13.4	193	8,937	849	0.13
			(3,166)	(205)	(0.05)
Total	100.0	1,441	9,780	811	0.13
			(2,746)	(162)	(0.05)

classified board, *cboard*, a measure of managerial entrenchment. With a classified board provision, the board is separated into usually three classes with successive board elections occurring only for a single class of directors.

An established line of research shows that a classified board arrangement reduces firm value (see for example Bebchuk and Cohen, 2005). Faleye (2007) investigates the reason for this value reduction and finds that a classified board significantly insulates management from market discipline. Specifically, classified boards reduce the sensitivity of CEO turnover and compensation to firm performance, deter proxy contests, and reduce the likelihood of implementing shareholder proposals. A number of other studies find results consistent with Faleye (2007). For example, Kadyrzhanova and Rhodes-Kropf (2011) find that no other

governance provisions presents as significant of a takeover barrier as do a classified board, Bebchuk, Coates and Subramanian (2002) find that no hostile bid wins control of a firm that has an "effective" classified board, defined as a board that cannot be circumvented by a hostile takeover, Masulis, Wang and Xie (2007) document that firms with classified boards make value-decreasing acquisitions, and Bereskin and Cicero (forthcoming) record that CEOs in Delaware-incorporated firms with classified boards enjoy the highest increase in compensation following a case law that increases firms' ability to resist hostile takeovers.

Panel A of Table 2.2 shows that 58.6% of acquirers in the sample have classified boards. This statistic is similar to that reported in Bebchuk and Cohen (2005), Masulis, Wang and Xie (2007), and Bereskin and Cicero (forthcoming).

4.2. Post: an indicator variable

The Delaware Supreme Court decided the Gantler case on January 27, 2009. The *post* variable takes the value of one for all acquisitions initiated after this date and zero otherwise.

However, the date when a firm initiates an acquisition process is not publicly available and must be estimated. Most M&A studies consider initial announcements as the beginning of a takeover process, but Boone and Mulherin (2007) report that a private takeover process precedes the public announcement. During the private takeover process, the target firm hires an investment bank as well as a legal counsel, and contacts potential buyers. Interested buyers then sign confidentiality, standstill and nonsolicitation agreements, place preliminary bids, and request a due diligence process. The deal is generally made public when the target's board approves the agreement. Subsequently, a target shareholder vote is scheduled on the deal "effective date" (available in SDC) when the target shareholders approve the merger agreement. Betton, Eckbo and Thorburn (2007) report that "the target shareholder vote is typically scheduled three to six months following the signing of the initial merger proposal".

Table 2.2
Summary statistics

The sample consists of 1,441 U.S. mergers and acquisitions between 2001 and 2011. Acquisitions are made by firms that complete transactions before and after the Rule, do not change classified board status, and are covered by the RiskMetrics database. Panel A presents summary statistics for the variables used in the analysis, and Panel B presents acquirer returns (*CAR*) conditional on target type and method of payment. Variable definitions are in the Appendix 2.

Panel A						
			Percentiles			
Variable	Mean	Std Dev	25th	50th	75th	N
Identification variables						
Cboard (1/0)	0.586	0.493	0.000	1.000	1.000	1,441
Post (1/0)	0.346	0.476	0.000	0.000	1.000	1,441
Cboard x post	0.192	0.394	0.000	0.000	0.000	1,441
Acquirer returns						
CAR (%)	0.503	6.169	-2.097	0.514	3.234	1,441
Synergistic gains and acquisition premium						
Portfolio CAR (%)	-0.874	5.207	-3.217	-0.592	1.779	237
Premium (%)	48.833	83.237	23.030	35.450	56.410	266
Proxy premium (%)	55.785	160.583	30.068	39.074	58.513	1,345
Deal characteristics						
Public (1/0)	0.204	0.403	0.000	0.000	0.000	1,441
Private (1/0)	0.421	0.494	0.000	0.000	1.000	1,441
Subsidiary (1/0)	0.375	0.484	0.000	0.000	1.000	1,441
Friendly deal (1/0)	0.992	0.091	1.000	1.000	1.000	1,441
All cash (1/0)	0.546	0.498	0.000	1.000	1.000	1,441
All stock (1/0)	0.026	0.160	0.000	0.000	0.000	1,441
Diversifying acquisition (1/0)	0.464	0.499	0.000	0.000	1.000	1,441
Relative deal size	0.128	0.248	0.023	0.047	0.116	1,441
High-tech (1/0)	0.218	0.413	0.000	0.000	0.000	1,441
Industry M&A	0.088	0.277	0.010	0.030	0.075	1,441
Acquirer characteristics						
Assets (log)	7.910	1.526	6.858	7.801	8.697	1,441
Tobin's q	1.892	1.044	1.300	1.585	2.103	1,441
Free cash flow	0.054	0.067	0.024	0.057	0.088	1,441
Leverage	0.221	0.164	0.093	0.210	0.327	1,441
Stock price run-up	0.074	0.299	-0.105	0.042	0.209	1,441
Panel B						
Target's status						
Public	-1.429	6.996	-3.723	-0.791	2.103	294
Private	0.495	5.895	-2.035	0.704	3.231	606
Subsidiary	1.561	5.730	-1.434	0.834	3.819	541
Deal consideration						
All cash	0.885	5.596	-1.742	0.689	3.130	787
Non-cash	0.043	6.770	-2.559	0.091	3.395	654

In light of these timing characteristics, the *post* variable takes the value of one for all acquisitions with effective dates from July 1, 2009.[48] Panel A of Table 2.2 shows that 34.6% of 1,441 (or 499) acquisitions occur between July 1, 2009 and December 31, 2011. In these 499 transactions, 277 acquirers (19.2% of the sample) have classified boards.

4.3. Acquirer returns

I examine the effect of OFDs on bidder's market-model adjusted abnormal returns around the initial acquisition announcement date. I obtain the acquisition announcement data from SDC. Following recent studies (e.g., Harford, Humphery-Jenner and Powell, forthcoming, Lin, Officer and Zou, 2011 and Masulis, Wang and Xie, 2007), I compute cumulative abnormal returns (*CAR*) with a five-day window (-2, +2) where the event day zero is the initial announcement date. To be consistent with these studies, I use the CRSP equal-weighted portfolio returns to estimate the market model parameters over event period (-210, -11).

Panel A of Table 2.2 shows that the average acquirer *CAR* for the 1,441 acquisitions is 0.503%, which is significant at the 1% level. This result is consistent with existing studies (for example, Masulis, Wang and Xie, 2007 and Lin, Officer and Zou, 2011).

4.4. Synergistic gains and acquisition premiums

The analyses of synergistic gains and premiums paid in a merger are alternative ways to examine whether a firm's acquisition efficiency improved after the Rule. The literature suggests that entrenched officers choose targets with low synergies (Harford, Humphery-Jenner and Powell, forthcoming) and overpay to reap personal benefits from acquisitions (Shleifer and Vishny, 1988).

[48]I consider alternative cutoff points later in the paper to conduct sensitivity analysis.

Following Lang, Stulz and Walkling (1991), Wang and Xie (2009) and Lin, Officer and Zou (2011), I measure synergistic gains by the weighted average cumulative abnormal returns of acquirers and targets (*portfolio CAR)*, with the weights based on their respective market capitalizations on event day -11. Table 2.2 shows that the average *portfolio CAR* is -0.874% for 237 acquisitions for which data is available on target returns.

I retrieve acquisition premium data from SDC, which provides data on the ratio of the offer price to the target's stock price four weeks prior to the acquisition announcement date minus one. Therefore, data on *premium* is available only for public targets. Following Harford, Humphery-Jenner and Powell (forthcoming), I also define a variable called *proxy premium* that estimates the premium paid for all companies regardless of their public status. *Proxy premium* is the average premium paid to the companies in the target's industry in the year of acquisition. Panel A of Table 2.2 shows that the average *premium* (*proxy premium*) is 48.3% (55.79%) for 266 (1,345) acquisitions.

4.5. Deal characteristics

I control for target's ownership status, deal attitude, method of payment, industry relatedness of the acquisition, relative deal size, high-tech mergers, and M&A intensity in the target's industry. The definitions of these variables are presented in the Appendix 2.

Acquirers of public targets experience negative abnormal stock returns around initial acquisition announcements because target shareholders are able to free ride on the improvements implemented by acquirers (Grossman and Hart, 1980 and Zingales, 1995). On the other hand, acquirers of private or subsidiary targets experience positive abnormal stock returns because they provide the owners of such targets a liquidity service (Moeller, Schlingemann and Stulz, 2004; Officer, 2007). Consequently, I create *public*, *private*, and *subsidiary* indicator variables to identify targets' ownership status. Following Harford, Humphery-Jenner and Powell

(forthcoming), who find that friendly deal attitude is relatively value destroying, I also define *friendly* as a variable that indicates the deal attitude reported in SDC.

Existing research shows that acquirer returns around acquisition announcements vary with respect to the method of payment. Bidders experience negative abnormal returns for stock deals due to the adverse selection problem in equity issuance (Masulis, Wang and Xie, 2007). Therefore, I create *all cash* and *all stock* dummy variables to indicate whether the deal is paid absolutely by cash or stock. I also create the variable *diversifying acquisition* which indicates whether the acquirer and target firms share the same Fama-French 48 industry. However, the effect of diversification on firm value is ambiguous given conflicting results found in the literature (see for example Morck, Shleifer and Vishny, 1990 and Campa and Kedia, 2002).

Following Moeller, Schlingemann and Stulz (2004), Masulis, Wang and Xie (2007), and Lin, Officer and Zou (2011), I control for *relative deal size*, *high-tech*, and *industry M&A*. *Relative deal size* is the deal value scaled by bidder's market value of equity determined on event day -11, *high-tech* is a variable that indicates whether the acquirer and the target are from high-tech industries, and *industry M&A* measures the intensity of takeover transactions or liquidity in target's industry. Following Masulis, Wang and Xie (2007), I measure this variable 1 year prior to the announcement of each deal to avoid potential look-ahead bias.

Due to my sampling criteria, deal characteristics reported in Panel A of Table 2.2 are different from those reported in Masulis, Wang and Xie (2007) and Moeller, Schlingemann and Stulz (2004). For example, the percentages of public, private and subsidiary acquisitions in my sample are 20.4%, 42.1% and 37.5%, compared to 33%, 35% and 32%, respectively, in Masulis, Wang and Xie (2007).

4.6. Acquirer characteristics

I control for bidder *assets (log)*, *Tobin's q*, *free cash flow*, *leverage*, and *stock price run-up* (see Moeller, Schlingemann and Stulz, 2004; Lang, Stulz and Walkling, 1991; Betton, Eckbo and Thorburn, 2007). All of these variables are measured at the fiscal year end prior to the acquisition announcement (see the Appendix 2 for definitions).

I present descriptive statistics of these variables in Panel A of Table 2.2. The median (average) acquirer has a book value of total assets of $2.4 ($2.7) billion, a Tobin's q of 1.6 (1.9), a free cash flow ratio of 5.7% (5.4%), and a leverage ratio of 21% (22.1%). Comparing these median statistics with those reported in Masulis, Wang and Xie (2007), I find that my sample acquirers are bigger, have higher investment opportunities and free cash flow, and are more highly levered.

Given that my sample is different from those used in existing M&A studies, I test whether my sample preserves established results. I categorize bidder CARs according to target type and deal consideration structure in Panel B of Table 2.2, and find results consistent with the literature. Specifically, I document that acquisitions of subsidiary targets are associated with the highest bidder returns, with an average CAR of 1.561% (p-value = 0.000), followed by acquisitions of private and public targets with average CARs of 0.495% (p-value = 0.039) and -1.429% (p-value = 0.000), respectively. I also find that deals with all cash considerations are associated with positive bidder abnormal returns (average CAR = 0.885%, p-value = 0.000).

5. Empirical Results

5.1. Methodology

I use a difference-in-difference methodology to compare acquisition outcomes of firms with classified board status (treatment firms) to firms not having such board status (control firms) before and after the Rule. I present the results of a univariate estimate of this procedure in Table

2.3. The sample is based on subsidiary targets, for which existing research finds the highest bidder stock returns around acquisition announcements.

Table 2.3

Cumulative abnormal returns (*CAR*) of firms that acquire subsidiary targets before and after the legal event

The sample consists of 1,441 U.S. mergers and acquisitions between 2001 and 2011. Acquisitions are made by firms that complete transactions before and after the Rule, do not change classified board status, and are covered by the RiskMetrics database. Standard deviations are presented in parentheses.

	Acquirer CAR		
	Classified board	Non-classified board	Classified board – non-classified board
Pre	1.455	1.783	-0.328
	(5.725)	(5.758)	(0.675)
Post	2.106	0.685	1.421
	(5.532)	(6.013)	(0.839)
Post – Pre	0.651	-1.098	**1.749**
	(0.619)	(0.881)	**(0.079)**

I find that acquirers with classified boards have lower CARs than acquirers without such board status in the *pre* but not in the *post* period, yielding a difference-in-difference estimate of 1.75% (p-value = 0.000) in treatment firms' average *CAR* after the Rule. In untabulated results, I consider the full takeover sample and document a lower but positive difference-in-difference estimate of acquirers' average abnormal return (*CAR* = 0.078%, p-value = 0.005). These results are consistent with the hypothesis that entrenched officers reduce value-decreasing investment decisions after the court ruling on OFDs.

Although straightforward, the above technique does not control for deal characteristics that existing studies find significant when explaining acquirer abnormal returns. Also, as reported in Table 2.4, firms with classified boards differ from those without classified boards along different dimensions. For instance, acquirers with classified boards have lower *assets (log)* and *Tobin's q* than firms without classified boards, similar to the results reported for "dictator" and

Table 2.4
Deal and acquirer characteristics conditional on classified board status

The sample consists of 1,441 U.S. mergers and acquisitions between 2001 and 2011. Acquisitions are made by firms that complete transactions before and after the Rule, do not change classified board status, and are covered by the RiskMetrics database. Variable definitions are in the Appendix 2. ***, **and * stand for statistical significance based on two-tailed tests at the 1%, 5% and 10% level, respectively.

	Cboard = 0		Cboard = 1			
	Mean	N	Mean	N	Difference	*p*-value
Acquirer characteristics						
Assets (log)	8.203	596	7.703	845	-0.500***	0.000
Tobin's q	1.972	596	1.835	845	-0.137**	0.015
Free cash flow	0.054	596	0.054	845	0.000	0.931
Leverage	0.213	596	0.226	845	0.013	0.131
Stock price run-up	0.065	596	0.080	845	0.015	0.359
Deal characteristics						
Public (1/0)	0.270	596	0.157	845	-0.113***	0.000
Private (1/0)	0.421	596	0.420	845	-0.001	0.969
Subsidiary (1/0)	0.309	596	0.422	845	0.114***	0.000
Friendly deal (1/0)	0.992	596	0.992	845	0.000	0.983
All cash (1/0)	0.549	596	0.544	845	-0.004	0.873
All stock (1/0)	0.037	596	0.019	845	-0.018**	0.036
Diversifying acquisition (1/0)	0.440	596	0.480	845	0.041	0.126
Relative deal size	0.115	596	0.136	845	0.021	0.101
High-tech (1/0)	0.265	596	0.185	845	-0.080***	0.000
Industry M&A	0.085	596	0.090	845	0.006	0.709

"democracy" firms in Harford, Humphery-Jenner and Powell (forthcoming).[49] I also find that treatment firms consider relatively larger deal size, more subsidiaries as targets, and fewer high-tech acquisitions. Because of these differences, I control for acquirer and deal characteristics, industry fixed effects, and year fixed effects in multivariate regressions to isolate the incremental effect of the Rule on acquirer stock returns. The baseline regression model is:

CAR = f(Cboard, post, cboard x *post, deal characteristics, acquirer characteristics, industry fixed effects, year fixed effects).* (1)

All variables, except industry effects, are as described earlier. I measure industry effects by the Fama-French 48 industry classification scheme. In this model, the main variable of interest

[49]Harford, Humphery-Jenner and Powell's (forthcoming) classification of "dictator" and "democracy" firms are based on 24 takeover defenses. Firms with at least 10 takeover defenses are defined as dictator, whereas firms with fewer than 10 takeover defenses, which does not include classified board, are classified as democracy firms.

is the interaction term *cboard* x *post*, whose coefficient estimates the Rule's impact specific to firms with classified boards.

5.2. Regression results

Table 2.5 presents ordinary least square (OLS) estimates of equation (1). The first model controls for deal features, acquirer characteristics and the *post* indicator variable. The second model adds year fixed effects, the third model adds year and industry fixed effects, and the fourth model adds year, industry and firm fixed effects. Because model 4 controls for firm fixed effects, the coefficient of *cboard*, which is time invariant, cannot be estimated. For a similar reason of multicollinearity, I drop the *post* indicator variable in models 2-4 that control for year fixed effects. The last model is similar to model 3, but is based on a subsample of firms where CFOs are not board members and thus, do not have access to D&O insurance.[50] Since CFOs play a major role in M&As, we expect a greater impact of the court law for this subsample.

Model 1 shows that the *post* indicator variable is positive but not statistically significant, suggesting that performance of all acquisitions did not improve after the court ruling on OFDs. This is consistent with my hypothesis since it expects the Rule's effect concentrated in firms where officers are insulated from market discipline.

In regression specifications 2-4, the coefficient of *cboard* x *post* is positive and statistically significant. Specifically, the coefficient estimate is 1.52 (*t*-statistic = 2.18) for the baseline regression in model 3, indicating that acquisitions by firms with classified boards increased shareholder value by about 1.52% after the court ruling on officers' fiduciary duties. For the average (median) bidder with classified board in the sample, this increased abnormal stock return translates into a gain of $77 ($40) million in shareholder value. Therefore, the effect of the Rule appears both economically and statistically significant.

[50]In my sample, about 95% of CFOs do not hold board memberships at their firms.

Table 2.5

Effects of officers' fiduciary duties on acquirers' abnormal announcement returns

The sample consists of 1,441 U.S. mergers and acquisitions between 2001 and 2011. Acquisitions are made by firms that complete transactions before and after the Rule, do not change classified board status, and are covered by the RiskMetrics database. The dependent variable is the acquirer 5-day cumulative abnormal returns (%). Variable definitions are in the Appendix 2. The coefficients of the constant, year, and industry (and firm) indicators are omitted for brevity. The *t*-statistics in parentheses are based on standard errors adjusted for heteroskedasticity and acquirer clustering. ***, **and * stand for statistical significance based on two-tailed tests at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)
Cboard x post		1.648**	1.521**	1.332*	1.627**
		(2.370)	(2.180)	(1.840)	(2.250)
Cboard (1/0)		0.136	0.189		0.167
		(0.340)	(0.450)		(0.380)
Post (1/0)	0.462				
	(1.330)				
Private (1/0)	1.345***	1.421***	1.499***	1.770***	1.444***
	(2.640)	(2.770)	(2.910)	(2.940)	(2.710)
Subsidiary (1/0)	2.359***	2.364***	2.290***	2.190***	2.219***
	(4.270)	(4.240)	(4.060)	(3.450)	(3.790)
Friendly deal (1/0)	-0.416	-0.426	-0.595	-0.649	-0.788
	(-0.240)	(-0.240)	(-0.310)	(-0.340)	(-0.370)
All cash (1/0)	0.565*	0.639*	0.785**	0.426	0.815**
	(1.740)	(1.950)	(2.330)	(1.000)	(2.290)
All stock (1/0)	-1.711	-1.522	-1.624	-1.739	-1.573
	(-1.120)	(-0.980)	(-1.080)	(-0.990)	(-0.950)
Diversifying acquisition (1/0)	-0.965***	-0.989***	-1.265***	-1.019**	-1.288***
	(-3.100)	(-3.200)	(-3.340)	(-2.080)	(-3.210)
Relative deal size	-0.348	-0.487	-0.709	-0.125	-0.354
	(-0.300)	(-0.420)	(-0.640)	(-0.100)	(-0.300)
High-tech (1/0)	-0.387	-0.223	-0.362	0.191	0.367
	(-0.960)	(-0.520)	(-0.610)	(0.240)	(-0.560)
High-tech x relative deal size	-4.585***	-4.720***	-4.696**	-5.115**	-4.861***
	(-2.760)	(-2.780)	(-2.570)	(-2.540)	(-2.590)
Industry M&A	-0.012	-0.159	-0.342	-0.523	-0.424
	(-0.030)	(-0.410)	(-0.710)	(-1.110)	(-0.860)
Assets (log)	-0.211*	-0.129	-0.190	-0.878	-0.201
	(-1.770)	(-1.070)	(-1.470)	(-1.380)	(-1.470)
Tobin's q	-0.093	-0.174	-0.036	-0.157	-0.062
	(-0.470)	(-0.930)	(-0.180)	(-0.430)	(-0.290)
Free cash flow	-0.155	0.005	-0.217	-6.629	-0.015
	(-0.050)	(0.000)	(-0.060)	(-1.350)	(-0.000)
Leverage	-0.258	-0.335	-1.078	-1.639	-1.558
	(-0.250)	(-0.310)	(-0.870)	(-0.600)	(-1.210)
Stock price run-up	-3.259***	-3.353***	-3.340***	-3.743***	-3.495***
	(-3.980)	(-4.140)	(-4.120)	(-4.040)	(-3.850)
Year fixed effects	No	Yes	Yes	Yes	Yes
Industry fixed effects	No	No	Yes	Yes	Yes
Firm fixed effects	No	No	No	Yes	No
Adjusted R^2	0.081	0.083	0.110	0.313	0.080
Observations	1,441	1,441	1,441	1,441	1,373

Model 4 shows that the effect of the court ruling is stronger in a subsample of firms where CFOs do not have access to liability insurance, consistent with our prediction. The

coefficients on control variables are largely consistent with those reported in Masulis, Wang and Xie (2007) and Moeller, Schlingemann and Stulz (2004). For example, I observe that bidder returns are (i) higher in acquisitions of private and subsidiary targets, (ii) higher in acquisitions that involve cash consideration, (iii) lower for acquisitions that are unrelated to acquirers' industry, and (iv) lower for high-tech acquisitions that consider relatively large deal size. I also find that acquirer's pre-announcement stock price run-up has a negative impact on its announcement-period abnormal returns. Further, the regression models 2, 3 and 5 fail to identify a reliable relation between acquirer returns and board classification status. This finding is not consistent with the results documented in Masulis, Wang and Xie (2007). One reason is that my sample period includes data after the court ruling on OFDs, which should reduce the adverse impacts of classified boards.[51] I also find that the explanatory power (as measured by adjusted R^2) of the models in Table 2.5 is higher than that found in the M&A literature. This is probably because I control for year, industry and firm fixed effects while most studies only consider year effects.

I conduct sensitivity analysis by considering alternative definitions of the *post* variable. Specifically, I require that the *post* variable take the value of one for all acquisitions with effective dates starting from August 1, 2009 / September 1, 2009 / October 1, 2009 / November 1, 2009 / December 1, 2009 / January 1, 2010, and then evaluate the impact of the Rule on acquirer *CAR* using the baseline regression model. For these alternative definitions, I find in untabulated regressions that the coefficients of *cboard* x *post* are 1.436 (*t*-statistic = 2.08) / 1.578 (*t*-statistic = 2.28) / 1.277 (*t*-statistic = 1.83) / 1.331 (*t*-statistic = 1.89) / 1.255 (*t*-statistic = 1.75) / 0.773 (*t*-statistic = 1.08), respectively.[52] The January 1, 2010 cutoff point potentially misclassifies 65 deals (499 – 434) as pre-event transactions, and thus greatly reduces the average impact of the Rule.

[51]I am able to replicate the findings of Masulis, Wang and Xie (2007) for a sample of acquisitions during 1990-2000.
[52]Thus, the coefficient of *cboard* x *post* monotonically decreases except in the months of September and October 2009.

I also investigate whether my results are a manifestation of the recent financial crisis. Several studies argue that the 2007 financial crisis created a negative shock to the supply of external finance (see Duchin, Ozbas and Sencoy, 2010). Thus, one could argue that firms with classified boards may profit from providing a liquidity service. To evaluate this argument, I re-estimate the baseline regression by redefining the *post* variable as taking the value of one for all acquisitions completed after July 1, 2007. I find that the coefficient of *cboard* x *post* is slightly positive but statistically insignificant (0.346, *t*-statistic = 0.53). This finding is consistent with the results reported in Table 2.4, which shows that firms with and without classified boards hold similar free cash flows and therefore, firms with classified boards are not more likely to provide liquidity service during the financial crisis.

Overall, the evidence reported in this section is consistent with the hypothesis that officers insulated from market discipline have fewer incentives to conduct value-decreasing acquisition decisions after the Rule, mainly because the Rule enhanced officers' liability exposure by increasing the threat that officers' personal wealth will be affected adversely by shareholder lawsuits.

5.3. Synergistic gains and acquisition premiums

In the previous section, I found that acquirers with entrenched boards experienced increased returns in the *post* period. In this section, I investigate whether the increase in acquirer returns can be attributed to synergistic gains that are due to officers' enhanced due diligence on corporate investment decisions or whether it is a redistribution of wealth from targets to acquirers. In a completed merger or acquisition, the wealth effect of acquirer-shareholders depends on the combined value of the company (Bradley, Desai and Kim, 1988). In the context of this paper, one could expect the synergy generated by an acquisition to increase after the Rule because the court ruling on officers' fiduciary duties improved a firm's governance structure

(particularly by discouraging its officers to make value-decreasing acquisitions). Alternatively, one could also expect in the spirit of Roll (1986) that acquirers with entrenched management can no longer afford its hubris after the Rule, and therefore the increased acquirer returns reflect a wealth redistribution effect. I test these alternative explanations in Table 2.6.

Following Bradley, Desai and Kim (1988), Lang, Stulz and Walkling (1991), and Wang and Xie (2009), I estimate a regression predicting *portfolio CAR* to measure synergistic gains in model 1. The explanatory variables are the same as in Table 2.5. The table shows that the synergy generated by acquirers with classified boards increased by 2.55% in the *post* period (*t*-statistic = 1.86). To ensure that my result does not reflect a redistribution of wealth between bidder and target shareholders, I analyze *target CAR* and acquisition *premium* in the next two models. These regression models are similar to those used by Lang, Stulz and Walkling (1991), Officer (2003), Schwert (2000), and Wang and Xie (2009). If the increased portfolio abnormal returns resulted from wealth redistribution, we would expect *target CAR* and acquisition *premium* to decline significantly for acquirers with entrenched officers in the *post* period.

The dependent variables in model 2 and 3 are *target CAR* and acquisition *premium*, respectively. I find that the coefficient estimates of *cboard* x *post* are statistically insignificant and unstable (changes sign) across these regression models, implying that acquirers with classified boards did not gain the increased returns by paying lower acquisition premiums in the *post* period.

A shortcoming of models 2 and 3 is that they are based on acquisitions of public targets for which target stock price data are available. Following Harford, Humphery-Jenner and Powell (forthcoming), I address the missing data problem of private and subsidiary targets by considering *proxy premium*, which is the average premium paid to the companies in the target's industry in the year of acquisition. Ceteris paribus, a higher *proxy premium* is considered value-reducing for the acquirer. In model 4, I re-estimate equation (1) with acquirers' *CAR* as the dependent variable

Table 2.6
Synergistic gains and acquisition premiums

The sample consists of 1,441 U.S. mergers and acquisitions between 2001 and 2011. Acquisitions are made by firms that complete transactions before and after the Rule, do not change classified board status, and are covered by the RiskMetrics database. The dependent variable is the portfolio/target/acquirer 5-day cumulative abnormal returns (%) in model 1/2/4, respectively. In model 3, the dependent variable is *premium*. Variable definitions are in the Appendix 2. The coefficients of the constant, year, and industry indicators are omitted for brevity. The *t*-statistics in parentheses are based on standard errors adjusted for heteroskedasticity and acquirer clustering. ***, **and * stand for statistical significance based on two-tailed tests at the 1%, 5% and 10% level, respectively.

	Dependent variable (model)			
	Portfolio CAR (1)	Target CAR (2)	Premium (3)	CAR (4)
Cboard x post	2.545*	-0.011	27.469	1.627**
	(1.860)	(-0.150)	(1.410)	(2.070)
Cboard (1/0)	-0.865	-0.076**	-25.687*	0.359
	(-1.110)	(-1.980)	(-1.780)	(0.820)
Proxy premium x cboard x post / 10^2				-0.112
				(-0.240)
Proxy premium x cboard /10^2				-0.045
				(-0.500)
Proxy premium / 10^2				0.055
				(1.190)
Private (1/0)				1.492***
				(2.850)
Subsidiary (1/0)			59.125***	2.282***
			(2.890)	(3.950)
Friendly deal (1/0)	-2.530	0.062	16.607	-0.623
	(-0.880)	(0.850)	(1.000)	(-0.320)
All cash (1/0)	0.757	0.088**	19.789	0.783**
	(0.940)	(2.350)	(1.640)	(2.200)
All stock (1/0)	-1.704	0.065	10.732	-1.607
	(-1.050)	(1.100)	(0.730)	(-1.070)
Diversifying acquisition (1/0)	0.225	0.026	4.001	-1.117***
	(0.330)	(0.740)	(0.400)	(-2.780)
Relative deal size	-1.690*	-0.123***	-3.386	-0.855
	(-1.680)	(-3.120)	(-0.290)	(-0.750)
High-tech (1/0)	-0.332	-0.030	4.638	-0.478
	(-0.430)	(-0.610)	(0.400)	(-0.780)
High-tech x relative deal size	-1.786	0.007	-15.702	-4.520**
	(-1.180)	(0.110)	(-0.840)	(-2.440)
Industry M&A	-0.773	-0.105*	-19.877	-0.447
	(-0.500)	(-1.720)	(-1.550)	(-0.890)
Assets (log)	-0.197	-0.018*	-7.602*	-0.173
	(-0.920)	(-1.760)	(-1.820)	(-1.310)
Tobin's q	-0.348	-0.015	-6.304	-0.011
	(-0.990)	(-1.570)	(-1.500)	(-0.050)
Free cash flow	4.118	0.266	96.891*	-0.405
	(0.690)	(1.180)	(1.700)	(-0.120)
Leverage	1.749	-0.122	-57.210*	-1.383
	(0.810)	(-1.170)	(-1.690)	(-1.070)
Stock price run-up	-2.805*	0.000	3.374	-3.393***
	(-1.810)	(0.000)	(0.210)	(-3.960)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	No	No	No	Yes
Adjusted R^2	0.073	0.135	0.123	0.111
Observations	237	237	266	1,345

and add *proxy premium* to the list of explanatory variables. If the coefficient on *proxy premium* is negative for firms with classified boards in the *post* period, it would suggest that acquirers with entrenched officers experienced increased returns by paying lower premiums (i.e., wealth redistribution).

As reflected in Table 2.6, the coefficient of *proxy premium* x *cboard* x *post* is statistically insignificant. Therefore, the claim that acquirers gained through wealth redistribution is not supported for any type of target acquisitions. Overall, the wealth effect of acquirer-shareholders appears to result from synergistic gains that likely arise from officers' heightened level of due diligence in the *post* period.

5.4. The sources of value creation

Thus far my results suggest that acquirers with classified boards (i) experience higher level of abnormal returns around initial acquisition announcements and (ii) make more synergistic acquisitions after the court ruling on officers' fiduciary duties. In this section, I examine the source of this value creation by focusing on the method of payments.

Harris and Raviv (1988) and Stulz (1988) offer an argument that financing policies are a function of corporate governance structure. Specifically, they argue that officers who hold a significant fraction of their firm's ownership have incentives to preserve (or increase) control over the corporation, and therefore choose cash as a preferred means of payment. Because most bidders are cash constraint, cash payments are generally financed by debt (Faccio and Masulis, 2005). The increased debt in turn reduces the fraction of stock owned by outside shareholders that a raider can acquire. Thus, cash financing deters the threat of future takeovers. To the extent that the court decision on officers' fiduciary duties reduces private benefits of control by improving a firm's governance structure, I expect entrenched officers to have fewer incentives to maintain corporate control, and therefore reduce acquisitions with cash financing. To test this proposition, I

use two approaches to analyze the method of payment decision in regression analyses. First, I classify transactions into cash deals if they pay entirely through cash. Second, I measure the proportion of cash used in each transaction. Table 2.7 presents regression results without controlling for deal characteristics since these characteristics are endogenously determined with the method of payment.[53]

In the first regression model, I consider a Logit model to estimate the likelihood of deals entirely financed through cash. Because this model controls for firm fixed effects, it removes acquirers that do not change method of payments during the sample period. In model 2, I consider an OLS estimation of the proportion of cash used in acquisitions. Since cash proportion by definition lies in the interval [0, 100], I consider a two-boundary Tobit model in model 3.

Table 2.7 shows that the coefficient of *cboard* x *post* is negative and significant in all three models. The marginal effect of *cboard* x *post* is -8.44 with a *t*-statistic of -2.18 in the Tobit model, indicating that firms with entrenched officers used 8.44% less cash to finance acquisitions in the *post* period. This result is consistent with the proposition that acquirers with entrenched officers reduce cash financing after the Rule, which is expected to reduce officers' control benefits. Acquirer-specific control variables have little success in explaining the likelihood or the proportion of cash.

Given the above evidence, there may be an effect of the interaction between the method of payment and officers' fiduciary duties on bidders' abnormal stock returns at the acquisition announcement. Model 4 shows that acquirers with classified boards experienced significantly positive abnormal stock returns for non-cash deals after the Rule, increasing the benefits of OFDs from 2.43% to 4.58% (2.43% + 2.15% = 4.58%). This finding suggests that shareholders perceive financing with some amount of stock as being consistent with firm value maximization after the court ruling on OFDs, consistent with control benefits being less valuable to entrenched officers

[53]However, my results are robust to the inclusion of deal characteristics.

after the Rule. Deal features and acquirer characteristics have similar explanatory power and statistical significance as in Table 2.5.

Table 2.7
Value creation by reducing cash acquisitions

The sample consists of 1,441 U.S. mergers and acquisitions between 2001 and 2011. Acquisitions are made by firms that complete transactions before and after the Rule, do not change classified board status, and are covered by the RiskMetrics database. The dependent variable in model 1 is cash (an indicator variable), whereas it is percent of cash in model 2 and 3. The dependent variable in model 4 is the acquirer 5-day cumulative abnormal returns (%). Variable definitions are in the Appendix 2. The coefficients of the constant, year, and firm indicators are omitted for brevity. The *t*-statistics in parentheses are based on standard errors adjusted for heteroskedasticity and acquirer clustering. ***, **and * stand for statistical significance based on two-tailed tests at the 1%, 5% and 10% level, respectively.

	Logit (1)	OLS (2)	Toibit (3)	OLS (4)
Cboard x all cash x post				-2.147**
				(-2.260)
Cboard x all cash				0.773
				(0.830)
Cboard x post	-0.653**	-6.171*	-30.797**	2.434***
	(-2.530)	(-1.870)	(-2.370)	(2.770)
Cboard (1/0)			18.207**	
			(2.130)	
Private (1/0)				1.759***
				(2.990)
Subsidiary (1/0)				2.180***
				(3.470)
Friendly deal (1/0)				-0.640
				(-0.330)
All cash (1/0)				0.417
				(0.640)
All stock (1/0)				-1.830
				(-1.070)
Diversifying acquisition (1/0)				-1.017**
				(-2.160)
Relative deal size				-0.062
				(-0.050)
High-tech (1/0)				0.292
				(0.380)
High-tech x relative deal size				-5.203***
				(-2.640)
Industry M&A				-0.350
				(-0.760)
Assets (log)	0.021	6.019**	-3.017	-0.734
	(0.100)	(2.160)	(-1.180)	(-1.200)
Tobin's q	-0.007	-0.305	-1.651	-0.092
	(-0.060)	(-0.190)	(-0.430)	(-0.250)
Free cash flow	-2.606	-15.774	205.082***	-8.392*
	(-1.290)	(-0.700)	(3.430)	(-1.700)
Leverage	0.263	-2.353	28.353	-1.701
	(0.280)	(-0.220)	(1.220)	(-0.640)
Stock price run-up	-0.287	-1.678	-11.782	-3.847***
	(-1.160)	(-0.450)	(-1.070)	(-4.200)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	No	No	No	No
Firm fixed effects	Yes	Yes	No	Yes
Adjusted R^2/log likelihood	-436.941	0.405	-2,587.785	0.314
Observations	1,087	1,441	1,441	1,441

5.5. The role of additional disciplinary mechanisms

My research design allows me to isolate the impact of the court ruling on acquisition outcomes for a sample of firms that do not change an important antitakeover provision, namely the classified board status. There are however other antitakeover provisions and corporate governance mechanisms that might attenuate or intensify agency conflicts between officers and shareholders. Omitting these variables may be problematic because disciplinary mechanisms often interact with one another (Cremers and Nair, 2005 and Giroud and Mueller, 2011). In this section, I consider officers' equity-based incentives, product market competition and the entrenchment index (Bebchuk, Cohen and Ferrell, 2009) to investigate whether officers' fiduciary duties interact with other corporate governance mechanisms.[54]

Equity-based compensation: It is argued that equity-based compensation aligns managerial interests with those of shareholders (Shleifer and Vishny, 1988). The absence of equity-based compensation allows officers to reap private benefits from acquisitions, which are not value-maximizing to acquirer-shareholders. In contrast, value-decreasing acquisitions are less of a concern in firms where officers' wealth is tied to their companies. Consistent with these predictions, Datta, Iskandar-Datta and Raman (2001) record a strong positive relation between acquiring officers' equity-based compensation and stock returns around acquisition announcements. I study this link by defining equity-based compensation (*EBC*) as the Black-Scholes value of new options granted to the top five executives divided by their total compensation in the year preceding the acquisition.[55] A firm is then categorized in the *high* (*low*) *EBC* group if the proportion of equity-based compensation offered to executives is greater (lower) than the median score in a year. Firms with *high EBC* should have officers with greater

[54]I do not consider board's disciplinary role because my sample is based on the post-SOX period for which Duchin, Matsusaka and Ozbas (2010) find board independence across 94% of firms. When I add the percentage of board independence in the regression analysis, I find insignificant coefficient estimate for this variable.

[55]Due to major changes in some Execucomp variables in 2006, I use fair value as the post-2006 equivalent of Black-Scholes value. See, for example, Maug, Niessen-Ruenzi and Zhivotova (2012) for detail.

wealth risk, and as such, I expect these firms to engage in more value-enhancing deals in the *post* period.

I subdivide the sample conditional on *EBC* to be consistent with Datta, Iskandar-Datta and Raman (2001). The first two regression models in Table 2.8 present the results. While the coefficient on *cboard* x *post* is positive in both subsamples, it is statistically significant only in the *high EBC* subsample. These results suggest that the impact of the Rule is concentrated in samples of firms with classified boards where officers have the incentive to increase acquisition efficiencies, i.e., where officers' future wealth is at risk.

Product market competition: Industry competition also plays an important disciplinary role on managerial behavior that can eliminate inefficiency (Hart, 1983 and Shelifer and Vishny, 1997). Following Masulis, Wang and Xie (2007) and Lin, Officer and Zou (2011), I measure industry competitiveness using the Herfindahl index, which is calculated as the sum of squared market shares (sales) of all Compustat firms in each Fama-French 48 industry. Industries with lower values of Herfindahl index indicate more product market competition. For each year, I define an industry as *competitive* if the industry's Herfindahl index is in the bottom quartile of all 48 Fama-French industries, and *noncompetitive* otherwise. Since corporate governance problems are more intense for firms in noncompetitive industries (Giroud and Mueller, 2011), I expect acquirer-shareholders of these industries to benefit more from the court ruling on officers' fiduciary duties.

Models 3 and 4 in Table 2.8 present the results. As expected, the coefficient of *cboard* x *post* is statistically significant only in the subsample of industries with less competition, although it is positive in both *competitive* and *noncompetitive* industries. These results suggest that shareholders of firms with entrenched officers, who also face less product market competition, benefit more from the court ruling on OFDs.

Entrenchment index: Bebchuk, Cohen and Ferrell (2009) measure the strength of a firm's takeover defense by the entrenchment index. This index is based on six antitakeover provisions:

Table 2.8

Officers' fiduciary duties, equity-based compensation and product market competition

The sample consists of 1,441 U.S. mergers and acquisitions between 2001 and 2011. Acquisitions are made by firms that complete transactions before and after the Rule, do not change classified board status, and are covered by the RiskMetrics database. The dependent variable in all subsample analyses is the acquirer 5-day cumulative abnormal returns (%). Variable definitions are in the Appendix 2. The coefficients of the constant, year, and industry indicators are omitted for brevity. The *t*-statistics in parentheses are based on standard errors adjusted for heteroskedasticity and acquirer clustering. ***, **and * stand for statistical significance based on two-tailed tests at the 1%, 5% and 10% level, respectively.

	Subsample (model)			
	High ECB	Low ECB	Competitive	Noncompetitive
	(1)	(2)	(3)	(4)
Cboard x post	2.225**	0.828	0.255	2.625***
	(2.310)	(0.740)	(0.230)	(2.800)
Cboard (1/0)	-0.192	0.477	1.115	-0.556
	(-0.340)	(0.780)	(1.610)	(-0.990)
Private (1/0)	1.887**	1.077	0.610	2.178***
	(2.560)	(1.470)	(0.800)	(3.000)
Subsidiary (1/0)	2.667***	2.044***	1.601*	2.901***
	(3.510)	(2.650)	(1.900)	(3.890)
Friendly deal (1/0)	-0.247	-0.918	0.710	-2.346
	(-0.100)	(-0.380)	(0.230)	(-0.970)
All cash (1/0)	1.207***	0.338	0.472	0.858*
	(2.640)	(0.680)	(0.890)	(1.880)
All stock (1/0)	-2.994	0.850	-2.221	-1.665
	(-1.550)	(0.490)	(-1.180)	(-0.700)
Diversifying acquisition	-1.308***	-0.975	-1.079**	-1.375***
(1/0)	(-2.700)	(-1.520)	(-2.140)	(-2.600)
Relative deal size	1.857	-2.851***	-0.035	-1.039
	(1.020)	(-2.860)	(-0.020)	(-0.960)
High-tech (1/0)	0.179	-0.562	-0.558	0.475
	(0.180)	(-0.830)	(-0.770)	(0.390)
High-tech x relative deal	-8.693	-2.585*	-5.307**	-6.575
size	(-1.080)	(-1.940)	(-2.090)	(-0.480)
Industry M&A	-0.091	-0.202	2.871	-0.511
	(-0.110)	(-0.350)	(1.210)	(-1.000)
Assets (log)	-0.237	-0.187	-0.270	-0.135
	(-1.120)	(-1.030)	(-1.540)	(-0.650)
Tobin's q	-0.026	-0.108	0.079	-0.202
	(-0.100)	(-0.250)	(0.260)	(-0.820)
Free cash flow	0.816	-3.190	-3.290	5.281
	(0.190)	(-0.530)	(-0.610)	(1.070)
Leverage	-1.495	-0.521	-1.897	0.055
	(-0.850)	(-0.300)	(-0.970)	(0.030)
Stock price run-up	-4.066***	-2.046*	-3.011***	-3.489***
	(-3.510)	(-1.650)	(-3.010)	(-2.750)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.120	0.130	0.088	0.146
Observations	818	623	670	771

Table 2.8 (continued)

	Subsample (model)			
	Mod. E-index < 2	Mod. E-index >= 2	High ODS	Low ODS
	(5)	(6)	(7)	(8)
Cboard x post	-0.807	2.568***	0.870	2.209**
	(-0.800)	(2.860)	(0.403)	(0.024)
Cboard (1/0)	0.884	-0.089	0.539	-0.260
	(1.320)	(-0.170)	(0.382)	(0.687)
Private (1/0)	1.071	1.971***	0.585	2.113***
	(1.390)	(2.810)	(0.507)	(0.001)
Subsidiary (1/0)	2.237***	2.661***	1.225	2.954***
	(2.920)	(3.520)	(0.163)	(0.000)
Friendly deal (1/0)	-5.764*	1.481	-2.278	1.147
	(-1.930)	(0.700)	(0.353)	(0.612)
All cash (1/0)	0.828*	0.869*	0.891*	0.641
	(1.750)	(1.760)	(0.078)	(0.162)
All stock (1/0)	-3.415	-0.127	-2.305	-1.482
	(-1.420)	(-0.080)	(0.254)	(0.501)
Diversifying acquisition (1/0)	-1.786***	-0.796	-0.879**	-1.359**
	(-3.550)	(-1.460)	(0.040)	(0.019)
Relative deal size	1.493	-1.559	-0.810	-0.433
	(0.800)	(-1.200)	(0.572)	(0.770)
High-tech (1/0)	0.329	-0.179	-1.225	-0.067
	(0.310)	(-0.250)	(0.152)	(0.951)
High-tech x relative deal size	-12.634	-3.228*	1.883	-6.620***
	(-1.630)	(-1.800)	(0.783)	(0.005)
Industry M&A	-0.435	-0.009	0.782	-0.886
	(-1.050)	(-0.010)	(0.263)	(0.113)
Assets (log)	-0.240	-0.248	-0.151	-0.263
	(-1.420)	(-1.370)	(0.471)	(0.230)
Tobin's q	-0.267	0.241	-0.030	-0.038
	(-0.840)	(0.940)	(0.917)	(0.902)
Free cash flow	-2.032	0.533	2.734	-3.499
	(-0.460)	(0.120)	(0.574)	(0.460)
Leverage	-3.340**	-0.347	-2.419	-0.628
	(-2.010)	(-0.210)	(0.159)	(0.772)
Stock price run-up	-2.995**	-3.742***	-2.045*	-4.290***
	(-2.440)	(-3.370)	(0.078)	(0.000)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.128	0.140	0.066	0.176
Observations	617	824	720	721

classified boards, poison pills, golden parachutes, limits to shareholder bylaw amendments, limits to shareholder charter amendments, and supermajority requirements for mergers. Bebchuk, Cohen and Ferrell (2009) find that increases in the level of this index are associated with reductions in firm value while Masulis, Wang and Xie (2007) find such increases to be associated with acquisitions generating lower announcement-period stock returns. Because I consider

classified boards as a measure of managerial entrenchment, I define a *modified E-index* by deducting classified board status from the entrenchment index. I then partition acquirers according to their takeover vulnerability, i.e., whether a firm's *modified E-index* is less than the sample median of 2. Since officers at firms with a high score are greatly insulated from market discipline, I expect the marginal impact of the court ruling to be more pronounced for this set of acquirers.

Models 5 and 6 in Table 2.8 present the results. As expected, the coefficient of *cboard* x *post* is positive and statistically significant in the subsample of acquirers that are resistant to takeovers. On the other hand, the coefficient is negative, although statistically insignificant, in the subsample of acquirers that are vulnerable to corporate takeovers. These findings suggest that acquiring firms where officers had the greatest protection from the market for corporate control benefit more from the court ruling on officers' fiduciary duties, probably because officers of these firms experience increased liability exposure in the *post* period.

Shareholding of outside directors: Ownership of outside directors is also a well-established measure of corporate governance. Without adequate ownership, directors are not likely to monitor officers (Hermalin and Weisbach, 1998), and this subsequently results in a broad range of agency problems. On the other hand, value-maximizing corporate decisions are often associated with large ownership of outside directors. For example, Shivdasani (1993) reports that outside directors with large ownership are able to negotiate a more favorable takeover deal, and Agrawal and Nasser (2012) find that independent director blockholders reduce agency costs by lowering firm cash holdings and increasing capital expenditures. To evaluate the importance of this disciplinary measure, I define outside director shareholding (*ODS*) as the total shareholding by directors who are not corporate insiders, do not have business relation with the firm, and/or are unrelated to corporate insiders. A firm is then categorized in the *high* (*low*) *ODS* group if the combined ownership of its outside directors is above (below) the sample median score. Since

officers at firms without significant *ODS* may evade board monitoring, I expect acquirer-shareholders of these firms to benefit more from the court ruling on OFDs.

From models 7 and 8 in Table 2.8, I find results consistent with my prediction. Although the coefficient is positive in both subsamples, the coefficient of *cboard* x *post* is statistically significant only in the subsample of acquirers with low outside director ownership. This suggests that acquiring firms with entrenched officers, who are also able to avoid monitoring by outside directors, benefit more from the Gantler court ruling on OFDs.

In all regression models in Table 2.8, the coefficients on acquirer characteristics and deal features are similar to those reported in Table 2.5. As a robustness check, I re-estimate the regressions reported in Table 2.8 with firm and industry fixed effects, and find similar results for the main variables of interest. In another robustness check, I consider the whole sample of acquisitions and add *EBC*, *competitive*, *modified E-index*, and *ODS* as additional control variables in the baseline regression model. I find that the coefficients of these variables are statistically insignificant. One explanation is that these governance variables are sticky over the sample period, and therefore their impact is hard to identify in a model with firm and industry fixed effects.[56]

5.6. Diagnostic tests

The analysis thus far follows the M&A literature and focuses on acquisition performance. In principle, if the Rule on OFDs increased officers' liability exposure, we would expect to see (i) an increase in D&O liability insurance premiums for firms with entrenched officers and (ii) a decline in the frequency of value-decreasing acquisitions performed by firms with entrenched officers.

[56]Masulis, Wang and Xie (2007) do not find a significant relation between acquirer returns and *EBC*. They also report a statistically insignificant, albeit positive, relation between acquirer returns and industry competitiveness for a sample of firms that change antitakeover provisions between 1990 and 2003.

D&O liability insurance premiums: U.S. firms are not required to disclose information on D&O insurance. They also do not disclose such information voluntarily (Lin, Officer and Zou, 2011). The only available source of information is the merger agreement, which describes directors' and officers' liability coverage in target firms as a percentage of pre-merger D&O insurance premium amount.[57] The SDC database reports this data item (*D&O premium limit*) from 2004.

Scaling the D&O insurance premium limit by the acquisition transaction value is necessary since the D&O insurance coverage is expected to be positively correlated with transaction value (see Baker and Griffith, 2007 for a discussion).[58] Thus, Figure 2.1 presents difference-in-difference estimates (before vs. after the Rule and classified vs. non-classified board status) of the scaled D&O insurance premium limit. The graph shows that the liability insurance premium, which was statistically indistinguishable for firms with and without classified boards before the Gantler case, increased disproportionately among firms with classified boards after the Rule. This simple difference-in-difference produces a 41.6% increase in insurance premium, statistically significant at the 1% level. This result reasonably validates the identification strategy that officers' liability exposure in some firms, but not all, increased at a greater pace after the Gantler case.

Frequency of acquisitions: An established line of research documents that acquisitions of public targets are associated with the lowest announcement-period abnormal stock returns (see for example Moeller, Schlingemann and Stulz, 2005 and Masulis, Wang and Xie, 2007). Thus, the following analysis focuses on acquisitions of public targets.

[57]For example, the merger agreement between ZiLOG, Inc. and IXYS Corporation documents a 225% D&O insurance premium limit. The agreement states that "ZiLOG will purchase a director and officer "tail" policy prior to the effective time of the merger in respect of acts or omissions occurring prior to the effective time of the merger that covers each indemnified person currently covered by ZiLOG's officers' and directors' liability insurance policy for six years after the effective time on terms with respect to coverage and amount at least as, but not materially more, favorable than those of such policy in effect on December 5, 2009 and with an aggregate premium not to exceed 225% of the amount per annum paid in respect of ZiLOG's last annual policy period".

[58]My results are similar when not scaling the D&O insurance premium limit.

The graph in Figure 2.2 plots the frequency of acquisitions as a percentage of total number of firms for two categories formed on the basis of firms' classified board statuses. Consistent with the implications of the court ruling, firms with entrenched officers completed 56.7% fewer acquisitions of public targets semiannually (*t*-statistic = 17.31) than firms without entrenched officers during January 2009 – June 2011.[59] In contrast, the parallel trend between the two categories is evident before the court ruling: Firms with entrenched officers performed merely 0.44% more acquisitions of public targets semiannually (*t*-statistic = 0.31) during 2001 – 2008. Thus, significant differences in the frequency of value-decreasing acquisitions occur only after the court ruling on OFDs. These results further support the argument that the court ruling improved the governance structure of firms where entrenched officers benefit at the expense of shareholders.

5.7. Propensity score matching

The objective is to estimate an unbiased coefficient of *cboard* x *post*. However, it may not be unbiased if the impact of the court ruling on entrenched officers is not homogenous across firms, but varies as a function of firm characteristics. For example, the impact of the Rule may matter more for firms with excess cash and low investment opportunities. In this case, difference-in-difference estimates may suffer from two sources of biases. The first arises if some firms affected by the Rule are not comparable with firms not affected by the Rule. The second bias arises from different distributions of observable firm characteristics that can affect acquisition outcomes of treatment and control firms.

Matching methods eliminate these biases by pairing firms with classified boards with those without classified boards on the basis of observable firm characteristics. My matching

[59] 3.43% of firms with classified boards and 3.42% of firms without classified boards complete acquisitions of public targets before the Gantler court ruling. However, after the court ruling only 1.67% of firms with classified boards and 2.62% of firms without classified boards complete acquisitions of public targets. Thus, the analysis suggests a difference-in-difference estimate of 27.4%.

procedure relies on propensity score matching, which was originally developed by Rosenbaum and Rubin (1983) and later discussed in Smith and Todd (2005). The matching procedure begins with a Logit regression at the firm level of a binary variable indicating whether a specific firm has the classified board status. For explanatory variables, I rely on firm-level characteristics – assets, Tobin's q, free cash flow, leverage and Delaware incorporation status, which Field and Karpoff (2002) use to predict the presence of takeover defenses in IPO firms. Because the objective is to create a sample of matched treatment and control firms both before and after the passage of *Gantler v. Stephens*, the Logit model is estimated on the whole sample of 845 treatment firms and 596 control firms.[60]

Using the propensity scores from the Logit estimation, I restrict my sample to the region of common support, i.e., discard from the sample of treatment group all firms to which control firms are not comparable. I then use the propensity scores to perform one-to-one matching without replacement where the difference of propensity scores between treatment and control firms does not exceed 1%.[61] This procedure yields a sample of 533 control and 533 treatment firms. The accuracy of this matching procedure is presented in Panel A of Table 2.9, which shows that there are economically negligible and statistically insignificant differences across all firm characteristics after matching. In addition, when I re-estimate the Logit regression on the matched sample (unreported), all firm characteristics appear insignificant.

Panel B of Table 2.9 presents results of the matched difference-in-difference estimation. As in Table 2.5, model 2 is the baseline regression model that is estimated with acquirer characteristics, deal features, and year and industry fixed effects. Compared to model 2, model 1 omits industry fixed effects while model 3 adds firm fixed effects.

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[60]The regression parameters (with *p*-values in parentheses) are as follows:
Cboard = 2.593 – 0.268 (asset(log)) – 0.215 (Tobin's q) + 0.927 (leverage) + 1.076 (free cash flow) + 0.045 (Delaware)
(0.000) (0.000) (0.000) (0.009) (0.216) (0.706).

[61]When the maximal propensity score difference is set at high levels, e.g., 10%, the matching procedure yields a sample where treatment and control observations are still different in some of the firm characteristics, e.g., assets.

Table 2.9
Difference-in-difference with propensity score matching

The sample consists of 1,066 U.S. mergers and acquisitions between 2001 and 2011 that are comparable in propensity scores. The propensity of classified board is determined by acquirer's assets, Tobin's q, free cash flow, leverage, and Delaware incorporation status. The dependent variable in all subsample analyses in Panel B is the acquirer 5-day cumulative abnormal returns (%). All regression models in Panel B include all acquirer and deal characteristics as presented in Table 2.5. Variable definitions are in the Appendix 2. The *t*-statistics in parentheses are based on standard errors adjusted for heteroskedasticity and acquirer clustering. ***, **and * stand for statistical significance based on two-tailed tests at the 1%, 5% and 10% level, respectively.

Panel A: Mean differences after propensity score matching

	Cboard = 0		Cboard = 1			
	Mean	N	Mean	N	Difference	*p*-value
Acquirer characteristics						
Assets (log)	7.898	533	7.918	533	-0.021	0.931
Tobin's q	1.900	533	1.870	533	0.030	0.950
Free cash flow	0.053	533	0.051	533	0.002	0.997
Leverage	0.218	533	0.220	533	-0.002	0.992
Delaware	0.668	533	0.642	533	0.026	0.977

Panel B: Difference-in-difference matching estimates

	(1)	(2)	(3)
Cboard x post	1.766**	1.589**	1.732**
	(2.250)	(2.050)	(2.000)
Cboard (1/0)	-0.062	0.167	
	(-0.140)	(0.370)	
Controls	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	No	Yes	Yes
Firm fixed effects	No	No	Yes
Adjusted R^2	0.130	0.089	0.386
Observations	1066	1066	1066

Focusing on the coefficient of *cboard* x *post*, we see that it is positive and statistically significant across all specifications (*p*-values < 0.05). Furthermore, for all models the magnitude of the coefficient is greater than that reported in Table 2.5. This confirms my earlier finding that shareholders of firms with classified boards benefitted from acquisition activities due to the heightened level of officers' fiduciary duties created by the court ruling.

6. Conclusion

Courts recognized officers' distinct fiduciary duties in *Gantler v. Stephens* (2009). Because it did not affect firms with good governance, the Gantler case provides a natural

experiment for examining how agency conflicts between officers and shareholders affect major corporate investment decisions, namely mergers and acquisitions. In the empirical analysis, I use a difference-in-difference technique that eliminates changes that occur contemporaneously with the legal event by comparing M&A performance of acquirers with classified boards to M&A performance of acquirers not having such boards, both before and after the legal event. In addition, I control for deal attributes, time-varying acquirer characteristics, and year, industry and firm fixed effects to isolate the marginal impact of officers' fiduciary duties on acquisition outcomes.

I find that firms with classified boards experienced increased abnormal stock returns around acquisition announcements after the court ruling, consistent with the hypothesis that entrenched officers reduce value-decreasing acquisitions when exposed to increased personal liability that arises from breach of fiduciary duties. Firms appear to increase shareholder value after the legal event by increasing synergistic gains and paying targets with stocks, which is likely to dilute entrenched officers' control and reduce private benefits. In further analysis, I investigate how officers' fiduciary duties interact with other disciplinary mechanisms. I find that OFDs are more important in firms where officers are not directors (thus, they do not have access to D&O insurance), have wealth risk, are insulated from product market competition or from the market for corporate control, or are able to avoid active board monitoring.

Overall, my results are consistent with the argument that officers' fiduciary duties are an important corporate governance mechanism that works in tandem with other disciplinary mechanisms. Because courts failed to recognize officers' fiduciary duties, earlier studies could not evaluate the hypothesis empirically. I take advantage of the 2009 Gantler case and establish a causal link that goes from officers' fiduciary duties to shareholder value.

Appendix 2
Definition of variables

Identification variables	
Cboard (1/0)	Equals one if a firm has classified board.
Post (1/0)	Equals one for all acquisitions with effective dates from July 1, 2009. Effective date (source: SDC) refers to the date when shareholders vote on M&A agreement.
Acquirer returns	
CAR (%)	Five-day [-2, +2] cumulative abnormal return calculated using a market model (with CRSP equally-weighted return) estimated over the period [-210, -11] relative to the acquisition announcement date.
Synergistic gains and acquisition premium	
Portfolio CAR (%)	Five-day [-2, +2] weighted average cumulative abnormal returns of the acquirer and the target. The weights are based on their respective market capitalizations at the eleventh trading day prior to the announcement.
Premium (%)	((Offer price/Target stock price 4 weeks before announcement) – 1) x 100.
Proxy premium (%)	The average premium paid to the acquired companies in the target's industry in the year of acquisition.
Deal characteristics	
Public (1/0)	Equals one for public targets, zero otherwise.
Private (1/0)	Equals one for private targets, zero otherwise.
Subsidiary (1/0)	Equals one for subsidiary targets, zero otherwise.
Friendly deal (1/0)	Equals one for the friendly attitude or recommendation of the target's management or board of directors toward the transaction.
All cash (1/0)	Equals one for solely cash-financed deals, zero otherwise.
All stock (1/0)	Equals one for solely stock-financed deals, zero otherwise.
Diversifying acquisition (1/0)	Equals one if bidder and target do not share the same Fama-French industry, zero otherwise.
Relative deal size	Deal value/Acquirer's market capitalization at the eleventh trading day prior to the announcement date.
High-tech (1/0)	Equals one for high-tech acquisitions, zero otherwise. High-tech industry classification follows Harford, Humphery-Jenner, and Powell (forthcoming).
Industry M&A	Aggregate value of corporate control transactions (exceeding $1 million)/Aggregate book value of assets of all Compustat firms. This measure is calculated for each year and Fama-French industry.
Acquirer characteristics	
Assets (log)	Log of book value of total assets (item6).
Tobin's q	Market value of assets over book value of assets: (item6 – item60 + item25 * item199)/item6.
Free cash flow	Operating income before depreciation – interest expenses – income taxes – capital expenditures, scaled by book value of total assets: (item13 – item15 – item16 – item128)/item6.
Leverage	Book value of debts over market value of total assets: (item34 + item9)/(item6 – item60 + item25 * item199).
Stock price run-up	Bidder's buy-and-hold abnormal return (BHAR) during over the

	period [-210, -11] using the CRSP value-weighted index as the market portfolio.
Other disciplinary variables	
ECB	The Black-Scholes or fair value of new options granted to the top five executives divided by their total compensation, both in the year preceding the acquisition announcement. This calculation follows Datta, Iskandar-Datta, and Raman (2001).
Competitive	Equals one if the acquirer's industry is in the bottom quartile of Fama-French 48 industries' Herfindahl index, zero otherwise.
Mod. E-index	Summation of five antitakeover provisions: limits to shareholder bylaw amendments + limits to shareholder charter amendments + supermajority requirements for mergers + poison pills + golden parachutes.
ODS	Summation of total ownership by outside directors. Outside directors are directors who are not corporate employees (insiders), do not have business relation with the company, and/or are not related to corporate employee.

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CHAPTER III

PROFIT SKIMMING, ASYMMETRIC BENCHMARKING OR THE EFFECTS OF IMPLICIT INCENTIVES? EVIDENCE FROM A NATURAL EXPERIMENT

1. Introduction

Academicians offer different perspectives on the relation between CEO compensation and "luck" (i.e. exogenous changes in firm performance).[62] One set of studies posits that CEOs should not be compensated for observable luck. Under this view, any relation between compensation and luck is explained through the lens of weak governance structures. For example, Bertrand and Mullainathan (2001) report findings consistent with a "skimming" model where CEOs are rewarded for favorable changes in macroeconomic variables, while Garvey and Milbourn (2006) document "asymmetric benchmarking" where CEOs enjoy stronger pay-for-market-performance when the market is good. Because these results are more pronounced in firms with weaker governance, these authors indicate that CEOs have captured the pay-setting process. The other set of studies proposes a positive relation between compensation and luck by explicitly modeling the effects of luck on a CEO's participation and incentive constraints. Oyer (2004) hypothesizes that compensation should be tied to industry measures as outside opportunities of managers correlate with industry performance. Feriozzi (2010) models a CEO's "implicit incentives" (i.e. the treat of being fired or being able to extract no private benefits) in the incentive compatibility constraint and argues that implicit incentives should substantially motivate CEOs to work in the best interest of shareholders. Because implicit incentives have pronounced impacts after negative shocks and vanish after positive shocks, these incentives can induce asymmetric sensitivity in pay-for-performance in Feriozzi (2010).

[62]Both views consider optimal contracting. The difference is in the extent of modeling luck into a principal-agent model.

The purpose of this paper is to investigate the relation between CEO compensation and luck, where luck is defined by the impact of natural disasters on firm performance. In doing so, I evaluate competing hypotheses on profit skimming, asymmetric benchmarking and the effects of implicit incentives and find evidence more consistent with the hypothesis that asymmetric sensitivity in pay-for-luck is due to the effects of implicit incentives. I also rule out explanations related to profit skimming or asymmetric benchmarking. First, I find that asymmetric sensitivity in pay-for-luck can result from firm specific changes in performance. Early research, in contrast, documents asymmetric sensitivity in pay for market-wide movements as an indication of possible corporate governance failures. Second, I show that results on asymmetric sensitivity do not vary with respect to different corporate governance measures. Third, I document asymmetric sensitivity in pay-for-luck not only for CEOs but also for non-CEO executives, suggesting that this company-wide phenomenon is less likely to be a corporate governance problem. Lastly, asymmetric pay sensitivity is present in subsamples of firms where CEOs are less likely to capture the pay-setting process, e.g. firms with newly appointed CEOs.

Natural disasters offer a unique opportunity to measure the luck component of firm performance. First, disasters are unanticipated natural occurrences that may cause financial, environmental and human losses. For example, hurricane Katrina caused damages of around $2 billion to Northrop Grumman Corporation and $1.55 billion to Allstate Corporation. Although such damages capture public and media attention, natural disasters also create opportunities for some industries. For example, firms in the construction and building materials industries are very likely to have increased profit opportunities after storms affect certain areas.

Second, natural disasters impose a great deal of uncertainty and are less likely to be fully insurable. Consider, for example, how Northrop Grumman insured its business before hurricane Katrina. It purchased dual-layered property insurance from Factory Mutual Insurance Company. The primary layer covered 15% of “all risk including earthquake, flood, boiler and machinery” up

to the first $100 million while the excess layer covered all additional losses above $500 million to $19.80 billion for "risks including boiler and machinery (excluding earthquake and flood)". After hurricane Katrina, Factory Mutual paid $15 million and informed Northrop Grumman that it would investigate the damage in two categories: damage caused by wind, under which there is no limit of coverage, and damage caused by flood, under which there is no coverage. Northrop Grumman filed suit against Factory Mutual on November 4, 2005 over disagreement for the eligible claim. Although the district court ruled in favor of Northrop Grumman, the federal appellate court reversed the decision on August 14, 2008 based on the finding that flood was not covered under the excess layer.[63] Added to this type of unpredicted event is the risk of business interruption after natural disasters, making the compensation contracts incomplete and providing us with an opportunity to investigate how sensitive pay is to observable luck or misfortune. Third, the adverse effects of natural disasters on firm performance are likely to increase a CEO's implicit incentives. Other shocks, e.g. oil prices and exchange rates, are less likely to detect this aspect of incentive and may bias result against finding asymmetric sensitivity in pay-for-luck.

Using the heterogeneous impact of natural disasters on firm performance as the identification strategy, I evaluate how firm-level shocks affect pay arrangements of CEOs and other top executives. Specifically, I first conduct event studies for each type of natural disaster and record how the market value of industries respond. I then label industries in the first (last) quartile with the lowest (highest) cumulative abnormal returns as adversely (favorably) affected. Next, I consider a firm's return-on-asset (ROA) as another dimension of differentiation. After specifying natural disasters and ROA as two probable identification variables, I use a difference-in-difference (DID) procedure to measure how affected firms change pay-for-performance sensitivities of CEOs and other top non-CEO executives. The latter analysis with non-CEO executives is motivated by Acharya, Myers and Rajan (2011), who view non-CEO executives as

[63]http://www.ca9.uscourts.gov/datastore/opinions/2009/04/02/0756760.pdf.

an internal governance mechanism that can force CEOs to act in a "more public-spirited" and "far-sighted" way.

I begin the analysis with a two-way sorting procedure that uses industry reactions to natural disasters and ROA as sorting variables. For both sets of executives, I document that pay-for-performance sensitivity is lower in firms that were adversely affected by natural disasters, but is higher in those that were positively affected. In regression analyses that consider CEO pay and other executive pay separately, I find asymmetric sensitivity in pay for exogenous changes in firm-specific performance for both groups of executives. My findings can be explained by Feriozzi (2010). Since the effect of implicit incentives is more (less) pronounced after adverse (favorable) effects of natural disasters, the pay-for-performance sensitivity is relaxed (intensified). Because CEOs should not be penalized when firm performance is exogenously worsened by natural disasters, this result suggests loosening the pay-for-performance relation. On the other hand, a tighter pay-for-performance relation is required when firms face increased profit opportunities in the industry. In such situations, a CEO is motivated to act in the best interest of shareholders when her pay is closely tied to the firm's upside gains.

The results on asymmetric pay-for-performance sensitivity are robust to the inclusion of industry-wide performance measures. Although I find some evidence of pay for industry-wide performance, I doubt that this reflects a failure in governance since non-CEO executives are also paid for industry-wide luck. Given career concerns, limited power, and resource constraints over particular divisions, these non-CEO executives are less likely to influence the pay-setting process of their firms. My result, however, supports Oyer (2004) who argues that executive outside opportunities correlate with industry performances and therefore executive pay should be optimally tied to industry measures.

In further analyses, I incorporate several measures of corporate governance and find that independent boards are instrumental in reducing the CEO's pay-for-performance sensitivity in firms that are adversely affected by disasters. This result is inconsistent with studies that explain asymmetric sensitivity in pay-for-luck through weak corporate governance. I also use the CEO and the set of top non-CEO executives as another source of difference in the pay-for-performance relation. This is intended to detect whether the pay-for-performance sensitivity of CEO is differentially adjusted relative to other non-CEO executives after firm performance is affected by natural disasters. In this triple difference (DIDID) setting, I find that pay sensitivities of CEOs and other non-CEO executives are adjusted similarly. This result suggests that asymmetric pay-for-performance sensitivity is a contracting mechanism that is used across all top executives and is less likely a corporate governance deficiency. Lastly, I find asymmetric pay-for-performance sensitivity in firms that are less likely to have corporate governance problems, i.e. firms with new CEO appointments and younger CEOs.

This paper provides a number of contributions to the current literature. First, it considers a unique type of shock that has a material impact on different industries. Second, I document asymmetric sensitivity in pay for firm specific changes in performance. This result is different from early research that finds asymmetric sensitivity in pay for market (or industry) performance. Third, I compare pay-for-performance sensitivities of CEOs and other non-CEO top executives. This analysis gives us a clear picture of whether asymmetry in pay-for-performance sensitivity is unique to CEOs.

I organize the paper in the following way. In Section 2, I provide a brief literature review on research relevant to pay-for-luck. In Section 3, I explain how natural disasters may have heterogeneous effects on industry prospects and can affect firm performances differently. I also explain how natural disasters and their effects on firm performance can be used as identification strategies to explain CEO and non-CEO compensation. Section 4 details the major regression

variables and data sources. The analyses of two-way sorting (on the basis of industry responses to natural disasters and ROA) and fixed effect regression models follow in Section 5. Section 6 highlights the findings and then concludes.

2. Theories of pay-for-luck

A compensation contract is a governance mechanism that is intended to align managers' incentives with shareholder welfare. An optimal compensation contract depends either on the efficient outcome of a market mechanism or on the arms length bargaining between the board and managers (Bebchuk and Fried, 2003). The market-based explanation relies on competitive assignment models, managerial skills, and corporate governance structures to explain CEO pay levels. For example, Rosen (1981, 1982) argues that larger firms should offer higher compensation since talented CEOs are relatively more valuable to them. Frydman (2007) observes that there is a shift in the type of skills demanded from firm-specific to general managerial skills. This shift improves CEO opportunities across industries, intensifies competition and explains the recent boost in top executive compensation. Hermalin (2005) argues that increased monitoring by more independent boards not only calls for more CEO effort and outside recruitment but also increases the probability of firing, which ultimately places an upward pressure on CEO compensation. However, Bebchuk, Fried and Walker (2002) criticize the market-based explanation by arguing that market constraints, which are far from adequate, allows substantial deviations from optimal contracting.

Alternatively, in the arm's length bargain, board members monitor and assess the CEO's ability over time and set a competitive compensation plan. In Hermalin and Weisbach's (1998) model, the extent of board monitoring is a function of its independence, which is measured by directors' financial incentives and aversion to confront managers. If the firm is profitable, the

CEO gains bargaining power and the board becomes less effective as board appointments are jointly negotiated by the existing board and the CEO. Therefore, Hermalin and Weisbach (1998) predict a gradual erosion of board independence where arm's length bargaining is no longer feasible.

The shortcomings in the optimal contracting mechanism raise concerns of whether a purely competitive pay arrangement exists. Bebchuk and Fried (2004) argue that incentive arrangements are independent of firm performance, mainly because CEOs capture the board and set their own compensation plans, leading to the popularly known managerial power hypothesis. Fundamentally, the studies on pay-for-luck are based on this theory.

Since optimal contracting is intended to solve agency problems, industry- or market-wide shocks should be adequately filtered out from compensation arrangements (Holmstrom, 1982). Relative Performance Evaluation (RPE) hinges on this idea and demands performance adjustment with respect to a benchmark. Empirically, there is little evidence supporting industry-RPE (e.g. Gibbons and Murphy, 1990 and Rosen, 1992), motivating arguments for pay-for-luck. In fact, Bertrand and Mullainathan (2001) show that CEOs pay is tied to luck, where luck is associated with oil prices, industry specific exchange rates, etc. They argue that managers are able to skim from company profits, mainly in the absence of large shareholders. Garvey and Milbourn (2006) refine Bertrand and Mullainathan's (2001) idea by arguing that pay-for-luck is valid if pay sensitivity is symmetric with respect to good and bad luck. If managers are opportunistic, they are likely to skim profits in lucky states of the world and insulate their pay in the unlucky states. They find results supporting asymmetric benchmarking in compensation – managers are rewarded for good market performance, but are not equally penalized for bad market outcomes.

Although Bertrand and Mullainathan (2001) and Garvey and Milbourn (2006) shed light on the managerial power hypothesis, the finance literature offers an alternative explanation, which is more consistent with optimal compensation contracting, to their results. For example, Oyer (2004) and Himmelberg and Hubbard (2000) argue that managers' outside opportunities are positively related to industry or market movements, suggesting that executive pay should reflect the changing nature of managers' participation constraints. Rajgopal, Shevlin and Zamora (2006) also argue that economic booms raise the demand for scarce CEO talent because booming periods reflect positive shocks to demand and productivity. They use several measures of CEO talent as proxies for outside opportunities and find that more talented CEOs face less RPE and enjoy more pay-for-luck. In a separate study, Feriozzi (2010) points out that asymmetric pay-for-performance sensitivity exists simply because managers have added incentives after bad luck, but not after good luck. The principal-agent model of Feriozzi (2010) imposes a personal cost on the agent when the firm goes into bankruptcy. The agent's cost in the model essentially corresponds to an implicit incentive mechanism that reduces the need for explicit incentives to induce a given level of effort only after bad news. After good news, the probability of financial distress decreases and so does the effectiveness of implicit incentives. Thus, the lack of implicit incentives explains why a tighter relation in pay-for-performance sensitivity is required after good luck.

Gopalan, Milbourn and Song (2010) also relate CEO compensation to the firm's systematic exposure to its industry stock return. Specifically, they set the CEO wage as a function of firm's stock return, R_i. Since $R_i = \beta_i R_s + \varepsilon_i$, where R_s corresponds to sector performance, compensation based on equity returns is directly related to the firm's systematic exposure to its sector performance. Because the CEO endogenously changes her firm's strategy on the exposure of its sector performance, she is rewarded for sector movements ($\beta_i R_s$). Moreover, the asymmetric sensitivity in pay for sector-performance is induced by offering the CEO a piecewise linear contract. The CEO is rewarded more when sector performance is good since her pay loads

differently on good and bad luck. Though theoretically plausible, the basic predictions are difficult to verify empirically because β is time varying and endogenously determined by the CEO.

In short, once believed to be an arrangement set by CEOs themselves, the evidence of (asymmetric) pay-for-luck is now argued to be an outcome of optimal contracting. Although Gopalan et al (2010) present empirical evidence consistent with pay for industry performance, it remains an empirical question whether compensation contracts of managers are tied to exogenous changes in firm-specific performance. In this paper, I use natural disasters as a shock that has firm-specific impacts on performance.[64]

3. Natural disasters, firm performance and identification strategy

My identification strategy hinges on the effects of natural disasters on CEO compensation via its impact on company performance. I utilize difference-in-difference (DID) and triple difference (DIDID) methods where firm performance is either positively or negatively affected by natural disasters in some years, but not in other years. An industry's response to natural disasters and a firm's operating performance are two identification variables to gauge how the firm's performance has changed due to natural disasters. I then evaluate how these exogenous changes in operating performance induce changes in CEO compensation.

Control groups in this experiment correspond to firms in industries that were not affected by natural disasters. I recognize that the incentive mechanisms for the control and treatment groups are not perfect. Therefore, in the next step, I introduce the average compensation of top non-CEO executives with the assumption that incentive mechanisms of CEOs and non-CEO

[64]Consider, for example, a local oil and gas company in the northern US. This company is likely to have benefited from jumps in oil prices after hurricane Katrina without any operational shutdowns following the devastating storm.

managers do not differ systematically after natural disasters. This DIDID procedure analyzes whether asymmetric pay-for-performance sensitivity in the DID method is unique to CEOs or an optimal contracting phenomenon that is observed for all top executives.

To formally analyze the nonlinear structure of explicit incentives (Feriozzi, 2010), I consider heterogeneous effects of natural disasters on firm performance. The idea is best understood with an example. After extreme cold temperatures, companies in the airline and amusement industries are likely to suffer while firms in the coal industry flourish. I assume that the stock price reaction after the disaster correctly detects whether and how an industry is likely to be affected.

My tests first use event studies separately for each type of natural disaster using the Fama-French 48 industry classifications to measure the immediate price impact. I use the Fama-French-Carhart four factor model to calculate abnormal returns at the industry level. The coefficient estimates are based on at least 225 trading days that end five days before the event date. Data on daily equal-weighted industry returns, risk-free rates, excess market returns, small minus big (SMB), high minus low (HML) and momentum (UMD) factors are retrieved from Professor French's website.[65] The abnormal return calculation is based on (0, +3) event window where event day 0 corresponds to the date when the disaster occurred (or more specifically, when the disaster makes the first landfall). I do not consider days before 0 because some disasters (e.g. earthquake, wildfire) are completely unexpected while it is difficult to predict the path of other disasters (e.g. storms). This uncertainty therefore does not allow us to measure industry reaction before event day 0.

After calculating cumulative abnormal returns (CARs) over the event window, I sort them in descending order, divide them into quartiles, and classify the lowest and highest quartiles

[65]http://mba.tuck.dartmouth.edu/pages/faculty/ken.french.

as negatively and positively impacted industries, respectively. The second and third quartiles are subsequently defined as the control group. In the next step, I update the industry impact in each year by measuring the frequency of the particular shock in my sample years. For example, for my sample that runs from 2001 to 2009, I do not identify any industry impact from extreme temperatures between 2001 and 2008 since the USA was not significantly affected by such disasters during these years. Next, firms are distributed across sample years and assigned to industry quartiles based on their exposure to natural disasters. In the DID procedure, I expect to have two sources of identification. The first source identifies how an average firm that is affected (either positively or negatively) by extreme temperature in 2009 sets its pay-performance sensitivity relative to non-affected years (i.e. 2001-2008) while the second source measures cross sectional differences in pay-performance sensitivity among affected and unaffected firms. I estimate the following DID model:

$$log(compensation_{ijt}) = \alpha + \beta(firm\ performance_{ijt}) + \gamma_1(positive\ treatment_{jt}) + \gamma_2(negative\ treatment_{jt}) + \delta_1(firm\ performance_{ijt} * positive\ treatment_{jt}) + \delta_2(firm\ performance_{ijt} * negative\ treatment_{jt}) + X_{ijt} * \theta + f_i + y_t + \epsilon_{ijt}, \quad (1)$$

where $compensation_{ijt}$ refers to the CEO's pay or the average pay of top non-CEO executives at firm *i*, industry *j* and year *t*, $positive\ treatment_{jt}$ and $negative\ treatment_{jt}$ indicate whether industry *j* was favorably or adversely affected by any type of natural disasters in year *t*, $firm\ performance_{ijt}$ is the company *i's* one-year operating (return-on-assets) and stock market performance measures in year *t*, X_{ijt} is a vector of control variables (firm assets, one-year stock return volatility, CEO age and tenure) in year *t* and f_i, y_t are firm and year fixed effects, respectively. I consider the natural logarithm of compensation to reduce right skewness and to be consistent with models where executive's effort or talent is proportional to firm size (see Baker and Hall, 2004 and Gabaix and Landier, 2008).

The coefficients δ_1 and δ_2 capture the relative difference in a CEO's (or in a top non-CEO executive's) pay-for-performance sensitivity caused by disaster-induced firm performance. In addition, H_0: $\delta_1 = \delta_2$ is the appropriate test of whether executives are symmetrically incentivized during good and bad times.

I also formally analyze the DIDID procedure in a regression setting. The specification is similar to equation (1) but adds a CEO indicator variable, which is also interacted with *(firm performance$_{ijt}$*positive treatment$_{jt}$)* and *(firm performance$_{ijt}$*negative treatment$_{jt}$)*. The main variables are (*CEO$_{ijt}$*positive treatment$_{jt}$*firm performance$_{ijt}$*) and (*CEO$_{ijt}$*negative treatment$_{jt}$*firm performance$_{ijt}$*) where coefficients test whether CEO's pay-for-performance sensitivity is adjusted differently from that of non-CEO executives after exogenous shocks change firm performance. Evidence in favor of the null is inconsistent with rent seeking arguments. Given future career concerns, resource constraints and limited power over certain divisions, it is unrealistic that top non-CEO executives could capture their firm's pay setting process. The evidence is also at odds with the argument offered in Gopalan et al (2010) since non-CEO executives cannot alter firm's exposure to sector performance.

4. Data

4.1. Summary statistics

Data on top executive compensation and CEO attributes are obtained from Execucomp. I retrieve information on total compensation (TDC1) for all top executives reported in Execucomp during 2001-2009. TDC1 is the summation of salary, bonus, total value of restricted stock granted, total Black-Scholes value of stock options granted, long-term incentive payouts and all other. Execucomp also provides data on CEO age and date of appointment as CEO. CEO tenure is calculated as the difference between the current year and the year when the manager was

appointed as CEO. I also consider quadratic forms of age and CEO tenure (Bertrand and Mullainathan, 2001). For non-CEO executives, data on age and tenure is very sparse. Therefore, I estimate regressions without these two variables whenever compensation of non-CEO executives is included as a dependent variable.

I use both one-year ROA and stock return as measures of firm performance. Accounting return data is obtained from Compustat and the cumulative stock return data is retrieved from CRSP. Lambert and Larcker (1987), Jensen and Murphy (1990) and Hall and Liebman (1998) argue for the use of stock returns to calculate pay-for-performance sensitivity. However, the literature on pay-for-luck considers both types of performance measures, e.g. Bertrand and Mullainathan (2001) use ROA and shareholder wealth while Garvey and Milbourn (2006) and Gopalan, Milbourn and Song (2010) use stock returns. Consistent with these studies, Core, Guay and Verrecchia (2003) document that ROA and stock returns mainly drive the pay-for-performance sensitivity.

I follow the compensation literature to control for different firm- and CEO- level characteristics. As argued by Rosen (1982), Gabaix and Landier (2008), and Baker and Hall (2004), I control for firm size to measure CEO effort and talent. I also control for one-year stock return volatility since it has been argued that a risk-averse manager has to be compensated for cross-sectional volatility. Milbourn (2003) argues that CEO tenure is one of the metrics contributing to her reputation. Bertrand and Mullainathan (2001) use CEO age, tenure and their squared terms to control for unobservable CEO effects. I therefore add these two CEO attributes as potential source of CEO ability.

I present summary statistics of top executive compensation, firm performance and other control variables in Panel A of Table 3.1. The average firm has approximately $3.36 billion in assets and around 11.5% operating and stock performance. The average total CEO compensation

Table 3.1: Summary statistics

Panel A: Summary statistics of CEO compensation, CEO attributes and firm characteristics

	N	10th	25th	Mean	Std Dev	Median	75th	90th
CEO attributes								
Compensation (log, in thousands)	15240	6.629	7.234	7.978	1.047	7.983	8.708	9.343
Age	14669	46	50	55.258	7.151	55	60	64
Tenure	14912	1	2	6.858	6.822	5	9	16
Non-CEO executives								
Average compensation (log, in thousands)	15240	6.023	6.472	7.099	0.854	7.037	7.676	8.246
Firm characteristics								
Firms assets (log, in millions)	15240	6.106	6.939	8.121	1.665	8.004	9.195	10.348
ROA	15240	0.004	0.057	0.115	0.101	0.113	0.170	0.234
Stock return	15240	-0.445	-0.178	0.114	0.492	0.072	0.320	0.653
Stock return volatility	15240	0.002	0.004	0.019	0.028	0.009	0.021	0.043

Panel B: Statistics on natural disaster during 2001-2009

Year	Type	Frequency	No. of affected people	Total damage (in '000,000)
2001	Earthquake, storm	2	172400	8000
2002	Flood, storm	4	144000	5200
2003	Storm, wildfire	5	240571	17970
2004	Storm	5	5070337	54100
2005	Storm	4	830000	157530
2006	Flood, storm	3	65667	3800
2007	Storm, wildfire	3	641192	5500
2008	Flood, storm, wildfire	9	13355388	55200
2009	Extreme temperature, storm	6	899	10900

is $2.92 million. The average total payment to non-CEO executives is $1.21 million. The typical CEO is 55 years old and stays approximately 7 years in the firm as the head of company. In my sample period, I have data on a total of 2,343 unique firms.

For data on natural disasters, I rely on the Center for Research on the Epidemiology of Disasters (CRED) at the Université Catholique de Louvain. This database provides information on disaster type and location, its start and end dates, and its intensity. The intensity of damage is defined as the total number of people affected and total amount of damage in US dollars. As my objective is to estimate how natural disasters affect industries economically, I require that

damages exceed $500 million. Panel B of Table 3.1 presents information on five types of disasters, namely earthquake, extreme temperature, flood, storm and wildfire. Strom is the most frequent type of disaster occurring at least once a year. The most significant damage of over $157.53 billion occurred in 2005 when hurricane Katrina affected the Gulf Coast. The effects of disasters on firm performance can be both short- and long- term. To balance between capturing some long-term effects and adequate identification, I consider the effects of natural disasters in the fourth quarter to carry over the next fiscal year.[66]

Table 3.1 (continued)

Panel C: Industry stock market response to natural disasters

Low, medium and high categories are based on lowest, middle two and highest quartiles of industry CARs, respectively. CAR is based on (0, 3) event window where event day 0 refers to the day when natural disaster first hits the land.

		Industry cumulative abnormal returns (in %)	
Disaster type	Category	Average	Standard deviation
Earthquake	Low	-1.394	0.419
	Medium	0.023	0.572
	High	2.625	1.373
Extreme temperature	Low	-2.517	0.684
	Medium	-0.262	0.838
	High	3.024	1.563
Flood	Low	-1.363	0.537
	Medium	-0.423	0.240
	High	0.337	0.472
Storm	Low	-0.346	0.249
	Medium	0.012	0.067
	High	0.314	0.164
Wildfire	Low	-2.521	1.443
	Medium	-0.771	0.316
	High	0.809	0.823

Panel C of Table 3.1 presents the mean and standard deviation of cumulative abnormal returns at the industry level, conditional on the type of natural disaster. I sort industry CARs in

[66]For some firms, it may be reasonable to consider the effects of natural disasters over more than one year (for example, the effects of hurricane Katrina on the performance of Northrop Grumman). However, this limits identification through time, i.e. executive pay-for-performance sensitivity in a firm may not be compared across time.

ascending order and classify the lowest (highest) quartile as the most adversely (favorably) affected by a specific type of natural disaster. Industry responses to the five types of disasters range from -2.52% to 2.62% over the four day event window. This classification shows that industries that are expected to be negatively affected indeed experience negative average CARs.

4.2. Difference-in-difference with two-way sorting

To identify whether industries are positively or negatively affected by natural disasters, I conduct event studies at the Fama-French 48 industry classifications. Since this industry classification is an incomplete measure of how firms within particular industries were affected, I also consider the firm's operating performance, ROA.

In Panel A of Table 3.2, I perform a two-way sort on CEO compensation to gauge how pay sensitivity changes in relation to exogenous shocks and operating performance. The first dimension of sorting is based on industry CARs following disasters. The second dimension is based on ROA. Since ROA is a continuous variable, I divide this into quartiles. The pay-for-performance sensitivity for firms in the adversely affected industry is 0.58 while it is 1.20 (0.58 + 0.39 + 0.23) for firms in the favorably affected industries.

Panel B of Table 3.2 duplicates the two-way sorting procedure for the average compensation of top non-CEO executives. The results are very similar to Panel A. Taken together, I find common patterns in pay sensitivity for all top executives after exogenous shocks have impacted the firm operating performance. Since non-CEO executives are less likely to influence the pay process, the findings of Table 3.2 call into question that the asymmetric pay-for-luck stems from weak governance arguments. The two-way sorting, however, does not control for firm-level observable and unobservable characteristics. Therefore, in the next section, I implement difference-in-difference and triple difference methods.

Table 3.2: CEO compensation across firm-years when firms are favorably/adversely affected by natural disasters

Two-way sort of total compensation. I use natural logarithm of total compensation while the total compensation variable, TDC1, is in thousands. Standard errors are given in parentheses. Low, medium and high categories are based on lowest, middle two and highest quartiles of industry CARs and ROA. Δln(wage) equates high minus low.

Panel A: CEO total compensation

		Industry CAR			
		Low	Medium	High	Δln(wage)
ROA	Low	7.635	7.686	7.870	0.235
		(1.117)	(1.097)	(1.105)	(0.043)
	Medium	8.001	8.020	8.061	0.060
		(1.006)	(1.014)	(0.953)	(0.028)
	High	8.213	8.072	8.104	-0.109
		(1.044)	(1.042)	(1.033)	(0.044)
Δln(wage)		0.577	0.386	0.233	-0.344
		(0.040)	(0.042)	(0.047)	(0.002)

Panel B: Average of top non-CEO executive total compensation

		Industry CAR			
		Low	Medium	High	Δln(wage)
ROA	Low	6.916	6.916	7.031	0.115
		(0.903)	(0.943)	(0.934)	(0.036)
	Medium	7.080	7.133	7.095	0.015
		(0.821)	(0.808)	(0.799)	(0.023)
	High	7.328	7.187	7.173	-0.155
		(0.847)	(0.822)	(0.850)	(0.036)
Δln(wage)		0.412	0.271	0.142	-0.269
		(0.032)	(0.035)	(0.039)	(0.002)

5. Empirical results

In this section, I first analyze whether CEO and top non-CEO pay is sensitive to disaster-induced firm performance. I use regression specifications that are similar to Bertrand and Mullainathan (2001) and identify asymmetric pay-for-performance sensitivity for both CEO and non-CEO top executives. In the second step, I investigate the source of this asymmetry. Using regressions that control for industry and year effects, I find that asymmetric sensitivity is mainly due to the idiosyncratic effects of natural disasters on firm performance. Third, I find that the result on asymmetric pay-for-performance is unlikely to be driven by governance problems. I implement a triple difference in the last step and show that pay-for-performance sensitivities of

CEO and other executives are similarly adjusted after exogenous shocks have changed firm performances.

5.1. Results with difference-in-difference method

5.1.A. Asymmetric pay-for-performance

Panels A and B of Table 3.3 present estimates of regression specification (1) for CEO and top non-CEO compensation separately. That is, these models are DID regressions that control for firm and year fixed effects. Moreover, I employ robust standard errors clustered at the firm level to infer statistical significance. Following controversies based on the effect of outliers in compensation literature (see Chhaochharia and Grinstein, 2009, and Guthrie, Sokolowsky and Wan, forthcoming), I choose to winsorize all Execucomp, Compustat and CRSP data at the 1% and 99% level. The first regression specification uses determinants motivated by the existing literature to explain executive compensation. The next two specifications add exogenous shocks and their interaction terms with firm performance measures to measure the incremental adjustments in pay-performance sensitivity.

Before discussing the effect of natural disasters on CEO compensation via its effects on firm performance, I briefly discuss the coefficient estimates of the other determinants. Morse, Nanda and Seru (2010) document an elasticity of CEO compensation with respect to (log) firm assets of between 0.32 and 0.37. I document a slightly higher elasticity of 0.41 across the regression specifications in Panel A of Table 3.3. This may be due to the different sample period considered in the study, as Frydman and Saks (2010) argue that the relation between CEO pay and firm size is sensitive to the time period chosen. The coefficient estimate of ROA falls between 1.00 and 1.03, which is also slightly higher than the result in Bertrand and Mullainathan (2001). My results imply that there is almost a one-to-one relation between executive compensation and firm operating performance as a 1% increase in ROA is associated with around

Table 3.3: Effects of natural disasters on CEO compensation

Difference-in-difference regressions where the dependent variable is natural logarithm of compensation. Panel A considers CEO compensation whereas panel B consider the average compensation of top non-CEO executives. The sample period spans from 2001 to 2009. All regressions control for firm and year fixed effects. Robust standard errors are clustered at the firm level. ***, ** and * refer statistical significance at the 1%, 5% and 10% level.

Panel A	Dependent variable: log(CEO compensation)					
	Model 1		Model 2		Model 3	
	Estimates	p-value	Estimates	p-value	Estimates	p-value
Positive treatment			-0.018	0.519	-0.018	0.519
Negative treatment			0.078**	0.031	0.078**	0.031
Pay-for-performance adjustments						
Positive treatment * ROA			0.531***	0.005	0.531***	0.005
Positive treatment * Stock return			0.015	0.514	0.015	0.514
Negative treatment * ROA			-0.417**	0.031	-0.417**	0.031
Negative treatment * Stock return			-0.042*	0.068	-0.042*	0.068
Firm Characteristics						
Firm assets (log, in millions)	0.415***	0.000	0.415***	0.000	0.415***	0.000
ROA	1.004***	0.000	1.030***	0.000	1.030***	0.000
Stock return	-0.016	0.266	-0.005	0.824	-0.005	0.824
Volatility	-0.706*	0.068	-0.714*	0.065	-0.714*	0.065
CEO attributes						
Age	-0.014	0.597	-0.013	0.616	-0.013	0.616
Age^2	0.000	0.643	0.000	0.661	0.000	0.661
CEO tenure	0.004	0.376	0.004	0.383	0.004	0.383
$CEO\ tenure^2$	0.000*	0.061	0.000*	0.062	0.000*	0.062
Pre-SOX					0.102***	0.000
Financial Crisis					0.257***	0.000
Firm effects	Yes		Yes		Yes	
Year effects	Yes		Yes		Yes	
Adjusted R^2	75.19%		75.26%		75.26%	
Observations	14358		14358		14358	
			H_0: $\delta_1 = \delta_2$ (ROA and stock return, respectively)			
F-test			20.79 (*p*-value = 0.000)		20.79 (*p*-value = 0.000)	

1.02% increase in CEO pay. Except for firm operating performance, I do not identify a statistically significant relation between CEO compensation and stock return in the fixed effect regressions. Also, I find a statistically significant and negative relation between CEO compensation and one-year stock return volatility. Note that all of the specifications in Panel A consider firm fixed effects, therefore the negative relation between CEO pay and return volatility implies that CEO pay is lower when the firm's stock return volatility is higher. To test whether

risk-averse managers are compensated more for idiosyncratic risk, I estimate the same regression specification using Fama-MacBeth procedure (results are not tabulated in the paper). I find a positive coefficient of 2.18 between volatility and compensation that is significant at better than the 6% level.

Models 2 and 3 of Panel A include exogenous variables to formally analyze asymmetric pay-for-performance. Model 3 also controls for two indicator variables; *pre-SOX* takes a value of 1 before 2003 and *financial crisis* takes a value of 1 after 2006. The results of these two specifications are surprisingly similar. I focus on the interaction terms of specification (1) that isolate the impact of natural disasters on firm performance to assess the positive and negative effects of exogenous shocks on pay-for-performance in the last regression specification.

On average, firms that are favorably affected by disasters increase their pay sensitivity to operating performance by 51.6% (0.53/1.03), whereas adversely affected firms reduce this sensitivity by 40.5% (0.42/1.03). The experiment, therefore, records an 11% difference in pay sensitivity adjustment based on whether disasters favorably or adversely affect firms' operating performance. For a CEO receiving an average compensation, this asymmetric adjustment in pay sensitivity corresponds to $322,752. I also test whether the asymmetry in pay-for-performance elasticity is statistically significant. The *F* test strongly rejects the null hypothesis at better than 1% significance level.

Panel B of Table 3.3 replicates the above analysis but includes the average pay of non-CEO executives. Pay-for-performance is less elastic for this set of executives – a 1% increase in ROA is associated with a 0.70% increase in total compensation. Based on how disasters shape the firm's fortune, I also document an 18.7% asymmetric pay-for-performance sensitivity that is equivalent to $226,205 for an average top non-CEO executive. In favorably affected firms, pay-

Table 3.3: Effects of natural disasters on CEO compensation (Continued)

Panel B	Dependent variable: log(average of top non-CEO executive compensation)					
	Model 1		Model 2		Model 3	
	Estimates	p-value	Estimates	p-value	Estimates	p-value
Positive treatment			-0.025	0.164	-0.025	0.164
Negative treatment			0.081***	0.000	0.081***	0.000
Pay-for-performance adjustments						
Positive treatment * ROA			0.482***	0.000	0.482***	0.000
Positive treatment * Stock return			0.010	0.528	0.010	0.528
Negative treatment * ROA			-0.360***	0.002	-0.360***	0.002
Negative treatment * Stock return			-0.019	0.241	-0.019	0.241
Firm Characteristics						
Firm assets (log, in millions)	0.382***	0.000	0.381***	0.000	0.381***	0.000
ROA	0.639***	0.000	0.653***	0.000	0.653***	0.000
Stock return	-0.043***	0.000	-0.039***	0.004	-0.039***	0.004
Volatility	0.355	0.118	0.336	0.136	0.336	0.136
Pre-SOX					-0.009	0.604
Financial Crisis					0.050***	0.002
Firm effects	Yes		Yes		Yes	
Year effects	Yes		Yes		Yes	
Adjusted R^2	82.19%		82.26%		82.26%	
Observations	15240		15240		15240	
			H_0: $\delta_1 = \delta_2$ (ROA and stock return, respectively)			
F-test			33.70 (*p*-value = 0.000)		33.70 (*p*-value = 0.000)	

performance elasticity is raised by 73.8% whereas in adversely affected firms, it is reduced by 55.1%.

5.1.B. Industry luck or firm idiosyncratic effect?

A finding of asymmetric adjustment in pay-performance sensitivity is not sufficient to conclude that managers skim profits from and shield themselves against industry-wide events. Natural disasters likely have firm-specific impacts that can increase implicit incentives (Feriozzi, 2010). As a consequence, manager pay is made less sensitive under optimal contracting. To isolate the effects of industry-induced lucky and unlucky events on pay, I estimate regressions by adding industry-wide returns and their interactions with a dummy variable that indicates whether

and how the industry was affected by natural disasters. I also investigate other top executives' average pay to assess whether pay for (industry) luck phenomenon is unique to the CEO. The model is:

$$log(compensation_{ijt}) = \alpha + \beta(firm\ performance_{ijt}) + \gamma_1(positive\ treatment_{jt}) + \gamma_2(negative\ treatment_{jt}) + \delta_1(firm\ performance_{ijt} * positive\ treatment_{jt}) + \delta_2(firm\ performance_{it} * negative\ treatment_{jt}) + \eta(industry\ performance_{jt}) + \kappa_1(industry\ performance_{jt} * positive\ treatment_{jt}) + \kappa_2(industry\ performance_{jt} * negative\ treatment_{jt}) + X_{ijt} * \theta + f_i + y_t + \epsilon_{ijt}\ , \quad (2)$$

where *industry performance* is calculated at Fama-French 48 classifications and other variables are as described earlier. Effectively, this difference-in-difference method with industry-level returns is similar to an instrumental variable approach where the identification requires performance measures to be predicted by the natural disaster. Therefore, it is similar to the two stage regressions in Bertrand and Mullainathan (2001). If firms reward CEOs and other executives for lucky events, the coefficient κ_1 should be positive.

I present regression results for the above specification in Panels A and B of Table 3.4. The first model considers industry level operating and stock market performances. The coefficients for these performance measures are insignificant, implying that firms do not adjust CEO pay based on industry performance (Gibbons and Murphy, 1990 and Rosen, 1992). Unlike the first model, the second considers interaction terms between annual industry performance and how industries respond to natural disasters. The following discussion focuses on the coefficient estimates of the second model. Consistent with earlier studies, I find the coefficients of industry performance to be insignificant in Panel A and therefore, I do not document relative performance evaluation at the industry level.

Controlling for industry level performance, I can interpret the interaction terms between firm performance and natural disasters as capturing the idiosyncratic effects of natural disasters

Table 3.4: Effects of natural disasters on CEO compensation after controlling for industry performance

Difference-in-difference regressions where the dependent variable is natural logarithm of compensation. Panel A considers CEO compensation whereas panel B consider the average compensation of top non-CEO executives. Industry is defined at Fama-French's 48 classifications. The sample period spans from 2001 to 2009. All regressions control for firm and year fixed effects. Robust standard errors are clustered at the firm level. ***, ** and * refer statistical significance at the 1%, 5% and 10% level.

Panel A	Dependent variable: log(CEO compensation)					
	Model 1		Model 2		Model 3	
	Estimates	p-value	Estimates	p-value	Estimates	p-value
Positive treatment	-0.020	0.476	-0.043	0.308	0.040**	0.032
Negative treatment	0.077**	0.031	0.055	0.344	0.018	0.419
Pay for industry performance						
Industry ROA	0.154	0.420	-0.076	0.842		
Industry stock return	0.014	0.648	-0.004	0.927		
Positive treatment * industry ROA			0.160	0.653		
Positive treatment * industry stock return			0.096**	0.011		
Negative treatment * industry ROA			0.304	0.430		
Negative treatment * industry stock return			-0.036	0.388		
Pay-for-performance adjustments						
Positive treatment * ROA	0.526***	0.006	0.501**	0.015		
Positive treatment * stock return	0.015	0.509	-0.022	0.439		
Negative treatment * ROA	-0.417**	0.031	-0.469**	0.019		
Negative treatment * stock return	-0.044*	0.059	-0.028	0.356		
Positive treatment * industry adjusted ROA					0.532***	0.010
Positive treatment * industry adjusted stock return					-0.030	0.300
Negative treatment * industry adjusted ROA					-0.449**	0.018
Negative treatment * industry adjusted stock return					-0.025	0.404
Firm characteristics						
Firm assets (log, in millions)	0.415***	0.000	0.416***	0.000	0.421***	0.000
ROA (or excess ROA)	1.017***	0.000	1.040***	0.000	0.884***	0.000
Stock return (or excess stock return)	-0.006	0.769	0.001	0.952	0.004	0.876
Volatility	-0.702*	0.069	-0.749*	0.053	-0.849**	0.028
CEO attributes						
Age	-0.013	0.618	-0.013	0.614	-0.013	0.621
Age^2	0.000	0.662	0.000	0.658	0.000	0.668
CEO tenure	0.004	0.386	0.004	0.386	0.004	0.368
CEO $tenure^2$	0.000*	0.062	0.000*	0.060	0.000*	0.061
Pre-SOX	0.107***	0.000	0.106***	0.000	0.106***	0.000
Financial Crisis	0.268***	0.000	0.272***	0.000	0.263***	0.000
Firm effects	Yes		Yes		Yes	
Year effects	Yes		Yes		Yes	
Adjusted R^2	75.26%		75.27%		75.18%	
Observations	14358		14358		14358	
			H_0: $\delta_1 = \delta_2$ (ROA and stock return, respectively)			
F-test			16.30 (*p*-value = 0.000)		17.71 (*p*-value = 0.000)	

Panel B	Dependent variable: log(average of top non-CEO executive compensation)					
	Model 1		Model 2		Model 3	
	Estimates	p-value	Estimates	p-value	Estimates	p-value
Positive treatment	-0.022	0.211	-0.021	0.420	0.025**	0.042
Negative treatment	0.083***	0.000	0.090***	0.009	0.031**	0.026
Pay for industry performance						
Industry ROA	0.150	0.222	0.195	0.427		
Industry stock return	-0.041**	0.035	-0.056**	0.020		
Positive treatment * industry ROA			-0.081	0.740		
Positive treatment * industry stock return			0.055**	0.034		
Negative treatment * industry ROA			-0.038	0.880		
Negative treatment * industry stock return			-0.009	0.727		
Pay-for-performance adjustments						
Positive treatment * ROA	0.472***	0.000	0.498***	0.000		
Positive treatment * stock return	0.009	0.563	-0.013	0.513		
Negative treatment * ROA	-0.362***	0.002	-0.360***	0.003		
Negative treatment * stock return	-0.017	0.274	-0.013	0.487		
Positive treatment * industry adjusted ROA					0.524***	0.000
Positive treatment * industry adjusted stock return					-0.018	0.361
Negative treatment * industry adjusted ROA					-0.338***	0.004
Negative treatment * industry adjusted stock return					-0.014	0.454
Firm characteristics						
Firm assets (log, in millions)	0.380***	0.000	0.380***	0.000	0.383***	0.000
ROA (or excess ROA)	0.641***	0.000	0.628***	0.000	0.523***	0.000
Stock return (or excess stock return)	-0.034**	0.017	-0.027*	0.076	-0.024	0.118
Volatility	0.334	0.138	0.315	0.163	0.239	0.289
Pre-SOX	0.086***	0.000	0.085***	0.000	-0.002	0.927
Financial Crisis	0.129***	0.000	0.130***	0.000	0.076***	0.000
Firm effects	Yes		Yes		Yes	
Year effects	Yes		Yes		Yes	
Adjusted R^2	82.27%		82.27%		82.20%	
Observations	15240		15240		15240	
			H_0: $\delta_1 = \delta_2$ (ROA and stock returns, respectively)			
F-test			30.12 (p-value = 0.000)		34.08 (p-value = 0.000)	

on firm performance. Firms favorably affected by disasters increase their pay sensitivity by 48.2% (0.50/1.04) whereas those affected adversely reduce this sensitivity by 45.1% (0.47/1.04). This asymmetric adjustment is statistically significant at better than the 1% level. In order to assess whether my results are robust to different specifications, I regress compensation on excess

firm performance, their interactions with positive and negative treatment indicators, and other control variables in the last model of Panel A. Similar results carry over to this specification.

Overall, the results of this section are consistent with optimal contracting where shareholders use asymmetric sensitivity in pay for firm specific performances (Feriozzi, 2010). Since CEOs and other top executives are adequately motivated by the fear of potential bankruptcy, optimal contracts offer lower pay-performance sensitivity after natural disasters adversely affect firm performance.

5.1.C. The effects of corporate governance

Thus far, I have established results indicating asymmetric pay-for-performance sensitivity that is consistent with the optimal contracting hypothesis. This section considers alternative tests of the role of corporate governance. Specifically, I consider managerial entrenchment (as measured by firm antitakeover defenses), board independence and total shareholdings of independent directors as possible corporate governance mechanisms. Garvey and Milbourn (2006) use Gompers, Ishii and Metrick's (2003) governance index based on 24 antitakeover defenses. Bebchuk, Cohen and Ferrell (2009) show that staggered boards, limits to shareholder bylaw amendments, poison pills, golden parachutes, supermajority and charter amendments are the six main antitakeover provisions that are related to economically significant reductions in firm value. Following this, I use Bebchuk, Cohen and Ferrell's (2004) entrenchment index as a measure of managerial entrenchment.

The importance of board independence cannot be overemphasized in the corporate governance literature (see, for example, Hermalin and Weisbach, 1998). Under the firm value optimization theory, Raheja (2005), Adams and Ferreira (2007), and Harris and Raviv (2008) show that boards can be optimally designed to make the best use of information. Duchin, Matsusaka and Ozbas (2010) document that the effectiveness of independent directors depends on

the cost of acquiring firm-specific information. By using SOX (which requires firms to increase the number of independent directors) as an exogenous intervention, they show that independent directors only add value to the firm when the cost of acquiring information is low. Considering the increase in board independence after SOX, I add an indicator variable that equals 1 if at least 70% of the board is independent.[67] To gauge whether independent directors are adequately incentivized to monitor the CEO, I also consider shareholdings of independent directors as another source of board effectiveness. The variable *independent board block* takes the value of 1 if all independent directors in a firm with an independent board jointly hold at least 5% of the company shares and 0 otherwise.

Data on the entrenchment index and independent directors is obtained from RiskMetrics. This database provides data on antitakeover defenses for alternate years and shares held by directors on a yearly basis. For missing years, I interpolate data on antitakeover defenses by information in the latest year. A director is classified as independent if he does not have any material connection to the company other than the board. This definition of independence is taken directly from RiskMetrics, and it excludes inside directors, affiliated/gray outside directors and directors having material connections with the company from the list of independent directors.

Like Bertrand and Mullainathan (2001) and Garvey and Milbourn (2006), I interact different governance mechanisms with performance variables in three regression models in Table 3.5. Panels A and B of Table 3.5 consider CEO and other executive pay separately. For all types of governance measures, I do not find any statistically significant results that would suggest managers have captured the pay setting process. In addition, Model 2 shows that independent boards in adversely affected firms reduce the CEO pay-performance elasticity by approximately 33.9%. The fact that the coefficient of (*negative treatment*ROA*) is insignificant in model 2

[67]In an attempt to avoid possible social ties not conventionally captured by RiskMetrics database, I consider 70% board independence (see Hwang and Kim, 2009).

Table 3.5: Controlling for corporate governance

Difference-in-difference regressions where the dependent variable is natural logarithm of CEO compensation. Panel A considers CEO compensation whereas panel B consider the average compensation of top non-CEO executives. Entrenchment index (e-index) is based on six antitakeover defenses (Bebchuk, Cohen and Ferrell, 2009). Weak (strong) entrenchment index is an indicator value with value 1 if a firm has at best 2 (at least 4) of the six antitakeover defenses. Independent board dummy takes the value of 1 if at least 70% of the board is independent and independent board block takes the value of 1 if all independent directors jointly hold more than 5% of the company share. The sample period spans from 2001 to 2009. All regressions control for firm and year fixed effects. Robust standard errors are clustered at the firm level. ***, ** and * refer statistical significance at the 1%, 5% and 10% level.

Panel A	Dependent variable: log(CEO compensation)					
	Model 1		Model 2		Model 3	
	Estimates	p-value	Estimates	p-value	Estimates	p-value
Positive treatment	-0.026	0.461	-0.022	0.510	-0.022	0.514
Negative treatment	0.135***	0.002	0.118***	0.004	0.118***	0.004
Pay-for-performance adjustments						
Positive treatment * ROA	0.353	0.228	0.458	0.063	0.557	0.017
Positive treatment * Stock return	0.044	0.164	0.043	0.134	0.042	0.139
Negative treatment * ROA	-0.677**	0.020	-0.277	0.310	-0.530**	0.024
Negative treatment * Stock return	-0.056*	0.075	-0.065**	0.021	-0.064**	0.023
Governance						
Positive treatment * ROA * weak e-index	-0.027	0.904				
Positive treatment * ROA * strong e-index	0.257	0.308				
Negative treatment * ROA * weak e-index	-0.012	0.952				
Negative treatment * ROA * strong e-index	0.185	0.452				
E-index	-0.005	0.681				
Positive treatment * ROA * independent board dummy			0.145	0.478		
Negative treatment * ROA * independent board dummy			-0.426**	0.036		
Independent board dummy			0.039	0.132		
Positive treatment * ROA * independent board block					-0.472	0.227
Negative treatment * ROA * independent board block					-0.006	0.984
Independent board block					0.041	0.469
Firm characteristics						
Firm assets (log, in millions)	0.399***	0.000	0.364***	0.000	0.364***	0.000
ROA (or excess ROA)	1.196***	0.000	1.257***	0.000	1.253***	0.000
Stock return (or excess stock return)	0.004	0.887	0.015	0.556	0.015	0.556
Volatility	0.303	0.566	-1.030**	0.044	-1.038**	0.043
CEO attributes						
Age	-0.006	0.852	-0.014	0.616	-0.014	0.627
Age^2	0.000	0.806	0.000	0.564	0.000	0.572
CEO tenure	0.003	0.655	0.005	0.322	0.005	0.330
CEO $tenure^2$	0.000*	0.077	0.000**	0.020	0.000**	0.019
Pre-SOX	-0.086***	0.002	- 0.079***	0.007	- 0.083***	0.005
Financial Crisis	0.185***	0.004	0.119***	0.000	0.123***	0.000
Firm effects	Yes		Yes		Yes	
Year effects	Yes		Yes		Yes	
Adjusted R^2	77.85%		76.96%		76.94%	
Observations	10767		11123		11123	

implies that independent boards are instrumental in reducing the pay sensitivity in bad states. This finding supports Feriozzi's (2010) argument because independent directors know when implicit

Table 5: Controlling for corporate governance (Continued)

Panel B	Dependent variable: log(average of top non-CEO executive compensation)					
	Model 1		Model 2		Model 3	
	Estimates	p-value	Estimates	p-value	Estimates	p-value
Positive treatment	-0.042*	0.056	-0.012	0.585	-0.011	0.598
Negative treatment	0.116***	0.000	0.117***	0.000	0.118***	0.000
Pay-for-performance adjustments						
Positive treatment * ROA	0.471**	0.019	0.406**	0.020	0.383**	0.013
Positive treatment * Stock return	0.027	0.194	0.025	0.212	0.025	0.213
Negative treatment * ROA	-0.548***	0.004	-0.537***	0.006	-0.585***	0.000
Negative treatment * Stock return	-0.015	0.486	-0.042**	0.036	-0.042**	0.036
Governance						
Positive treatment * ROA * weak e-index	-0.131	0.466				
Positive treatment * ROA * strong e-index	0.219	0.254				
Negative treatment * ROA * weak e-index	0.029	0.838				
Negative treatment * ROA * strong e-index	0.003	0.985				
E-index	-0.007	0.453				
Positive treatment * ROA * independent board dummy			-0.027	0.846		
Negative treatment * ROA * independent board dummy			-0.034	0.804		
Independent board dummy			0.007	0.650		
Positive treatment * ROA * independent board block					0.099	0.784
Negative treatment * ROA * independent board block					0.273	0.273
Independent board block					-0.022	0.559
Firm characteristics						
Firm assets (log, in millions)	0.380***	0.000	0.366***	0.000	0.366***	0.000
ROA (or excess ROA)	0.843***	0.000	0.923***	0.000	0.928***	0.000
Stock return (or excess stock return)	-0.031	0.067	-0.011	0.513	-0.011	0.521
Volatility	1.168***	0.000	0.739**	0.011	0.744***	0.010
Pre-SOX	-0.040**	0.048	-0.022	0.299	-0.022	0.286
Financial Crisis	0.018	0.266	0.023	0.182	0.024	0.147
Firm effects	Yes		Yes		Yes	
Year effects	Yes		Yes		Yes	
Adjusted R^2	83.77%		83.10%		83.10%	
Observations	11458		11804		11804	

incentives are an effective motivating tool. Panel B also shows that other corporate governance measures are not important determinants of non-CEO executive compensation.

5.2. Results with a triple difference method

Table 3.6 presents regression results using triple differences. The first difference classifies how industries are affected by certain natural disasters, the second difference evaluates how a firm's operating performance is affected in a catastrophic year and the third difference

analyzes whether CEO pay-for-performance sensitivity is set differently from that of top non-CEO executives.

The profit skimming and asymmetric benchmarking arguments that are based on weak corporate governance indicate CEO rent extraction. However, it is unlikely that all top executives

Table 3.6: DIDID regression results

Triple difference regressions where the dependent variable is natural logarithm of compensation of CEOs and other executives. The sample period spans from 2001 to 2009. All regressions control for firm and year fixed effects. Robust standard errors are clustered at the firm level. ***, ** and * refer statistical significance at the 1%, 5% and 10% level.

	Dependent variable: log(compensation)			
	Model 1		Model 2	
	Estimates	p-value	Estimates	p-value
CEO indicator and its interactions				
CEO * positive treatment * ROA	0.030	0.853	0.030	0.853
CEO * positive treatment * stock return	0.021	0.353	0.021	0.353
CEO * negative treatment * ROA	0.115	0.442	0.115	0.442
CEO * negative treatment * stock return	0.004	0.855	0.004	0.855
CEO * ROA	0.328***	0.005	0.328***	0.005
CEO * stock return	0.000	0.991	0.000	0.991
CEO * positive treatment	0.058**	0.011	0.058**	0.011
CEO * negative treatment	-0.029	0.212	-0.029	0.212
CEO	0.823***	0.000	0.823***	0.000
Positive treatment	-0.050**	0.014	-0.050**	0.014
Negative treatment	0.095***	0.000	0.095***	0.000
Pay-for-performance adjustments				
Positive treatment * ROA	0.507***	0.000	0.507***	0.000
Positive treatment * Stock return	0.004	0.797	0.004	0.797
Negative treatment * ROA	-0.472***	0.000	-0.472***	0.000
Negative treatment * Stock return	-0.033**	0.048	-0.033**	0.048
Firm Characteristics				
Firm assets (log, in millions)	0.388***	0.000	0.388***	0.000
ROA	0.680***	0.000	0.680***	0.000
Stock return	-0.021	0.138	-0.021	0.138
Volatility	-0.142	0.598	-0.142	0.598
Pre-SOX			0.091***	0.000
Financial Crisis			0.203***	0.000
Firm effects	Yes		Yes	
Year effects	Yes		Yes	
Adjusted R^2	78.02%		78.02%	
Observations	30480		30480	

are involved with such rent seeking behavior. Top non-CEO executives are competitors in tournament-like games, have career concerns and often have limited resources and power over certain divisions. Therefore, if pay-performance sensitivities of CEOs and non-CEO executives face similar adjustments after natural disasters, then this result may best be explained by the optimal contracting mechanism. The similar pay-performance adjustments would run counter to the argument made by Gopalan et al (2010), as non-CEO executives are less likely to change the risk exposure of their firm.

In Table 3.6, I find that the first four coefficients that consider triple interaction terms are insignificant. These results suggest that implicit incentives trigger during bad events and vanish during good events. Therefore, all top managers require less (more) sensitive pay-for-performance relation to exert a certain level of effort during bad (good) events (Feriozzi, 2010).

5.3. Robustness

5.3.A. Different event windows

The research design of this study considers industry responses to natural disasters as an identification variable. Industry responses are measured by CARs based on (0, 3) event window. In this section, I consider alternate specifications of CARs based on (0, 2) and (0, 5) event windows to analyze the robustness of my earlier findings. Panel A and B of Table 3.7 present results on CEO and top non-CEO executives, respectively. The results of this table support asymmetric adjustment in the pay-for-performance sensitivity that I document earlier.

After conducting event studies at the Fama-French 48 industry classifications, I label industries in the first (last) quartile with the lowest (highest) CARs. I then analyze whether any industry in the first (last) quarter that is expected to be affected adversely (favorably) experiences positive (negative) CAR. After re-categorizing a few industries and re-estimating the regression models, I

find more robust results on asymmetric pay-for-luck sensitivity. This indicates that any misclassification only reduces the power of the regression analyses.

5.3.B. Subsample analyses

Acharya, Myers and Rajan (2011) consider the set of non-CEO top managers as a potential governance mechanism. Considering their argument, I analyze the set of non-CEO

Table 3.7: Different event windows

Difference-in-difference regressions where the dependent variable is natural logarithm of compensation. Panel A considers CEO compensation whereas panel B consider the average compensation of top non-CEO executives. Model 1 and 2 consider industry response to natural disasters with [0, 5] and [0, 2] windows, respectively. Event day 0 refers to the day when natural disaster first occurs (or makes the landfall). The sample period spans from 2001 to 2009. All regressions control for firm and year fixed effects. Robust standard errors are clustered at the firm level. ***, ** and * refer statistical significance at the 1%, 5% and 10% level.

Panel A	Dependent variable: log(CEO compensations)			
	Model 1: [0, 5] window		Model 2: [0, 2] window	
	Estimates	p-value	Estimates	p-value
Positive treatment	0.007	0.658	0.022	0.236
Negative treatment	0.003	0.894	0.015	0.421
Pay-for-performance adjustment				
Positive treatment * industry adjusted ROA	0.402**	0.020	0.233	0.214
Positive treatment * industry adjusted stock return	-0.024	0.426	-0.002	0.949
Negative treatment * industry adjusted ROA	-0.429**	0.021	-0.505***	0.010
Negative treatment * industry adjusted stock return	0.002	0.942	-0.069**	0.022
Firm characteristics				
Firm assets (log, in millions)	0.423***	0.000	0.426***	0.000
Industry adjusted ROA	0.851***	0.000	1.023***	0.000
Industry adjusted stock return	-0.003	0.898	0.028	0.327
Volatile	-0.819**	0.033	-0.815**	0.036
CEO attributes				
Age	-0.012	0.656	-0.010	0.686
Age^2	0.000	0.709	0.000	0.742
CEO tenure	0.004	0.391	0.004	0.384
CEO $tenure^2$	0.000*	0.073	0.000*	0.074
Pre-SOX	0.110***	0.000	0.110***	0.000
Financial crisis	0.265***	0.000	0.260***	0.000
Firm effects	Yes		Yes	
Year effects	Yes		Yes	
Adjusted R^2	75.08%		75.08	
Observations	14375		14,375	

Panel B	Dependent variable: log(average of top non-CEO executive compensations)			
	Model 1: [0, 5] window		Model 2: [0, 2] window	
	Estimates	p-value	Estimates	p-value
Positive treatment	0.007	0.505	-0.010	0.423
Negative treatment	0.007	0.637	0.008	0.512
Pay-for-performance adjustment				
Positive treatment * industry adjusted ROA	0.270**	0.016	0.387***	0.006
Positive treatment * industry adjusted stock return	-0.014	0.485	0.009	0.660
Negative treatment * industry adjusted ROA	-0.283**	0.014	-0.235**	0.040
Negative treatment * industry adjusted stock return	0.018	0.371	-0.044**	0.025
Firm characteristics				
Firm assets (log, in millions)	0.383***	0.000	0.385***	0.000
Industry adjusted ROA	0.540***	0.000	0.497***	0.000
Industry adjusted stock return	-0.035**	0.049	-0.012	0.519
Volatile	0.292	0.196	0.302	0.179
Pre-SOX	-0.008	0.676	-0.001	0.957
Financial crisis	0.067***	0.000	0.075***	0.000
Firm effects	Yes		Yes	
Year effects	Yes		Yes	
Adjusted R^2	82.12%		82.13%	
Observations	15248		15248	

executives and find asymmetric pay-for-performance sensitivity. Because asymmetric pay sensitivity is present for both CEO and non-CEO executives, I argue that asymmetric pay-for-performance sensitivity is more likely an optimal contracting phenomenon. However, it can be argued that CEOs and non-CEO executives are collectively involved in the opportunistic pay-setting process. I evaluate this hypothesis using two different subsamples in Table 3.8 where CEO power is less of a concern and then estimate pay-for-performance sensitivities of non-CEO executives.

The initial subsample considers first two years after the appointments of new CEOs. In this sample, non-CEO executives are less likely to capture the pay-setting process collectively with new CEOs. In the second subsample, I exclude CEOs above the retirement age of 65. Elder CEOs have fewer career concerns and may entrench themselves by providing top executives similar pay arrangements. For these two sampling criteria, I find asymmetric pay-for-performance sensitivity for the set of non-CEO executives. These results further strengthen my earlier

conclusion that asymmetric pay-for-performance sensitivity is more likely an optimal contracting phenomenon that is observed across all executives in a company.

Table 3.8: Samples of firms where optimal contracting is more likely

Difference-in-difference regressions where the dependent variable is natural logarithm of compensation. In Model 1, I consider the first two years after CEO appointments whereas in Model 2, I consider firms with CEOs not exceeding 65 years of age (i.e. retirement age). The sample period spans from 2001 to 2009. All regressions control for firm and year fixed effects. Robust standard errors are clustered at the firm level. ***, ** and * refer statistical significance at the 1%, 5% and 10% level.

	Dependent variable: log(average of top non-CEO compensations)			
	Model 1: New CEO appointment		Model 2: CEO below 65	
	Estimates	p-value	Estimates	p-value
Positive treatment	0.026	0.219	0.029**	0.025
Negative treatment	0.032	0.187	0.031**	0.034
Pay-for-performance adjustment				
Positive treatment * industry adjusted ROA	0.422*	0.055	0.442***	0.002
Positive treatment * industry adjusted stock return	-0.026	0.419	-0.016	0.429
Negative treatment * industry adjusted ROA	-0.360*	0.095	-0.370***	0.002
Negative treatment * industry adjusted stock return	0.020	0.556	-0.022	0.270
Firm characteristics				
Firm assets (log, in millions)	0.348***	0.000	0.397***	0.000
Industry adjusted ROA	0.489**	0.026	0.583***	0.000
Industry adjusted stock return	-0.040	0.104	-0.026	0.111
Volatile	-0.056	0.869	0.390*	0.100
Pre-SOX	0.133***	0.000	0.123***	0.000
Financial crisis	0.129***	0.000	0.192***	0.000
Firm effects	Yes		Yes	
Year effects	Yes		Yes	
Adjusted R^2	84.78%		82.64%	
Observations	5914		13619	

6. Summary and conclusion

Feriozzi (2010) argues that the effectiveness of implicit incentives is most apparent during bad events since managers are threatened by the increased probability of bankruptcy. On the other hand, implicit incentives are not effective motivating tools during good economic

conditions since the firm is less likely to be in financial distress. As a result, top managers need more sensitive pay-performance relation to exert a certain effort level when the economy prospers.

By considering the heterogeneous and idiosyncratic impact of natural disasters on firm performance, I show that the compensation of CEOs and other top executives reflects asymmetric pay sensitivity, consistent with Feriozzi (2010). I use natural disasters because unlike other exogenous shocks, natural disasters are likely to favor some industries, adversely affect others and not have any economic effect on the rest. Moreover, the infrequent occurrence of natural disasters allows us to compare pay arrangements of the same firm across different years.

When CEO compensation is sorted based on the industry reaction to natural disasters and firm operating performance (ROA), I document lower pay-for-performance sensitivity for firms that are adversely affected by natural disasters. In a more systematic difference-in-difference procedure that controls for several time-varying variables and firm and year fixed effects, I document that favorably affected firms increase their pay sensitivity by 51.6% while adversely affected firms reduce this sensitivity by 40.5%, equivalent to $322,752. I also find similar asymmetry in pay-for-performance sensitivity for non-CEO executives. Moreover, the asymmetry in CEO pay-for-performance is not statistically different from that in non-CEO executive pay. This particular finding helps us reject rent seeking arguments on asymmetric pay-for-performance sensitivity.

I show that my results are robust to the inclusion of industry-wide luck. The effect of natural disasters on firm performance is largely idiosyncratic and extends beyond industry-wide performance. To verify that my results are consistent with optimal contracting and not a governance problem, I use the entrenchment index, independent board dummy and shareholdings

of independent directors as corporate governance measures. From this experiment, I confirm that asymmetric pay-for-performance is not merely a weak governance problem.

Overall, this paper considers a particular set of exogenous shocks that firms may find difficult to insure against. This uncertainty makes compensation contracts incomplete and provides us an opportunity to investigate how executive pay is adjusted for exogenous changes. By finding results consistent with the optimal contracting theory, this study justifies revisions of our views on pay-for-luck, which is currently assumed to be the outcome of corporate governance problems.

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