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THREE ESSAYS ON CORPORATE FINANCE

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SUMMARY

This dissertation contains three essays on corporate finance. In Essay one, to assess the importance of corporate social responsibility (CSR) in creating value and encouraging cooperative behavior among stakeholders, I examine the valuation effects of merger announcements on acquirers' various stakeholders and on their behavior in related to proposed merger deals. I find that shareholders, bondholders, suppliers, and major customers of high CSR acquirers as well as target shareholders of these acquirers in stock-swap mergers realize higher merger announcement returns than those of low CSR acquirers. Compared to low CSR acquirers, high CSR acquirers also realize higher announcement returns of the value-weighted portfolio of the acquirer and the target, larger increases in post-merger stock return and operating performance, greater reductions in post-merger cost of capital, and smaller reductions in post-merger number of employees. I also find that mergers by high CSR acquirers take less time to complete, are less likely to fail, and are less likely to be challenged by antitrust authorities than those by low CSR acquirers. These results suggest that CSR benefits both a firm's shareholders and its other relevant stakeholders and support the stakeholder value maximization view of stakeholder theory.

Essay two examines the effects of nonmonetary benefits on overall executive compensation from the perspective of the living environment at the firm headquarters. Companies in polluted, high crime-rate or otherwise unpleasant locations pay higher compensation to their CEOs than companies locating in more livable locations. This premium in pay for quality of life is stronger when firms face tougher competition in the

managerial labor market, when the CEO is hired from outside, and when the CEO has short-term career concerns. Overall, the geographic desirability of the corporate headquarters is an effective substitute for CEO monetary pay.

Essay three proposes a model of board voting that shows that in comparison to boards with an even number of directors (even boards), those with an odd number of directors (odd boards) improve voting efficiency by better aggregating directors' information. Consistent with the model's implications, I find that firms with an odd board show better performance than those with even boards. Furthermore, I find that firms with an odd board have lower levels of total CEO compensation but a higher sensitivity of pay to stock return performance. Finally, firms with an odd board experience more CEO turnovers and exhibit higher turnover-performance sensitivity. My findings highlight the importance of board voting efficiency to firm performance and corporate governance.

Essay One:

Corporate Social Responsibility and Stakeholder Value Maximization:

Evidence from Mergers

Abstract: To assess the importance of corporate social responsibility (CSR) in creating value and encouraging cooperative behavior among stakeholders, we examine the valuation effects of merger announcements on acquirers' various stakeholders and on their behavior in related to proposed merger deals. We find that shareholders, bondholders, suppliers, and major customers of high CSR acquirers as well as target shareholders of these acquirers in stock-swap mergers realize higher merger announcement returns than those of low CSR acquirers. Compared to low CSR acquirers, high CSR acquirers also realize higher announcement returns of the value-weighted portfolio of the acquirer and the target, larger increases in post-merger stock return and operating performance, greater reductions in post-merger cost of capital, and smaller reductions in post-merger number of employees. We also find that mergers by high CSR acquirers take less time to complete, are less likely to fail, and are less likely to be challenged by antitrust authorities than those by low CSR acquirers. These results suggest that CSR benefits both a firm's shareholders and its other relevant stakeholders and support the stakeholder value maximization view of stakeholder theory.

1. Introduction

The importance of corporate social responsibility (CSR) in U.S. firms' operation has increased substantially over the last decade as evidenced by the increase in their investment in CSR either voluntarily as part of their strategy and vision or as a result of pressure from activist shareholders.¹ Many U.S. firms also publish annual CSR reports that provide detailed information on their CSR activities and achievements or devote large sections of their annual reports to a description of their CSR activities. For example, according to CorporateRegister.com, the number of firms that publish annual CSR reports reached more than 300 in 2007.² Reflecting the importance of CSR in U.S. firms' operation, socially responsible investing (SRI) has also become an increasingly important investment vehicle in the U.S.: the amount invested in socially responsible firms (i.e., SRI funds) was \$2.71 trillion in 2007, up from \$2.16 trillion in 2003 (Social Investment Forum's 2007 Report).

The rise in the importance of CSR has led to much debate about its potential impact on the firm performance and the shareholder value, as well as its role as one of a firm's key corporate objectives and strategies. A major point of contention in this debate centers on managerial incentives to invest in CSR activity, particularly given mixed evidence on the relation between CSR and the firm performance (shareholder wealth) and the profitability of SRI funds.³

¹Although there is no consensus about an exact definition of CSR, it is generally used to describe corporate self-regulation to move beyond a firm's financial and legal responsibility, for example, assuming responsibility for the environment, local communities, working conditions, and ethical business practices. Consistent with this general description, Carroll (1979, 1991) argues that CSR encompasses four categories of social responsibilities: (1) economic responsibilities to be profitable, (2) legal responsibilities to obey the law, (3) ethical responsibilities to do what is right and fair and to avoid harm, and (4) philanthropic responsibilities to improve quality of life by contributing resources to the community.

²According to the 2008 Global CEO study by IBM and the Economist Intelligence Unit that was conducted by interviewing 1,130 CEOs from 40 countries across 32 industries, CEOs plan to increase CSR investment by 25% by 2011.

³For studies that examine the relation between CSR and firm performance (shareholder value), see, for example, Vance (1975), Alexander and Buchholz (1978), Cochran and Wook (1984), Aupperle, Carroll, and Hatfield (1985),

Two opposing views, namely, the stakeholder value maximization view⁴ and the management entrenchment view, have been expressed in this regard.

According to the stakeholder value maximization view, active engagement in CSR activities has a positive impact on shareholder value because focusing on other stakeholders' interests increases these stakeholders' willingness to cooperate in a firm's operation, which results in an increase in shareholder wealth. This view is mainly supported by advocates of stakeholder theory who argue that a firm cannot maximize its long-term shareholder value without paying attention to its relevant stakeholders' interests (Freeman, Wicks, and Parmar (2004), Jawahar and McLaughlin (2001), Jensen (2001)). For example, Freeman, Wicks, and Parmar (2004) argue that CSR creates shareholder value by "creating products and services that customers are willing to buy, offering jobs that employees are willing to fill, building relationships with suppliers that companies are eager to have, and being good citizens in the community."

The stakeholder value maximization view is also in line with the literature on contract theory and the theory of the firm advanced by Coase (1937) and expanded by Alchian and Demsetz (1972), Jensen and Meckling (1976), Cornell and Shapiro (1987), and Hill and Jones

Ullman (1985), Posnikoff (1997), Russo and Fouts (1997), Waddock and Graves (1997), Wright and Ferris (1997), McWilliams, Siegel, and Teoh (1999), Teoh, Welch, and Wazzan (1999), McWilliams and Siegel (2000), Margolis and Walsh (2001), Lev, Petrovits, and Radhakrishnan (2008), and Jiao (2010). These studies show mixed evidence on the effect of social performance on shareholder wealth. In addition, Statman (2000), Bauer, Koedijk, and Otten (2005), Kreander et al. (2005), and Brammer, Brooks, and Pavelin (2006) examine the profitability of SRI funds and find that the risk-adjusted returns of SRI funds do not outperform those of conventional funds. Hong and Kacperczyk (2009) further show that sin stocks (i.e., stocks of companies involved in alcohol, tobacco, or gambling services) have higher expected returns than comparable stocks. See Renneboog, Horst, and Zhang (2008) for a review of the literature on SRI. On one hand, the CSR related investment sometimes is costly, for example, to achieve better union relation, stronger retirement benefits, and clean energy usage. On the other hand, it is expected to improve the productivity significantly in return.

⁴ Stakeholders usually include government, employees, customers, suppliers, debt holders, community and any other parties that can affect or be affected by the actions of the business. In this paper, the measure that we use is based on firms' social performance in perspective of community, corporate governance, diversity, employee relations, environment, human rights, product quality and safety, and all seven dimensions are viewed equally important.

(1992), among others. This line of literature views a firm as a nexus of contracts between shareholders and other stakeholders in which each group of stakeholders supplies the firm with critical resources or effort in exchange for claims outlined in explicit contracts (e.g., wage contracts and product warranties) or suggested in implicit contracts (e.g., promises of job security to employees and continued services to customers). Cornell and Shapiro (1987) argue that the value of implicit contracts depends on other stakeholders' expectations about a firm honoring its promises and suggest that honoring its implicit contracts is in shareholders' economic interest because, in the long run, firm value reflects not only the value of explicit contracts but also the value of implicit contracts it expects to sell in the future. To the extent that firms that invest more in CSR (hereafter, high CSR firms) have a stronger reputation for keeping their promises associated with the implicit contracts with their relevant stakeholders, contract theory and the theory of the firm suggest that stakeholders of high CSR firms have stronger incentives to contribute resources and effort to the firm and accept less favorable explicit contracts than stakeholders of low CSR firms. Hence, according to this argument, high CSR firms should exhibit higher shareholder value and better firm performance than low CSR firms. This argument also suggests that stakeholders of high CSR firms have greater incentives to support their firms than stakeholders of low CSR firms.

During the mergers, with more supports or less challenges from other relevant stakeholders, high CSR firms are supposed to integrate the bidder and the target with lower cost. Provided that high CSR firms are more committed to honoring its implicit contracts, such as providing good career prospects and job security, competent employees of acquirers and targets are more likely to stay with the merged firm and demand less monetary compensation (Roberts and Dowling (2002)). This retention of competent workers should increase the probability of a

successful integration and the realization of synergy value, resulting in higher firm value. Similarly, given the strong reputation of the product quality of high CSR acquirers, customers of combined firms may be willing to pay a premium price for their product or services (Fisman, Heal, and Nair (2006)). This support from customers is expected to improve firm performance after the mergers and, in turn, create more value for shareholders. With better records of high CSR bidders, suppliers may give better credit terms to the combined firms because they expect to be paid more punctually. There will also be fewer challenges from government if the acquirers are high CSR firms. For example, they may have a quicker approval or more favorable tax treatment from the government. On the other hand, socially irresponsible firms are more likely to be criticized and shunned by employees, customers, and other stakeholders (Chun (2009)) and consequently face higher cost or even fail to complete the deal.⁵ For example, according to the Merger Guideline 2010, customers can provide a variety of information to the antitrust authorities to show the adverse effect of the merger on them. As a result, the deals by low CSR bidders, which usually do not have a good relation with customers, are more likely to be questioned and challenged by the antitrust authorities. Therefore, the stakeholder value maximization view predicts that with the supports of other relevant stakeholders, high CSR acquirers incur lower cost and realize higher returns during the mergers.

In contrast to the stakeholder value maximization view, the management entrenchment view suggests that managers use corporate resources earmarked for CSR to advance their careers, develop entrenchment strategies, or promote other private benefits at the expense of shareholders

⁵ To illustrate the importance of relevant stakeholders' support in merger completion, consider the case of Krupp-Hoesch. In 1997, the German steel producer Krupp attempted to take over the Thyssen. Thyssen's employees and the community, however, protested and lobbied against the takeover. The regional government also used political pressure to block the deal. As a result, Krupp withdrew its bid and only managed to successfully acquire Thyssen in a second attempt in 1999.

(Friedman (1970, 1998), Pagano and Volpin (2005), Barnea and Rubin (2006), Cespa and Cestone (2007), Cronqvist et al. (2009)). For example, Friedman (1970, 1998) argues that there is an apparent conflict between CSR and corporate objectives, and that managers of firms that actively engage in CSR activities use firms' resources to maximize their own private benefits. Thus, the management entrenchment view predicts that compared to firms that engage in fewer CSR activities, those engage in more CSR activities suffer from more pronounced agency problems, resulting in greater shareholder wealth reduction and lower operating performance. To the extent that firms with more severe agency problems have weaker incentives to honor their implicit contracts, the management entrenchment view also suggests that compared to major stakeholders of firms with better CSR records, those of firms with poorer CSR records have fewer incentives to support their firms.

In this paper, we use a large sample of U.S. mergers to shed light on the debate between the stakeholder value maximization and the managerial entrenchment views. We study merger activity because managerial objectives play an important role when managers acquire other firms, and as one of the most important corporate investment decisions, mergers can have a significant effect on the wealth of various stakeholders. Moreover, merger announcements serve as a good exogenous event that minimizes potential endogeneity problems arising in tests of these competing views. In addition, in many cases the merger approval process is subject to a range of challenges as well as support from various stakeholders -- including bondholders, suppliers, customers, employees, and government -- who have a significant bearing on the eventual merger outcome. These characteristics make mergers particularly well suited to our investigation of the two competing views on CSR.

To investigate the relation between the extent of a firm's active involvement in CSR activity and merger outcome variables, we exploit a firm-level measure of a firm's CSR performance. Our data come from the KLD Research & Analytics, Inc. (hereafter, KLD) STATS database. This database provides extensive information on firms' CSR performance ratings and is the most comprehensive database available for evaluating a firm's strengths with respect to its CSR activity. Using this database, we create an adjusted CSR score to measure each firm's CSR performance.⁶

Our study is different from previous studies on CSR in several respects and attempts to overcome potential limitations of these studies. First, unlike previous studies that focus on the impact of CSR on shareholder wealth (Waddock and Graves (1997), Teoh, Welch, and Wazzan (1999), McWilliams and Siegel (2000), Jiao (2010)), we investigate the impact of CSR on the wealth of both shareholders and other stakeholders including bondholders, major customers, suppliers, and employees. We also examine how a firm's CSR record affects its post-merger performance and the extent to which stakeholders facilitate the merger process.

Our first hypothesis, the stakeholder value maximization view, predicts that high CSR firms, which have a reputation for honoring their implicit contracts with a wide range of stakeholders, undertake mergers that benefit both their shareholders and the firm's other stakeholders. Thus, according to this view, shareholders and other relevant stakeholders of high CSR acquiring firms experience higher merger valuation effects than those of low CSR acquiring firms. The stakeholder value maximization view also predicts greater benefits to shareholders

⁶ We estimate adjusted CSR by scaling the raw strength and concern scores of each category of KLD CSR scores by the number of strengths and concerns in that category-year and then taking the net difference between the adjusted strength and concern scores for that category. See Section 3.1 for a detailed discussion on the construction of adjusted CSR.

and other stakeholders of high CSR acquiring firms in the post-merger period, as manifested by larger increases in stock return and operating performance, greater reductions in the costs of debt and equity, and smaller reductions in post-merger number of employees. Further, high CSR firms' consideration of the interests of a wide range of stakeholders encourages stakeholders to facilitate merger negotiation through more cooperative behavior, resulting in a lower likelihood of mergers being challenged by antitrust authorities, a lower likelihood of mergers failing, and a reduction in the time to complete merger deals.

Our second hypothesis, the management entrenchment view, predicts the opposite. If the managers of high CSR firms invest in CSR activities to maximize their own wealth rather than to maximize shareholder wealth, then these managers are more likely to undertake acquisitions that benefit themselves or other stakeholders at the expenses of shareholders, suggesting that shareholders of high CSR firms realize negative announcement returns. This argument also suggests that agency problems inherent in high CSR firms result in a deterioration of post-merger financial and operating performance, as manifested by larger decreases in stock return and operating performance and greater increases in the costs of debt and equity. This view also predicts that high CSR firms' more severe agency problems lower their reputation for honoring implicit contracts with stakeholders, which undercuts stakeholder incentives to cooperate in the merger approval process. Thus, high CSR acquirers are expected to experience a higher likelihood of mergers being challenged by antitrust authorities, a higher likelihood of mergers failing, and an increase in the time to complete merger deals.

Second, we explicitly address the potential endogeneity problems that previous studies ignore in their analyses. One concern with regard to the finding in previous papers that high CSR firms perform better than low CSR firms is that it could suffer from several endogeneity

problems. First, potential omitted variables could affect both the CSR measure and firm performance at the same time, resulting in a spurious correlation. For example, well-governed firms could be the same firms that are able to make large profits and at the same time afford to invest actively in CSR activity. Second, it could be the case that firms with strong performance invest more in CSR, so that high CSR firms have better operating and stock return performance than low CSR firms. In this case, the direction of causation goes from good performance to high CSR, and not the other way around. Third, if merger opportunities are predictable and if managers believe that high CSR leads to better merger performance, then firms could choose to improve their social image prior to merger announcements. In this case, higher merger announcement returns may simply reflect this adjustment in social image.

We address these endogeneity problems using two-stage least squares (2SLS) regressions in which we employ (1) industry social responsibility and (2) religion ranking as the instrumental variables. Industry social responsibility is measured as the ratio of the number of firms with positive adjusted CSR in the same industry as the bidder to the total number of firms in that industry. Religion ranking is the religious ranking of the state in which the bidder's headquarters is located and is measured as the ratio of the number of religious adherents in the bidder's state to the total population in that state in 2000. Both variables satisfy the requirements of relevance and exogeneity as instrumental variables (i.e., they are positively correlated with an individual firm's CSR, but are uncorrelated with the error terms in acquisition performance and stakeholder behavior regressions), allowing us to effectively correct for the potential exogeneity problems discussed above.

Third, to ensure that the CSR measure we use in our study does not proxy for other known factors that affect merger performance, we control for several variables in the regressions,

such as variables that capture the extent of a firm's management quality (Morck, Shleifer, and Vishny (1990)), product market competition (Leibenstein (1966), Graham, Kaplan, and Sibley (1983), Hart (1983), Nickell (1996), Shleifer and Vishny (1997), Berger and Hannan (1998), Luo and Bhattacharya (2006), Simmons and Becker-Olsen (2006)), and corporate governance (Byrd and Hickman (1992), Masulis, Wang, and Xie (2007)).

Using a sample of 1,575 completed U.S. mergers in which acquiring firms' KLD ratings are available for the period 1992 to 2007, we find strong evidence that after controlling for bidder- and deal-specific characteristics and correcting for the endogeneity of the link between the CSR measure and firm value, shareholders, bondholders, major customers, suppliers of high CSR acquirers, and target shareholders of these acquirers in stock-swap mergers earn significantly higher abnormal returns around the merger announcement date than those of low CSR bidders. We also find that compared to low CSR firms, high CSR bidders experience higher announcement returns of the value-weighted portfolio of the acquirers and the targets, better post-merger stock return and operating performance, lower post-merger costs of capital, and fewer post-merger employee reductions. These results are largely consistent with the stakeholder value maximization view and inconsistent with the management entrenchment view.

An analysis of the extent to which stakeholders facilitate the merger approval process provides further support for the stakeholder value maximization view, but little support for the management entrenchment view. Specifically, we find that mergers by high CSR acquirers take less time to complete, are less likely to fail, and are less likely to be challenged by antitrust authorities than those by low CSR acquirers.

Given our strong evidence in support of the stakeholder value maximization view, we further test the robustness of the results by performing an out-of-sample test using U.S. firms in the FTSE4Good Index between 2003 and 2006. Because these firms are known to have a good reputation with respect to social performance, we expect acquiring firms in this list to realize higher stock announcement returns around the merger announcement date than matched acquiring firms. We find that our results are robust to using this alternative measure of a firm's social performance.

Our study contributes to the ongoing debate about the impact of CSR on stakeholder value in several ways. First, we present the first large-scale study to examine the impact of U.S. bidders' CSR on investment quality, the wealth of various stakeholders, and post-merger long-term performance. Although Aktas, Bodt, and Cousin (2011) also examine the impact of CSR on merger announcement returns, their analysis focuses on the effect of target CSR on bidder shareholder wealth for a small sample of 106 international mergers and acquisitions. To our knowledge, no study to date has investigated how strong social performance influences the announcement effects of an acquiring firm's various types of stakeholders and long-term post-merger performance.

Second, we complement the previous literature on the market for corporate control by documenting significant effects of bidders' social performance on their stakeholders' behavior in relation to proposed merger deals. The success of mergers has significant economic consequences for other stakeholders of acquiring firms as the realization of merger benefits is contingent on the successful completion of merger deals. Thus, rather than focus only on the valuation effect of mergers, we extend our analysis to examine whether an acquiring firm's CSR has any bearing on stakeholder behavior in support of or against its proposed merger. We show

that high CSR bidders effectively reduce the conflicts between shareholders and other stakeholders by improving the welfare of both parties, and as a result the integration of bidder and target is accelerated over the merger negotiation period.

Third, our analysis explicitly controls for potential biases associated with the endogenous nature of social performance, which existing literature has generally ignored. By effectively correcting endogeneity problems inherent in the link between CSR and merger performance, our analyses identify a clear, important channel through which CSR contributes to stakeholder wealth.

The paper proceeds as follows. In Section 2, we discuss the literature and develop our main hypotheses. Section 3 describes the data and provides summary statistics for variables of interest. Section 4 presents the announcement returns for shareholders, bondholders, major customers, suppliers of the acquirer, target shareholders in stock-swap mergers, and the value-weighted portfolio of the acquirer and the target, and provides the results from cross-sectional regressions. In Section 5, we report long-term post-merger performance for the merged firms, the likelihood of merger deals being challenged by antitrust authorities, the likelihood of mergers being completed, and the time to complete merger deals. Section 6 discusses the results from robustness tests. Section 7 summarizes and concludes the paper.

2. Literature Review and Hypothesis Development

To distinguish between the stakeholder value maximization view and the management entrenchment view, in this section we present testable implications of the two views on announcement returns for various stakeholders of acquiring firms, long-term post-merger

performance, and stakeholders' cooperative behaviors. We first present hypotheses for the stakeholder value maximization view; we then present hypotheses for the management entrenchment view.

2.1. Stakeholder Value Maximization View

CSR requires firms to consider the interests of various stakeholders, such as suppliers, consumers, creditors, employees, regulators, and communities, when developing and implementing corporate key strategies. This simultaneous consideration of all relevant stakeholders' interests when making corporate actions raises an important question of whether a firm can indeed simultaneously enhance the interests of its both shareholders and other stakeholders.

The advocates of the stakeholder theory of CSR argue that the interests of shareholders and other stakeholders are compatible each other and all these stakeholders contribute to corporate long-term profitability and efficiency (Jensen (2001), Jawahar and McLaughlin (2001), Freeman et al. (2004), Sundaram and Inkpen (2004)). Jensen (2001), for example, argues that a firm cannot maximize its long-term market value without paying attention to the interests of its relevant stakeholders in its business decisions.

This argument is also in line with the literature on contracts and the theory of the firm developed by Coase (1937), March and Simon (1958), Alchian and Demsetz (1972), Jensen and Meckling (1976), Cornell and Shapiro (1987), and Hill and Jones (1992). According to this literature, a firm is viewed as a nexus of explicit and implicit contracts among shareholders and other stakeholder. Unlike explicit contracts, implicit contracts are nebulous and have little legal standing. Firms can default on their implicit promises without legal recourse from other

stakeholders. As such, the value of implicit contracts is contingent on a firm's reputation for honoring its promises. Firms with high CSR records tend to build reputations for considering the interests of a wide range of stakeholders and fulfilling implicit contracts with these stakeholders, and this makes their implicit contracts more valuable (Cornell and Shapiro (1987)). In return, stakeholders are willing to contribute more resources and effort to firms with high CSR records and accept less favorable terms of explicit contracts, which eventually help improve shareholder value.

These arguments suggest that high CSR acquirers will gain more support or face fewer obstacles from their relevant stakeholders for their merger proposals, which eventually benefits both shareholders and other stakeholders. For example, high CSR acquirers will have incentives to maintain a strong reputation for continuously providing future service and quality products, prompt and reliable delivery, and fulfilling implicit contracts with their customers. Thus, high CSR acquirers can impose fewer costs on customers, which are passed back to them in the form of increased demand, higher product prices, and more favorable terms of trade with customers. These supports from customers help improve firm performance and can create more value for shareholders. At the same time, other stakeholders of high CSR acquirers are also able to benefit more from the proposed merger since they can share synergistic gains created from the mergers more reliably without worrying about the potential breach of implicit contracts with the firm. Overall, these arguments suggest that both shareholder and other stakeholders benefit from the merger when their firm has high social performance.

2.1.1. Announcement Effects for Stakeholders of Acquiring Firms

If high CSR acquirers are able to gain the strong support for their proposed mergers from their relevant stakeholders and this strong support translates into high firm performance, the stakeholders of higher CSR acquirers should experience higher abnormal announcement returns than those of low CSR acquirers. Thus, we expect high CSR acquirers' shareholders, bondholders, major customers, and suppliers to earn higher abnormal returns around the merger announcement date than low CSR acquirers' corresponding stakeholders. In addition, target shareholders in stock-swap deals become the shareholders of the combined firms after the transactions, and therefore, we also expect that the target shareholders of high CSR acquirers to realize higher merger announcement returns than those of low CSR acquirers. However, a priori, it is unclear what effect cash transactions have on target shareholder returns because target shareholders in cash deals will not be shareholders of the combined firms unless they decide to buy the shares of these firms.

Further, if CSR helps facilitate the integration between the acquirer and the target, high CSR bidders should be able to redeploy the combined assets of the two merging firms more efficiently and, as a result, increase the combined shareholder wealth of the acquirer and the target. Therefore, we expect the announcement return of the value-weighted portfolio of the acquirer and the target to be higher for the acquirer with better social performance than for the acquirer with poorer social performance.

2.1.2. Post-merger Performance

The stakeholder value maximization view also predicts changes in post-merger firm performance and its cost of capital. If high CSR bidders are able to increase the value of implicit contracts, costs incurred under explicit contracts are likely to decrease, which would have a

positive impact on cash flow of the merged firm as well as its cost of capital. For example, employees of high CSR firms may demand less monetary compensation and are more committed (Roberts and Dowling (2002)), customers are willing to pay a premium price for quality products and services (Fisman et al. (2006)), suppliers may give better credit terms because they expect to be paid punctually, and local government may provide more favorable tax treatments given their contribution to the local community. Equity investors and creditors may also accept lower costs of capital since high CSR firms tend to have less financial, regulatory, or idiosyncratic risk than lower CSR firms (Alexander and Bucholtz (1978), Spicer (1978), Godfrey et al. (2009), Lee and Faff (2009), Ghoul et al. (2010)). Such cooperative behavior among stakeholders should manifest itself by an improvement in post-merger performance and a reduction in post-merger costs of capital. Therefore, the stakeholder value maximization view predicts that higher CSR acquirers experience higher post-merger long-term stock return and operating performance and lower post-merger costs of debt and equity than lower CSR acquirers.

As a further test of the stakeholder value maximization view, we examine the long-term dismissal rate of employees after the merger. Acquirers frequently engage in large-scale layoffs to achieve substantial cost savings in post-merger period (Krishnan et al. (2007)). To the extent that high CSR acquirers take all relevant stakeholders' interest including that of employees into consideration when they make post-merger strategic decisions, they are less likely to sacrifice employees' welfare in exchange for cost reductions. Hence, we expect that when acquirers have higher CSR records, employees of the merged firm will face lower risk of being laid off in post-merger period.

2.1.3. Stakeholder Behavior in Supporting Merger Deals

The stakeholder value maximization view has implications for stakeholder behavior in supporting merger deals proposed as well. Since a number of stakeholder relationships are governed by non-enforceable implicit contracts, the incentives of stakeholders to coordinate their operations during the merger process are dependent on the perceived viability of the relationship implied by acquiring firms' past social performance. To the extent that higher CSR firms are less likely to breach implicit contracts with their stakeholders, mergers initiated by these firms will receive more support from various stakeholders, such as regulators, employees, bondholders, customers, suppliers, and the target's management. Consequently, mergers proposed by higher CSR firms are expected to stand more chance to be successfully completed and be finished in a shorter duration. Moreover, we expect high CSR acquirers to experience a lower likelihood of mergers being challenged by antitrust authorities. If the merger has a potential to substantially reduce competition in the industry, the Department of Justice or Federal Trade Commission (FTC) will likely challenge it by bringing suit or threatening to block the deal. To the extent that as a socially responsible firm, higher CSR acquirers have few incentives to exploit customers by increasing their market power in the industry, we expect these acquirers to face less challenge from antitrust authorities than lower CSR firms.

2.2 *Management Entrenchment View*

The management entrenchment view argues that firms that actively engage in CSR activities compromise shareholder interest because managers of these firms use corporate resources allocated to CSR activities to advance their personal or other stakeholders' interests (Friedman (1970, 1998)). For example, managers with high agency problems may treat employees better in order to secure their positions against takeover threats (Pagano and Volpin

(2005), Cronqvist et al. (2009)). These managers may also want to maintain close relationships with social activists because such relationships can serve as an effective entrenchment strategy for inefficient CEOs (Cespa and Cestone (2007)). In addition, some managers may overinvest in CSR activities in order to improve their reputations as good global citizens (Barnea and Rubin (2006)). It is also possible that managers who serve multiple stakeholders' objectives may have to prioritize these stakeholders' interests based on each stakeholder's ability to enforce its will (Mitchell et al. (1997)). Since private benefits that managers obtain from CSR activities come at the expense of shareholder wealth and the literature on the market for corporate control shows that the mergers driven by the agency motives of bidding firms' managers, such as managerial entrenchment, job security, and personal reputation, decrease bidder value (Shleifer and Vishny (1989), Sudarsanam (2003)), we expect shareholders of high CSR firms to realize negative abnormal returns around the merger announcement date. High agency problem of bidding firms' managers also predicts announcement returns of the value-weighted portfolio of the acquirer and the target to be lower in mergers involving higher CSR acquirers than in those involving lower CSR acquirers. However, a priori, it is unclear what effect CSR has on merger announcement returns for other stakeholders. If entrenched managers are willing to treat other stakeholders more favorably to enjoy private benefits, we expect these stakeholders of high CSR acquirers to experience positive announcement returns. If, however, high CSR acquirers undertake acquisitions only to maximize their own private benefits at the expense of other stakeholders, the effect of CSR on merger announcement returns for other stakeholders could be negative.

The management entrenchment view also suggests that high CSR acquirers suffering severe agency problems will be more likely to experience a subsequent deterioration in post-merger financial and operating performance because the stakeholders of these acquirers will

worry about the possibility that self-entrenched managers breach their trust and indulge in opportunistic behaviour when it is profitable. Thus, the view predicts that high CSR acquirers experience larger decreases in stock return and operating performance and greater increases in costs of debt and equity after the mergers. However, we have an unclear prediction for the effect of CSR on post-merger change in the number of employees. If managers treat employees more favorably to strength their position in the firm, we expect high CSR acquirers not to reduce or even increase the number of their employees after the mergers. If, however, high CSR acquirers undertake acquisitions only to maximize their own private benefits at the expense of other stakeholders, the relation between CSR and the change in the number of employees could be non-positive.

Since firms with higher agency problems have weaker incentives to maintain a strong reputation for fulfilling implicit contracts with stakeholder, their propose mergers can create great uncertainty about stakeholders' future interests. This uncertainty discourages stakeholders from providing their support to merger deals, increasing the odds for merger failure. Thus, the management entrenchment view predicts that mergers proposed by higher CSR acquirers are more likely to be challenged by antitrust authorities, are more likely to be failed, and take a longer time to be completed.

3. Data and Summary Statistics

3.1. Measures of a Firm's CSR

We measure a firm's social performance using a score that reflects the extent of the firm's involvement in CSR activity. We construct this measure based on the KLD database,

which has been extensively used in prior CSR literature (Jiao (2010), Lev, Petrovits, and Radhakrishnan (2008), Waddock and Graves (1997)).⁷ The KLD database covers approximately 650 companies that comprise the Domini 400 Social SM Index and the S&P 500 since 1991 and more than 3,000 firms that comprise the Russell 3000 since 2003.⁸

Based on a wide variety of sources, including company filings, government data, non-governmental organization data, and more than 14,000 global media sources, KLD evaluates firms' social performance along seven major dimensions, including community, corporate governance, diversity, employee relations, environment, human rights, and product quality and safety. In each dimension, there are both positive (strength) and negative (concern) indicators. If the firm conducts a good deed listed as a strength indicator, it gains one point; on the other hand, if the firm produces a harm listed as a concern indicator, it loses one point.⁹ The raw KLD CSR score is the sum of these dimension scores based on approximately 80 strength and concern indicators, with a higher value indicating better social performance. This simple-summation approach has the drawback, however, of a lack of comparability across years and dimensions because the number of strength and concern indicators varies considerably across most dimensions (Manescu (2009)). To overcome this issue, we construct another CSR measure using the KLD raw data by first dividing the strength and concern scores of each dimension by the respective number of strength and concern indicators to derive adjusted strength and concern

⁷ Graves and Waddock (1994) argue that the KLD database has advantages over other databases because "it rates firms using an objective set of screening criteria, the ratings are applied consistently across all companies, and KLD consists of knowledgeable individuals who are not affiliated with any of the rated companies" (p. 1039). Moreover, Ioannou and Serafeim (2009) note that the KLD database reports CSR strategies that are implemented rather than declared by the firm. Thus, the KLD database has generally been regarded as one of the best data sources for corporate social performance to date.

⁸ As the sample covered by KLD is not consistent over time, this may lead to biases in our empirical tests. Therefore, we also conduct the empirical tests using a sample that consists of only S&P 500 firms to mitigate concerns related to sample variation. Our results using this smaller set of firms are largely unchanged.

⁹ Appendix II provides the full list of indicators in each of the seven qualitative dimensions.

scores for that dimension, and then taking the difference between the adjusted total strength score and the adjusted total concern score (“adjusted CSR” score).¹⁰ The adjusted CSR score thus gives equal weight to the seven dimensions rather than to the individual indicators, mitigating any bias caused by an indicator on the social performance of firms in relatively irrelevant industries. We use this adjusted CSR as our main measure of a firm’s social performance.¹¹

3.2 *Sample Selection and Summary Statistics*

Our sample consists of U.S. mergers between 1992 and 2007. The initial sample of mergers comes from Thomson Financial’s Security Data Corporation (SDC) Platinum database. Our final sample includes all completed mergers that meet the following selection criteria: (1) The deal value disclosed in SDC is greater than one million dollars, (2) the acquirer controls less than 50% of the target’s shares before the announcement and owns 100% of its shares after the merger has been completed, (3) the acquirer is publicly traded and has stock return and financial data available from Center for Research in Security Prices (CRSP) and Compustat, respectively, (4) the acquirer is in the KLD database, and (5) the acquirer is not in the financial or utilities industries (i.e., firms with primary SIC codes between 6000 and 6999 or between 4900 and 4999). These restrictions result in a final sample of 1,575 successful mergers made by 802 firms.

[Insert Table I.1 Here]

In Table I.1, we present the distribution of our sample mergers according to acquirer

¹⁰For example, suppose that in 2004 the summations of the KLD strength indicators across the seven dimensions are 0, 1, 1, 2, 1, 0, and 1, and the numbers of strength indicators across the seven dimensions are 4, 3, 3, 5, 7, 4, and 4. According to our definition, the adjusted total strength score for the firm is equal to $(0/4+1/3+1/3+2/5+1/7+0/4+1/4) = 1.45$. If the adjusted total concern is 1.25, which is calculated in the same way as that of the adjusted total strength score, the adjusted CSR score will then be $(1.45 - 1.25) = 0.2$.

¹¹ The results using raw CSR scores are qualitatively similar to those using adjusted CSR scores and are available upon request.

industry and year. The number of mergers in each year increases more or less monotonically until the end of the 1990s. Then it decreases significantly before rebounding in 2004. Most of the acquirers are in manufacturing (56.8%), services (24.5%), and transportation and communication (7.6%).

[Insert Table I.2 Here]

Table I.2 shows the summary statistics for our sample acquirers classified according to the sample median of the adjusted CSR score. Several features are worth noting. Firms with a high CSR score have significantly higher Tobin's q and free cash flow than firms with a low CSR score, suggesting that firms with strong performance are more active in their CSR activities (McGuire, Sundgren, and Schneeweis (1988), Jiao (2010)). Compared to firms with a low CSR score, those with a high CSR score are better governed, as measured by G-index, are larger, and maintain lower leverage. As for deal characteristics, we find that compared to firms with a low CSR score, firms with a high CSR score prefer to acquire smaller targets, targets in high tech industries, targets whose industries are different from theirs, and privately held targets.

4. Empirical Methodology and Abnormal Announcement Returns

4.1. Methodology

To correct endogeneity problems discussed in the introduction section, we perform 2SLS regression analysis using various combinations of the following three variables as the instrumental variables for the CSR score: (1) industry social responsibility, (2) religion rank and (3) blue state.

Industry social responsibility is calculated as the ratio of the number of firms with positive adjusted CSR in the same industry as the acquirer to the total number of firms in that industry.¹² To the extent that peer firms' CSR activities influence those of other firms in the same industry, this variable is expected to be positively correlated with an individual firm's social responsibility. However, it is unlikely that industry social responsibility has any correlation with merger performance or stakeholder behaviors.

Religion rank measures the religion ranking of the state in which the bidder's headquarters is located, which ranges from 1 to 50. The ranking is based on the ratio of the number of religious adherents in the bidder's state to the total population in that state in 2000.¹³ A lower ranking indicates more religiosity. McGuire, Omer, and Sharp (2010) argue that managers of firms located in highly religious areas are less inclined to direct firm resources toward social issues as faith-based organizations play a prominent role in those areas. They show that firms in religious areas do indeed receive lower CSR ratings. This finding suggests that the religion rank variable is likely to be positively correlated with a firm's CSR.

Blue state is a dummy variable that equals one if a firm's headquarters is located in the blue/democratic state and zero otherwise. Rubin (2008) finds that firms with a high CSR rating tend to be located in democratic or blue states. Therefore, we expect this dummy variable to be highly correlated with our sample firms' social responsibility. In addition, there seems to be no reason to believe that the choice of locating in a blue or red state could have any significant effect on merger performance or stakeholder behaviors.

¹² Excluding the sample firm when calculating industry social responsibility yields qualitatively similar results as those reported in this paper.

¹³ The data on religiosity are obtained from the *American Religion Data Archive*.

To examine the validity of our instrumental variables, we perform Cragg-Donald (1993) instrument relevance and Sargan (1958) overidentification tests in each of the 2SLS regressions below and find that these measures are valid variables.¹⁴ Using any combination of two instrumental variables (i.e., industry social responsibility and blue state, industry social responsibility and religion rank, and blue state and religion rank) yields qualitatively similar results; therefore, we only report the results using industry social responsibility and religion rank as the instrument variables in this paper.

4.2. *Announcement Effects for Stakeholders*

To test the two competing views of CSR, the stakeholder value maximization view and the management entrenchment view, in this section we examine the announcement returns of acquiring firms' shareholders and other relevant stakeholders.

4.2.1. Univariate Tests

[Insert Table I.3 Here]

We measure abnormal returns by estimating the market model. The market model parameters are estimated using 200 trading days of return data ending 11 days before the merger announcement. The CRSP value-weighted return is used as a proxy for the market return. The daily abnormal stock returns are cumulated to obtain the cumulative abnormal return (CAR) from day t_1 before the merger announcement date to day t_2 after the merger announcement date.

¹⁴ To investigate the explanatory power of individual instrument variable, we regress adjusted CSR only on industry social responsibility, religion rank, and blue state, respectively. The R^2 of the regression is 5%, 4%, and 5%, respectively.

Table I.3 reports the CARs for various stakeholders of the acquiring firms. In each panel, we report the results for all bidders, the high CSR bidders, and the low CSR bidders. Panel A shows the CARs for the stockholders of the acquiring firms. The average CAR (-1, 1), CAR (-2, 2), and CAR (-5, 5) for the full sample are -0.22%, -0.15%, and -0.53%, respectively, and the average CAR (-5, 5) is significant at the 5% level. The subsample results show that these negative returns are mostly driven by the low CSR bidders. The mean CAR (-1, 1), CAR (-2, 2), and CAR (-5, 5) for the low CSR bidders are -0.55%, -0.4%, and -0.74%, respectively. These CARs are all statistically significant. The median CARs for the low CSR bidders show a similar pattern. In contrast, the respective CARs for the high CSR bidders are not significant and sometimes positive. The equality in mean CARs (-1, 1) between the high and low CSR subsamples is strongly rejected, suggesting that shareholders of high CSR acquirers earn relatively higher abnormal return than those of low CSR acquirers.

Panel B of Table I.3 shows the CARs for the bondholders of the acquiring firms. To estimate bond CARs, we follow Bessembinder et al. (2010). Specifically, we first obtain intraday bond trading data from the TRACE database and delete trades under \$100,000, canceled trades, corrected trades, and commission trades. Daily bond prices are estimated by weighting individual transaction prices by trading volume. We then form the value-weighted control portfolio of bonds that have the same Moody's rating as that of the bidder. Bond rating information is obtained from the Mergent FISD database. Finally, we calculate bond CARs by subtracting the return of the value-weighted control portfolio of bonds from the bidder bond returns.

We find that on average bondholders of the acquiring firms experience a wealth loss around the merger announcement date. The median bond CAR (-1, 1) is -0.06%, which is significant at the 1% level. The mean bond CAR (-1, 1) is also negative and significant. These

results are consistent with those in previous studies that show that bondholders realize significant negative returns around the merger announcement date (Billet, King, and Mauer (2004), Bessembinder et al. (2010)). The subsample analysis shows that while bondholders of the low CSR bidders suffer a significant wealth loss, those of the high CSR bidders do not. For example, the mean CAR (-1, 1), CAR (-2, 2), and CAR (-5, 5) for the low CSR bidders are -0.12%, -0.07%, and -0.05%, respectively, all of which are statistically significant. The corresponding CARs for the high CSR bidders are close to zero and insignificant. The difference in mean (median) CARs (-1, 1) between the high and low CSR firms is significant at the 5% (10%) level. Thus, the value loss to bondholders due to the mergers is particularly severe when acquiring firms have lower social performance. These results support the stakeholder value maximization view of CSR.

Panels C and D of Table I.3 show the stock CARs for the major customers and suppliers of the acquiring firms, respectively. Prior studies argue that mergers enable firms to collude with rivals more easily and gain at the expense of customers and suppliers (Robinson (1933), Stigler (1964)). Thus, the management entrenchment view suggests that if the acquirers have a notorious reputation with respect to their treatment of customers and suppliers, they are more likely to appropriate the wealth of customers and suppliers to pursue better merger performance (e.g., lower input (increase product) prices to take advantage of suppliers (customers)). However, the stakeholder value maximization view suggests that if the acquirers are socially responsible, they are less likely to conduct mergers that allow them to engage in anticompetitive collusion in order to exploit customer and supplier value.

We use the Compustat Segment Level Customer Database to identify an acquirer's major customers and suppliers. Major customers are those that comprise at least 10% of the acquirer's

sales and suppliers are those whose information on sales to the acquirer is available in the Compustat Segment Level Customer database. When there are multiple major customers (suppliers) for the acquirer, we use the market-capitalization weighted portfolio CAR of the multiple customers (suppliers) as the CAR for the major customer (supplier) of the acquiring firm.

We find that both the major customers and the suppliers of the acquiring firms lose significantly around the merger announcement dates. For example, the median CAR (-1, 1) for the acquiring firms' major customers and suppliers are -0.23% and -0.20%, respectively, both of which are significant at the 10% level. Similar to the results in Panels A and B of Table I.3, the significant negative CARs for the full sample are mainly driven by the low adjusted CSR subsample, supporting the stakeholder value maximization view.

Next, we examine the CARs for target shareholders in stock-swap mergers. Since target shareholders in stock-swap mergers will become the shareholders of the merged firm, they are taken to be potential future stakeholders of the acquiring firms. If the stakeholder value maximization view holds, we expect these potential shareholders to experience higher abnormal returns when their firms are acquired by high CSR bidders than by low CSR bidders. In contrast, the management entrenchment view predicts the opposite.

Panel E of Table I.3 shows the results. We find that consistent with previous studies, target shareholders in the cash-merger subsample earn higher abnormal returns than those in the stock-merger subsample. When we partition the stock-merger subsample into high and low CSR groups, we observe that the median CAR (-1, 1), CAR (-2, 2), and CAR (-5, 5) for the shareholders of the targets acquired by high CSR bidders are significantly higher than those for

the shareholders of the targets acquired by low CSR bidders. The mean CARs show a similar pattern. These results support the stakeholder value maximization view.

Finally, we examine whether the combined shareholder wealth of the acquirers and the targets in stock-swap mergers is different between mergers by high and low CSR acquirers using acquirer market capitalizations 10 days prior to the announcement date as the weight (Bradley, Desai, and Kim (1988)). The results are reported in Panel F of Table I.3. The median portfolio CAR (-1, 1) for the total sample is 0.93%, which is significant at the 1% level. The median portfolio CAR (-1, 1) for the stock-merger subsample in which targets are acquired by high CSR bidders is an insignificant 0.31% while the corresponding CAR for the stock-merger subsample in which targets are acquired by low CSR bidders is an insignificant -0.03%. The difference in these mean CARs is not statistically significant. In an untabulated test, we divide the total sample according to the sample median acquirer CSR without considering the method of payment and examine whether the combined shareholder wealth of the acquirers and the targets is different between mergers by high and low CSR acquirers. We again find that their returns are not significantly different. Thus, the analysis of portfolio returns does not provide conclusive evidence in support of the stakeholder value maximization view.

Overall, the results in Table I.3 show that shareholders, bondholders, suppliers, and major customers of high CSR acquirers and target shareholders of these acquirers in stock-swap mergers realize higher merger announcement returns than those of low CSR acquirers, supporting the stakeholder value maximization view.

4.2.2. Cross-Sectional Regression Analysis

To better understand the cross-sectional variation in CARs, we present the estimates from multivariate regressions using CAR (-1, 1) as the dependent variable and adjusted CSR as a key independent variable. Detailed definitions for the variables used in the regressions are provided in Appendix I.

[Insert Table I.4 Here]

The results using the stock CAR (-1, 1) of the acquiring firms as the dependent variable are reported in Table I.4. *T*-statistics reported in the table are calculated using standard errors adjusted for heteroskedasticity and bidder clustering. Columns (1) and (2) present the estimates from ordinary least squares (OLS) regressions. In column (1), following Masulis, Wang, and Xie (2007) we include as control variables bidder-specific characteristics (firm size, Tobin's *q*, leverage, free cash flow, and previous market-adjusted return), deal-specific characteristics (relative deal size, industry M&A, hostile dummy, high tech dummy, diversifying acquisition dummy, public target dummy, private target dummy, and all-cash deal and stock deal dummies), and industry and year fixed effects. We find that the coefficient estimate on a bidder's adjusted CSR is positive and significant at the 5% level. Thus, even after controlling for various firm- and deal-specific characteristics, shareholders of high CSR acquiring firms realize higher returns than those of low CSR acquiring firms. This result is consistent with the prediction of the stakeholder value maximization view.

In column (2), we further control for three additional variables, namely, operating income growth rate, a competitive industry dummy, and G-index, to rule out alternative explanations for the positive coefficient on a bidder's adjusted CSR in column (1). For example, it is possible that high-quality managers could treat their stakeholders fairly because they have stronger incentives to increase firm value by increasing stakeholder motivation. Thus, our results that high CSR

firms undertake more value-increasing acquisitions for their stakeholders could be due to high-quality managers/better-performing firms making better acquisitions (Morck, Shleifer, and Vishny (1990)). To control for bidder management quality/bidders' previous performance, we include operating income growth rate in the regression. It should be noted that the operating measures, Tobin's q and previous market-adjusted return, that are included in regression (1) to control for bidder characteristics can also be considered as important measures for management quality (Lang, Stulz, and Walkling (1989), Milbourn (2003)).

Alternatively, it is possible that the CSR score simply captures the extent of product market competition that can incentivize managers to be more efficient (Leibenstein (1966), Graham, Kaplan, and Sibley (1983), Hart (1983), Nickell (1996), Shleifer and Vishny (1997), Berger and Hannan (1998)), with firms in more competitive industries having fewer agency problems and thus caring more about shareholder interests. In addition, as an effective marketing strategy, firms in competitive industries may want to focus more on CSR activities (Luo and Bhattacharya (2006), Simmons and Becker-Olsen (2006)). To the extent that these effects of product market competition lead firms to undertake better acquisitions, our result that shareholders of high CSR firms realize higher CARs may simply mean that firms in more competitive industries engage in more value-increasing acquisitions. We control for the extent of a firm's product market competition by including a dummy variable that equals one if the bidder's industry is in the bottom quartile of all two-digit SIC industries annually sorted by the Herfindahl index and zero otherwise. The industry Herfindahl index is computed as the sum of squared market shares of all COMPUSTAT firms in the industry.

Finally, our results may be driven by the quality of a firm's corporate governance, which affects merger performance (Byrd and Hickman (1992), Masulis, Wang, and Xie (2007)). To the

extent that well-governed firms make more profitable acquisitions, our results could be due to the quality of a firm's corporate governance, not necessarily its social performance. We use the G-index constructed by Gompers, Ishii, and Metrick (2003) to measure a firm's corporate governance.

The results show that including these three additional variables does not change the significance of the coefficient estimate on adjusted CSR. In untabulated tests, we replace G-index with other governance measures, such as institutional ownership, the proportion of independent directors on the board, dual class dummy, and block holder director dummy and reestimate all regressions. The coefficient estimate on adjusted CSR is largely unchanged.

In columns (3) through (6), we report the results from 2SLS regressions. Columns (3) and (4) reestimate the OLS regression in column (1) using the 2SLS regression. The first-stage regression results are reported in column (3) and the second-stage regression results are reported in column (4). In column (3), we use adjusted CSR as the dependent variable and the two instrumental variables discussed in Section 4.1, bidder characteristics, and industry and year fixed effects as the independent variables. As expected, both instrumental variables (industry social responsibility and religion rank) have positive and significant coefficients (at the 1% level). The p -value for the Cragg-Donald (1993) instrument relevance test is 0.007, rejecting the null hypothesis that the instruments are weak instruments. This result confirms the relevance of our instrumental variables (i.e., high correlations between the instrumental variables and adjusted CSR). In column (4), we use the stock CAR (-1, 1) of the acquiring firms as the dependent variable and the predicted variable for adjusted CSR, bidder- and deal-specific characteristics, and industry and year fixed effects as the independent variables. We find that the coefficient estimate on the predicted variable for adjusted CSR is positive and significant at the 5% level.

The p -values of the Sargan (1958) overidentification test are 0.120. Hence, we are unable to reject the null hypothesis that at least one instrument is valid.

Columns (5) and (6) reestimate the OLS regression in column (2) using the 2SLS regression. We find that the coefficient estimates on the industry social responsibility and religion rank variables are again positive and significant (column (5)), confirming the relevance of our instrumental variables. The predicted variable for adjusted CSR also has a positive and significant coefficient (column (6)). Thus, our finding that shareholders of high CSR acquiring firms realize higher merger announcement returns than those of low CSR acquiring firms appears to be robust to controlling for endogeneity concerns, further supporting the stakeholder value maximization view.

[Insert Table I.5 Here]

Next, we perform multivariate regressions using the bond CAR (-1, 1) of the acquiring firms as the dependent variable. We use as control variables those used in Billet, King, and Mauer (2004) as well as industry and year fixed effects. Specifically, following Billet, King, and Mauer (2004), we use as bidder-specific characteristics dummy variables that are equal to one if the leverage, standard deviation of unlevered stock returns, average bond rating, and average bond maturity of the combined firm are greater than those of the acquirer. We also control for deal-specific characteristics including relative deal size, all-cash deal dummy, hostile dummy, diversifying acquisition dummy, and tender offer dummy. Finally, we include operating income growth rate, a competitive industry dummy variable, and G-index to rule out alternative explanations for our result. T -statistics reported in the table are calculated using standard errors adjusted for heteroskedasticity and deal clustering.

The results are reported in Table I.5. We find that both OLS and 2SLS regressions produce positive and significant coefficient estimates on adjusted CSR (columns (1) and (2)) and the predicted variable for adjusted CSR (columns (4) and (5)). Thus, bondholders earn higher abnormal merger announcement returns when their firms are more socially responsible. These results are consistent with the prediction of the stakeholder value maximization view.

[Insert Table I.6 Here]

We next perform multivariate regressions using the CAR (-1, 1) for the major customers of the acquiring firms as the dependent variable and report the results in Table I.6. Following Fee and Thomas (2004), we include several customer relation characteristics as control variables, such as the ratio of an acquirer's sales to the customer to the customer's cost of goods sold, a terminated customer dummy (equals one if the firm is listed as a major customer before the merger but not after the merger), dummy variables equal to one if the acquirer industry Herfindahl index, the change in acquirer industry Herfindahl index before and after the merger, and the customer industry Herfindahl index are greater than 2000, 100, and 2000, respectively, and a retail industry dummy (equals one if the two-digit SIC code is between 5200 to 5999). We also control for the bidder- and deal-specific characteristics used in the Table I.6 regressions. When the acquiring firm has multiple major customers, the events we consider are perfectly clustered among these customers; in other words, since we use the market-model approach to estimate abnormal returns for major customers around merger announcements of their suppliers, the event windows and estimation periods to compute customer abnormal returns overlap perfectly. As a result, it is likely that the t -statistics in the analyses of customer abnormal returns are biased upwards and the assumption of cross-sectional independence in the OLS regression is

not justified. To avoid this problem, we adjust the standard error to estimate t -statistics for deal clustering.

We find that the coefficient estimates on adjusted CSR are positive and significant in the OLS regressions (columns (1) and (2)). Correcting for endogeneity bias does not change the inference from the OLS regressions: The coefficient estimates on the predicted variable for adjusted CSR is still positive and significant at the 5% level (columns (4) and (6)). These results suggest that major customers benefit more from mergers made by socially responsible acquirers than from those made by socially irresponsible acquirers, providing further support for the stakeholder value maximization view.

[Insert Table I.7 Here]

Using the Compustat Segment Level Customer Database, we can also trace acquirers' suppliers. We conduct similar regressions as in Table I.6, but using the CAR (-1, 1) for the suppliers of the acquiring firm as the dependent variable and replacing customer relation characteristics with supplier relation characteristics as control variables.

The results are reported in Table I.7. We find that in columns (1) and (2), which use the OLS method to estimate the regressions, the coefficient estimates on adjusted CSR are positive and significant at the 10% and 5% levels, respectively. Using 2SLS regression yields similar results: The coefficient estimates on the predicted variable for adjusted CSR in columns (4) and (6) are positive and significant at the 10% level. Thus, the test of abnormal stock returns for the suppliers of acquiring firms also provides results that are consistent with the stakeholder value maximization view.

Finally, we examine the cross-sectional variation in the CARs of target shareholders in stock-swap mergers. We regress target CARs (-1, 1) on adjusted CSR (predicted variable for adjusted CSR), a stock deal dummy, their interaction term, target characteristics (size, Tobin's q , leverage, free cash flow, and previous market-adjusted return), and the other control variables used in the Table I.4 regressions.

[Insert Table I.8 Here]

The results are reported in Table I.8. We find that in column (2), which uses the OLS approach to estimate the regressions, the coefficient estimate on adjusted CSR is negative and significant (-3.75) while the coefficient estimate on the interaction term between adjusted CSR and a stock deal dummy is positive and significant (6.44). Thus, relative to non-stock deals, target shareholders who will potentially become acquiring firm shareholders after a merger realize higher returns when the acquiring firms are more socially responsible. This result is consistent with the stakeholder value maximization view. However, neither the coefficient on the predicted variable for adjusted CSR nor the coefficient on its interaction with a stock deal dummy is significant in the 2SLS regressions (columns (4) and (6)).¹⁵

Overall, the regression results reported in Tables I.4 through I.8 confirm the univariate results reported in Table I.3 and provide further evidence that active engagement in CSR activities has a positive impact on both shareholder and other relevant stakeholder values, supporting the stakeholder value maximization view.

¹⁵ In untabulated tests, we examine whether the effect of the acquirer CSR on the value-weighted portfolio CAR (-1, 1) of the acquirer and the target is different between mergers by high CSR acquirers and low CSR acquirers using the same explanatory variables as in the Table I.8 regressions. We find that the coefficient estimates on the interaction term between adjusted CSR and a stock deal dummy are not significant in either the OLS or the 2SLS regressions. However, the coefficient estimates on adjusted CSR (predicted variable for adjusted CSR) are positive and significant at the 10% level in the OLS (2SLS) regressions without including the interaction term, suggesting that mergers by high CSR acquirers create higher portfolio gains for the acquirer and the target than those by low CSR acquirers, weakly supporting the stakeholder value maximization view.

5. Long-Term Post-merger Performance and Stakeholder Behavior

As a further test of the stakeholder value maximization and management entrenchment views, in this section we examine long-term post-merger performance and the extent to which stakeholders support proposed merger deals.

5.1. Long-term Post-merger Performance

Our first test of long-term post-merger performance is to compare the post-merger long-term stock returns of high CSR bidders with those of low CSR bidders using a calendar-time portfolio regression approach (Fama (1998), Ikenberry, Lakonishok, and Vermaelen (2000)).

Specifically, following Moeller, Schlingemann, and Stulz (2004), we form equally weighted portfolios of firms that have just completed mergers for each calendar month from 1992 to 2007. We keep these firms in the portfolio for a holding period of 12 months, 24 months, and 36 months counted relative to the announcement month. We rebalance the portfolio monthly by dropping all firms that have reached the end of their holding period and adding all firms that have just announced a merger. The time series of portfolio excess returns is then regressed on the four factors from the Fama and French (1992, 1993) and Carhart (1997) models,

$$R_{p,t} - R_{f,t} = \alpha + \beta_1(R_{m,t} - R_{f,t}) + \beta_2SMB_t + \beta_3HML_t + \beta_4UMD_t + \varepsilon_t, \quad (1)$$

where $R_{p,t} - R_{f,t}$ is the excess return of the bidder portfolio, $(R_{m,t} - R_{f,t})$ is the market excess return, SMB_t is the size factor, HML_t is the book-to-market factor, and UMD_t is the momentum factor. The intercept α measures the average monthly abnormal return for the sample.

[Insert Table I.9 Here]

Panel A of Table I.9 shows the long-term post-merger abnormal stock returns of the equally weighted portfolios of all bidders in the sample. The value of α is an insignificant 0.002 across all three holding periods.

To examine whether the long-term post-merger abnormal stock returns are different between high and low CSR bidders, we divide the bidders into two subgroups according to the sample median of their adjusted CSR immediately prior to the mergers and form the portfolios separately for these two groups. We then reestimate equation (1) separately for these two portfolios.

Panels B and C of Table I.9 show the results for low and high CSR bidder portfolios, respectively. We find that the portfolio of low CSR bidders does not exhibit significant abnormal returns across for any of the three holding periods considered. In contrast, the portfolio of high CSR bidders earns significantly positive abnormal returns for all three holding periods.

To measure the economic significance of the difference in abnormal stock returns, we form a zero-cost portfolio that buys bidders with high CSR and sells bidders with low CSR and examine whether this hedge portfolio strategy generates significantly positive returns.

Panel D of Table I.9 shows the results for the excess returns on the zero-cost portfolio. The values of α are 0.004 for the hedge portfolio with a holding period of one year and 0.003 (0.003) for the hedge portfolio with a holding period of two (three) years, both of which are significant at the 10% level. These numbers suggest that investors are able to earn as high as 4.8% and 3.6% annual abnormal returns from their hedge portfolios with a holding period of one and

two (three) years, respectively.¹⁶ These results are consistent with the stakeholder value maximization view.

[Insert Table I.10 Here]

The reliability of using the calendar-time portfolio approach in nonrandom samples has been questioned in prior literature (Lyon, Barber, and Tsai (1999)); therefore, as an alternative test of long-term post-merger performance, we investigate the impact of a bidder's CSR score on the long-term operating performance of a merged firm and its costs of capital using the approach of Healy, Palepu, and Ruback (1992). Specifically, we first divide our sample bidders into two subgroups according to the sample median of their adjusted CSR. For these two subgroups of high and low CSR bidders, we then separately regress the difference in post-merger operating cash flow between the merged firm and the control firm on the difference in pre-merger operating cash flow between the merged firm and the control firm. The intercept of the regression measures the abnormal change in operating cash flow between the pre-merger post-merger periods. A similar regression is estimated to examine the impact of a bidder's CSR score on the merged firm's costs of equity and debt. The control firms are selected by matching each bidder in our sample with a non-bidder that is in Compustat and KLD STATS using the nearest-neighborhood matching approach. The variables we use to match firms are adjusted CSR, firm size, leverage, market-to-book ratio, industry dummies (two-digit SIC code), and year dummies. The pre-merger and post-merger periods are the two years before and the two years after the merger. The merged firm's pre-merger operating cash flow is the total asset weighted average

¹⁶ We also employ Chow's test to examine whether the differences in α between the regressions in Panels B and C of Table I.9 are statistically significant. We find that the differences are significant at the 10% level or better.

operating cash flow of the bidder and the target before the merger.¹⁷ Similarly, the merged firm's pre-merger cost of equity (cost of debt) is the total asset weighted average implied cost of equity (cost of debt) of the bidder and the target before the merger. Implied cost of equity is the average of the estimates from the models employed by financial accounting literature, Claus and Thomas (2001), Gebhardt, Lee, and Swaminathan (2001), Gode and Mohanram (2003), and Easton (2004). Following Francis et al. (2005), the cost of debt is given by the ratio of pre-tax interest to total debt. In unreported tests, we use the beta estimated from the CAPM as the measure of cost of equity and the bond yield from the TRACE database as the measure of cost of debt, and obtain the similar results as those using the implied cost of equity and the implied cost of debt, respectively.¹⁸

Panel A of Table I.10 shows the post-merger changes in operating cash flow of the merged firms. The constant of the regression in the high CSR bidder subsample is positive but not significant, while the constant of the regression in the low CSR bidder subsample is negative and significant at the 1% level. These results indicate that unlike combined firms with high CSR bidders that experience no significant changes in post-merger operating performance, combined firms with low CSR bidders experience deterioration in their post-merger operating performance.

Panels B and C of Table I.10 show the abnormal post-merger change in a merged firm's cost of equity and cost of debt, respectively. We find that in both panels, the constant of the regression in the high CSR bidder subsample is negative and significant at the 5% level, while the constant of the regression in the low CSR bidder subsample is insignificant. These results indicate that the costs of capital for merged firms with high CSR bidders decrease after the

¹⁷ (Bidder's total assets $\times$ bidder's operating cash flow + target's total assets $\times$ target's operating cash flow) / (bidder's total assets + target's total assets).

¹⁸ Data on bond yields are available in the TRACE database only for 26 deals.

merger, while those for merged firms with low CSR bidders do not, supporting the stakeholder value maximization view.

Finally, using the same approach as that for the tests of post-merger changes in operating performance and costs of capital, we investigate whether employees of merged firms with different CSR experience different post-merger job security. Specifically, for the subgroups of high and low CSR acquirers, we separately regress the difference in post-merger number of employees between the merged firms and the control firms on the difference in pre-merger number of employees between the merged firms and the control firms.

Panel D of Table I.10 presents the results. We find that the constant of the regression in the low CSR bidder subsample is negative and significant at the 10% level, while the constant of the regression in the high CSR bidder subsample is not significant. These results suggest that low CSR bidders tend to lay off more (or hire fewer) employees after mergers, while high CSR bidders do not engage in such employment restructuring activities.

5.2. *Stakeholder Behavior*

In this section, we examine whether mergers initiated by high CSR firms receive more support from their stakeholders and thus are more likely to be completed and in less time. As a first test, we examine whether mergers by high CSR bidders are less likely to be challenged by antitrust authorities. If a proposed merger is expected to substantially reduce competition in the industry, the Department of Justice or FTC could challenge the deal by bringing suit or threatening to block the deal. In this case, firms would have to restructure the deal or agree to meet regulatory requirements. Since socially responsible firms tend to have few incentives to hurt customers by reducing competition, the stakeholder value maximization view predicts that

mergers initiated by these acquirers are likely to face less opposition from antitrust authorities than those by socially irresponsible firms. To test for the difference in the likelihood of high versus low CSR firms' mergers being challenged by antitrust authorities, we first identify challenged deals. Following Fee and Thomas (2004), we define a deal as challenged if the Justice Department or FTC brought suit or threatened to sue to block the deal. We obtain information on challenged mergers from "Annual Report to Congress Pursuant to Subsection (j) of Section 7A of the Clayton Act Hart-Scott-Rodino Antitrust Improvements Act of 1976" for each fiscal year from 1992 to 2007 (15th to 30th report). We find that out of the 1,575 merger deals in our sample, 43 are challenged by the Justice Department or FTC. We then estimate probit and two-stage probit least squares (2SPLS) regressions in which the dependent variable is a dummy variable that equals one if the merger is challenged by antitrust authorities and zero otherwise.

[Insert Table I.11 Here]

Table I.11 reports the results. We use the same explanatory variables as used in Table I.4. Columns (1) and (2) show the estimation results from the probit regressions. The coefficient estimate on adjusted CSR is negative and significant at the 5% level, suggesting that the probability of merger deals being challenged by antitrust authorities is lower for socially responsible firms.

The estimation results from 2SPLS regressions are presented in columns (3) through (6). In the first-stage regressions, we regress adjusted CSR on two instrumental variables (i.e., industry social responsibility and religion rank), bidder-specific characteristics, and industry and year fixed effects (columns (3) and (5)). In the second-stage regressions, we regress the

challenge dummy on the predicted CSR obtained from the first-stage regressions, bidder- and deal-specific characteristics, and industry and year fixed effects (columns (4) and (6)). We calculate t -statistics based on 100-time bootstrapping to correct biased t -statistics. We find that the coefficient estimates on the predicted CSR are negative and significant at the 1% level.

Overall, these results suggest that socially responsible acquirers face fewer challenges from antitrust authorities than socially irresponsible acquirers, possibly due to their weaker incentives to exploit customers through increased market power, which is in line with the stakeholder value maximization view.

[Insert Table I.12 Here]

The stakeholder value maximization view also predicts that mergers proposed by socially responsible bidders stand more chance of being successfully completed, and of being completed in less time, since these acquirers are less likely to breach implicit contracts with their stakeholders. Table I.12 provides empirical evidence in support of this prediction.

Columns (1) and (2) show the results of a probit regression in which the dependent variable is a dummy variable that equals one if the deal is complete and zero otherwise. Both regressions show that the probability of deal completion increases with a bidder's adjusted CSR. The results do not change when we estimate the models using 2SPLS regressions (columns (4) and (6)). These results support the stakeholder value maximization view.

The last two columns of Table I.12 show the regression results from a proportional hazard Cox model. The dependent variable is the number of days spent to complete the deal from the announcement date to the effective date. In both regressions, the hazard ratio for the adjusted CSR measure is significantly greater than one, suggesting that mergers by high CSR acquirers

take less time to complete than those by low CSR bidders. This evidence is again consistent with the prediction of the stakeholder value maximization view.

6. Robustness Tests

To further substantiate the role of the stakeholder value maximization view in explaining the positive relationship between CSR and merger performance, in this section we conduct several sensitivity tests.

6.1. Alternative CSR Measure: Analysis Using U. S. Firms in the FTSE4Good Index

To further examine whether a firm's social performance affects its merger announcement returns, we use U.S. firms in the FTSE4Good Index as an alternative sample of socially responsible firms.¹⁹ The FTSE4Good series measures the performance of firms that meet social and environmental criteria in five categories, which include environmental sustainability, human rights, countering bribery, supply chain labor standards, and climate change. The FTSE4Good Index consists of 600 to 700 socially responsible firms around the world from 2002 to 2005, among which approximately 200 are U.S. firms. To the extent that the FTSE4Good Index, like the KLD CSR rating, measures a firm's social performance, we expect shareholders of U. S. firms in the list of FTSE4Good Index to realize high merger announcement returns.

After merging U.S. firms in the list of FTSE4Good Index with firms in the SDC U.S. Mergers and Acquisitions Database, Compustat, and CRSP, our final sample comprises 262 mergers made by U.S. FTSE4Good firms.

¹⁹ We thank FTSE for providing constituent data from the FTSE4Good Index from 2002 to 2005.

To examine whether FTSE4Good U. S. firms realize higher merger announcement returns, we use a matching-firm approach. To select matching firms, we use a propensity score matching approach as in Lee and Wahal (2004) and Bae, Kang, and Wang (2011). We choose matching firms from the merged database of SDC and Compustat during the sample period. Based on a set of firm characteristics, using a probit regression we first predict whether the merger deal is by a FTSE4Good firm (Rosenbaum and Rubin (1983), Heckman, Ichimura, and Todd (1997, 1998)). Firm characteristics we consider include firm size, Tobin's q , leverage, free cash flow, previous market-adjusted return, relative deal size, industry M&A, hostile dummy, high tech dummy, public target dummy, private target dummy, diversifying acquisition dummy, stock deal dummy, all-cash deal dummy, industry dummies (two-digit SIC code), and year dummies. We then use these firm characteristics to calculate a propensity score. To find optimal matches, we separately use three different matching techniques: nearest neighborhood, Gaussian kernel, and local linear regression.

[Insert Table I.13 Here]

Panel A of Table I.13 shows the differences in CAR (-1, 1) and CAR (-2, 2) between FTSE4Good firms and matching firms. We find that the differences in CARs between these two groups of firms are positive and significant at the 10% level or better across all three matching techniques.

Panel B shows the results from regressing the CAR (-1, 1) on the FTSE merger dummy (equals one if the merger is made by a FTSE4Good firm and zero otherwise) and the control variables used in Table I.4 for a sample of all completed mergers between 2003 and 2006. We find that the coefficient on the FTSE merger dummy variable is 0.01 in columns (1) and (2), both of which are statistically significant, suggesting that the announcement return is approximately 1%

higher for mergers by FTSE4Good U. S. firms than for mergers by non-FTSE4Good U. S. firms. Because FTSE4Good U. S. firms are determined independently from KLD firms, the results using FTSE4Good U. S. firms lend additional support to the stakeholder value maximization view.

6.2. *Alternative Explanations*

To the extent that the 2SLS regressions cannot completely resolve the endogeneity bias, we perform several additional untabulated tests to rule out alternative explanations for our results. First, using a sample of 106 acquirers in foreign takeovers, Aktas, Bodt, and Cousin (2011) show that acquirer abnormal returns are positively associated with targets' social and environmental performance. This result suggests that a potential alternative explanation for the positive relation between bidder CSR and bidder stock CAR is that high CSR bidders acquire high CSR targets and thus the bidder social performance measure used in our previous analyses simply captures target social performance effects. To investigate this alternative explanation, in untabulated tests we reestimate regressions (1) and (2) of Table I.4 for a small sample of 236 mergers in which target CSR is available by including both bidder adjusted CSR and target adjusted CSR as key explanatory variables. We find that while the coefficient estimate on bidder adjusted CSR is still positive and significant, the coefficient estimate on target adjusted CSR is negative and significant. As an additional test, we regress the bidder stock CAR (-1, 1) on the difference between bidder adjusted CSR and target adjusted CSR. We find that this difference is positively, significantly related to bidder stock CAR (-1, 1) at the 5% level. Thus, the positive relation between bidder CSR and abnormal announcement returns is more pronounced when bidder CSR is higher than target CSR, possibly due to the fact that the bidder may be more likely to improve

on its relationship with target stakeholders in this case. Overall, these results suggest that our main finding on the positive relation between bidder CSR and bidder stock CAR is not driven by high CSR targets, but rather by high CSR acquirers.

Second, it is also possible that a bidder's CSR captures its ability to identify undervalued targets. To address this possibility, we examine whether targets of high CSR bidders are more likely to be "value" firms (i.e., firms with high book-to-market) and whether the portfolio returns of targets acquired by high CSR firms load positively on the HML factor (Brav et al. (2008)). We find that there is no significant difference in a target's book-to-market ratio between high and low CSR acquirer groups and that the loading on the HML factor for the portfolio of targets acquired by high CSR firms is not significant. Overall, these results suggest that our main findings are not likely to be driven by stock-picking ability of high CSR bidders.

Third, a firm's CSR may be a proxy for advertising expense. For example, high CSR firms may spend more resources on advertising activities to increase the visibility of their brand names and in turn sell more products. Grullon, Kanatas, and Weston (2004) show that firms with greater advertising expenditures have a larger investor base and better stock liquidity, which results in lower costs of capital, suggesting that high CSR bidders are able to improve shareholder value not through stakeholder cooperation, but rather through their high visibility. To rule out this alternative explanation, we include the ratio of advertising expenses to sales in bidder stock CAR (-1, 1) regressions. The coefficient on adjusted bidder CSR remains significantly positive.

Fourth, our result may simply reflect the effect of corporate governance components/agency cost of CSR measures on shareholder wealth. To test this view, we create a

new CSR index using only two components in the KLD social ratings database that are least likely to be influenced by a firm's corporate governance/agency cost, namely, environment and product quality and safety, and re-estimate the regressions in Table I.4 using this new CSR measure. We find that the coefficient estimates on the new CSR measure remain significantly positive and their magnitudes are almost two times larger than those reported in Table I.4. As an alternative test, we exclude corporate governance component when measuring CSR and re-estimate the regressions in Table I.4. We obtain qualitatively similar results. In addition, we add the interaction of adjusted CSR with G-index in regressions in Table I.4 and the coefficient estimate on the interaction does not significant. These tests suggest that our results are not driven by the corporate governance/agency cost components of CSR measures.

Fifth, since Table I.2 shows that high CSR firms tend to be in high tech industries, if CSR is proxy for certain firm characteristics that capture well-performing firms in high tech industries, our results could be biased. To exclude this alternative explanation, we drop those deals conducted by firms in high tech industries and redo the tests. The results do not change.

Finally, if merger opportunities are predictable and managers are aware of the positive effect of CSR on merger performance, then it is possible that firms will choose to optimally adjust their social activities before merger announcements. It is also possible that firms expecting their merger deals to be challenged by the antitrust authorities choose to adjust their social activities prior to the mergers to better comply with the potential antitrust issues that they might face in the future. To mitigate these concerns, we replace adjusted CSR in Table I.4 and I.10 with three-year (four-year) lagged bidder adjusted CSR and re-estimate the regressions. We find that the coefficient estimates on three-year (four-year) lagged bidder adjusted CSR in Tables I.4 and I.10 are still significantly positive and negative, respectively. These results provide little

support for the social-activity adjustment explanation but yield additional support for the stakeholder value maximization view.

6.3. *Self-Selection Bias*

Table I.2 shows that a firm's decision to invest in CSR activities has its own determinants, raising the possibility that firms with certain characteristics choose to become high CSR firms. It is well known that if self-selecting firms are not random subsets of the population, the usual OLS estimators will not be consistent estimators (Heckman (1979)). To correct for potential self-selection bias, we follow the two-step procedure outlined in Heckman (1979). First, using a probit model in which the dependent variable (C_i) is equal to one if the firm's CSR is above the sample median and zero otherwise, we estimate the likelihood of a firm being in a high CSR group. Specifically, we estimate

$$C_{it} = Z_{it}\alpha_1 + IV_{it}\alpha_2 + u_{it}, \quad (2)$$

where Z_{it} is a vector of the i^{th} acquirer's publicly observable characteristics, IV_{it} is the instrumental variable (i.e., industry social responsibility), and u_{it} is a disturbance term that includes the acquirer's publicly unobservable characteristics.

Next, in a second-stage OLS regression of the CARs for shareholders (bondholders, major customers, and suppliers) of acquiring firms, we estimate

$$CAR_{it} = X_{it}\beta_1 + C_{it}\beta_2 + \lambda\delta + v_{it}, \quad (3)$$

where CAR_{it} is the CAR (-1, 1) for shareholders (bondholders, major customers, and suppliers) of acquiring firms, X_{it} represents the set of publicly observable characteristics of the i^{th}

acquirer that affect the CAR (-1, 1), C_{it} is a dummy variable that takes the value of one if the i^{th} acquirer is a high CSR firm and zero otherwise, λ is the inverse Mills ratio that equals to

$$\begin{aligned} & \phi(-Z_{it}\alpha_1 - IV_{it}\alpha_2) / \Phi(-Z_{it}\alpha_1 - IV_{it}\alpha_2) \text{ if } C_{it} = 1; \\ & -\phi(-Z_{it}\alpha_1 - IV_{it}\alpha_2) / (1 - \Phi(-Z_{it}\alpha_1 - IV_{it}\alpha_2)) \text{ if } C_{it} = 0, \end{aligned}$$

which corrects for self-selection bias, and ν_{it} is the disturbance term.²⁰ The coefficient β_2 is the key parameter of interest: it measures the pure effect due to social performance. If β_2 is positive and significant, higher CSR is associated with higher announcement returns.²¹

To meet the exclusion restrictions of Heckman's model, in the first-stage probit regression we include an instrumental variable, industry social responsibility, as well as the control variables (Z_{it}), which are firm characteristics used in regression (1) of Table I.4 (I.5, I.6, and I.7). In the second-stage OLS regression, we use all control variables (X_i) used in the same regression as the explanatory variables.²² To the extent that peer firms' CSR activities influence those of other firms in the same industry, we expect the industry social responsibility variable to be positively correlated with an individual firm's social responsibility measure, which is unlikely to affect merger performance.

We first use Heckman's two-step procedure to estimate the CAR (-1, 1) for shareholders of acquiring firms. In untabulated tests, we find that in the first-stage probit regression, the

²⁰ The Heckman model with the dummy variable is called a treatment effect model.

²¹ Since the OLS regression of CARs for target shareholders in stock-swap mergers includes the interaction between the firm's CSR and a stock deal dummy, the Heckman model cannot be estimated for this regression. Similarly, we cannot estimate the probit regressions of the likelihood of a merger being challenged by antitrust authorities and the likelihood of deal completion using the Heckman model since the Heckman model requires that the dependent variable be a continuous variable.

²² Using all control variables (X_i) as the explanatory variables in the first-stage regression does not change the results discussed below.

coefficient estimate on IV is 1.55, which is significant at the 1% level. We also find that high CSR firms are more likely to have high Tobin's q and high free cash flow. In the second-stage OLS regression of CAR (-1, 1), we find that the δ coefficient on the inverse Mills ratio term (λ) is -4.39, statistically significant at the 5% level, suggesting that the OLS regression is subject to sample selection bias. However, we find that the β_2 coefficient on the high CSR dummy (Cit) is 7.78, significant at the 5% level, indicating that after controlling for self-selection bias, the pure effect of social performance on shareholder wealth is positive.

We next use Heckman's two-stage procedure to estimate the CAR (-1, 1) for bondholders of acquiring firms. The δ coefficient is -0.04, which is statistically insignificant. Consistent with the result in Table I.5, we find that the coefficient β_2 on the CSR dummy is positive and significant at the 10% level.

When we use the Heckman test to estimate the CAR (-1, 1) for major customers of acquiring firms, we again find an insignificant δ (-1.67). The β_2 coefficient on the CSR dummy, however, is still positive (3.32) and significant at the 5% level.

Finally, we examine the relation between returns for suppliers of acquiring firms and social performance using a Heckman treatment effect model. Consistent with the previous two tests, we do not find any evidence of sample selection bias: the δ coefficient (-1.01) is insignificant. The coefficient on the CSR dummy, in contrast, is positive (2.24) and significant at the 10% level.

Overall, our results from the Heckman two-stage regressions are generally consistent

with those of previous tables, suggesting that self-selection bias is unlikely to affect our results.²³

6.4. Likelihood of High CSR Firms Becoming Targets

If high CSR firms suffer greater agency problems, they are more likely to become targets of other firms. Thus, the management entrenchment view predicts that high CSR firms are more likely to become targets of other firms. In untabulated tests, we find that the coefficient on target adjusted CSR is negative and significant in probit regressions in which the dependent variable is a dummy variable that equals one if the firm is acquired by another firm and zero otherwise and the independent variables are those used in Table I.4, suggesting that high CSR firms are less likely to become targets. This result is not consistent with the management entrenchment view.

6.5. The Relevance of Social Performance in Different Dimensions

As shown in Appendix II, there are seven different dimensions on which KLD evaluates firms' social performance. It is interesting to examine the social performance of which category is most influential and the effect of which category is negligible. We regress bidder stock CARs (-1, 1) on adjusted CSR of individual dimensions and other control variables in Table I.4. We find that the social performance in environment has a positive coefficient, which is significant at 5% and 10% level in OLS and 2SLS regression, respectively. In addition, better social performance in employee relations is associated with higher bidder's stock CAR and the

²³ Although it is very unlikely, it is possible that when KLD evaluates firms' social performance, it covers only firms that are likely to make good investments in the future. In this case, the positive relation between the merger performance and adjusted CSR we document in this paper mainly captures the selection bias of KLD, not necessarily the stakeholder wealth maximization aspect of CSR. However, since firms covered in the KLD social ratings database are exactly those included in Domini 400 Social SM, S&P 500, and Russell 3000 indices and these firms' inclusion in the stock indices is mainly based on the size of their market capitalization, the selection bias of KLD is not likely to be the driving factor that determines our results.

coefficient is significant at 10% level in OLS regression. Finally, the social performances in human rights and product quality and safety have significantly positive coefficients in 2SLS regressions (5% level). In sum, the social performances in environment, employee relations, human rights and product quality and safety are more relevant than those in community, corporate governance, and diversity.

6.6. *Discussion*

One concern with CSR investment is that if the CSR expenditure is truly beneficial, why those low-CSR firms don't enhance their CSR level. This could be that the agency problems of those firms prevent them from improving their social performance. It could also be determined by the structure of the CEO compensation. The benefit of investing in CSR may be capitalized in the long run, while the cost of investing in CSR is immediate. If the compensation of CEO is based on firms' short-term performance, CEO may not have enough incentive to invest in CSR. For example, Mahoney and Thorne (2006) document that salary component of the CEO total compensation is significantly and negatively correlated with firms' social performance, while stock based components of the CEO total compensation are significantly and positively related with firms' social performance.

Another interesting test is to examine whether CSR still benefits both shareholders and other relevant stakeholders in a setting that is more likely to have the conflict of interests among shareholders and other relevant stakeholders. We split the full sample into low and high CSR subsamples and into poor and good previous performance subsamples based on sample medians of adjusted CSR and previous market-adjusted return, respectively, and only keep those deals having low CSR and good previous performance and those deals having high CSR and poor

previous performance. I redo the tests of announcement effect of shareholders and other relevant stakeholders with the new sample and find that the results are largely unchanged.

7. Summary and Conclusion

In this paper, we examine two competing views about the effect of a firm's social activities on its performance, namely, the stakeholder value maximization view and the management entrenchment view. The stakeholder value maximization view predicts that engagement in CSR activities has a positive impact on shareholder value because taking other relevant stakeholders' interests into account makes these stakeholders more willing to support a firm's operations, which results in an increase in shareholder wealth. If high CSR firms offer more valuable implicit contracts to their stakeholders, then these stakeholders may be willing to accept less favorable explicit contracts or even contribute more resources and effort to the firms. Thus, the stakeholder value maximization view predicts that high CSR firms undertake mergers that benefit both their shareholders and other stakeholders. On the other hand, the management entrenchment view suggests that managers misuse corporate resources earmarked for CSR to advance their careers, develop entrenchment strategies, or promote other private benefits at the expense of shareholders. Thus, the management entrenchment view predicts that the managers of high CSR firms undertake acquisitions that benefit themselves or other stakeholders at the expenses of shareholders.

After correcting for endogeneity bias, we find that shareholders, bondholders, suppliers, and major customers of high CSR acquirers as well as target shareholders of these acquirers in stock-swap mergers realize higher merger announcement returns than those of low CSR

acquirers. High CSR acquirers also realize higher announcement returns of the value-weighted portfolio of the acquirer and the target.

Moreover, after mergers, socially responsible acquirers experience larger increases in stock return and operating performance, greater reductions in the costs of debt and equity capital, and smaller reductions in number of employees compared to socially irresponsible acquirers. We also find that mergers by high CSR acquirers take less time to complete, are less likely to fail, and are less likely to be challenged by antitrust authorities than those by low CSR acquirers.

Finally, the positive relation between a firm's social performance and its merger announcement stock returns is also evident when we capture its social performance using an indicator for whether it is included in the list of FTSE4Good, and is robust to a variety of model specifications. Overall, these results support the stakeholder value maximization view.

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Table I. 1 Sample Distribution by Year and Industry

The sample consists of 1,575 completed U.S. mergers between 1992 and 2007. We obtain the initial sample of mergers from Thomson Financial's Security Data Corporation (SDC) Platinum database. Our final sample includes all completed mergers subject to the following selection criteria: (1) the deal value disclosed in SDC is greater than \$1 million, (2) the acquirer controls less than 50% of the target's shares prior to the announcement and owns 100% of the target's shares after the transaction, (3) the acquirer is publicly traded and has stock return and financial data available from Center for Research in Security Prices (CRSP) and Compustat, respectively, (4) the acquirer is covered by KLD database, and (5) the acquirer is not in the financial and utilities industries.

Bidder Industry (First two digits of the SIC code)	Agriculture, Forestry, & Fisheries (01-09)	Mineral Industries & Construction (10-17)	Manufacturing (20-39)	Transportation & Communications (40-48)	Wholesale Trade & Retail Trade (50-59)	Service Industries (70-89)	Total
1992	0	1	17	5	5	4	32
1993	0	1	19	4	2	6	32
1994	0	2	30	7	3	10	52
1995	0	1	35	5	2	7	50
1996	0	3	46	2	6	21	78
1997	0	3	46	9	4	6	68
1998	0	3	53	6	10	7	79
1999	0	3	75	20	8	16	122
2000	0	3	74	9	4	7	97
2001	0	7	41	2	3	15	68
2002	0	5	43	2	4	30	84
2003	0	2	40	1	5	29	77
2004	0	8	99	4	5	56	172
2005	1	10	99	13	19	75	217
2006	1	12	85	16	8	48	170
2007	1	10	92	14	11	49	177
Total	3	74	894	119	99	386	1,575

Table I. 2 Summary Statistics

The sample consists of 1,575 completed U.S. mergers between 1992 and 2007. We obtain the initial sample of mergers from Thomson Financial's Security Data Corporation (SDC) Platinum database. Our final sample includes all completed mergers subject to the following selection criteria: (1) the deal value disclosed in SDC is greater than \$1 million, (2) the acquirer controls less than 50% of the target's shares prior to the announcement and owns 100% of the target's shares after the transaction, (3) the acquirer is publicly traded and has stock return and financial data available from Center for Research in Security Prices (CRSP) and Compustat, respectively, (4) the acquirer is covered by the KLD Research & Analytics, Inc. (KLD) STATS database, and (5) the acquirer is not in the financial and utilities industries. Firms are divided into high and low adjusted corporate social responsibility (CSR) firms according to the sample median of adjusted CSR. All variables are defined in Appendix I. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Variable	Full Sample (N=1,575)		Subsample of High Adjusted CSR: A (N=793)		Subsample of Low Adjusted CSR: B (N=782)		Test of Difference (A-B)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Adjusted CSR	-0.115	-0.083	0.262	0.143	-0.496	-0.408	0.758***	0.551***
Raw CSR	0.256	0.000	2.030	1.000	-1.543	-1.000	3.574***	2.000***
G-index	9.253	9.000	9.020	9.000	9.511	9.000	-0.491***	0.000***
Total asset (in million dollars)	9800.060	2642.620	9895.380	2770.030	9703.400	2556.090	191.980	213.940
Tobin's q	2.907	2.065	3.314	2.276	2.495	1.906	0.819***	0.369***
Leverage	0.108	0.079	0.095	0.065	0.122	0.100	-0.027***	-0.035***
Free cash flow	0.056	0.059	0.067	0.064	0.045	0.053	0.022***	0.012***
Previous market-adjusted return	0.103	0.036	0.114	0.037	0.091	0.035	0.023	0.002
Relative deal size	0.202	0.055	0.162	0.043	0.242	0.074	-0.081***	-0.031***
Industry M&A	0.041	0.030	0.039	0.030	0.044	0.030	-0.005**	0.000
Hostile (dummy)	0.011	0.000	0.009	0.000	0.014	0.000	-0.005	0.000
High tech (dummy)	0.305	0.000	0.372	0.000	0.238	0.000	0.134***	0.000***
Diversifying acquisition (dummy)	0.667	1.000	0.702	1.000	0.630	1.000	0.072***	0.000***
Public target (dummy)	0.532	1.000	0.502	1.000	0.563	1.000	-0.061**	0.000**
Private target (dummy)	0.371	0.000	0.392	0.000	0.350	0.000	0.042*	0.000*
Subsidiary target (dummy)	0.091	0.000	0.101	0.000	0.082	0.000	0.019	0.000*
Stock deal (dummy)	0.444	0.000	0.440	0.000	0.449	0.000	-0.009	0.000
All-cash deal (dummy)	0.361	0.000	0.353	0.000	0.368	0.000	-0.015	0.000

Table I. 3 Cumulative Abnormal Returns (CARs) for Stakeholders of Acquiring Firms around the Merger Announcement Date

In Panel A, the sample consists of completed U.S. mergers between 1992 and 2007. We obtain the initial sample of mergers from Thomson Financial's Security Data Corporation (SDC) Platinum database. Our final sample includes all completed mergers subject to the following selection criteria: (1) the deal value disclosed in SDC is greater than \$1 million, (2) the acquirer controls less than 50% of the target's shares prior to the announcement and owns 100% of the target's shares after the transaction, (3) the acquirer is publicly traded and has stock return and financial data available from Center for Research in Security Prices (CRSP) and Compustat, respectively, (4) the acquirer is covered by the KLD Research & Analytics, Inc. (KLD) STATS database, and (5) the acquirer is not in the financial and utilities industries. In Panel B, the sample consists of completed mergers in which acquirers have bonds outstanding and their bond information is available in both the TRACE and Mergent FISD databases. In Panels C and D, the sample consists of completed mergers in which acquirers have large public customers and suppliers, respectively. Information on large public customers and suppliers comes from the Compustat Segment Customer database. Large customers are those that comprise at least 10% of the acquirer's sales and suppliers are those whose information on sales to the acquirer is available in Compustat Segment Customer database. In Panels E and F, the sample consists of completed mergers in which both acquirers and targets are publicly traded and have stock return and financial data available from CRSP and Compustat, respectively. Firms are divided into high and low adjusted corporate social responsibility (CSR) firms according to the sample median of adjusted CSR. In Panels A, C, D, E, and F, the abnormal stock return is calculated using the market model. The market model parameters are estimated using 200 trading days of return data ending 11 days before the acquisition announcement. The CRSP value-weighted return is used as a proxy for the market return. The daily abnormal stock returns are cumulated to obtain the cumulative abnormal return (CAR) from day t_1 before the acquisition announcement date to day t_2 after the acquisition announcement date. When there is more than one customer (supplier) for each acquirer on the announcement date, we use the market-capitalization weighted portfolio abnormal return of all these customers (suppliers) as the customer's (supplier's) abnormal return. In Panel B, the abnormal bond return is computed as the bidder's bond return minus the value-weighted portfolio return of bonds that have the same Moody's rating as that of the bidder. In Panel F, the value-weighted portfolio abnormal stock returns are the market-capitalization weighted abnormal stock returns of the acquirer and the target. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: CARs (%) for Bidders' Shareholders								
	Full Sample (N=1,575)		Subsample of Bidders with High Adjusted CSR: A (N=793)		Subsample of Bidders with Low Adjusted CSR: B (N=782)		Test of Difference (A-B)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
CAR (-1,1)	-0.224	-0.090	0.097	0.026	-0.550**	-0.173**	0.647**	0.199
CAR (-2,2)	-0.148	0.008	0.098	0.155	-0.397*	-0.216	0.495	0.371*
CAR (-5,5)	-0.527**	-0.456**	-0.315	-0.357	-0.743***	-0.723***	0.428	0.366
Panel B: CARs (%) for Bidders' Bondholders								
	Full Sample (N=121)		Subsample of Bidders with High Adjusted CSR: A (N=63)		Subsample of Bidders with Low Adjusted CSR: B (N=58)		Test of Difference (A-B)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
CAR (-1, 1)	-0.055*	-0.057***	0.002	-0.022	-0.116***	-0.096***	0.118**	0.074*
CAR (-2, 2)	-0.029	-0.022**	0.008	-0.035	-0.069**	-0.019*	0.077*	-0.016
CAR (-5, 5)	-0.023	0.002	-0.001	0.000	-0.047*	0.004	0.046	-0.005
Panel C: CARs (%) for Bidders' Major Customers								
	Full Sample (N=390)		Subsample of Bidders with High Adjusted CSR: A (N=191)		Subsample of Bidders with Low Adjusted CSR: B (N=199)		Test of Difference (A-B)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
CAR (-1, 1)	-0.251*	-0.233*	0.053	0.044	-0.542***	-0.353***	0.595**	0.396**

CAR (-2, 2)	-0.340*	-0.212*	0.018	0.024	-0.683***	-0.403***	0.701*	0.427
CAR (-5, 5)	-0.704**	-0.279*	-0.478	0.090	-0.920**	-0.325*	0.442	0.415

Panel D: CARs (%) for Bidders' Suppliers

	Full Sample (N=642)		Subsample of Bidders with High Adjusted CSR: A (N=321)		Subsample of Bidders with Low Adjusted CSR: B (N=321)		Test of Difference (A-B)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
CAR (-1, 1)	-0.126	-0.201*	0.043	-0.013	-0.295	-0.396**	0.338	0.383*
CAR (-2, 2)	-0.198	-0.199	-0.394	-0.346	-0.003	-0.043	-0.391	-0.302
CAR (-5, 5)	-0.510	-0.189	-0.986*	-0.246	-0.033	-0.081	-0.954	-0.166

Panel E: CARs (%) for Targets' Shareholders

	Full Sample (N=791)	Stock Merger		Cash Merger: C (N=381)	Test of Difference		
		Subsample of Bidders with High Adjusted CSR: A (N=203)	Subsample of Bidders with Low Adjusted CSR: B (N=207)		(A-B)	(A-C)	(B-C)
	Median	Median	Median	Median	Median	Median	Median
CAR (-1, 1)	22.066***	19.718***	14.710***	27.518***	5.008***	-7.800***	-12.808***
CAR (-2, 2)	22.708***	20.635***	15.198***	29.509***	5.437**	-8.873***	-14.311***
CAR (-5, 5)	23.676***	20.335***	16.545***	30.276***	3.791**	-9.940***	-13.731***

Panel F: Value-Weighted Portfolio CARs (%) of the Bidder and the Target

	Full Sample (N=791)	Stock Merger		Cash Merger: C (N=381)	Test of Difference		
		Subsample of Bidders with High Adjusted CSR: A (N=203)	Subsample of Bidders with Low Adjusted CSR: B (N=207)		(A-B)	(A-C)	(B-C)
	Median	Median	Median	Median	Median	Median	Median
CAR (-1, 1)	0.932***	0.310	-0.030	1.510***	0.340	-1.200**	-1.540***
CAR (-2, 2)	0.867***	0.576	-0.049	1.500***	0.625	-0.924**	-1.549***
CAR (-5, 5)	1.009**	0.479	0.009	1.705***	0.470	-1.226**	-1.696**

Table I. 4 Regressions of Cumulative Abnormal Return (-1, 1) for the Shareholders of Acquiring Firms on Explanatory Variables

The sample consists of 1,575 completed U.S. mergers between 1992 and 2007. We obtain the initial sample of mergers from Thomson Financial's Security Data Corporation (SDC) Platinum database. Our final sample includes all completed mergers subject to the following selection criteria: (1) the deal value disclosed in SDC is greater than \$1 million, (2) the acquirer controls less than 50% of the target's shares prior to the announcement and owns 100% of the target's shares after the transaction, (3) the acquirer is publicly traded and has stock return and financial data available from Center for Research in Security Prices (CRSP) and Compustat, respectively, (4) the acquirer is covered by the KLD Research & Analytics, Inc. (KLD) STATS database, and (5) the acquirer is not in the financial and utilities industries. The dependent variable in models (1), (2), (4), and (6) is the acquirer's cumulative abnormal stock return (CAR) from one day before to one day after the merger announcement date. The abnormal stock return is calculated using the market model. The market model parameters are estimated using 200 trading days of return data ending 11 days before the acquisition announcement. The CRSP value-weighted return is used as a proxy for the market return. The dependent variable in models (3) and (5) is adjusted CSR. The first instrumental variable, industry social responsibility, is measured as the ratio of the number of firms with positive adjusted CSR in the same industry as the acquirer over the total number of firms in that industry. The second instrumental variable, religion rank, is the ranking of the state in which the bidder's headquarters is located, which ranges between one and 50. The ranking is based on the ratio of the number of religious adherents in the bidder's state over the total population in that state in 2000. A lower religion ranking indicates more religiosity. The data on religiosity come from the American Religion Data Archive. Two-digit SIC code dummies are used to control for industry fixed effects. The *t*-statistics in parentheses are based on standard errors adjusted for heteroskedasticity and acquirer clustering. All variables are defined in Appendix I. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	OLS		2SLS			
	(1)	(2)	1 st stage	2 nd stage	1 st stage	2 nd stage
			(3)	(4)	(5)	(6)
<i>CSR measure:</i>						
Adjusted CSR	0.675** (2.31)	0.623** (2.11)		5.364** (2.03)		7.757*** (2.60)
<i>Instrument variables:</i>						
Industry social responsibility			0.554*** (4.04)		0.318** (1.96)	
Religion rank			0.004*** (3.60)		0.005*** (3.40)	
<i>Bidder management quality:</i>						
Operating income growth rate		-0.009 (-1.04)				-0.010 (-1.00)
<i>Product market competition:</i>						
Competitive industry (dummy)		-0.162 (-0.27)				-0.102 (-0.15)
<i>Corporate Governance:</i>						
G-index		0.008 (0.12)				-0.025 (-0.33)
<i>Other Bidder characteristics:</i>						
Firm size	-0.180 (-1.34)	-0.134 (-0.99)	0.028*** (3.31)	-0.310** (-2.11)	0.048*** (4.28)	-0.470** (-2.30)
Tobin's <i>q</i>	0.295*** (2.78)	0.243** (2.46)	0.014** (2.10)	0.240** (2.51)	0.017** (2.22)	0.103 (0.92)
Leverage	3.698** (1.97)	1.863 (0.93)	-0.151 (-1.10)	4.431** (2.31)	-0.176 (-0.98)	3.476 (1.48)
Free cash flow	-3.059 (-1.08)	-4.202 (-1.25)	0.110 (0.74)	-3.689* (-1.78)	0.109 (0.55)	-4.244* (-1.68)
Previous market-adjusted return	0.039 (0.07)	-0.389 (-0.66)	-0.023 (-0.76)	0.132 (0.32)	-0.025 (-0.69)	-0.108 (-0.23)
<i>Deal characteristics:</i>						
Relative deal size	-0.104 (-0.23)	-2.037*** (-2.63)		-0.111 (-0.25)		-2.105*** (-3.10)

Industry M&A	1.723 (0.44)	-1.461 (-0.38)		1.721 (0.44)		-0.434 (-0.11)
Hostile (dummy)	-0.586 (-0.52)	-0.639 (-0.58)		-0.663 (-0.42)		-0.505 (-0.32)
High tech (dummy)	-0.543 (-1.08)	-0.138 (-0.32)		-0.446 (-0.93)		0.113 (0.20)
Diversifying acquisition (dummy)	0.484 (1.26)	0.365 (0.92)		0.508 (1.36)		0.202 (0.47)
Public target (dummy)	-1.411** (-2.47)	-0.769 (-1.28)		-1.492** (-2.51)		-0.715 (-1.07)
Private target (dummy)	-0.109 (-0.19)	0.047 (0.08)		-0.152 (-0.25)		0.187 (0.27)
All-cash deal (dummy)	0.307 (0.65)	0.476 (0.95)		0.307 (0.63)		0.350 (0.64)
Stock deal (dummy)	-1.019** (-2.11)	-0.729 (-1.42)		-1.008** (-2.07)		-0.866 (-1.57)
Constant	0.509 (0.22)	0.674 (0.36)	-0.868*** (-4.67)	3.823 (1.22)	-1.425*** (-4.62)	10.297** (2.38)
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
First-stage Cragg-Donald test			(<i>p-value</i> = 0.007)		(<i>p-value</i> = 0.003)	
Overidentification test				(<i>p-value</i> = 0.120)		(<i>p-value</i> = 0.419)
Sample size	1,575	1,253	1,575	1,575	1,253	1,253
Adjusted- R^2	0.105	0.117	0.150	0.044	0.158	0.031

Table I. 5 Regressions of Cumulative Abnormal Return (-1, 1) for the Bondholders of Acquiring Firms on Explanatory Variables

The sample consists of 121 U.S. acquirers with bonds outstanding between 2002 and 2007. We obtain the initial sample of mergers from Thomson Financial's Security Data Corporation (SDC) Platinum database. Our final sample includes all completed mergers subject to the following selection criteria: (1) the deal value disclosed in SDC is greater than \$1 million, (2) the acquirer controls less than 50% of the target's shares prior to the announcement and owns 100% of the target's shares after the transaction, (3) the acquirer is publicly traded and has stock return and financial data available from Center for Research in Security Prices (CRSP) and Compustat, respectively, (4) the acquirer is covered by the KLD Research & Analytics, Inc. (KLD) STATS database, (5) the acquirer is not in the financial and utilities industries, and (6) the acquirers have bonds outstanding and information on their bonds is available in both the TRACE and Mergent FISD databases. The dependent variable in models (1), (2), (4), and (5) is the acquirer's cumulative abnormal bond return (CAR) from one day before to one day after the merger announcement date. The abnormal bond return is computed as the bidder's bond return minus the value-weighted portfolio return of bonds that have the same Moody's rating as that of the bidder. The dependent variable in model (3) is adjusted CSR. The first instrumental variable, industry social responsibility, is measured as the ratio of the number of firms with positive adjusted CSR in the same industry as the acquirer over the total number of firms in that industry. The second instrumental variable, religion rank, is the ranking of the state in which the bidder's headquarters is located, which ranges between one and 50. The ranking is based on the ratio of the number of religious adherents in the bidder's state over the total population in that state in 2000. A lower religion ranking indicates more religiosity. The data on religiosity come from the American Religion Data Archive. Two-digit SIC code dummies are used to control for industry fixed effects. The *t*-statistics in parentheses are based on standard errors adjusted for heteroskedasticity and deal clustering. All variables are defined in Appendix I. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	OLS		2SLS		
	(1)	(2)	1 st stage (3)	2 nd stage (4)	(5)
<i>CSR measure:</i>					
Adjusted CSR	0.124** (2.14)	0.084* (1.93)		0.126** (2.01)	0.427** (2.36)
<i>Instrument variables:</i>					
Industry social responsibility			3.667*** (11.87)		
Religion rank			0.039** (3.29)		
<i>Bidder management quality:</i>					
Operating income growth rate		-0.164 (-1.62)			-0.011 (-0.10)
<i>Product market competition:</i>					
Competitive industry (dummy)		-0.215 (-1.56)			2.135*** (3.63)
<i>Corporate Governance:</i>					
G-index		-0.012 (-0.67)			-0.010 (-0.44)
<i>Other Bidder Characteristics:</i>					
Dummy = 1 if $Leverage_{combined} > Leverage_{acquire}$	-0.268** (-2.65)	-0.247*** (-3.00)	0.100 (0.90)	0.063 (0.73)	-0.161 (-1.03)
Dummy = 1 if $StdDev_{combined} > StdDev_{acquirer}$	-0.014 (-0.23)	-0.046 (-0.49)	0.225** (1.98)	0.037 (0.36)	-0.060 (-0.43)
Dummy = 1 if $Rating_{combined} > Rating_{acquirer}$	0.206* (1.85)	0.274** (2.26)	0.747** (3.14)	-0.505*** (-2.74)	0.001 (0.03)
Dummy = 1 if $Maturity_{combined} > Maturity_{acquirer}$	-0.119 (-0.90)	-277 (-1.15)	-0.715*** (-4.01)	0.573*** (2.90)	0.201 (0.61)
<i>Deal Characteristics:</i>					
Relative deal size	0.058** (2.21)	0.052 (1.57)		0.010 (0.33)	0.084* (1.73)
All-cash deal (dummy)	0.143 (1.61)	0.111 (1.26)		0.123 (1.00)	-0.041 (-0.22)
Hostile (dummy)	0.000 (0.00)	0.000 (0.00)		0.000 (0.00)	0.000 (0.00)

Diversifying acquisition (dummy)	0.057 (0.61)	-0.012 (-0.07)		0.144 (1.05)	0.405** (2.24)
Tender offer (dummy)	0.332*** (3.08)	0.502** (2.24)		0.018 (0.09)	1.010** (2.53)
Constant	0.263 (1.38)	0.705* (1.82)	-1.494*** (-3.99)	-0.205 (-0.61)	-1.963*** (-2.76)
Industry fixed effect	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes
First-stage Cragg-Donald test			(<i>p-value</i> <0.001)		
Overidentification test				(<i>p-value</i> = 0.612)	(<i>p-value</i> = 0.208)
Sample size	121	121	121	121	121
Adjusted- R^2	0.489	0.505	0.809	0.156	0.237

Table I. 6 Regressions of Cumulative Abnormal Return (-1, 1) for the Major Customers of Acquiring Firms on Explanatory Variables

The sample consists of 693 major public customers of the acquiring firms (publicly traded firms that comprise at least 10% of acquirer sales) that complete mergers between 1992 and 2007. We obtain the initial sample of mergers from Thomson Financial's Security Data Corporation (SDC) Platinum database. Our final sample includes all completed mergers subject to the following selection criteria: (1) the deal value disclosed in SDC is greater than \$1 million, (2) the acquirer controls less than 50% of the target's shares prior to the announcement and owns 100% of the target's shares after the transaction, (3) the acquirer is publicly traded and has stock return and financial data available from Center for Research in Security Prices (CRSP) and Compustat, respectively, (4) the acquirer is covered by the KLD Research & Analytics, Inc. (KLD) STATS database, (5) the acquirer is not in the financial and utilities industries, and (6) the acquirer's major public customer is covered by the Compustat Segment Customer database. The dependent variable in models (1), (2), (4), and (6) is the cumulative abnormal return (CAR) for the major customers of the acquiring firms from one day before to one day after the merger announcement date. The abnormal stock return is calculated using the market model. The market model parameters are estimated using 200 trading days of return data ending 11 days before the merger announcement. The CRSP value-weighted return is used as a proxy for the market return. The dependent variable in models (3) and (5) is adjusted CSR. The first instrumental variable, industry social responsibility, is measured as the ratio of the number of firms with positive adjusted CSR in the same industry as the acquirer over the total number of firms in that industry. The second instrumental variable, religion rank, is the ranking of the state in which the bidder's headquarters is located, which ranges between one and 50. The ranking is based on the ratio of the number of religious adherents in the bidder's state over the total population in that state in 2000. A lower religion ranking indicates more religiosity. The data on religiosity come from the American Religion Data Archive. Two-digit SIC code dummies are used to control for industry fixed effects. The *t*-statistics in parentheses are based on standard errors adjusted for heteroskedasticity and deal clustering. All variables are defined in Appendix I. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	OLS		2SLS			
	(1)	(2)	1 st stage (3)	2 nd stage (4)	1 st stage (5)	2 nd stage (6)
<i>CSR measure:</i>						
Adjusted CSR	0.649** (2.50)	0.529* (1.77)		2.384** (2.07)		1.517** (1.97)
<i>Instrument variables:</i>						
Industry social responsibility			1.228*** (3.75)		0.630* (1.71)	
Religion rank			0.006** (2.48)		0.017*** (4.94)	
<i>Bidder management quality:</i>						
Operating income growth rate		0.009 (1.54)				0.012* (1.84)
<i>Corporate Governance:</i>						
G-index		-0.059 (-0.75)				-0.073 (-0.79)
<i>Other Bidder characteristics:</i>						
Firm size	0.118 (1.00)	0.179 (1.20)	0.074*** (3.06)	0.000 (0.00)	0.151*** (8.34)	0.055 (0.34)
Tobin's <i>q</i>	-0.029 (-0.25)	-0.095 (-0.67)	0.013 (0.76)	-0.050 (-0.41)	0.011 (0.78)	-0.085 (-0.58)
Leverage	-0.692 (-0.46)	-0.324 (-0.18)	-0.455 (-1.45)	0.161 (0.09)	0.265 (0.96)	-0.459 (-0.24)
Free cash flow	0.238 (0.24)	0.422 (0.36)	0.016 (0.08)	0.300 (0.27)	-0.108 (-0.52)	0.979 (0.81)
Previous market-adjusted return	-0.267 (-0.56)	-0.695 (-1.12)	-0.090 (-1.28)	-0.033 (-0.06)	-0.137* (-1.95)	-0.447 (-0.66)
<i>Customer Relation characteristics:</i>						
Sales to customer/customer's COGS	-1.546 (-1.42)	-1.217 (-0.97)		0.091** (2.44)		0.102** (1.99)
Terminated Customer (dummy)	0.062 (0.23)	0.058 (0.18)		0.113 (0.38)		0.058 (0.16)

Acquirer industry Herfindahl >2000 (dummy)	1.146 (0.48)	-0.158 (-0.07)		0.862 (0.37)		0.133 (0.06)
Acquirer Δ industry Herfindahl >100 (dummy)	0.804* (1.74)	-0.097 (-0.17)		0.791* (1.80)		0.054 (0.10)
Customer industry Herfindahl >2000 (dummy)	1.452** (2.57)	0.753 (1.17)		1.462** (2.38)		0.589 (0.87)
Retail industry (dummy)	0.000 (0.00)	0.000 (0.00)		0.000 (0.00)		0.000 (0.00)
<i>Deal characteristics:</i>						
Relative deal size	0.173 (0.24)	0.203 (0.23)		0.370 (0.49)		0.396 (0.44)
Industry M&A	-5.060 (-0.73)	-7.973 (-1.43)		-4.264 (-0.68)		-7.746 (-1.49)
Hostile (dummy)	1.129 (0.89)	2.285 (1.55)		0.290 (0.22)		1.662 (1.02)
High tech (dummy)	-0.628* (-1.73)	-0.507 (-1.09)		-0.801** (-2.00)		-0.816* (-1.65)
Diversifying acquisition (dummy)	0.227 (0.83)	0.398 (1.20)		0.348 (1.19)		0.608 (1.60)
Public target (dummy)	-0.215 (-0.39)	-0.445 (-0.70)		-0.146 (-0.25)		-0.263 (-0.41)
Private target (dummy)	-0.352 (-0.64)	-0.585 (-0.90)		-0.262 (-0.46)		-0.449 (-0.66)
All-cash deal (dummy)	0.224 (0.54)	-0.437 (-0.87)		0.121 (0.28)		-0.548 (-1.07)
Stock deal (dummy)	0.768* (1.84)	0.266 (0.49)		0.720* (1.69)		0.251 (0.44)
Constant	-1.197 (-1.05)	0.727 (0.46)	-1.201 (-4.44)	-0.108 (-0.08)	-1.587*** (-4.68)	2.005 (1.25)
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
First-stage Cragg-Donald test			(<i>p-value</i> < 0.001)		(<i>p-value</i> < 0.001)	
Overidentification test				(<i>p-value</i> = 0.122)		(<i>p-value</i> = 0.118)
Sample size	693	538	693	693	538	538
Adjusted- R^2	0.079	0.101	0.340	0.077	0.327	0.102

**Table I. 7 Regressions of Cumulative Abnormal Return (-1, 1) for the Suppliers of
Acquiring Firms on Explanatory Variables**

The sample consists of 5,629 public suppliers of the acquiring firms (publicly traded suppliers whose information on sales to the acquirer is covered by the Compustat Segment Customer database) that complete mergers between 1992 and 2007. We obtain the initial sample of mergers from Thomson Financial's Security Data Corporation (SDC) Platinum database. Our final sample includes all completed mergers subject to the following selection criteria: (1) the deal value disclosed in SDC is greater than \$1 million, (2) the acquirer controls less than 50% of the target's shares prior to the announcement and owns 100% of the target's shares after the transaction, (3) the acquirer is publicly traded and has stock return and financial data available from Center for Research in Security Prices (CRSP) and Compustat, respectively, (4) the acquirer is covered by the KLD Research & Analytics, Inc. (KLD) STATS database, (5) the acquirer is not in the financial and utilities industries, and (6) the acquirer's public supplier is covered by the Compustat Segment Customer database. The dependent variable in models (1), (2), (4), and (6) is the cumulative abnormal return (CAR) for the suppliers of the acquiring firms from one day before to one day after the merger announcement date. The abnormal stock return is calculated using the market model. The market model parameters are estimated using 200 trading days of return data ending 11 days before the merger announcement. The CRSP value-weighted return is used as a proxy for the market return. The dependent variable in models (3) and (5) is adjusted CSR. The first instrumental variable, industry social responsibility, is measured as the ratio of the number of firms with positive adjusted CSR in the same industry as the acquirer over the total number of firms in that industry. The second instrumental variable, religion rank, is the ranking of the state in which the bidder's headquarters is located, which ranges between one and 50. The ranking is based on the ratio of the number of religious adherents in the bidder's state over the total population in that state in 2000. A lower religion ranking indicates more religiosity. The data on religiosity come from the American Religion Data Archive. Two-digit SIC code dummies are used to control for industry fixed effects. The *t*-statistics in parentheses are based on standard errors adjusted for heteroskedasticity and deal clustering. All variables are defined in Appendix I. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	OLS		2SLS			
	(1)	(2)	1 st stage	2 nd stage	1 st stage	2 nd stage
			(3)	(4)	(5)	(6)
<i>CSR measure:</i>						
Adjusted CSR	0.369*	0.435**		0.891*		0.851*
	(1.72)	(2.15)		(1.77)		(1.77)
<i>Instrument variables:</i>						
Industry social responsibility			0.297***		0.300***	
			(3.28)		(3.28)	
Religion rank			0.003***		0.003***	
			(3.38)		(3.07)	
<i>Bidder management quality:</i>						
Operating income growth rate		0.040				0.217
		(1.07)				(1.30)
<i>Corporate Governance:</i>						
G-index		-0.060				-0.059
		(-0.85)				(-0.95)
<i>Other Bidder characteristics:</i>						
Firm size	-0.053	-0.202	0.144***	-0.048	0.152***	-0.113
	(-0.32)	(-1.40)	(16.82)	(-0.33)	(16.63)	(-0.76)
Tobin's <i>q</i>	0.050	0.031	-0.047***	0.048	-0.047***	0.000
	(0.66)	(0.41)	(-13.84)	(0.65)	(-13.75)	(0.01)
Leverage	-0.009	0.332	-1.914***	2.723	-2.062***	2.574
	(-0.00)	(0.18)	(-16.7)	(1.29)	(-17.58)	(1.27)
Free cash flow	5.402*	5.768**	-0.080	3.354	-0.119	3.470
	(1.85)	(2.03)	(-0.45)	(1.09)	(-0.66)	(1.20)
Previous market-adjusted return	0.262	0.191	-0.009	0.279	-0.016	0.318
	(0.49)	(0.36)	(-0.33)	(0.52)	(-0.58)	(0.60)
<i>Supplier Relation characteristics:</i>						
Sales to acquirer/supplier's total sales	0.039	0.027		0.758		0.555
	(0.76)	(0.53)		(1.43)		(1.05)
Terminated Supplier (dummy)	0.000	0.000		0.000		0.000

	(0.00)	(0.00)		(0.00)		(0.00)
Industry Herfindahl >2000	0.132	-0.255		-0.778		-0.730
(dummy)	(0.15)	(-0.26)		(-1.15)		(-0.98)
Δ Industry Herfindahl >100	0.853	1.150*		0.467		0.529
(dummy)	(1.22)	(1.68)		(0.94)		(1.07)
Supplier industry Herfindahl >2000	-0.877	-0.945		-1.131		-0.861
(dummy)	(-1.14)	(-1.19)		(-1.09)		(-0.79)
Retail industry (dummy)	-0.835	-0.760		-1.150		-1.135
	(-0.96)	(-0.83)		(-1.39)		(-1.30)
<i>Deal characteristics:</i>						
Relative deal size	-0.518	-1.396*		-0.363		-1.199
	(-0.64)	(-1.75)		(-0.44)		(-1.54)
Industry M&A	1.978	2.374		2.687		2.824
	(0.55)	(0.67)		(0.82)		(0.89)
Hostile (dummy)	0.181	0.375		0.047		0.335
	(0.24)	(0.48)		(0.06)		(0.45)
High tech (dummy)	-2.151***	-2.035***		-1.452***		-1.446
	(-3.53)	(-3.53)		(-2.99)		(-3.05)
Diversifying acquisition (dummy)	0.055	0.178		-0.091		0.034
	(0.13)	(0.44)		(-0.23)		(0.09)
Public target (dummy)	0.561	0.524		0.375		0.405
	(1.16)	(1.07)		(0.83)		(0.87)
Private target (dummy)	0.321	0.117		0.055		0.025
	(0.58)	(0.21)		(0.10)		(0.05)
All-cash deal (dummy)	0.078	-0.108		-0.140		-0.206
	(0.15)	(-0.22)		(-0.31)		(-0.45)
Stock deal (dummy)	-0.002	-0.118		-0.088		-0.141
	(-0.00)	(-0.24)		(-0.20)		(-0.32)
Constant	-1.565	0.393	-1.807***	0.240	-1.925***	1.681
	(-0.88)	(0.21)	(-17.71)	(0.15)	(-17.62)	(0.88)
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
First-stage Cragg-Donald test			(<i>p-value</i> < 0.001)		(<i>p-value</i> < 0.001)	
Overidentification test				(<i>p-value</i> =0.404)		(<i>p-value</i> =0.462)
Sample size	5,629	5,537	5,629	5,629	5,537	5,537
Adjusted- R^2	0.022	0.023	0.523	0.015	0.515	0.017

Table I. 8 Regressions of Cumulative Abnormal Return (-1, 1) for Target Shareholders on Explanatory Variables

The sample consists of 791 completed U.S. mergers between 1992 and 2007. We obtain the initial sample of mergers from Thomson Financial's Security Data Corporation (SDC) Platinum database. Our final sample includes all completed mergers subject to the following selection criteria: (1) the deal value disclosed in SDC is greater than \$1 million, (2) the acquirer controls less than 50% of the target's shares prior to the announcement and owns 100% of the target's shares after the transaction, (3) both the acquirer and the targets are publicly traded and have stock return and financial data available from Center for Research in Security Prices (CRSP) and Compustat, respectively, (4) the acquirer is covered by the KLD Research & Analytics, Inc. (KLD) STATS database, and (5) the acquirer is not in the financial and utilities industries. The dependent variable in models (1), (2), (4), and (6) is the target's cumulative abnormal stock return (CAR) from one day before to one day after the merger announcement date. The abnormal stock return is calculated using the market model. The market model parameters are estimated using 200 trading days of return data ending 11 days before the merger announcement. The CRSP value-weighted return is used as a proxy for the market return. The dependent variable in models (3) and (5) is adjusted CSR. The first instrumental variable, industry social responsibility, is measured as the ratio of the number of firms with positive adjusted CSR in the same industry as the acquirer over the total number of firms in that industry. The second instrumental variable, religion rank, is the ranking of the state in which the bidder's headquarters is located, which ranges between one and 50. The ranking is based on the ratio of the number of religious adherents in the bidder's state over the total population in that state in 2000. A lower religion ranking indicates more religiosity. The data on religiosity come from the American Religion Data Archive. Two-digit SIC code dummies are used to control for industry fixed effects. The *t*-statistics in parentheses are based on standard errors adjusted for heteroskedasticity and target clustering. All variables are defined in Appendix I. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	OLS		2SLS			
	(1)	(2)	1 st stage	2 nd stage	1 st stage	2 nd stage
			(3)	(4)	(5)	(6)
<i>CSR measure:</i>						
Adjusted CSR	-3.176 (-1.58)	-3.754* (-1.70)		4.619 (0.50)		-16.789 (-1.15)
Adjusted CSR*Stock deal (dummy)	6.023* (1.77)	6.442* (1.67)		2.931 (1.12)		2.966 (0.93)
<i>Instrument variables:</i>						
Industry social responsibility			0.385** (2.18)		0.348 (1.36)	
Religion rank			0.009*** (4.44)		0.007*** (2.59)	
<i>Bidder management quality:</i>						
Operating income growth rate		-0.022 (-0.37)				-0.021 (-0.43)
<i>Product market competition:</i>						
Competitive industry (dummy)		6.293* (1.83)				6.286 (1.99)
<i>Corporate Governance:</i>						
G-index		-0.308 (-0.69)				-0.323 (-0.68)
<i>Other Bidder characteristics:</i>						
Firm size	0.544 (0.58)	0.240 (0.21)	0.029** (1.97)	0.247 (0.28)	0.069*** (3.47)	1.234 (0.80)
Tobin's <i>q</i>	-0.359 (-0.52)	-1.168* (-1.67)	0.009 (0.73)	-0.346 (-0.59)	0.011 (0.61)	-1.069 (-1.45)
Leverage	-8.951 (-0.81)	-19.317 (-1.35)	-0.571*** (-2.59)	-4.865 (-0.41)	-0.484* (-1.69)	-25.151* (-1.65)
Free cash flow	21.059 (1.23)	22.491 (1.03)	0.539 (1.61)	17.774 (1.08)	0.739 (1.37)	30.280 (1.38)
Previous market-adjusted return	-0.628 (-0.76)	-0.502 (-0.64)	0.004 (0.17)	-0.677 (-0.65)	-0.040 (-1.12)	-0.509 (-0.43)
<i>Target characteristics:</i>						

Firm size	-2.463** (-2.35)	-2.864** (-2.24)		-2.329*** (-2.64)		-2.752** (-2.56)
Tobin's q	-2.344*** (-4.40)	-2.018*** (-3.39)		-2.347*** (-4.25)		-1.774*** (-2.80)
Leverage	-1.803 (-0.64)	-1.052 (-0.33)		-1.682 (-0.55)		-0.488 (-0.13)
Free cash flow	-4.229 (-0.52)	6.865 (0.69)		-4.297 (-1.08)		6.863 (1.26)
Previous market-adjusted return	-0.923 (-1.05)	-0.969 (-1.22)		-0.858 (-0.92)		-0.859 (-0.84)
<i>Deal characteristics:</i>						
Relative deal size	-3.456 (-1.52)	-1.372 (-0.43)		-3.673 (-1.22)		-2.090 (-0.52)
Industry M&A	12.719 (0.89)	6.407 (0.39)		12.229 (0.72)		6.775 (0.35)
Hostile (dummy)	9.564 (1.53)	9.438 (1.38)		9.132 (1.30)		8.568 (1.07)
High tech (dummy)	-3.365 (-1.23)	-3.346 (-1.07)		-3.666 (-1.25)		-3.662 (-1.05)
Diversifying acquisition (dummy)	-2.291 (-0.94)	-3.494 (-1.30)		-2.435 (-1.06)		-3.804 (-1.40)
All-cash deal (dummy)	-3.761 (-0.83)	-3.743 (-0.72)		-3.420 (-1.03)		-3.443 (-0.86)
Stock deal (dummy)	-8.807* (-1.96)	-11.085** (-2.16)		-9.008*** (-2.75)		-11.555*** (-2.96)
Constant	49.067*** (4.20)	55.662*** (3.60)	-0.747*** (-3.47)	51.463*** (5.11)	-1.762*** (-2.86)	44.952*** (2.66)
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
First-stage Cragg-Donald test			(p -value < 0.001)		(p -value = 0.002)	
Overidentification test				(p -value = 0.747)		(p -value = 0.001)
Sample size	791	641	791	791	641	641
Adjusted- R^2	0.233	0.252	0.122	0.147	0.134	0.127

Table I. 9 Calendar-Time Portfolio Analysis of Bidder's Long-Term Abnormal Stock Return

The sample consists of 1,575 completed U.S. mergers between 1992 and 2007. We obtain the initial sample of mergers from Thomson Financial's Security Data Corporation (SDC) Platinum database. Our final sample includes all completed mergers subject to the following selection criteria: (1) the deal value disclosed in SDC is greater than \$1 million, (2) the acquirer controls less than 50% of the target's shares prior to the announcement and owns 100% of the target's shares after the transaction, (3) the acquirer is publicly traded and has stock return and financial data available from Center for Research in Security Prices (CRSP) and Compustat, respectively, (4) the acquirer is covered by the KLD Research & Analytics, Inc. (KLD) STATS database, and (5) the acquirer is not in the financial and utilities industries. For the calendar-time portfolio regression analysis of a bidder's long-term abnormal returns, we follow the approach used by Ikenberry, Lakonishok, and Vermaelen (2000). Specifically, we form equally weighted portfolios of acquirers that complete the merger and keep them in the portfolio for a pre-specified holding period (12, 24, and 36 months) relative to the announcement month. Portfolios are rebalanced monthly by dropping all acquirers that reach the end of their holding period and adding all acquirers that have just announced a merger. Bidder portfolio abnormal performance is then estimated as the intercept of the following time-series regression: $R_{p,t} - R_{f,t} = \alpha + \beta_1(R_{m,t} - R_{f,t}) + \beta_2SMB_t + \beta_3HML_t + \beta_4UMD_t + \varepsilon_t$, where $(R_{p,t} - R_{f,t})$ is the excess return of the bidder portfolio, $(R_{m,t} - R_{f,t})$ is the market excess return, SMB_t is the size factor, HML_t is the book-to-market factor, and UMD_t is the momentum factor. Panel A reports the results for the portfolios composed of all bidders in the sample. Panels B and C report the results for the portfolios composed of bidders with low and high adjusted corporate social responsibility (CSR), respectively. Bidders are divided into high and low adjusted CSR bidders according to the sample median of adjusted CSR. Panel D presents results for the zero-cost portfolio that buys bidders with high adjusted CSR and sells bidders with low adjusted CSR. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	After one year		After two years		After three years	
	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics
Panel A: Full Sample of Bidder Portfolios						
α	0.002	1.16	0.002	1.62	0.002	1.40
β_{mkt}	1.114	31.78***	1.068	31.83***	1.080	33.18***
β_{SMB}	0.174	4.29***	0.172	4.27***	0.156	3.98***
β_{HML}	0.006	0.12	-0.040	-0.93	-0.009	-0.23
β_{UMD}	-0.146	-5.15***	-0.210	-8.08***	-0.232	-9.21***
Adjusted- R^2	0.883		0.886		0.895	
Sample size	203		215		215	
Panel B: Subsample of Bidder Portfolios with Low Adjusted CSR						
α	-0.000	-0.26	0.001	0.46	0.001	0.44
β_{mkt}	1.105	23.84***	1.055	26.96***	1.053	29.01***
β_{SMB}	0.164	3.04***	0.182	3.89***	0.145	3.32***
β_{HML}	0.166	2.67***	0.097	1.91*	0.108	2.31**
β_{UMD}	-0.159	-4.24***	-0.240	-7.90***	-0.251	-8.93***
Adjusted- R^2	0.797		0.848		0.865	
Sample size	203		214		214	
Panel C: Subsample of Bidder Portfolios with High Adjusted CSR						
α	0.004	1.95*	0.004	2.23**	0.003	2.04**
β_{mkt}	1.123	23.99***	1.081	26.25***	1.107	28.17***
β_{SMB}	0.176	3.24***	0.166	3.36***	0.167	3.54***
β_{HML}	-0.168	-2.65***	-0.181	-3.44***	-0.137	-2.71***
β_{UMD}	-0.128	-3.40***	-0.178	-5.58***	-0.213	-6.97***
Adjusted- R^2	0.827		0.844		0.862	
Sample size	202		215		215	
Panel D: Zero-Cost Portfolio of Buying Bidder with High Adjusted CSR and Selling Bidder with Low Adjusted CSR						
α	0.004	1.66*	0.003	1.67*	0.003	1.68*
β_{mkt}	0.013	0.22	0.027	0.61	0.054	1.42
β_{SMB}	0.007	0.10	-0.015	-0.28	0.023	0.49
β_{HML}	-0.347	-4.18***	-0.274	-4.74***	-0.245	-4.97***
β_{UMD}	0.031	0.62	0.062	-1.78*	0.039	1.31
Adjusted- R^2	0.109		0.131		0.162	
Sample size	202		214		215	

Table I. 10 Post-Merger Changes in Operating Performance, Cost of Capital, and Number of Employees

The sample consists of completed U.S. mergers between 1992 and 2007. We obtain the initial sample of mergers from Thomson Financial's Security Data Corporation (SDC) Platinum database. Our final sample includes all completed mergers subject to the following selection criteria: (1) the deal value disclosed in SDC is greater than \$1 million, (2) the acquirer controls less than 50% of the target's shares prior to the announcement and owns 100% of the target's shares after the transaction, (3) both the acquirer and the target are publicly traded and have stock return and financial data available from Center for Research in Security Prices (CRSP) and Compustat, respectively, (4) the acquirer is covered by the KLD Research & Analytics, Inc. (KLD) STATS database, and (5) the acquirer is not in the financial and utilities industries. In Panels A, B, C, and D, the dependent variables are the difference in the change in post-merger operating performance, cost of equity, cost of debt, and number of employees between the combined (bidder and target) firm and the control firm, respectively. The combined firm's pre-merger (post-merger) operating performance is weighted operating cash flow over the assets of the bidder and target prior to (after) the merger using the bidder and targets' relative total assets as the weights. The combined firm's pre-merger (post-merger) cost of equity is the weighted implied cost of equity of the bidder and target prior to (after) the merger using the bidder and targets' relative total assets as the weights. Implied cost of equity is the average estimate from the Claus and Thomas (2001) model, Gebhardt, Lee, and Swaminathan (2001) model, Gode and Mohanram (2003) model, and Easton (2004) model. The combined firm's pre-merger (post-merger) cost of debt is the weighted cost of debt of the bidder and target prior to (after) the merger using the bidder and targets' relative total assets as the weights. Following Francis et al. (2005), the cost of debt is estimated as the ratio of pre-tax interest to total debt. The combined firm's pre-merger (post-merger) number of employee is the sum of the number of employees of the bidder and the target prior to (after) the merger. The pre- and post-merger periods are the two years prior to and after the event year, respectively. We match each acquirer in our sample with a non-acquirer that is in Compustat and KLD STATS using the nearest neighborhood matching approach. The variables used in the matching are adjusted CSR, firm size, leverage, market-to-book ratio, industry dummies (two-digit SIC code), and year. The constants of the regressions in Panels A, B, C, and D measure, respectively, the abnormal change in operating performance, cost of equity, cost of debt, and number of employees between the pre-merger and post-merger periods. Bidders are divided into high and low adjusted corporate social responsibility (CSR) bidders according to the sample median of adjusted CSR. The *t*-statistics are in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Combined Firm's Abnormal Changes in Operating Performance		
	Dependent variable = Difference in post-merger operating performance between the combined firm and the control firm	
	Subsample of High Adjusted CSR	Subsample of Low Adjusted CSR
Constant	0.003 (0.45)	-0.024*** (-3.69)
Difference in pre-merger operating performance between the combined firm and the control firm	0.501*** (12.46)	0.710*** (17.16)
Sample size	250	249
Adjusted- R^2	0.383	0.542
Panel B: Combined Firm's Abnormal Changes in Cost of Equity		
	Dependent variable = Difference in post-merger cost of equity between the combined firm and the control firm	
	Subsample of Bidders with High Adjusted CSR	Subsample of Bidders with Low Adjusted CSR
Constant	-0.008** (-2.05)	-0.004 (-1.20)
Difference in pre-merger cost of equity between the combined firm and the control firm	0.327*** (2.90)	0.272*** (2.69)
Sample size	118	122
Adjusted- R^2	0.060	0.049
Panel C: Combined Firm's Abnormal Changes in Cost of Debt		

	Dependent variable= Difference in post-merger cost of debt between the combined firm and the control firm	
	Subsample of Bidders with High Adjusted CSR	Subsample of Bidders with Low Adjusted CSR
Constant	-0.012** (-2.18)	-0.004 (-1.08)
Difference in pre-merger cost of debt between the combined firm and the control firm	0.224*** (3.38)	0.523*** (10.55)
Sample size	61	60
Adjusted- R^2	0.148	0.651
Panel D: Combined Firm's Abnormal Changes in Number of Employees		
	Dependent variable = Difference in post-merger number of employees between the combined firm and the control firm	
	Subsample of Bidders with High Adjusted CSR	Subsample of Bidders with Low Adjusted CSR
Constant	-1.358 (-0.99)	-3.106* (-1.87)
Difference in pre-merger number of employees between the combined firm and the control firm	1.170*** (91.83)	1.171*** (86.73)
Sample size	272	269
Adjusted- R^2	0.969	0.960

Table I. 11 Likelihood of a Merger Being Challenged by Antitrust Authorities

The sample consists of 1,575 completed U.S. mergers between 1992 and 2007. We obtain the initial sample of mergers from Thomson Financial's Security Data Corporation (SDC) Platinum database. Our final sample includes all completed mergers subject to the following selection criteria: (1) the deal value disclosed in SDC is greater than \$1 million, (2) the acquirer controls less than 50% of the target's shares prior to the announcement and owns 100% of the target's shares after the transaction, (3) the acquirer is publicly traded and has stock return and financial data available from Center for Research in Security Prices (CRSP) and Compustat, respectively, (4) the acquirer is covered by the KLD Research & Analytics, Inc. (KLD) STATS database, and (5) the acquirer is not in the financial and utilities industries. The dependent variable in models (1), (2), (4), and (6) is a dummy variable that equals one if the merger is challenged by the Department of Justice or Federal Trade Commission and zero otherwise. The dependent variable in models (3) and (5) is adjusted CSR. The first instrumental variable, industry social responsibility, is measured as the ratio of the number of firms with positive adjusted CSR in the same industry as the acquirer over the total number of firms in that industry. The second instrumental variable, religion rank, is the ranking of the state in which the bidder's headquarters is located, which ranges between one and 50. The ranking is based on the ratio of the number of religious adherents in the bidder's state over the total population in that state in 2000. A lower religion ranking indicates more religiosity. The data on religiosity come from the American Religion Data Archive. Two-digit SIC code dummies are used to control for industry fixed effects. The *t*-statistics in parentheses for OLS and two-stage probit least squares (2SPLS) are based on standard errors adjusted for heteroskedasticity and acquirer clustering and 100-time bootstrapping, respectively. The numbers in brackets are marginal effects. All variables are defined in Appendix I. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Probit		2SPLS			
	(1)	(2)	1 st stage (3)	2 nd stage (4)	1 st stage (5)	2 nd stage (6)
<i>CSR measure:</i>						
Adjusted CSR	-0.354** (-1.96) [-0.000]	-0.377** (-2.05) [-0.000]		-1.796*** (-8.69)		-2.075*** (-5.34)
<i>Instrument variables:</i>						
Industry social responsibility			0.554*** (4.04)		0.318** (1.96)	
Religion rank			0.004*** (3.60)		0.005*** (3.40)	
<i>Bidder management quality:</i>						
Operating income growth rate		-0.002 (-0.92) [-0.000]				-0.002 (-0.08)
<i>Product market competition:</i>						
Competitive industry (dummy)		-0.578* (-1.71) [-0.000]				-0.184** (-2.27)
<i>Corporate Governance:</i>						
G-index		-0.014 (-0.34) [-0.000]				0.006 (0.66)
<i>Bidder characteristics:</i>						
Firm size	0.246*** (2.74) [0.000]	0.277*** (2.58) [0.000]	0.028*** (3.31)	0.341*** (12.16)	0.048*** (4.28)	0.412*** (8.41)
Tobin's <i>q</i>	0.111** (1.98) [0.000]	0.153** (2.56) [0.000]	0.014** (2.10)	0.118*** (6.47)	0.017** (2.22)	0.155*** (4.63)
Leverage	0.642 (0.57) [-0.000]	-0.390 (-0.30) [-0.000]	-0.151 (-1.10)	0.451 (1.21)	-0.176 (-0.98)	-0.314 (-0.62)
Free cash flow	3.206***	2.426	0.110	3.488***	0.109	3.132***

	(2.75) [0.000]	(1.52) [0.000]	(0.74)	(6.70)	(0.55)	(5.47)
Previous market-adjusted return	-0.629* (-1.76) [-0.000]	-0.379 (-1.12) [-0.000]	-0.023 (-0.76)	-0.450*** (-6.88)	-0.025 (-0.69)	-0.270*** (-3.06)
<i>Deal characteristics:</i>						
Relative deal size	0.312* (1.95) [0.000]	1.015*** (3.66) [0.000]		0.355*** (3.35)		0.939*** (2.96)
Industry M&A	-0.003 (-0.00) [-0.000]	-1.836 (-1.08) [-0.000]		0.684 (1.37)		-0.162 (-0.31)
Hostile (dummy)	2.751*** (6.50) [0.000]	2.659*** (6.29) [0.000]		1.832*** (7.31)		1.689*** (5.26)
High tech (dummy)	-0.429 (-1.55) [-0.000]	-0.451 (-1.50) [-0.000]		-0.561*** (-6.46)		-0.615*** (-5.79)
Diversifying acquisition (dummy)	-0.808*** (-3.93) [-0.000]	-0.759*** (-3.64) [-0.000]		-0.823*** (-13.79)		-0.805*** (-11.67)
Public target (dummy)	0.546 (1.36) [0.000]	0.251 (0.68) [0.000]		0.656** (3.44)		0.395* (1.95)
Private target (dummy)	-5.726 (0.00) [-0.000]	-6.352 (-0.00) [-0.000]		-3.791*** (-9.75)		-4.120*** (-7.55)
All-cash deal (dummy)	0.070 (0.17) [-0.000]	-0.072 (-0.17) [-0.000]		0.088 (0.58)		0.028 (0.16)
Stock deal (dummy)	0.923** (2.13) [0.000]	0.725* (1.67) [0.000]		0.763*** (4.50)		0.632*** (2.85)
Constant	-5.464*** (-6.22)	-9.484 (0.00)	-0.868*** (-4.67)	-6.866*** (-14.96)	-1.425*** (-4.62)	-10.960*** (-9.79)
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
First-stage Cragg-Donald test			(p-value = 0.007)		(p-value = 0.003)	
Overidentification test				(p-value = 0.164)		(p-value = 0.110)
Sample size	1,575	1,253	1,575	1,575	1,253	1,253
Pseudo-R ²	0.477	0.501	0.150		0.158	
LR Chi-2				161.001		162.055

Table I. 12 Likelihood of Deal Completion and COX Regression Analysis of Length of Days to Complete Deal

In columns (1) through (6), the sample consists of 882 successful and unsuccessful U.S. mergers between 1992 and 2007. We obtain the initial sample of mergers from Thomson Financial's Security Data Corporation (SDC) Platinum database. Our final sample includes all mergers subject to the following selection criteria: (1) the deal value disclosed in SDC is greater than \$1 million, (2) both the acquirer and the target are publicly traded and have stock return and financial data available from Center for Research in Security Prices (CRSP) and Compustat, respectively, (3) the acquirer is covered by the KLD Research & Analytics, Inc. (KLD) STATS database, and (4) the acquirer is not in the financial and utilities industries. In columns (7) and (8), the sample consists of 777 successful U.S. mergers. In columns (1) and (2), we use a probit regression to estimate the likelihood of a bid success. The dependent variable is a dummy variable that equals one if the deal is completed and zero otherwise. In column (3) through (6), we use two-stage probit least squares (2SPLS) regression. The dependent variable in the first-stage regression is adjusted CSR and the dependent variable in the second-stage regression is a dummy variable that equals one if the deal is completed and zero otherwise. The first instrumental variable, industry social responsibility, is measured as the ratio of the number of firms with positive adjusted CSR in the same industry as the acquirer over the total number of firms in that industry. The second instrumental variable, religion rank, is the ranking of the state in which the bidder's headquarters is located, which ranges between one and 50. The ranking is based on the ratio of the number of religious adherents in the bidder's state over the total population in that state in 2000. A lower religion ranking indicates more religiosity. The data on religiosity come from the American Religion Data Archive. In columns (7) and (8), we use a non-parametric Cox model to estimate the regressions. The dependent variable is the number of days spent to complete the deal (i.e., the length of days from the announcement date to the effective date). Two-digit SIC code dummies are used to control for industry fixed effects. The numbers in parentheses for the probit regressions, 2SPLS, and COX model are *t*-statistics based on standard errors adjusted for heteroskedasticity and acquirer clustering, *t*-statistics based on 100-time bootstrapping, and *z*-statistics, respectively. The numbers in brackets are marginal effects. All variables are defined in Appendix I. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Probit		2SPLS				COX model	
	Dependent variable = A dummy variable for deal completion		Dependent variable = Adjusted CSR	Dependent variable = A dummy variable for deal completion	Dependent variable = Adjusted CSR	Dependent variable = A dummy variable for deal completion	Dependent variable = The number of days spent to complete the deal	
			1 st stage	2 nd stage	1 st stage	2 nd stage		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>CSR measure:</i>								
Adjusted CSR	0.295** (2.08) [0.016]	0.327** (2.31) [0.011]		6.182*** (37.93)		6.182*** (30.35)	1.194** (2.52)	1.202** (2.46)
<i>Instrument variables:</i>								
Industry social responsibility			0.972*** (5.36)		1.018*** (5.11)			
Religion rank			0.005*** (3.30)		0.006*** (3.34)			
<i>Bidder management quality:</i>								

Operating income growth rate		-0.002 (-1.24) [-0.000]				-0.002 (-0.45)		0.997* (-1.83)
<i>Product market competition:</i>								
Competitive industry (dummy)		0.342 (1.47) [0.014]				-0.050 (-1.04)		1.329* (1.70)
<i>Corporate governance:</i>								
G-index		0.063* (1.96) [0.002]				0.073*** (12.03)		1.008 (0.44)
<i>Bidder characteristics:</i>								
Firm size	0.368*** (5.97) [0.020]	0.355*** (4.88) [0.012]	0.055*** (4.34)	-0.146*** (-11.69)	0.071*** (4.77)	-0.146*** (-8.76)	1.100*** (3.20)	1.096*** (2.71)
MB	-0.063*** (-2.91) [-0.003]	-0.062** (-2.52) [-0.002]	0.000 (-0.15)	0.000 (-0.10)	-0.000 (-0.14)	0.000 (-0.07)	1.002 (0.81)	1.002 (0.77)
<i>Target characteristics:</i>								
Firm size	-0.164*** (-3.12) [-0.009]	-0.140** (-2.47) [-0.005]		-0.135*** (-14.24)		-0.135*** (-10.99)	0.874*** (-4.96)	0.872*** (-4.68)
MB	0.008 (0.51) [0.000]	0.010 (0.54) [0.000]		0.000 (-0.30)		0.000 (-0.08)	1.000 (0.45)	1.005*** (2.24)
<i>Deal characteristics:</i>								
Premium	0.334** (2.11) [0.018]	0.315* (1.85) [0.011]		0.479*** (15.58)		0.479*** (10.41)	0.995 (-0.46)	0.996 (-0.41)
Toehold (dummy)	0.600 (1.06) [0.019]	0.467 (0.81) [0.010]		0.465 (0.88)		0.465 (0.75)	0.939 (-0.28)	1.164 (0.61)
All-cash deal (dummy)	-0.262 (-1.61) [-0.015]	-0.316* (-1.72) [-0.011]		-0.359*** (-14.11)		-0.359*** (-8.54)	1.424*** (3.57)	1.395*** (3.08)
Tender (dummy)	0.269 (1.44) [0.012]	0.324 (1.58) [0.010]		0.614*** (19.39)		0.614*** (11.62)	2.317*** (7.70)	2.549*** (8.00)
Hostile (dummy)	-1.242*** (-4.28) [-0.190]	-1.335*** (-4.67) [-0.163]		-1.580*** (-32.18)		-1.580*** (-21.55)	0.275*** (-4.22)	0.253*** (-4.34)

Diversify acquisition (dummy)	-0.159 (-0.99) [-0.008]	-0.225 (-1.16) [-0.007]		-0.265*** (-9.24)		-0.265*** (-7.74)	1.022 (0.25)	1.130 (1.24)
Multiple bidder (dummy)	-1.293*** (-6.78) [-0.190]	-1.282*** (-6.31) [-0.137]		-1.037*** (-30.65)		-1.037*** (-24.31)	0.617*** (-2.77)	0.566*** (-3.06)
Constant	-0.772* (-1.73)	-1.496** (-2.21)	-0.897*** (-6.79)	3.798*** (31.91)	-1.026*** (-6.37)	4.229*** (24.16)		
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
First-stage Cragg-Donald test			(<i>p-value</i> < 0.001)		(<i>p-value</i> < 0.001)			
Overidentification test				(<i>p-value</i> < 0.001)		(<i>p-value</i> < 0.001)		
Sample size	882	750	882	882	750	750	777	668
Pseudo- R^2	0.339	0.368	0.083		0.097			
LR Chi-2				290.72		251.79	329.52	317.82

Table I. 13 Difference in Cumulative Abnormal Stock Returns between Acquiring Firms in the FTSE4Good Index and Matched Acquiring Firms

In Panel A, the sample consists of mergers by U.S. firms in the FTSE4Good Index and those by matched firms from 2003 to 2006. We match each acquirer in the FTSE4Good Index with an acquirer that is in Compustat and SDC but not in the FTSE4Good Index using nearest neighborhood, Gaussian kernel, and local linear regression approaches. The variables used in the matching are firm size, Tobin's q , leverage, free cash flow, previous market-adjusted return, relative deal size, industry M&A, hostile dummy, high tech dummy, public target dummy, private target dummy, diversifying acquisition dummy, stock deal dummy, all-cash deal dummy, industry dummies (two-digit SIC code), and year dummies. The t -statistics are reported in parentheses and 95% confidence intervals are in brackets. In Panel B, the sample consists of all completed U.S. mergers between 2003 and 2006. We obtain the initial sample of mergers from Thomson Financial's Security Data Corporation (SDC) Platinum database. Our final sample includes all completed mergers subject to the following selection criteria: (1) the deal value disclosed in SDC is greater than \$1 million, (2) the acquirer controls less than 50% of the target's shares prior to the announcement and owns 100% of the target's shares after the transaction, (3) the acquirer is publicly traded and has stock return and financial data available from Center for Research in Security Prices (CRSP) and Compustat, respectively, and (4) the acquirer is not in the financial and utilities industries. The dependent variable is the acquirer's cumulative abnormal stock return (CAR) from one day before to one day after the merger announcement date. The abnormal stock return is calculated using the market model. The market model parameters are estimated using 200 trading days of return data ending 11 days before the merger announcement. The CRSP value-weighted return is used as a proxy for the market return. FTSE merger dummy is equal to one if the acquirer is included in the FTSE4Good Index in the year prior to the merger and zero otherwise. Two-digit SIC code dummies are used to control for industry fixed effects. The t -statistics in parentheses are based on standard errors adjusted for heteroskedasticity and acquirer clustering. All variables are defined in Appendix I. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Test of Difference in Cumulative Abnormal Stock Returns Between FTSE4 Good Index firms and Matching Firms			
	Nearest Neighborhood	Gaussian Kernel	Local Linear Regression
CAR (-1,+1)	0.395** (2.19) [0.042, 0.743]	0.296* (1.76) [-0.033, 0.625]	0.338** (2.00) [0.007, 0.669]
CAR (-2,+2)	0.210* (1.70) [-0.031, 0.451]	0.239* (1.95) [-0.002, 0.480]	0.239** (2.01) [0.006, 0.472]
Panel B: Regression of CARs (-1, 1) for Bidders on Explanatory Variables			
	(1)	(2)	
<i>CSR measure:</i>			
FTSE merger dummy	0.011** (2.15)	0.010* (1.70)	
<i>Bidder management quality:</i>			
Operating income growth rate		0.000** (2.44)	
<i>Product market competition:</i>			
Competitive industry (dummy)		0.008 (1.07)	
<i>Corporate Governance:</i>			
G-index		-0.001 (-1.43)	
<i>Bidder characteristics:</i>			
Firm size	-0.005*** (-3.85)	-0.005*** (-3.52)	
Tobin's <i>q</i>	-0.002** (-2.25)	-0.001 (-0.97)	
Leverage	0.008 (0.58)	0.033* (1.92)	
Free cash flow	-0.012 (-0.53)	0.019 (1.09)	
Previous market-adjusted return	0.006**	0.007**	

	(1.98)	(2.10)
<i>Deal characteristics:</i>		
Relative deal size	-0.000** (-2.25)	-0.000*** (-3.63)
Industry M&A	0.046*** (11.26)	0.047*** (10.99)
Hostile (dummy)	-0.008 (-0.60)	-0.006 (-0.52)
High tech (dummy)	-0.000 (-0.04)	0.004 (0.52)
Diversifying acquisition (dummy)	0.005 (1.27)	0.004 (1.16)
Public target (dummy)	-0.025*** (-4.07)	-0.021*** (-3.35)
Private target (dummy)	-0.005 (-0.82)	0.001 (0.11)
Stock deal (dummy)	-0.003 (-0.69)	-0.004 (-0.89)
All-cash deal (dummy)	0.007 (1.53)	0.005 (1.05)
Constant	0.062*** (4.04)	0.050*** (3.14)
Industry fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
Sample size	2,435	2,073
Adjusted- R^2	0.089	0.090

Appendix 1: Variable Definitions

This appendix provides a detailed description of the construction of all the variables used in the tables.

Variable	Definitions
Adjusted CSR	The sum of yearly adjusted community activities, corporate governance, diversity, employee relations, environmental record, human rights, and product quality and safety KLD STATS corporate social responsibility (CSR) scores. Adjusted CSR is estimated by scaling the raw strength and concern scores of each category by the number of items of the strength and concern of that category in the year and then taking the net difference between adjusted strength and concern scores for that category.
All-cash deal (dummy)	One if the deal is purely cash-financed and zero otherwise.
Competitive industry (dummy)	One if the bidder's industry is in the bottom quartile of all two-digit SIC industries annually sorted by the Herfindahl index and zero otherwise. The industry Herfindahl index is computed as the sum of squared market shares of all COMPUSTAT firms in the industry.
Diversifying acquisition (dummy)	One if the bidder and the target have different first two-digit SIC codes and zero otherwise.
Firm size	Log (book value of total assets).
Free cash flow	Operating income before depreciation – interest expenses – income taxes – capital expenditures, scaled by book value of total assets.
FTSE merger (dummy)	One if the bidder is included in FTSE4Good Index's list in the year prior to the deal and zero otherwise.
G-index	Governance index constructed by Gompers, Ishii, and Metrick (2003)
High tech (dummy)	One if the bidder and the target operate in both high tech industries defined by Loughran and Ritter (2004) and zero otherwise.
Hostile (dummy)	One if the deal is reported as hostile in SDC and zero otherwise.
Industry social responsibility	The ratio of the number of firms with positive adjusted CSR in the same industry as the acquirer over the total number of firms in that industry.
Industry M&A	The value of all corporate control transactions (over \$1 million) reported by SDC for each two-digit SIC industry and year divided by the total book value of assets of all Compustat firms in the same two-digit SIC industry and year.
Leverage	Book value of debts (sum of current liabilities and long-term debt) divided by market value of assets (total book value of assets minus book value of equity plus market value of equity).
Maturity	The value-weighted average of the maturity of an acquirer's individual bonds.
Market-to-book	Market value of equity over book value of equity.
Multiple bidder (dummy)	One if there is more than one bidder and zero otherwise.
MV	Market value of equity computed as the number of shares outstanding multiplied by the stock price at the 50th trading day prior to announcement date.
Operating income growth rate	$(EBITDA_{t-1} - EBITDA_{t-4})/EBITDA_{t-4}$, adjusted for the industry median.
Previous market-adjusted return	Bidder's buy-and-hold abnormal stock return estimated using 200 trading

	days of return data ending 11 days before the acquisition announcement. The CRSP value-weighted return is used as a proxy for the market return.
Private target (dummy)	One if the bidder acquires a privately held target and zero otherwise.
Public target (dummy)	One if the bidder acquires a publicly held target and zero otherwise.
Rating	The value-weighted average of the Moody's rating of an acquirer's individual bonds.
Raw CSR	The sum of community activities, corporate governance, diversity, employee relations, environmental record, human rights, and product quality and safety KLD STATS CSR scores.
Relative deal size	Deal value reported in SDC over market value of bidder equity.
Religion rank	The ranking of the state in which the bidder's headquarters is located, which ranges between one and 50. The ranking is based on the ratio of the number of religious adherents in the bidder's state over the total population in that state in 2000. A lower religion ranking indicates more religiosity. The data on religiosity come from the American Religion Data Archive. The data on religiosity are from the American Religion Data Archive.
Retail industry (dummy)	One for deals that occurred in industries included in the retail classification of Fama and French (1997), i.e. SIC code from 5200 to 5999, and zero otherwise.
StdDev	The standard deviation of unlevered stock returns computed using two years of monthly returns over months -25 to -2 relative to the announcement month. Unlevered returns are computed by multiplying the stock returns by $(1 - \text{leverage})$. Firms are required to have at least 12 monthly returns over months -25 to -2.
Stock deal (dummy)	One if the deal is at least partially financed by stocks and zero otherwise.
Subsidiary target (dummy)	One if the bidder acquires a subsidiary of the targets and zero otherwise.
Tender (dummy)	One if the acquisition is a tender-offer and zero otherwise.
Terminated customer (dummy)	One for customers that were listed as customers before a merger but not after and zero otherwise.
Terminated supplier (dummy)	One for suppliers that were listed as suppliers before a merger but not after and zero otherwise.
Tobin's q	Market value of assets (total book value of assets minus book value of equity plus market value of equity) over book value of assets.
Toehold (dummy)	One if bidder holds at least 5% of the target shares prior to the acquisition and zero otherwise.

Appendix 2: List of strength and Concern Items in the KLD Social Ratings Database

This appendix provides the list of strength and concern items used in estimating corporate social responsibility (CSR) scores.

Category	Strength Items	Concern Items
Community	Generous Giving Innovative Giving Support for Housing Support for Education (added '94) Indigenous Peoples Relations (added '00, moved '02) Non-U.S. Charitable Giving Volunteer Programs (added '05) Other Strength	Investment Controversies Negative Economic Impact Indigenous Peoples Relations ('00-'01) Tax Disputes (added '05) Other Concern
Corporate Governance	Limited Compensation Ownership Transparency/Communications (added '05) Political Accountability (added '05) Other Strength	High Compensation Tax Disputes (moved '05) Ownership Accounting (added '05) Transparency (added '05) Political Accountability (added '05) Other Concern
Diversity	CEO Promotion Board of Directors Work/Life Benefits Women/Minority Contracting Employment of the Disabled Gay & Lesbian Policies Other Strength	Controversies Non-Representation Other Concern
Employee Relations	Union Relations No Layoff Policy (ended '94) Cash Profit Sharing Involvement Strong Retirement Benefits Health and Safety Strength (added '03) Other Strength	Union Relations Safety Controversies Workforce Reductions Pension/Benefits (added '92) Other Concern
Environment	Beneficial Products & Services Pollution Prevention Recycling Clean Energy Transparency/Communications (added '96, moved '05) Property, Plant, and Equipment (ended '95) Other Strength	Hazardous Waste Regulatory Problems Ozone Depleting Chemicals Substantial Emissions Agricultural Chemicals Climate Change (added '99) Other Concern
Human Rights	Positive Operations in South Africa (added '94, ended '95) Indigenous Peoples Relations (added '02) Labor Rights (added '02) Other Strength	South Africa (ended '94) Northern Ireland (ended '94) Burma (added '95) Mexico (added '95, ended '02) International Labor (added '98) Indigenous Peoples Relations (added '00) Other Concern
Product Quality and Safety	Quality R&D/Innovation Benefits to Economically Disadvantaged Other Strength	Product Safety Marketing/Contracting Controversy Antitrust Other Concern

Essay Two:

Nonmonetary Benefits, Quality of Life, and Executive Compensation

Abstract: We examine the effects of nonmonetary benefits on overall executive compensation from the perspective of the living environment at the firm headquarters. Companies in polluted, high crime-rate or otherwise unpleasant locations pay higher compensation to their CEOs than companies locating in more livable locations. This premium in pay for quality of life is stronger when firms face tougher competition in the managerial labor market, when the CEO is hired from outside, and when the CEO has short-term career concerns. Overall, the geographic desirability of the corporate headquarters is an effective substitute for CEO monetary pay.

1. Introduction

Economists have long recognized the importance of nonmonetary reward for managers, such as living environment, prestige, community standing and social respect (see Jensen and Murphy (1990), for example). However, the empirical evidence on CEO compensation mainly focuses on monetary reward, while the nonmonetary factors are largely overlooked. As pointed out by Mathios (1989), a failure to account for the role of nonmonetary benefit can seriously distort our understanding of compensation policies. From the perspective of geographic attractiveness, this paper is one of the very few studies incorporating important nonmonetary items into the overall CEO compensation package. In particular, we find a strong substitute effect of good living environment for CEO monetary compensation: Companies in locations with a lower quality of life (e.g., where there is poor infrastructure, high rates of violent crime, heavy pollution, and unpleasant weather, etc.) pay higher monetary compensation to their CEOs than companies locating in more livable areas.

A substantial economic literature exists on the need for “disamenity compensation” and the importance of living environment for people’s career choices (Power (1980) and Myers (1987)). Given that people generally prefer a location with a higher quality of life, companies must pay higher compensation for keeping the same quality employees in an area with poor liveability (Roback (1982)). Myers (1987, p.269) points out that, “Firms can reduce the salary levels needed to secure adequate labor (or secure more and better workers at the same price) if they locate in an area whose quality of life is attractive to workers.”

Our primary quality-of-life measure is the index provided by Morgan Quitno Press, a leading research and publishing company that ranks cities and states in the U.S. Morgan Quitno measures quality of life from various aspects, including crime rates, cost of living,

unemployment rates, education systems, household income, weather, and infrastructure. Based on a large compensation dataset from 1993 to 2008, we first find a premium in CEO compensation for quality of life at the headquarter locations. The premium is both statistically and economically significant. A CEO working in the least livable state (Mississippi) receives 10% higher compensation than a CEO in the most livable state (Minnesota), after controlling for the conventional firm and CEO characteristics. This pay premium in response to working in an unpleasant location is robust after accounting for different ways of measuring annual compensation, the cost of living, and state income tax.

Furthermore, we find that competitive labor market forces and managerial career concerns are important in explaining the premium for quality of life. Small firms, young firms, and firms with a large number of industry peers, which typically face tougher competition for managerial talents, tend to pay higher premiums in response to unpleasant corporate locations. An externally hired CEO, who usually has better outside opportunities than an internal CEO, is also compensated more for poor geographic liveability. Consistent with the view that a retiring CEO emphasizes more short-term compensation than long-term career concern, a CEO near retirement is found to be associated with a higher compensation premium for quality of life.

To address the possibility that quality of life is subjective depending on individuals, we further breaking down the overall quality-of-life ranking into a few individual factors where people are likely to have similar preference. We find that individual factors on environmental safety, transportation system, and family-supporting infrastructure are important in influencing CEO monetary rewards. In particular, companies pay CEO higher compensation when the headquarters are located in areas with more hazardous waste sites, higher prisoner incarceration rates, less efficient transportation systems, and poorer facilities for education and public welfare.

Lastly, we do some additional investigation to further our understanding of the quality of life pay premium. First of all, we use alternative rankings provided by *Bloomberg Business Week* and *Forbes Magazine* for the quality of life across the U.S. Our results are largely unchanged under these different ranking methods. Second, we extend our investigation to the top five executives in companies and find that this premium applies not only for CEOs but also for top management teams.

While studies focusing on agency costs exist, the nature of environmental factors and how they impinge on CEO pay is less examined. Our paper contributes to the literature on executive compensation by providing the first systematic examination (to our knowledge) of the geographic attractiveness of the company headquarters. We demonstrate that, in addition to conventional financial parameters like firm size and performance, the liveability at the corporate headquarters is also important in attracting executive talent and eventually influences compensation. Our results suggest that the nonmonetary benefits, like a nice living environment, are a substitute for monetary reward to corporate executives.

The plan of the paper is as follows: we describe our sample and variable construction in the next section; we explore the existence and justification of the pay premium for quality of life in Section 3; additional investigation is implemented in Section 4, and we conclude in Section 5.

2. Sample Formation and Variable Construction

Our primary proxy for quality of life across the U.S. is the state ranking published by Morgan Quitno. The ranking is done on an annual basis from 1991 to 2010. Morgan Quitno measures quality of life based on 43 factors, including crime rates, cost of living, unemployment rates, education systems, household income, weather, and infrastructure. As shown in the

appendix, to determine a state's "Liveability Rating," Morgan Quitno takes the average of each state's rankings for those 43 factors. Among them, there are 24 factors that are negatively associated with the state's liveability (for example, crime rates, cost of living, and unemployment rates). There are 19 factors that are positively associated with the state's liveability (for example, per capita personal income, percentage of days that are sunny and home ownership rates). The scale for each factor is 1 to 50 and all factors are given equal weight: The higher the ranking for each factor, the less pleasant the state is to live in.²⁴ In other words, a higher average for these factors means that the state has fewer positive factors and/or more negative factors. Notably, these 43 factors are broadly consistent with the economics literature on quality of life (see, for example, Blomquist et al. (1988), Gyourko and Tracy (1991), and Viscusi (1993)).

It is worth noting that there are various rankings for liveability in U.S. cities and states provided by other institutions, such as *Forbes Magazine* and *Bloomberg Business Week*. We chose Morgan Quitno mainly because, unlike the rankings that usually cover only a limited number of U.S. cities for the very recent years, it provides the widest time-series and geographic coverage. However, as shown in the later part of the paper, using alternative city-level rankings gives similar results.

As Compustat records only the firm's current headquarter locations, we collect the historical record of firms' headquarters information from Compact Disclosure, following Pirinsky and Wang (2006). Further, we collect CEO compensation data from ExecuComp, accounting information from Compustat, and stock price information from CRSP. We use

²⁴ The rankings that are based on 24 negative factors are taken to be 1 if the number of the negative factor is the smallest and 50 if it is the highest, while the rankings that are based on 19 positive factors are taken to be 1 if the number of the positive factor is the highest and 50 if it is the smallest. The state liveability ranking is based on the average of the rankings of those 43 factors and ranges from 1 to 50 with 1 meaning the most livable and 50 meaning the least livable.

ExecuComp Item *TDC1* to measure an executive's total compensation in a given year, which is the sum of the executive's salary, bonuses, long-term incentive plans, the grant-date value of restricted stock awards, and the Black-Scholes value of granted options.

Based on the existing literature, we also include a set of control variables that influence compensation policies. We measure firm size (*Firmsize*) as the natural logarithm of the firm sales. To control for firm growth opportunities, we compute market-to-book (*M/B*) as the ratio of market value of common equity over the book value of common equity, where the market value is obtained as fiscal year closing price multiplied by common shares outstanding. Return on assets (*ROA*) is measured as the ratio of net income before extraordinary items and discontinued operation over total assets. We compute *Leverage* as the ratio of long-term debt and current debt over total assets minus book value of equity plus market value of equity, *Cash* as the ratio of the cash item over the firm's total assets, and *Capex* as the ratio of capital expenditure over the firm's total assets. To measure the firm's risk, we use stock return standard deviation based on the firm's monthly returns over a five-year period (*Volatility*). We also include the firm's annual stock return (*RET*) to control for the stock performance. All of the monetary variables are measured in 2008-constant dollars. To mitigate the effect of outliers, we winsorize all the continuous variables at the 1% level in both tails of the distribution. The final sample consists of 14,295 firm-year observations from 1993 to 2008.

3. Empirical Results

3.1. Summary Statistics

[Insert Table II.1 Here]

As shown in Table II.1, Minnesota, New Hampshire, Iowa, Utah and Nebraska are the top five most livable states; Tennessee, Alabama, West Virginia, Louisiana and Mississippi are the five least livable states. Our sample firms locate in each of the 50 states, except for Wyoming. The five states with the largest median sales are Rhode Island, Kentucky, Virginia, Kansas, and North Dakota. Not surprisingly, California has the most firm-year observations (15% of the sample observations), followed by Texas (9%) and New York (8%).

[Insert Table II.2 Here]

Table II.2 reports the firm and CEO characteristics. The mean (median) CEO total pay is \$5.17 million (\$2.93 million); the mean (median) salary and bonus is \$1.54 million (\$1.03 million). The median firm is quite large; its sales are \$1,428 million. The sample firms are performing well, with a median M/B ratio of 2.36, ROA of 5.08%, and annual stock return of 12.32%. Moreover, the median firm is moderately leveraged with Leverage of 12%, and has sizeable cash holdings of 4% total asset, and makes considerable investment with Capex of 4%. The median CEO is 56 years old and holds 0.32% of the firm's stock. Panel B presents the correlation matrix of firm and CEO characteristics. The extent of correlation among most pairs of firm and CEO characteristic variables raises little concern for multicollinearity.

3.2. *State Liveability Ranking and CEO Compensation*

In this section, we implement a multivariate test on the effect of liveability on CEO pay. In particular, we estimate the following lead-lag OLS regression:

$$(1) \quad \ln(CEO \text{ Pay})_{it} = \alpha + \beta_1 Rank_{it-1} + \beta_2 Firmsize_{it-1} + \beta_3 Volatility_{it-1} + \beta_4 RET_{it-1} + \beta_5 ROA_{it-1} + \beta_6 M/B_{it-1} + \beta_7 Cash_{it-1} + \beta_8 Leverage_{it-1} +$$

$$\beta_9 Capex_{it-1} + \beta_{10} CEOage_{it-1} + \beta_{11} Ownership_{it-1} + Year\ fixed\ effects + Industry\ fixed\ effects.$$

The dependent variable is the natural logarithm of CEO total pay or other pay measures. *Rank* is the Morgan Quitno Ranking for the liveability for each state scaled by 50. In Morgan Quitno Ranking, the most livable state is ranked as 1, while the least attractive one is ranked as 50. Therefore, *Rank* ranges from 0 to 1 with 0 meaning most livable and 1 least livable. It is worth noting that the liveability in each state can be largely regarded as exogenous to the company itself, as it is difficult for a firm to influence the geographic desirability of the state.

We also control for a set of firm and CEO characteristics, including firm size, performance, growth potential, risk, availability of cash, investment, CEO age and CEO ownership. Fama and French (1997) 48 industry dummies and year dummies are included to control for industry and time variation in executive pay schemes. Throughout the entire empirical test, *p*-values are computed based on robust standard errors.

[Insert Table II.3 Here]

Table II.3 shows a significant and positive association between the liveability ranking and CEO compensation, indicating that companies locating in less livable states pay higher compensation to CEOs than companies in more livable states. In Column (1), we only include *Rank* as the independent variable. The coefficient of *Rank* is 0.127 and is significant at the 1% level. We further control for industry and year fixed effects in Column (2); the coefficient of *Rank* is 0.151 and its significance remains at the 1% level. In Column (3), we include *Firmsize* as an additional independent variable. The coefficient of *Rank* is 0.148 and significant at the 1%

level. The result is also economically important: Firms in the ten least livable states pay 12% higher compensation to CEOs than the firms in the ten most livable states.²⁵

In Column (4), we introduce other firm characteristics that are commonly used to explain CEO pay, including firm operating and stock performance, firm risk, investment, and leverage (see, for example, Core et al. (1999)). The coefficient on liveability ranking is 0.120 and is significant at the 1% level, suggesting that a firm in the ten least livable states pays 10% higher compensation to CEOs relative to the firms in the ten most livable states, after controlling for firm characteristics.

We further control for CEO age and ownership in Column (5), and the coefficient of *Rank* is 0.124 and significant at the 1% level. An extreme interpretation of this coefficient is that CEOs working in the least pleasant state (Mississippi) are paid 12.4% higher than the CEOs in the most pleasant state (Minnesota).²⁶ In Column (6), we include the state fixed effects to control for the unobserved geographic heterogeneity that may influence CEO compensation. The coefficient of *Rank* is significantly positive. Given the inclusion of state fixed effects, the interpretation of the results is: Firms in a state which experiences downgrade in their rankings tend to increase their CEO compensation.

The coefficients of control variables are generally similar to those in the existing literature (for example, Core et al. (1999)). A CEO receives higher total compensation in larger firms, in better-performing firms, in riskier firms, and in firms with less leverage. Also, older

²⁵ Suppose the average liveability ranking for the ten most livable states is 5, and for the ten least livable states is 45. Then we obtain $0.148 \times (45-5)/50 = 12\%$.

²⁶ We further control CEO duality in the regression and our results do not change. Since duality information is only available from 1996, our sample is reduced to 9,616 observations. The coefficient estimate on *Rank* is 0.092 and significant at 5% level. The coefficient estimate on *Duality* is 0.185 and significant at 1% level, which suggests that added responsibility leads to higher pay.

CEOs get paid more. Consistent with the argument that higher ownership is a substitute for annual compensation, we find that CEOs with higher ownership receive less annual pay.

[Insert Table II.4 Here]

To further assess the robustness of the pay premium for quality of life, we perform several adjustments in measuring CEO compensation. First, in Column (1), we examine the effect of liveability on the CEO's salary and bonus. The coefficient on the liveability rank is still positive and significant at the 1% level. In Column (2), we use ExecuComp Item *TDC2* to measure the CEOs' compensation. Item *TDC2* is the same as *TDC1* except it replaces the value of options granted with the value of options exercised during the year. Kaplan and Rauh (2010) suggest that *TDC2* measures the *ex post* pay level and *TDC1* captures the *ex ante* pay. The coefficient of *Rank* is 0.092 and significant at the 1% level.

A location with a good natural environment tends to have a higher cost of living, which may lead to high levels of executive compensation. This possibility may work against us finding a negative relation between natural environment and executive compensation. As shown in the appendix, the cost of living has already been incorporated as a factor in the Morgan Quitno ranking. To avoid controlling for cost of living twice, we do not include cost of living in our baseline regressions in Table II.3. However, it is still important to examine the extent to which our results are affected by the cost of living. For this purpose, we adjust the CEO total pay to the corresponding cost of living, using the city of Los Angeles as the benchmark. In particular, cost-of-living-adjusted pay is computed as [total pay $\times$ (Los Angeles' cost of living / the city's cost of living)].²⁷

²⁷ The city-level cost of living data is from the Council for Community and Economic Research (<http://www.coli.org>).

Based on cost-of-living-adjusted total pay as the dependent variable in Column (3) of Table II.4, the coefficient of *Rank* is 0.228 and is significant at the 1% level. This result implies that firms in the ten least livable states pay 18% higher cost-of-living-adjusted compensation than the firms in the ten most livable states. Notably, the magnitude of *Rank* is around two times bigger after adjusting for cost of living directly, which is consistent with the view that the cost of living may lead to underestimation of the substitute effect of natural environment on monetary CEO pay.

Moreover, state-level income tax is a negative factor in the Morgan Quitno ranking and income tax may be positively associated with before-tax CEO pay. In other words, our results of pay premium for quality of life can be largely driven by income tax. To examine this possibility, we define tax-adjusted pay as $[\text{total pay} \times (1 - \text{state income tax rate})]$, where we apply the highest bracket of the state income tax rate.²⁸ Even though we cannot observe the actual income tax paid by CEOs, the tax-adjusted pay variable should be a reasonable estimation for the CEO's compensation net of state-level income tax. Column (4) of Table II.4 shows a significantly positive association between *Rank* and tax-adjusted pay. The coefficient of *Rank* is 0.140, indicating a 11% after-tax pay premium of firms in the ten least livable states over the firms in the ten most livable states.

It is worth pointing out that the specifications of cost-of-living-adjusted pay and tax-adjusted pay force a unit slope coefficient on the cost of living and tax rate, respectively. These specifications may be problematic if a CEO saves a large amount of his income in one location and spends it in another location. To address this possibility, we directly include cost of living and income tax rate as two additional independent variables in Column (5) of Table II.4. The

²⁸ The information on state income tax is from Federation of Tax Administrators (<http://www.taxadmin.org>).

coefficient of *Rank* is 0.169 and still significant at the 1% level. Not surprisingly, cost of living has a significantly positive coefficient (0.003), indicating that companies pay more to the CEO when the local cost of living is higher. Income tax rate also attracts a positive coefficient (0.424), although the coefficient is not statistically significant at the 10% level.²⁹ Those coefficients indicate that an increase in cost of living (state income tax) by one percentage point is associated with an increase in CEO pay by approximately 0.3% (0.4%).

Overall, the pay premium for quality of life is robust after accounting for alternative measures of pay, cost of living, and income tax.

3.3. *Justifications of Quality of Life Premium*

Once we have identified a significant and robust CEO pay premium for quality of life, it is important to explore what drives this premium. To address these questions, we carried out additional analysis in this subsection.

If a poorly located firm faces more competition in the labor market, it needs to pay a higher premium to the CEO. Otherwise, the premium can be relatively smaller if the firm has stronger bargaining power in the labor market. We use three proxies to measure the firm's competitiveness in the managerial labor market: firm size, firm age, and number of firms in the same industry outside the state. Chidambaran and Prabhala (2003) and Kalpathy (2009) suggest that firm size and firm age are positively associated with the firm's bargaining power in the labor market, as smaller firms and younger firms face tougher competition for managerial talents. Therefore, we expect that those firms will pay a higher premium in response to less attractive

²⁹ As a robustness check, we construct a new state ranking by excluding the factors of cost of living and state & local tax (Factor 4 and Factor 10 in the appendix) from Morgan Quitno's ranking, and replace *Rank* with this new state ranking in Column (5) of Table II.4, our results are unchanged.

locations. Our third proxy is motivated by the literature of industry clusters (see, for example, Almazan et al. (2007) and Almazan et al. (2010)). If a large number of a firm's industry peers are located outside the state, it implies a high likelihood that the firm's CEO will be hired by its rivals to different states. In this case, the pay premium in response to a less desirable environment will be more important. In contrast, if a firm faces few industry peers, or if most of the peer firms cluster in the same state, the geographic attractiveness will be of less importance because it is less likely for the CEO to move to other states.

[Insert Table II.5 Here]

The regression specification in Table II.5 is similar to that in Table II.3: $\ln(\text{Total Pay})$ is the dependent variable and Rank is the key independent variable. In Column (1) of Table II.5, we define *Small Firm* dummy, taking the value of one if firm size is below the sample median, and zero otherwise. The coefficient of the interaction $\text{Rank} \times \text{Small Firm}$ is 0.199 and is significant at the 1% level. This result indicates that small firms tend to pay a higher premium in response to unpleasant living environments. The economic magnitude is also sizeable: The partial effect of Rank on total pay is about 0.039 for large firms ($\text{Small Firm}=0$) and is about 0.248 ($0.039+0.199$) for small firms. In Column (2), we define *Young Firm* dummy based on the sample median firm age, where firm age is the number of years since the firm first appeared in CRSP. The interaction $\text{Rank} \times \text{Young Firm}$ has a coefficient of 0.268, which is significant at the 1% level. This result indicates that young firms are more likely to increase CEO pay in response to a less attractive location. Furthermore, based on the sample median of the number of firms in the same industry outside a given state, we define *Outside Rivals* dummy. When $\text{Outside Rivals}=1$, it indicates that the firm faces a more competitive labor market for managerial talents because there are many potential rivals in other states. Column (3) shows a significantly positive coefficient of

Rank×*Outside Rivals*, implying that a poorly located firm is more likely to pay a premium when facing a large number of potential rivals. Overall, the results in Columns (1)-(3) support the view that the compensation premium for quality of life is more evident for firms that face tougher competition for managerial talents.

The pay premium for quality of life can be different between an internally promoted CEO and a CEO hired from outside. CEOs appointed from outside the firm are usually the ones with better reputation, stronger managerial talent and richer outside opportunities, because the hurdle for hiring an outside CEO is higher than for hiring an inside CEO, since insiders have the advantage of possessing firm-specific knowledge (Milbourn (2003) and Rajgopal et al. (2006)). To examine this idea, we flag the CEO hired from inside the firm based on ExecuComp database. In particular, ExecuComp records the date when the CEO takes the CEO position and the date when the CEO first joins the company. We define *Internal CEO* dummy as one if the CEO joins the firm more than one year earlier than she takes the CEO position, and zero otherwise. In Column (4) the coefficient of *Rank*×*Internal CEO* is significantly negative, consistent with the view that the pay premium for quality of life is more important for a firm competing for outside CEOs.

Another factor that may influence the premium for quality of life is the CEO's career concerns. A CEO approaching retirement tends to be more short-term oriented (Gao (2010) and Gibbons and Murphy (1992)). A young CEO, who has greater concern about future development in the labor market, may agree to work as CEO in a poorly located company even if the current annual compensation is not high. In contrast, a near-retirement CEO, who is usually more concerned about the short-term monetary recompense, is more likely to demand a high compensation premium for working in a less pleasant location. To examine this prediction, we

define the *Retirement* dummy, using the age 65 as the cutoff, and include this variable and its interaction with *Rank* in Column (5). The coefficient of *Rank*×*Retirement* is 0.236 and is significant at the 5% level. The economic interpretation of this coefficient is as follows. The partial effect of *Rank* on compensation for non-retiring CEOs is 0.108, while its partial effect for retiring CEOs is 0.344 (0.108+0.236). Clearly, managerial career concern plays an important role in explaining the compensation premium for living in a less pleasant location.³⁰

In summary, Table II.5 suggests that the pay premium for life quality is largely driven by the competition in the labor market for CEOs. In particular, this pay premium is more evident when the firm is small, when the firm is young, when the firm faces a large number of rivals, when the firm tries to hire an external CEO, and when the CEO has a short career horizon.³¹

3.4. *Individual Ranking Factors and CEO Compensation*

So far, we have used the overall quality-of-life ranking, but quality of life may be subjective depending on individuals. For example, some people like sunny days, while others enjoy rain. Their views of quality of life may not be uniform. Moreover, our overall quality-of-life ranking is based on an equal-weighted index of all the 43 factors, but these factors may not be equally important. To address these concerns, in this section we examine some individual factors where people are likely to have similar preferences. To the extent that a typical CEO

³⁰ It is possible that CEOs in different age cohorts have different concerns about geographic liveability and that the *Retirement* dummy captures this general age effect rather than career developments. To examine this possibility, we interact *Rank* with *CEO age*. The interaction *Rank*×*CEO age* is not significantly different from zero and its coefficient is almost zero. This result indicates that the compensation premium for quality of life is generally the same for CEOs of different age cohorts.

³¹ It may also be interesting to know whether the quality of life premium varies across gender. We then flag female CEO, and include the female dummy and its interaction with *Rank* in the regression. The coefficient of *Rank*×*Female CEO* is not significantly different from zero, suggesting that the compensation premium for the location desirability is not different between female CEOs and male CEOs. This result is understandable if men and women derive the same utility from living in a pleasant location or if the CEO and his/her spouse make the career choice together.

candidate, aged 45 to 60, may particularly care about environmental safety, efficient transportation, and family-friendly infrastructure, we focus on rankings based on five specific factors: hazardous waste sites, prisoner incarceration rates, travel time to work, government expenditure on education, and government spending on public welfare.

[Insert Table II.6 Here]

In Table II.6 Column (1), the coefficient on *Hazardous Waste Site* is positive and significant at the 1% level, indicating that companies in a state with more hazardous waste sites pay higher CEO compensation. Given the well-known fact of people's desire to avoid this type of facility (see Smith and Desvousges (1986) for example), a CEO will demand higher compensation to work in such a location. In Column (2), we use the prisoner incarceration rates as another indicator of environmental safety and find that CEOs receive more compensation when the prisoner incarceration rate is higher. Our results are broadly consistent with Roback (1982), who argues that the price of pollution and crime may be implicitly reflected in the workers' wages in the labor market.

Transportation may be another aspect of liveability for corporate executives. Using the average state-level travel time to work as a proxy for the overall transportation conditions in Column (3), we find that CEO compensation is higher in areas with less efficient transportation (i.e., more travel time to work).³² This result is consistent with view that travel time to work reduces the employees' leisure and therefore a higher wage is needed to compensate for that (Becker (1965), Gronau (1977), and Solberg and Wong (1992)).

³² Morgan Quitno starts to provide state ranking of the number of airports from 2005. Based on the subsample over 2005-2008, we find that companies in the states with more airports pay significantly lower CEO compensation. We also conduct the test using the state ranking based on Highway Fatality Rate, but the result is not significant, which suggests that highway fatality may not be the important factor that affects the CEO pay.

It is possible that family considerations are also important in CEOs' career choices. To investigate this possibility, in Columns (4) and (5) we include state spending on education and public welfare as independent variables, respectively. These variables are particularly interesting for two reasons. First of all, they can be proxies for the facilities of children's education and overall neighborhood environment, which are important from a family's perspective and in turn influence CEO compensation. Second, unlike the previous three factors which might imply higher managerial effort needed to run a business in these areas and thereby higher pay for the effort,³³ the government expenditure on education and public welfare is less likely to be correlated with managers' effort, but more likely to be regarded as family-supporting facilities. The coefficients on spending on education and public welfare are significantly negative, indicating that a CEO receives lower pay when the firm's location is more family-friendly.

In summary, complementing our earlier analysis on overall liveability rankings, we find that individual factors of pollution, crime, transportation, and family facilities are also important in influencing CEO compensation.

4. Robustness Check and Additional Investigations

4.1. Alternative Ranking for Quality of Life

Given that there is likely to be very large within-state variability in Morgan Quitno rankings, we employ two city level measures published by *Forbes Magazine* and *Bloomberg Business Week*. *Forbes* has published a list of "America's Most Miserable Cities" annually from 2008 to 2010 and a list of "America's Most Livable Cities" annually from 2009 to 2010.

³³ Specifically, Hazardous Waste Sites, Prisoner Incarceration Rate and Travel Time to Work could be proxies for environmental regulatory risk, property loss risk, and commuting convenience. If there are higher risks and less convenience, the CEO has to contribute more effort and consequently may require higher compensation. In other word, the effect of such factors might reflect the compensation for managerial efforts.

Bloomberg Business Week also compiles a list of “Unhappiest Cities” for U.S. cities in 2010.³⁴ Similar to Morgan Quitno’s approach, *Forbes* and *Business Week* also construct their ranking based on factors like suicide rates, divorce rates, crime, unemployment, population loss, job loss, weather, and green space. Under these alternative rankings, we re-examine the effect of liveability on CEO compensation. Given that the rankings for *Forbes* and *Business Week* only cover recent years, we apply these rankings to our entire sample period from 1993 to 2008, assuming that the city’s living environment is persistent over time. We define the dummies of *Business Week America’s Unhappiest City*, *Forbes America’s Most Miserable City*, and *Forbes America’s Most Livable City* as one if the firm’s headquarter locates within ten miles of the cities in the respective rankings, and zero otherwise.³⁵ In our sample, 354, 1284, and 812 firm-year observations are *Business Week America’s Unhappiest City*, *Forbes America’s Most Miserable City*, and *Forbes America’s Most Livable City*, respectively.

[Insert Table II.7 Here]

Table II.7 shows the results with *Forbes* and *Business Week* rankings. In Column (1), we use *Business Week America’s Unhappiest City* dummy as our livable measure and the coefficient is 0.134 and is significant at the 1% level. The result suggests that firms around the “Unhappiest

³⁴ Forbes Magazine most miserable cities 2008-2010: Akron, Buffalo, Canton, Chicago, Cleveland, Detroit, Flint, Gary, Kansas City, Memphis, Miami, Modesto, New York, Philadelphia, Rockford, Sacramento, St Louis, Stockton, Toledo, Youngstown, Los Angeles, Charlotte and Providence (www.forbes.com/2010/02/11/americas-most-miserable-cities-business-beltway-miserable-cities.html).

Forbes Magazine most livable cities 2009-2010: Little Rock, Peabody, Madison, Harrisburg, Denver, Pittsburgh, Worcester, Baltimore, Cambridge, Oklahoma City, Tulsa, Stamford, Des Moines, Bethesda, Portland, Lincoln, Bridgeport, Norwalk, Trenton, Ewing, Manchester, Nashua, Omaha, Council Bluffs, Harrisburg, Carlisle, Ann Arbor, Provo, Orem, Clearfield and Ogden (www.forbes.com/2010/04/29/cities-livable-pittsburgh-lifestyle-real-estate-top-ten-jobs-crime-income_slide.html).

Businessweek America’s Unhappiest Cities 2010: Portland, St Louis, New Orleans, Detroit, Cleveland, Jacksonville, Las Vegas, Nashville Davidson, Cincinnati, Atlanta, Milwaukee, Sacramento, Kansas City, Pittsburgh, Memphis, Indianapolis City, Louisville, Tucson, Minneapolis and Seattle (http://images.businessweek.com/ss/09/02/0226_miserable_cities/index.htm).

³⁵ Instead of using ten miles, we also construct the dummies based on the same Metropolitan Statistical Areas; our results are similar.

Cities” pay about 13% higher compensation to CEOs than other companies. Using *Forbes America’s Most Miserable City* and *Forbes America’s Most Livable City* dummies respectively, Columns (2) and (3) give consistent results: Firms in the miserable locations pay more, while those locating around the desirable places pay less to their CEOs. Finally, we include both *Forbes America’s Most Miserable City* and *Forbes America’s Most Livable City* in the regression analysis and find that the coefficients for both dummies are significant, the first at the 5% significance level and the latter at the 10% level. The coefficients for the two dummies are 0.055 and -0.057, respectively, indicating that firms located around “Forbes America’s Most Miserable Cities” pay 5.5% higher than those located in the normal places, while firms located around “Forbes America’s Most Livable Cities” pay 5.7% less than those located in the normal places.

4.2. *Quality of Life Premium for Management Team*

To further our understanding of how the company pays compensation premiums to attract managerial talents in response to unpleasant locations, we examine how widespread the pay premium is within the senior management ranks. The ExecuComp database includes compensation information for up to the five highest paid managers. We re-estimate Equation (1) by using all the rest of top four executive data (excluding the CEO).³⁶

[Insert Table II.8 Here]

Table II.8 shows that the premium for quality of life applies not only for the CEO but is also prevalent for other senior executives. The coefficients of *Rank* are significantly positive in

³⁶ We don’t include executive age in Table II. 8, because about 50% of executive age is missing in ExecuComp database.

all the six regressions. Notably, the magnitude of these coefficients is similar to that reported in Table II.3 based on CEO compensation, suggesting that the premium for quality of life is equally important for CEOs and other top executives.³⁷

4.3. *Discussion*

The purpose of this paper is not to explain the choices of corporate headquarter locations, but rather to examine the real effect of the desirability of corporate locations on CEO pay. But it is still an interesting question why some firms choose to stay in an unpleasant location and pay a premium to their executives. One possible reason is that households and firms differ in their objectives, utility versus profit maximization; many places least attractive to households are most attractive to firms (Gabriel and Rosenthal (2004)). Moreover, it is theoretically possible that a firm moves its headquarters to a more desirable location in order to attract managerial talent. But moving headquarters is rare in practice. For example, Pirinsky and Wang (2006) find that over the period 1992-1997, only 118 U.S. public firms relocated their headquarters, and the primary concern for the headquarter location decision was to get closer to customers. In our sample, we only find 34 relocation cases. This number is even smaller than that reported in Pirinsky and Wang (2006), probably because the firms covered in ExecuComp database are the biggest U.S. public firms and these companies are less likely to relocate headquarters. As a robustness check, we exclude these relocation firms and re-do all the analysis; our results are unchanged.

Another possible channel for geographic desirability to influence compensation is that a good working and living environment increases the CEO's productivity, which in turn increases the compensation level. This argument is less likely for the following two reasons. First of all,

³⁷ I also use the subsample of COOs and CFOs to conduct the regression (5) and I find that the coefficient estimate on Rank is 0.080 and significant at 5% level.

we have controlled for stock and operating performance in the regression, which can roughly reflect the CEO's productivity. Second, this argument suggests that CEOs working in more livable locations should receive higher compensation, which is just opposite to our findings.

It is worth mentioning that a state's attractiveness to a CEO may depend on the CEO's origin. Yonkers (2010) shows that CEOs have geographic preference towards working in their home states, especially when their home states are desirable for living. Moreover, CEOs working in their home states are paid less. Our paper is consistent with Yonkers (2010) in terms of showing the important role of geography in CEO compensation policy.

Ang et al. (2010) show that the level of CEO compensation is positively associated with the number of local CEOs, and they explain this finding as the effect of social pressure on CEO compensation. It is possible that a large number of CEOs live in some unpleasant location, which pushes up the level of CEO pay due to the social pressure effect. To investigate this possibility, we compute the number of firms in the same state as a proxy for the number of local CEOs, and include it as an additional control to re-estimate Equation (1). The result of the pay premium for quality of life is the same.

It is likely that firms in the same industry tend to cluster at the same location, and therefore, the geographic difference in CEO pay reflects the industry effect. In the regression analysis, we have controlled for industry fixed effects based on Fama and French (1997) 48 industry classifications. As a robustness check (unreported), we also control for industry fixed effects based on 1-digit, 2-digit, and 3-digit SIC codes; our results are largely unchanged. Moreover, we pay special attention to California for the following two reasons. First, most of the IT firms are clustered in California; therefore the industry fixed effect for tech companies may be compounded with the state fixed effect. Second, California is the most populated state as regards

the number of company headquarters and it is in the lower half of states by desirability, which may critically influence our results. To examine whether our results are mainly driven by California, we exclude the firms in California from our sample and re-do all the empirical analysis; the results are similar.

It is worth mentioning that the Morgan Quitno index includes individual income as positive factors (for example, Per Capita Personal Income and Median Household Income). This fact may work against us finding a positive relation between *Rank* and CEO pay if the CEO compensation in each state were solely a multiple of the state's average income.³⁸

Our primary measure of total compensation is ExecuComp Item *TDC1*. Starting in 2006, the definition of *TDC1* is slightly changed.³⁹ To examine the effect of this inconsistency of *TDC1* definition on our results, we follow Walker's (2009) method to reconcile the *TDC1* definition between the 1993-2005 period and the 2006-2008 period. Our results are unchanged.

To investigate whether the effect of pay premium of living quality changes over time, I split the sample into two subsamples, pre-2000 and post-2000, and run the regression (5) in table 3 using these two subsamples. The coefficient estimate of *Rank* in pre-2000 subsample is 0.23 and significant at 1% level, while that in post-2000 subsample is 0.07 and significant at 10% level. This could be due to that post-2000 period covers the enactment of the Sarbanes-Oxley act and the 2008 financial crisis, which may biased down the effect of quality of life premium. In addition, since there may be high serial correlation in annual CEO compensations, I average

³⁸ We thank the anonymous referee for providing this comment.

³⁹ For 1993-2005, *TDC1* consists of salary, bonus, other annual compensation, the grant date value of restricted stock, the grant date value of option, long-term incentive plan and other total compensation. For 2006-2008, *TDC1* consists of salary, bonus, non-equity incentive plan, the grant date value of restricted stock, the grant date value of option, deferred compensation, and other compensation.

individual CEO compensations across years and then estimate the simple cross sectional regression. The coefficient estimate on Rank is 0.134 and significant at 5%.

Our results could also be driven by financial firms, most of which are located in New York. As is shown in Table II.1, New York is relatively less livable with an average ranking of 37, while financial firms are well known for the high compensation. To rule out such possibility, we exclude firms in financial and utility industries, namely firms with a SIC code between 4900-4999 and 6000-6999. The results reported in Appendix 3 show that the coefficients of rank remain significantly positive across different models.

It is also worth noting that since CEOs in livable places are more likely to be better CEOs, the premium for quality of life is expected to be higher if CEO qualities are correctly controlled. In the regression, I have included Return and M/B, which can be considered as important measures for management quality (Lang, Stulz, and Walkling (1989), Milbourn (2003)). To further control, I use operating income growth rate, which is calculated as the growth rate of *EBITDA* over the past three years, as another proxy for management quality (Morck, Shleifer, and Vishny (1990)) and redo the regression (5) in Table II.3. The coefficient estimate on Rank increases to 0.137.

5. Conclusion

Do nonmonetary benefits matter in overall executive compensation practice? In this paper, we empirically examine this question from the perspective of the living environment around corporate headquarters. We provide the first evidence that CEOs working in unpleasant locations are paid more than those working in more livable locations. This compensation

premium for quality of life is both economically and statistically significant after controlling for conventional firm and CEO characteristics.

This quality of life pay premium is more evident for firms facing tougher competition for managerial talents, for externally-hired CEOs, and for retiring CEOs. These results suggest that the CEO pay premium for liveability is part of efficient contracting driven by competitive market forces.

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Table II. 1 State Ranking and CEO Compensation

The table reports the compensation for executives in states with different liveability rankings. The sample consists of 14,295 firm-year observations based on CRSP/Compustat/ExecuComp merged data from 1993 to 2008. The liveability ranking is published by Morgan Quitno in the end of every year. The ranking scales from 1 to 50, with 1 meaning “most livable” and 50 “least livable.” *Average Rank* is based on the average Morgan Quitno ranking of each state during 1993-2008. CEO Total Pay is the variable *TDC1* in ExecuComp, which consists of salary, bonus, value of restricted stock granted, value of options granted (using Black-Scholes), long-term incentive payouts, and other compensation. Sales is from Compustat. The compensation and sales are in 2008 dollars.

Average Rank	State Name	CEO Total Pay (\$M)		Sales (\$M)		Number of firm-year
		Mean	Median	Mean	Median	
1	Minnesota	4.65	2.95	5,626	1,616	505
2	New Hampshire	2.80	1.84	945	802	26
3	Iowa	2.61	1.69	1,795	1,120	109
4	Utah	2.23	1.47	949	616	69
5	Nebraska	5.47	3.27	4,135	1,232	63
6	Kansas	7.62	5.10	6,908	3,288	63
7	Wisconsin	3.49	2.80	3,238	1,613	345
8	Virginia	6.86	3.78	8,058	3,908	372
9	Vermont	0.90	0.63	379	381	17
10	South Dakota	0.91	0.65	760	579	20
11	Connecticut	5.47	3.45	5,729	1,429	346
12	Massachusetts	4.78	2.89	2,395	810	584
13	Colorado	5.30	2.92	2,360	997	197
14	Wyoming	--	--	--	--	0
15	New Jersey	5.54	3.45	6,329	1,487	440
16	North Dakota	2.44	2.66	2,818	2,608	8
17	Idaho	2.82	1.60	1,467	725	65
18	Maine	5.60	2.80	1,028	591	19
19	Maryland	5.92	3.86	5,178	1,384	165
20	Oregon	2.99	2.12	1,771	586	180
21	Delaware	5.53	4.64	14,696	1,065	42
22	Washington	3.42	2.13	7,963	1,942	229
23	Indiana	4.25	2.07	3,904	1,261	186
24	Missouri	3.54	2.21	3,107	1,734	321
25	Montana	2.10	1.69	543	346	12
26	Hawaii	2.35	2.20	1,465	1,608	40
27	Nevada	3.29	1.83	1,273	924	102
28	Illinois	4.87	3.40	7,362	2,316	843
29	Ohio	4.17	2.74	5,894	2,032	784
30	Rhode Island	5.52	2.69	8,656	3,226	57
31	Alaska	1.61	1.40	398	420	11
32	Michigan	4.75	2.67	7,387	2,235	382
33	Pennsylvania	5.23	3.09	4,617	1,934	653
34	California	5.80	2.99	3,710	779	2,188
35	Texas	5.51	3.09	6,132	1,513	1,286
36	Arizona	4.48	3.22	2,362	998	153
37	Georgia	4.73	2.57	6,000	1,477	422
38	New York	8.28	4.59	8,889	2,325	1,209
39	North Carolina	4.18	2.56	5,168	2,074	349
40	Oklahoma	3.74	2.20	3,102	1,124	115
41	Florida	5.03	3.73	3,869	1,545	443
42	Arkansas	4.34	1.62	13,438	2,348	122
43	South Carolina	2.67	2.31	1,732	1,280	78
44	Kentucky	7.20	5.58	6,178	4,680	92
45	New Mexico	1.63	1.47	1,647	1,464	13
46	Tennessee	3.96	2.86	4,421	1,433	265
47	Alabama	4.32	2.18	1,465	831	117
48	West Virginia	1.33	1.30	331	314	11
49	Louisiana	3.27	1.84	1,829	934	128
50	Mississippi	1.84	1.17	601	488	49

Table II. 2 Summary Statistics of Sample Firms

The sample consists of 14,295 firm-year observations based on CRSP/Compustat/ExecuComp merged data from 1993 to 2008. Total pay is the variable *TDC1* in ExecuComp, which consists of salary, bonus, value of restricted stock granted, value of options granted (using Black-Scholes), long-term incentive payouts, and other compensation. Salary and Bonus are the variables *salary* and *bonus* in ExecuComp, respectively. *Firmsize* is natural logarithm of total sales from Compustat. *Volatility* is the standard deviation of monthly stock return for the prior sixty months. *RET* is the buy-and-hold return on the firm's stock for the prior twelve months. *ROA* is net income before extraordinary items and discontinued operation divided by the total asset. *M/B* equals market value of equity divided by book value of equity, where the market value is obtained as fiscal year closing price multiplied by common shares outstanding. *Cash* is the ratio of cash item over total asset. *Leverage* is defined as the sum of current liabilities and long-term debt divided by total assets minus book value of equity plus market value of equity. *Capex* is the ratio of capital expenditures over total assets. *CEO Age* is the age of the executive from ExecuComp. *Ownership* is the ratio of shares excluding options owned by the executives over shares outstanding. All the dollar-value variables are measured in 2008-constant dollars. Correlations with an absolute value greater than 0.02 are significant at the 5% level.

Panel A: Descriptive statistics of firm characteristics

Variable	N	Mean	Std	P25	Median	P75
Total pay (\$M)	14,295	5.17	6.44	1.43	2.93	6.04
Salary (\$M)	14,295	0.78	0.37	0.52	0.73	1.00
Bonus (\$M)	14,295	0.76	1.80	0.00	0.30	0.89
Sales (\$M)	14,295	5,240	10,786	555	1,428	4,390
Firmsize	14,295	7.35	1.62	6.32	7.26	8.39
Volatility (%)	14,295	12.14	5.77	8.02	10.70	14.77
RET (%)	14,295	19.34	49.23	-9.41	12.32	36.61
ROA (%)	14,295	4.88	8.71	2.07	5.08	9.00
M/B	14,295	3.27	3.21	1.61	2.36	3.83
Cash	14,295	0.09	0.11	0.02	0.04	0.12
Leverage	14,295	0.15	0.14	0.03	0.12	0.24
Capex	14,295	0.06	0.05	0.02	0.04	0.07
CEO Age	14,295	55.65	7.24	51.00	56.00	60.00
Ownership (%)	14,295	2.51	5.81	0.09	0.32	1.47

Panel B: Correlation matrix of explanatory variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Rank	1.00										
(2) Firmsize	0.00	1.00									
(3) Volatility	0.06	-0.44	1.00								
(4) RET	0.02	-0.06	0.09	1.00							
(5) ROA	-0.02	0.18	-0.31	0.20	1.00						
(6) M/B	-0.01	-0.02	0.10	0.31	0.26	1.00					
(7) Cash	-0.02	-0.35	0.42	0.13	0.00	0.23	1.00				
(8) Leverage	0.02	0.18	-0.11	-0.19	-0.30	-0.30	-0.39	1.00			
(9) Capex	0.06	-0.04	0.02	0.03	0.13	0.07	-0.08	-0.06	1.00		
(10) CEO Age	0.01	0.12	-0.20	-0.04	0.06	-0.09	-0.13	0.05	-0.02	1.00	
(11) Ownership	0.02	-0.16	0.10	0.06	0.08	0.07	0.09	-0.11	0.06	0.13	1.00

Table II. 3 The Existence of Pay Premium for Quality of Life

The sample consists of 14,295 firm-year observations based on CRSP/Compustat/ExecuComp merged data from 1993 to 2008. Total Pay is the variable *TDC1* in ExecuComp, which consists of salary, bonus, value of restricted stock granted, value of options granted (using Black-Scholes), long-term incentive payouts, and other compensation. *Rank* is the state-level liveability ranking published by Morgan Quitno at the end of every year scaled by 50. The ranking scales from 0 to 1, with 0 meaning “most livable” and 1 “least livable.” The definitions of all other controls are the same as in Table 2. Industry dummies are constructed based on Fama and French (1997) 48 industries. Corresponding *p*-values from robust standard errors are reported in parentheses. The notations ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	(1) Ln(Total Pay)	(2) Ln(Total Pay)	(3) Ln(Total Pay)	(4) Ln(Total Pay)	(5) Ln(Total Pay)	(6) Ln(Total Pay)
Rank	0.127*** (0.001)	0.151*** (0.000)	0.148*** (0.000)	0.120*** (0.000)	0.124*** (0.000)	0.152* (0.076)
Firmsize			0.411*** (0.000)	0.431*** (0.000)	0.416*** (0.000)	0.433*** (0.000)
Volatility				1.365*** (0.000)	1.597*** (0.000)	1.634*** (0.000)
RET				0.173*** (0.000)	0.176*** (0.000)	0.164*** (0.000)
ROA				-0.057 (0.679)	0.099 (0.463)	0.802*** (0.000)
M/B				0.033*** (0.000)	0.033*** (0.000)	0.034*** (0.000)
Cash				0.114 (0.403)	0.143 (0.286)	0.164 (0.202)
Leverage				-0.070 (0.323)	-0.124* (0.080)	-0.372*** (0.000)
Capex				-0.303 (0.112)	-0.188 (0.318)	0.260 (0.164)
CEO Age					0.003** (0.013)	0.003** (0.033)
Ownership					-2.844*** (0.000)	-2.621*** (0.000)
Constant	7.925*** (0.000)	8.275*** (0.000)	4.849*** (0.000)	4.364*** (0.000)	4.333*** (0.000)	4.039*** (0.000)
Year Fixed Effect	No	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	No	Yes	Yes	Yes	Yes	Yes
State Fixed Effect	No	No	No	No	No	Yes
Observations	14,295	14,295	14,295	14,295	14,295	14,295
Adjusted- R^2	0.1%	6%	34%	36%	38%	42%

Table II. 4 The Existence of Pay Premium for Quality of Life—Different Measure of Pay

The sample consists of 14,295 firm-year observations based on CRSP/Compustat/ExecuComp merged data from 1993 to 2008. Ex-post Pay is the Item *TDC2* in ExecuComp; *TDC2* is the same as *TDC1* except it replaces the value of options granted with the value of options exercised during the year. Cost of Living Adjusted Pay is Total Pay adjusted for the cost of living of the headquarter-located city using the city of Los Angeles as the benchmark, which is equal to $[\text{total pay} \times (\text{Los Angeles' cost of living} / \text{the city's cost of living})]$. Tax Adjusted Pay is computed as $[\text{Total Pay} \times (1 - \text{state income tax})]$, where state income tax is the highest bracket of the state income tax. The variable, *Rank*, is the state-level liveability ranking published by Morgan Quitno at the end of every year scaled by 50. The ranking scales from 0 to 1, with 0 meaning “most livable” and 1 “least livable.” The definitions of all other controls are the same as in Table 2. Industry dummies are constructed based on Fama and French (1997) 48 industries. Corresponding *p*-values from robust standard errors are reported in parentheses. The notations ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	(1) Ln(Salary+ Bonus)	(2) Ln(Ex-post Pay)	(3) Ln(Cost of Living Adjusted Pay)	(4) Ln(Tax Adjusted Pay)	(5) Ln(Total Pay)
Rank	0.070*** (0.001)	0.092*** (0.008)	0.228*** (0.000)	0.140*** (0.000)	0.169*** (0.000)
Cost of Living					0.003*** (0.000)
State Income Tax					0.424 (0.121)
Firmsize	0.250*** (0.000)	0.382*** (0.000)	0.409*** (0.000)	0.422*** (0.000)	0.412*** (0.000)
Volatility	-0.366** (0.014)	0.362 (0.107)	1.432*** (0.000)	1.410*** (0.000)	1.540*** (0.000)
RET	0.101*** (0.000)	0.314*** (0.000)	0.184*** (0.000)	0.184*** (0.000)	0.182*** (0.000)
ROA	0.044 (0.693)	0.658*** (0.000)	0.220 (0.106)	-0.008 (0.944)	0.143 (0.292)
M/B	0.003 (0.388)	0.039*** (0.000)	0.031*** (0.000)	0.031*** (0.000)	0.033*** (0.000)
Cash	-0.229* (0.055)	0.253* (0.076)	-0.003 (0.983)	0.344*** (0.000)	0.061 (0.642)
Leverage	0.098 (0.147)	-0.085 (0.276)	-0.106 (0.130)	-0.140** (0.030)	-0.095 (0.176)
Capex	-0.519*** (0.003)	-0.206 (0.346)	-0.074 (0.697)	-0.223 (0.195)	-0.088 (0.641)
CEO Age	0.009*** (0.000)	0.013*** (0.000)	0.002* (0.068)	0.002* (0.095)	0.003** (0.029)
Ownership	-1.130*** (0.000)	-2.615*** (0.000)	-2.751*** (0.000)	-2.649*** (0.000)	-2.829*** (0.000)
Constant	4.829*** (0.000)	4.203*** (0.000)	4.210*** (0.000)	4.267*** (0.000)	3.757*** (0.000)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes
Observations	14,224	14,280	14,251	14,295	14,295
Adjusted- <i>R</i> ²	28%	34%	41%	46%	39%

Table II. 5 The Justification of Pay Premium for Quality of Life

The sample consists of 14,295 firm-year observations based on CRSP/Compustat/ExecuComp merged data from 1993 to 2008. Total Pay is the variable *TDC1* in ExecuComp, which consists of salary, bonus, value of restricted stock granted, value of options granted (using Black-Scholes), long-term incentive payouts, and other compensation. *Rank* is the state-level liveability ranking published by Morgan Quitno at the end of every year scaled by 50. The ranking scales from 0 to 1, with 0 meaning “most livable” and 1 “least livable.” *Small Firm* is a dummy variable taking the value of one if firm size is below the sample median, and zero otherwise. *Young Firm* is a dummy variable defined as one if firm age is below the sample median, where firm age is the number of years since the firm first appears in CRSP. *Outside Rivals* is a dummy variable, which equals one if the number of firms outside this state in the same industry is above the sample median, and zero otherwise. *Internal CEO* is a dummy variable, taking the value of one if the CEO was promoted from inside the firm, and zero otherwise. *Retirement* dummy equals one if the CEO reaches age 65 or above, and zero otherwise. The definitions of all other controls are the same as in Table 2. Industry dummies are constructed based on Fama and French (1997) 48 industries. Corresponding *p*-values from robust standard errors are reported in parentheses. The notations ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	Ln(Total Pay)	Ln(Total Pay)	Ln(Total Pay)	Ln(Total Pay)	Ln(Total Pay)
Rank	0.039 (0.390)	-0.011 (0.769)	0.020 (0.599)	0.186*** (0.000)	0.108*** (0.001)
Small Firm	-1.064*** (0.000)				
Rank×Small Firm	0.199*** (0.001)				
Young Firm		-0.071** (0.041)			
Rank×Young Firm		0.268*** (0.000)			
Outside Rivals			-0.008 (0.889)		
Rank×Outside Rivals			0.095* (0.100)		
Internal CEO				-0.025 (0.486)	
Rank×Internal CEO				-0.103* (0.078)	
Retirement					-0.162** (0.020)
Rank×Retirement					0.236** (0.028)
Firmsize		0.422*** (0.000)	0.441*** (0.000)	0.416*** (0.000)	0.416*** (0.000)
Volatility	-0.268 (0.225)	1.437*** (0.000)	1.840*** (0.000)	1.548*** (0.000)	1.522*** (0.000)
RET	0.157*** (0.000)	0.175*** (0.000)	0.159*** (0.000)	0.177*** (0.000)	0.176*** (0.000)
ROA	0.970*** (0.000)	0.071 (0.599)	0.828*** (0.000)	0.095 (0.481)	0.097 (0.474)
M/B	0.040*** (0.000)	0.033*** (0.000)	0.035*** (0.000)	0.033*** (0.000)	0.033*** (0.000)
Cash	-0.414*** (0.001)	0.177 (0.182)	0.216* (0.094)	0.141 (0.292)	0.136 (0.308)
Leverage	0.294*** (0.000)	-0.132* (0.061)	-0.405*** (0.000)	-0.119* (0.092)	-0.124* (0.079)
Capex	-0.662*** (0.001)	-0.189 (0.317)	0.103 (0.571)	-0.209 (0.269)	-0.203 (0.282)
CEO Age	0.004*** (0.001)	0.004*** (0.003)	0.003*** (0.009)	0.003*** (0.006)	
Ownership	-3.210*** (0.000)	-2.886*** (0.000)	-2.612*** (0.000)	-2.880*** (0.000)	-2.754*** (0.000)
Constant	7.939*** (0.000)	4.281*** (0.000)	4.031*** (0.000)	4.384*** (0.000)	4.519*** (0.000)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes
Observations	14,295	14,295	14,295	14,295	14,295
Adjusted- R^2	30%	38%	41%	38%	38%

Table II. 6 Individual Liveability Factors and CEO Compensation

The sample consists of 14,295 firm-year observations based on CRSP/Compustat/ExecuComp merged data from 1993 to 2008. Total Pay is the variable *TDC1* in ExecuComp, which consists of salary, bonus, value of restricted stock granted, value of options granted (using Black-Scholes), long-term incentive payouts, and other compensation. Hazardous Waste Sites, Prisoner Incarceration Rate, Travel Time to Work, Expenditures for Education, and Spending for Public Welfare are the state-level ranking based on the corresponding individual factors scaled by 50, which are ranges from 0 to 1. A higher ranking implies more hazardous waste sites, higher prisoner incarceration rates, more time needed to travel to work, greater government expenditure for education, and larger government spending for public welfare, respectively. The definitions of all other controls are the same as in Table 2. Industry dummies are constructed based on Fama and French (1997) 48 industries. Corresponding *p*-values from robust standard errors are reported in parentheses. The notations ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	(1) Ln(Total Pay)	(2) Ln(Total Pay)	(3) Ln(Total Pay)	(4) Ln(Total Pay)	(5) Ln(Total Pay)
Hazardous Waste Sites	0.205*** (0.000)				
Prisoner Incarceration Rate		0.063** (0.035)			
Travel Time to Work			0.304*** (0.000)		
Expenditures for Education				-0.248*** (0.000)	
Spending for Public Welfare					-0.070** (0.018)
Firmsize	0.413*** (0.000)	0.416*** (0.000)	0.412*** (0.000)	0.416*** (0.000)	0.416*** (0.000)
Volatility	1.663*** (0.000)	1.615*** (0.000)	1.570*** (0.000)	1.630*** (0.000)	1.678*** (0.000)
RET	0.176*** (0.000)	0.176*** (0.000)	0.177*** (0.000)	0.178*** (0.000)	0.177*** (0.000)
ROA	0.118 (0.382)	0.092 (0.498)	0.139 (0.374)	0.123 (0.363)	0.104 (0.440)
M/B	0.033*** (0.000)	0.034*** (0.000)	0.033*** (0.000)	0.033*** (0.000)	0.034*** (0.000)
Cash	0.116 (0.386)	0.141 (0.293)	0.081 (0.459)	0.089 (0.504)	0.135 (0.313)
Leverage	-0.109 (0.125)	-0.124* (0.081)	-0.111** (0.043)	-0.116 (0.101)	-0.118* (0.096)
Capex	-0.096 (0.611)	-0.200 (0.288)	-0.068 (0.112)	-0.120 (0.527)	-0.177 (0.348)
CEO Age	0.003** (0.015)	0.003** (0.011)	0.002** (0.035)	0.003** (0.034)	0.003** (0.012)
Ownership	-2.841*** (0.000)	-2.842*** (0.000)	-2.802*** (0.000)	-2.816*** (0.000)	-2.841*** (0.000)
Constant	4.240*** (0.000)	4.348*** (0.000)	4.161*** (0.000)	4.524*** (0.000)	4.420*** (0.000)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes
Observations	14,295	14,295	14,295	14,295	14,295
Adjusted- R^2	39%	39%	39%	39%	39%

Table II. 7 Alternative Rankings and CEO Compensation

The sample consists of 14,295 firm-year observations based on CRSP/Compustat/ExecuComp merged data from 1993 to 2008. Total Pay is the variable TDC1 in ExecuComp, which consists of salary, bonus, value of restricted stock granted, value of options granted (using Black-Scholes), long-term incentive payouts, and other compensation. Business Week's America's Unhappiest City, Forbes' America's Most Miserable City and Forbes' America's Most Livable City are dummies defined as one if the firms' headquarters are located within ten miles from the cities in the three rankings, otherwise zero. The definitions of all other controls are the same as in Table 2. Industry dummies are constructed based on Fama and French (1997) 48 industries. Corresponding p-values from robust standard errors are reported in parentheses. The notations ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	(1) Ln(Total Pay)	(2) Ln(Total Pay)	(3) Ln(Total Pay)	(4) Ln(Total Pay)
Business Week America's Unhappiest City	0.134*** (0.000)			
Forbes America's Most Miserable City		0.059** (0.029)		0.055** (0.044)
Forbes America's Most Livable City			-0.064* (0.070)	-0.057* (0.081)
Firmsize	0.441*** (0.000)	0.440*** (0.000)	0.441*** (0.000)	0.440*** (0.000)
Volatility	1.857*** (0.000)	1.863*** (0.000)	1.834*** (0.000)	1.847*** (0.000)
RET	0.158*** (0.000)	0.159*** (0.000)	0.160*** (0.000)	0.160*** (0.000)
ROA	0.822*** (0.000)	0.830*** (0.000)	0.821*** (0.000)	0.827*** (0.000)
M/B	0.035*** (0.000)	0.035*** (0.000)	0.035*** (0.000)	0.035*** (0.000)
Cash	0.207 (0.112)	0.205 (0.116)	0.212 (0.103)	0.208** (0.020)
Leverage	-0.422*** (0.000)	-0.412*** (0.000)	-0.411*** (0.000)	-0.411*** (0.000)
Capex	0.079 (0.663)	0.106 (0.559)	0.091 (0.617)	0.107 (0.551)
Age	0.003** (0.011)	0.003*** (0.010)	0.003*** (0.008)	0.003*** (0.004)
Ownership	-2.590*** (0.000)	-2.603*** (0.000)	-2.599*** (0.000)	-2.601*** (0.000)
Constant	4.051*** (0.000)	4.041*** (0.000)	4.042*** (0.000)	4.040*** (0.000)
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
Observations	14,295	14,295	14,295	14,295
Adjusted-R ²	41%	41%	41%	41%

Table II. 8 The Pay Premium for Quality of Life for Management Team (Excluding CEO)

The sample consists of 65,732 person-year observations based on the top five executives (excluding CEOs) recorded in ExecuComp from 1993 to 2008. Total Pay is the variable *TDC1* in ExecuComp, which consists of salary, bonus, value of restricted stock granted, value of options granted (using Black-Scholes), long-term incentive payouts, and other compensation. *Rank* is the state-level liveability ranking published by Morgan Quitno at the end of every year scaled by 50. The ranking scales from 0 to 1, with 0 meaning “most livable” and 1 “least livable.” The definitions of all other controls are the same as in Table 2. Industry dummies are constructed based on Fama and French (1997) 48 industries. Corresponding *p*-values from robust standard errors are reported in parentheses. The notations ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	(1) Ln(Total Pay)	(2) Ln(Total Pay)	(3) Ln(Total Pay)	(4) Ln(Total Pay)	(5) Ln(Total Pay)	(6) Ln(Total Pay)
Rank	0.168*** (0.000)	0.198*** (0.000)	0.132*** (0.000)	0.105*** (0.000)	0.104*** (0.000)	0.119*** (0.000)
Firmsize			0.381*** (0.000)	0.438*** (0.000)	0.439*** (0.000)	0.432*** (0.000)
Volatility				1.665*** (0.000)	1.662*** (0.000)	1.518*** (0.000)
RET				0.156*** (0.000)	0.155*** (0.000)	0.155*** (0.000)
ROA				0.304*** (0.000)	0.302*** (0.000)	0.302*** (0.000)
M/B				0.001*** (0.002)	0.001*** (0.002)	0.001*** (0.001)
Cash				0.701*** (0.000)	0.706*** (0.000)	0.625*** (0.000)
Leverage				-0.856*** (0.000)	-0.853*** (0.000)	-0.838*** (0.000)
Capex				0.356*** (0.000)	-0.347*** (0.000)	0.468*** (0.000)
Ownership					0.001*** (0.003)	0.001*** (0.002)
Constant	7.013*** (0.000)	6.226*** (0.000)	3.931*** (0.000)	3.252*** (0.000)	3.243*** (0.000)	3.306*** (0.000)
Year Fixed Effect	No	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	No	Yes	Yes	Yes	Yes	Yes
State Fixed Effect	No	No	No	No	No	Yes
Observations	65,732	65,732	65,732	65,732	65,732	65,732
Adjusted- <i>R</i> ²	0.1%	6%	41%	45%	45%	46%

Appendix 1. Factors considered in Morgan Quitno's state ranking

Morgan Quitno considers 43 factors in its state rankings for liveability. The scale for each factor is 1 to 50; all factors are given equal weight. For negative factors, a higher number implies poorer liveability. Rankings for positive factors are inverted such that a higher number also indicates poorer liveability. For example, a number of 50 for "crime rate", a negative factor, indicates that the state has the highest crime rate in the U.S. A number of 50 for "median household income", a positive factor, means that the state has the lowest median household income. After averaging all the 43 factors, the state with the smallest average value is ranked as No.1, the most livable state.

Negative Factors
1. Percent Change in Number of Crimes
2. Crime Rate
3. State Prisoner Incarceration Rate
4. State Cost of Living Index
5. Pupil-Teacher Ratio in Public Elementary and Secondary Schools
6. Unemployment Rate
7. Percent of Nonfarm Employees in Government
8. Electricity Prices
9. Hazardous Waste Sites on the National Priority List per 10,000 Square Miles
10. State & Local Taxes as a Percent of Personal Income
11. Per Capita State and Local Government Debt Outstanding
12. Percent of Population Not Covered by Health Insurance
13. Births of Low Birthweight as a Percent of All Births
14. Teenage Birth Rate
15. Infant Mortality Rate
16. Age-Adjusted Death Rate by Suicide
17. Population per Square Mile
18. Divorce Rate
19. Poverty Rate
20. State and Local Government Spending for Welfare Programs as a Percent of All Spending
21. Percent of Households Receiving Food Stamps
22. Deficient Bridges as a Percent of Total Bridges
23. Highway Fatality Rate
24. Fatalities in Alcohol-Related Crashes as a Percent of All Highway Fatalities
Positive Factors
25. Per Capita Gross State Product
26. Percent Change in Per Capita Gross State Product
27. Per Capita Personal Income
28. Change in Per Capita Personal Income
29. Median Household Income
30. Public High School Graduation Rate
31. Percent of Population Graduated from High School
32. Expenditures for Education as a Percent of All State and Local Government Expenditures
33. Percent of Population with a Bachelor's Degree or More
34. Books in Public Libraries Per Capita
35. Per Capita State Art Agencies' Legislative Appropriations
36. Annual Average Weekly Earnings of Production Workers on Manufacturing Payrolls
37. Job Growth
38. Normal Daily Mean Temperature
39. Percent of Days That Are Sunny
40. Homeownership Rate
42. Marriage Rate
43. Percent of Eligible Population Reported Voting

Appendix 2. Sample Distribution by Year and Industry

The table reports the compensation for executives in states with different livability rankings. The sample consists of 14,295 firm-year observations based on CRSP/Compustat/Execucomp merged data from 1993 to 2008.

Fama-French 48 industries	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Aero	6	3	3	3	4	5	4	6	5	5	7	7	7	7	9	10	91
Agric	0	0	0	0	0	0	0	0	0	0	0	2	3	1	3	5	14
Autos	12	19	17	18	18	20	22	22	21	22	22	22	24	18	24	21	322
Banks	2	1	1	3	4	5	5	6	8	8	8	9	71	70	96	107	404
Beer	2	3	3	3	3	2	1	2	2	3	4	4	5	4	6	6	53
BldMt	5	10	10	14	15	21	23	22	22	21	19	18	22	19	20	26	287
Books	9	9	9	11	11	11	11	10	9	9	10	10	10	6	11	12	158
Boxes	3	2	2	4	5	5	5	3	5	7	7	6	7	5	8	9	83
BusSv	25	31	32	38	48	59	72	77	75	89	93	89	103	82	129	150	1192
Chems	20	25	28	28	28	29	28	30	28	30	31	31	30	21	35	37	459
Chips	21	31	35	42	44	53	68	74	73	77	84	84	83	60	99	99	1027
Clths	8	11	13	13	16	15	15	15	16	14	15	17	17	13	24	27	249
Cnstr	5	9	10	8	10	10	12	13	12	15	18	19	18	11	19	18	207
Coal	0	0	0	0	0	0	0	1	1	1	3	3	4	4	4	5	26
Comps	11	16	14	14	18	21	28	36	33	35	39	40	35	28	50	56	474
Drugs	17	20	21	23	25	28	31	31	28	31	35	37	35	28	47	47	484
ElcEq	4	4	3	6	9	10	10	9	12	11	12	10	10	5	15	15	145
Enrgy	15	22	22	26	25	27	29	30	31	30	37	43	46	44	57	59	543
FabPr	1	3	1	1	3	4	4	4	4	3	2	3	3	3	4	3	46
Fin	3	6	5	6	8	10	16	25	24	28	36	38	47	44	83	91	470
Food	12	15	15	16	17	19	18	20	20	25	25	22	23	12	27	30	316
Fun	1	2	1	1	4	3	4	3	4	4	6	9	9	7	13	14	85
Gold	2	1	3	3	3	2	2	3	3	3	3	3	3	3	3	3	43
Guns	1	1	2	4	5	4	4	3	3	3	5	4	3	3	5	6	56
Hlth	3	7	6	8	9	13	14	16	13	15	18	23	20	19	29	31	244
Hshld	12	14	14	17	19	17	15	19	21	20	20	19	20	16	25	26	294
Insur	6	7	24	26	29	31	32	33	31	37	46	45	50	52	62	66	577
LabEq	9	10	10	12	13	13	14	24	20	22	28	24	25	18	34	34	310
Mach	23	26	31	30	31	34	34	41	44	45	46	43	40	29	47	53	597
Meals	7	8	10	12	13	13	15	18	17	18	18	17	17	16	26	30	255
MedEq	4	9	11	12	11	14	15	15	16	17	20	26	30	19	33	36	288
Mines	1	3	3	4	5	7	7	5	6	7	7	6	5	4	7	7	84
Misc	3	2	2	4	5	7	8	11	6	10	12	12	11	9	15	17	134
Paper	16	16	17	16	15	17	18	16	16	20	18	20	20	20	23	22	290
PerSv	5	6	7	6	7	6	7	9	11	11	8	10	12	4	14	18	141
REst	0	0	0	0	0	0	0	0	0	0	0	1	2	1	3	3	10
Rtail	29	42	50	51	61	71	72	68	72	72	79	84	76	68	94	100	1089
Rubber	3	3	4	4	3	5	4	5	6	6	6	6	5	6	9	8	83
Ships	1	1	1	2	2	1	2	2	2	3	3	3	3	4	5	5	40
Smoke	1	1	2	2	1	1	1	2	2	2	2	2	2	1	2	2	26
Soda	2	2	2	2	2	3	2	2	2	1	1	3	2	1	3	2	32
Steel	6	9	11	11	11	18	19	19	17	17	14	15	16	16	21	22	242
Telcm	7	7	7	6	8	8	11	12	17	14	14	17	17	21	28	35	229
Toys	4	4	4	5	5	6	6	6	7	5	5	4	4	6	7	7	85
Trans	17	24	24	24	25	26	24	28	27	28	32	31	33	34	42	42	461
Txtls	4	6	7	7	7	5	6	5	6	6	5	7	5	4	5	6	91
Util	51	55	59	57	54	56	54	58	59	60	59	63	68	58	74	77	962
Whlsl	15	19	24	22	24	29	32	31	35	32	37	38	35	26	50	48	497
Total	414	525	580	625	683	764	824	890	892	942	1019	1049	1136	950	1449	1553	14295

Appendix 3. The Existence of Pay Premium for Quality of Life

The sample consists of 11,872 firm-year observations based on CRSP/Compustat/Execucomp merged data from 1993 to 2008. The financial and utility firms are excluded from the sample. Total Pay is the variable *TDC1* in Execucomp, which consists of salary, bonus, value of restricted stock granted, value of options granted (using Black-Scholes), long-term incentive payouts, and other compensation. *Rank* is the state-level liveability ranking published by Morgan Quitno at the end of every year. The ranking scales from 1 to 50, with 1 meaning “most livable” and 50 “least livable.” The definitions of all other controls are the same as in Table 2. Industry dummies are constructed based on Fama and French’s (1997) 48 industries. Corresponding *p*-values from robust standard errors are reported in parentheses. The notations ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	(1) Ln(Total Pay)	(2) Ln(Total Pay)	(3) Ln(Total Pay)	(4) Ln(Total Pay)
Rank	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.003* (0.088)
Firmsize	0.400*** (0.000)	0.418*** (0.000)	0.400*** (0.000)	0.437*** (0.000)
Volatility		1.088*** (0.000)	1.321*** (0.000)	1.446*** (0.000)
RET		0.163*** (0.000)	0.167*** (0.000)	0.166*** (0.000)
ROA		-0.022 (0.881)	0.153 (0.275)	0.713*** (0.000)
M/B		0.032*** (0.000)	0.032*** (0.000)	0.029*** (0.000)
Cash		0.100 (0.500)	0.110 (0.445)	-0.019 (0.892)
Leverage		-0.143* (0.066)	-0.199*** (0.010)	-0.508*** (0.000)
Capex		-0.463** (0.023)	-0.348* (0.082)	-0.075 (0.708)
CEO Age			0.002* (0.074)	0.002 (0.146)
Ownership			-2.968*** (0.000)	-2.680*** (0.000)
Constant	4.614*** (0.000)	4.230*** (0.000)	4.377*** (0.000)	4.175*** (0.000)
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
State Fixed Effect	No	No	No	Yes
Observations	11872	11872	11872	11872
Adjusted- R^2	0.328	0.348	0.370	0.413

Essay Three:

The Even-Odd Effects of Corporate Board

Abstract: We propose a model of board voting that shows that in comparison to boards with an even number of directors (even boards), those with an odd number of directors (odd boards) improve voting efficiency by better aggregating directors' information. Consistent with the model's implications, we find that firms with an odd board show better performance than those with even boards. Furthermore, we find that firms with an odd board have lower levels of total CEO compensation but a higher sensitivity of pay to stock return performance. Finally, firms with an odd board experience more CEO turnovers and exhibit higher turnover-performance sensitivity. Our findings highlight the importance of board voting efficiency to firm performance and corporate governance.

1. Introduction

Understanding the relation between board characteristics and the efficacy of board decisions is an important issue that has attracted considerable research interests. The extant finance literature has put under scrutiny the effects of key board characteristics, including board size, fraction of independent directors, CEO-chairman duality, etc., on boards' role in advising CEOs on major corporate strategy, monitoring CEO conduct, and, when circumstances necessitate, disciplining CEOs.⁴⁰ This paper extends the existing literature by focusing on a distinct aspect of board characteristics – even vs. odd boards, and its impact on boards' voting efficiency – the ability of boards in reaching voting outcomes that best aggregate directors' information. To the extent that major board decisions are generally preceded by a voting process, voting efficiency is of critical importance to the functioning of boards, be it advising, monitoring, or disciplining CEOs. We empirically examine the hypothesis that in comparison to even boards, odd boards improve the aggregation of directors' information, thereby enhancing board voting efficiency and the quality of board decisions.

Our hypothesis is inspired by both anecdotal evidence and models on voting. For example, the 2003 proxy filing of Del Global Technologies Corp., a manufacturer of medical devices, described how the company, in an effort to improve board voting process, switched to an odd board by expanding its board members from four to five. As another example, the corporate governance guidelines of Enliven Corporation (Nasdaq: ENLV), in addition to prescribing the range of board size, explicitly states that an odd number of directors is desirable,

⁴⁰ A partial list of the previous studies include Weisbach (1988), Byrd and Hickman (1992), Bickley et al. (1994), Yermack (1996), Baliga et al (1996), Brickley et al. (1994), Brickley et al. (1997), Eisenberg et al. (1998), Adams and Ferreira (2007), and Linck et al. (2008). Also see Adams, Hermalin, and Weisbach (2010) for an excellent survey of the recent research on corporate boards.

though not required. A similar statement appears in the corporate governance guidelines of Broadpoint Securities Group, Inc. (Nasdaq: BPSG).

Beyond the anecdotal evidence, a large literature in economics and political science has extensively analyzed the relation between the efficiency of committee voting and committee composition. Building on this literature, we develop a simple model of board voting where we assume that directors exhibit a preference to conform to the board's decision, that is, they prefer to vote for the decision that the board ends up undertaking. Directors' conformity preference has appeared in several theoretical analyses on corporate boards (Gillette, Noe, and Rebello, 2003; Chemmanur and Fedaseyeu, 2010; Malenko, 2011), and seems to be consistent with previous empirical evidence.⁴¹ Substantiating our hypothesis on the difference between even and odd boards, our model reveals that because of the conformity preference, voting in odd boards can more fully aggregate directors' information than does that in even boards.

To empirically test our hypothesis, we examine a large sample of corporate boards over the period 1997-2009. Our analysis yields three sets of important findings. First, we find that on average firms with an odd board show substantially better performance, as measured by Tobin's Q and return-on-asset (ROA), than do firms with an even board. In terms of economic significance, when evaluated at the median book value of sample firms, a firm with an odd board

⁴¹ Conformity preference can be motivated by two reasons. First, when the board sides with the CEO in its decision, a dissident director can be denied future nomination for reelection, as the CEO may wield significant influence over the selection of directors (Mace, 1971; Lorsch and MacIver, 1989; Tejada 1997). Hermalin and Weisbach (1988) find that when a CEO is approaching retirement and several individuals from the firm's management are competing for the CEO position, those who fail to win the competition subsequently leave the company and the board. Second, when the board decides against the CEO, a director may also suffer a significant personal cost from dissenting from the majority. For example, Farrell and Whidbee (2000) find that in a forced CEO succession, outside directors that are closely aligned with the outgoing CEO face increased likelihood of leaving the board subsequent to the departure of the CEO.

derives \$108 million more shareholder value than does a firm with an even board. Thus, odd boards are associated with an economically significant improvement in firm value.

Second, we find that the benefits of odd boards exhibit patterns of cross-sectional variations that are consistent with our model's implications. In particular, since low director ownership and large CEO influence over the board tend to exacerbate directors' conformity preference (we illustrate these effects in detail in Section 2), the difference in performance between firms with even and odd boards should be particularly large in such instances. Furthermore, boards' ability to fully aggregate directors' information is likely to be of critical importance to firms that actively make informationally intensive investments. Consequently, the differences in performance between firms with odd and even boards should be especially pronounced when the firms make significant R&D investments. Our findings confirm these implications.

Finally, we find that in comparison to firms with an even board, those with an odd board have lower levels of CEO compensation but a higher sensitivity of pay to stock return performance. Moreover, firms with an odd board have higher occurrences of CEO turnover and turnover-performance sensitivity. Prior studies suggest that levels of both CEO pay and turnover, and the sensitivities of CEO pay and turnover to performance, are important corporate governance mechanisms that align a CEO's incentive with that of shareholders' (e.g., Weisbach (1988), Hartzell and Starks (2003), and Core et. al (1999)). Our findings, therefore, indicate that odd boards are associated with a significant enhancement of corporate governance. Taken together with the other findings, our results suggest that the strengthening of corporate governance through increased voting efficiency is an important source of performance improvements for firms with an odd board.

There may be two concerns with our findings. First, as with any study on board structure, our results may also potentially suffer from endogeneity problems. In our empirical analysis, we explicitly control for other board characteristics, including board size, proportion of independent directors, CEO-chairman duality, so as to ensure that our findings about the difference between even and odd boards are not a mere reflection of the well-documented effects associated with these other characteristics. Furthermore, in our regression models we control for an extensive list of firm characteristics. Nevertheless, to verify the robustness of our results, we perform several additional tests. First, we use firm fixed effect to control for omitted firm-specific but stable characteristics that are correlated with firm propensity of having an odd board. Second, we perform a two-stage Heckman test, using as instrumental variables the prevalence of odd boards in the firm's industry and that in the state in which the firm is located. Third, we consider changes to boards' even-odd characteristics and employ the event study methodology to compare the announcement effects of director appointments that change even boards to odd boards and those that change odd boards to even boards. We find that in each of the above tests our key results on the difference between firms with even and odd boards remain qualitatively the same.

Second, if our findings suggest genuine benefits of odd boards, it might appear that firms should invariably opt for odd boards. Yet, many firms in our sample have even boards. Our response to the seemingly conflicting evidence follows from the views in Adams et al (2010) and Coles et al (2010). Specifically, since each firm operates within the confines of its exogeneously given environment, a firm's choice between an even and odd board represents the firm's best solution to the constrained optimization problem relating to the design of the board. If changing the exogenous environment is costly and takes time, the firm may optimally adopt an even board, even if an odd board is more desirable when the firm can freely choose its exogenous

environment. Such reasoning also explains why we are able to empirically find the significant effects of odd boards in the first place.

This paper makes two important contributions to the literature. First, while there is a voluminous literature on voting in economics and political science, the finance literature on board voting remains small and mostly theoretical in nature (e.g., Warther, 1998; Gillette et al, 2003; Harris and Raviv, 2006; Baranchuck and Dybvig, 2008; Chemmanur and Fedaseyeu, 2010; Malenko, 2011). Lack of sufficiently detailed data on the process and outcome of board voting renders challenging direct tests of these theories, which typically involve subtle assumptions on board composition and director preference. Perhaps for this reason, empirical analysis on board voting remains scarce. Our model and empirical analysis focus on an easily measurable board characteristic, the evenness and oddness of a board, which has a direct effect on board voting efficiency. Our findings help empirically establish the link between board voting efficiency and the quality of board decisions.

Second, we complement the existing literature by identifying the even-odd characteristics of boards as a new measure of the boards' effectiveness in strengthening corporate governance and enhancing firm performance. Our analysis suggests that this new measure represents an economically significant yet under-explored aspect of board characteristics that is distinct from those captured by the conventional measures, such as board size, the percentage of outside directors, CEO-chairman duality, etc.

The rest of the paper is organized as follows. Section 2 presents a simple model of board voting and develops the empirical implications of the model. Section 3 describes the data and

the summary statistics of the key variables. Section 4 presents the main empirical findings. We discuss robustness tests and present the results in Section 5. Section 6 concludes the paper.

2. A simple model of voting and model implications

2.1. A simple model of board voting

2.1.1. Model setup

A firm can undertake one of two actions: sticking to the *status quo*, which is denoted as $a=0$, and adopting a new strategy, which is denoted as $a=1$. The new strategy can be a decision to change CEO compensation scheme, replace the current CEO, adapt key firm policies, etc. The firm's performance improvement $v(\theta, a)$ depends on the suitability of the new strategy θ to the firm, which can be either high $\theta = \theta_h$ or low $\theta = \theta_l$, and the action undertaken:

$$v(\theta, a = 0) = 0; \quad (1)$$

$$v(\theta_h, a = 1) = 1, v(\theta_l, a = 1) = -1. \quad (2)$$

From Eq. (1), if the *status quo* is maintained the performance improvement is invariably 0. On the other hand, from Eq. (2) adopting the new strategy enhances the firm's performance if it is highly suitable to the firm, but leads to a decline in performance if its suitability is low. In the example of CEO replacement decision ($a=1$ if the current CEO is replaced, and $a=0$ if the current CEO is retained), suitability θ is determined by the difference in the overall abilities between a new CEO candidate and the current CEO. If the new CEO candidate is more (less) competent than the current CEO, replacing the current CEO is a highly suitable (unsuitable) strategy, and it improves (reduces) firm performance.

The firm's choice of action is determined by the firm's board through voting. The board has $n > 2$ directors.⁴² Prior to casting their votes, the directors learn aspects of the new strategy. Specifically, director i , $i=1, 2, \dots, n$, can privately learn the i th aspect of the new strategy ϕ_i , which can be either good, $\phi_i = 1$, or bad, $\phi_i = -1$. Before the directors learn about the ϕ_i s, they share a common prior belief that each ϕ_i is equally likely to be good or bad. Since ϕ_i s represent distinct aspects of the new strategy, they are independently distributed.

Collectively, the various aspects of the new strategy stochastically determine its suitability. Specifically, let $\Phi = (\phi_1, \dots, \phi_n)$ be the set of the directors' information, and $\Gamma(\Phi) = (\sum_{i=1}^n \phi_i)$ be the n directors' collective information about the new strategy. The probabilities of high and low suitability conditional on $\Gamma(\Phi)$ are:

$$f(\theta = \theta_h | \Gamma(\Phi)) = \frac{1}{2} + \frac{1}{2n} \Gamma(\Phi), \quad (3)$$

$$f(\theta = \theta_b | \Gamma(\Phi)) = \frac{1}{2} - \frac{1}{2n} \Gamma(\Phi). \quad (4)$$

Eqs. (3) and (4) suggest that positive (negative) collective information, i.e. $\Gamma(\Phi) > 0$ ($\Gamma(\Phi) < 0$), is indicative of high (low) suitability. Moreover, as $\Gamma(\Phi)$ increases, high suitability becomes increasingly more likely. In the limit when all the directors get positive (negative) information, i.e. $\phi_i = 1$ ($\phi_i = -1$) for all i , suitability $\theta = \theta_h$ ($\theta = \theta_l$) with certainty. Note that before the directors obtain their information, according to the common prior belief $\theta = \theta_h$ and $\theta = \theta_l$ are equally likely.

In the running example of CEO replacement, suitability θ is likely to reflect the aggregate of the differences between the two individuals in multiple aspects. These aspects may include knowledge and understanding about the firm's business, creative ideas about how to grow the

⁴² The smallest board in our sample has three directors.

firm, the abilities to work with the firm's other senior executives and provide leadership, personal charisma, etc. Collectively, the differences in these aspects determine which one of the two individuals is likely to be the more competent CEO for the firm.

Based on the own information and the conjecture about the other directors' information concerning the suitability of the new strategy, each director votes for either $a = 1$ or $a = 0$.⁴³ All the directors vote simultaneously without observing each other's vote. After the directors cast their votes, the board chooses the action to implement based on the pre-specified voting rule k_R , so that the new strategy is adopted, i.e., $a = 1$, if the number of directors voting for $a = 1$ is greater or equal to k_R . The directors' votes are non-anonymous so that after the board makes its collective decision, each director's vote becomes known to all the other directors.

All of the directors have the same utility function, which consists of two parts. The first part, $u(\theta, a)$, produces a *performance preference* that is perfectly aligned with maximizing the firm's expected performance improvement. Specifically, $u(\theta, a)$ is proportional to the performance improvement $v(\theta, a)$, so that $u(\theta, a) = \beta v(\theta, a)$, where constant $\beta > 0$ and measures the strength of the directors' preference for performance maximization. The directors' performance preference may arise directly from their share ownership, as greater ownership benefit directors more when firm performance improves. Performance preference can also arise from directors' reputational concerns: Poor firm performance may be seen by the director labor market as a sign of the directors' inability in providing quality monitoring and advising services, thereby jeopardizing the directors' pursuit of retaining other directorships they currently hold or obtaining new directorships.

⁴³ Implicitly, we are assuming that the directors cannot choose to abstain. In our model, this is without loss of generality as directors will not abstain from casting a vote even if abstention is allowed.

The basic setup outlined so far parallels the standard setup widely used in the previous studies on common value voting (e.g., Austen-Smith and Banks, 1996; Feddersen and Pesendorfer, 1996). We enrich the basic setup by considering a second part of the director's utility function that gives rise to a *conformity preference* – that to vote for the same action as the one that the board ends up adopting (Gillette et al, 2003; Chemmanur and Fedaseyeu, 2010; Malenko, 2011). Specifically, we assume that each director faces a personal cost $u_m > 0$ if the action he votes for turns out to disagree with the action that the board chooses. Thus, the total utility for director i

$$U_i(\theta, a, I_{im}) = u(\theta, a) - I_{im}u_m, \quad (5)$$

where I_{im} is an indicator function that takes the value of one if director i 's vote disagrees with the board's decision. Cost u_m measures the strength of the directors' conformity preference.

2.1.2. The analysis of the model

Before examining the voting equilibrium, consider the optimal decision that utilizes the directors' collective information to maximize the expected performance improvement. Since based on the prior belief the two actions yield the same expected performance improvement, one good (bad) aspect of the new strategy tips the balance toward favoring action $a=1$ ($a=0$). Thus, the optimal decision is determined by the balance between the numbers of the good and bad aspects that the directors observe.

Given a set of the directors' observations $\Phi = (\phi_1, \dots, \phi_n)$, the total number of the good aspects is $k(\Phi) = \sum_{i=1}^n \phi_i$, while that of the bad aspects is $n - k(\Phi)$. When n is an odd number, let $k^* = (n + 1)/2$. If $k(\Phi) \geq k^*$ ($k(\Phi) < k^*$), the directors observe a strictly greater (smaller)

number of good aspects than that of bad aspects, so the optimal decision chooses $a = 1$ ($a = 0$). When n is an even number, we set $k^* = \left(\frac{n}{2}\right) + 1$. If $k(\Phi) \geq k^*$ ($k(\Phi) < k^* - 1$), the directors observe a strictly greater (smaller) number of good aspects than that of bad aspects, so the optimal decision chooses $a = 1$ ($a = 0$). If $k(\Phi) = k^* - 1$, there is an equal number of good and bad aspects. In this case, the two alternative actions provide the same expected performance improvement, and without loss of generality, we assume that the optimal decision chooses $a = 0$.

To achieve the optimal decision through board voting, it is essential that in equilibrium each director follows an *informative voting* strategy, according to which a director votes for action $a = 1$ ($a = 0$) upon observing a good (bad) aspect. It follows from the above discussion on the optimal decision that the appropriate voting rule is a simple majority voting rule with $k_R = k^*$ (the proof of Proposition 1 below shows that this is indeed the optimal rule). The following proposition describes the respective voting equilibrium for an odd board (n is odd) and an even board (n is even). The proof of the proposition is in Appendix 2.

Proposition 1: For an odd board, informative voting is an equilibrium strategy for the directors. Thus, voting aggregates the directors' information, and board decision coincides with the optimal decision. For an even board, if $\beta \geq u_m$, informative voting is also an equilibrium strategy. However, when $\beta < u_m$, informative voting is not an equilibrium strategy, so board voting fails to aggregate directors' information. In this case, the board's decision does not coincide with the optimal decision.

Since the performance preference is fully aligned with maximizing the firm's expected performance improvement, this preference produces an incentive for the directors to vote informatively. However, as Proposition 1 indicates, for an even board the conformity preference can conflict with the performance preference, and when the former is stronger than the latter, in

equilibrium the directors no longer vote informatively. In particular, a director may vote for $a = 0$ even if he has observed a good aspect of the new strategy.

To illustrate the differential effects of the conformity preference on voting in even and odd boards, consider an odd board with $n=5$, and the voting decision by one of the directors, say director 1, when all the other directors vote informatively. Because director 1 does not know the other directors' information, he thinks that the other directors' possible voting profile can be (4, 0), (3, 1), (2, 2), (1, 3), or (0, 4), where the first (second) component in each binary is the number of other directors who vote for $a=0$ ($a=1$). Given voting rule $k_R(=\frac{5+1}{2}) = 3$, profile (2, 2) represents a pivotal case in which director 1's vote determines the board's choice of action. In this case, director 1 can always ensure his vote to be in line with the board's decision, so the conformity preference does not bias director 1's choice between the two alternative actions.

For the four (even number of) remaining non-pivotal cases, the board's choice of action is independent of director 1's vote. However, because these non-pivotal cases are paired, on net conformity preference does not bias director 1's choice between the two actions, either. Specifically, when the other directors' voting profile is (1, 3), the board chooses action $a=1$, so the conformity preference causes director 1 to bias toward voting for $a=1$. But, in the case of voting profile being (3, 1), the board chooses $a=0$, so director 1 is biased toward voting for $a=0$. Since the directors' information is statistically independent, director 1 views (1, 3) and (3, 1) as equally likely.⁴⁴ Thus, for the paired equal probable profiles (1, 3) and (3, 1), the conformity preference creates exactly offsetting biases between the two actions. The same logic applies to the pair (4, 0) and (0, 4).

⁴⁴ The probability for profile (3, 1) is $\binom{3}{4} \left(\frac{1}{2}\right)^3 \left(\frac{1}{2}\right) = \frac{4!}{3!1!} \frac{1}{2^4} = \frac{1}{4}$, while the probability for profile (1, 3) is $\binom{1}{4} \left(\frac{1}{2}\right) \left(\frac{1}{2}\right)^3 = \frac{4!}{1!3!} \frac{1}{2^4} = \frac{1}{4}$.

Consider next director 1's voting decision in an even board with $n=4$. To director 1, the other directors' possible voting profiles include (3, 0), (2, 1), (1, 2), and (0, 3). Given voting rule $k_R(=\frac{4}{2} + 1) = 3$, profile (1, 2) is the pivotal case, for which the conformity preference does not bias director 1's choice between the two actions. However, among the three (odd number of) remaining non-pivotal profiles, one profile must be unpaired, thereby creating a net bias in director 1's preference between the two actions. Specifically, it is clear that (3, 0) and (0, 3) are paired equal probable profiles for which the conformity preference creates exactly offsetting biases between the two actions. In the case of the unpaired profile (2, 1), the board adopts action $a=0$, so the conformity preference creates a bias toward voting for $a=0$. When this bias is stronger than the incentive that performance preference creates to vote informatively, director 1 votes for $a=0$ even after observing a good aspect about the new strategy. As a result, an equilibrium with informative voting is infeasible.

2.1.2. Discussion

The main intent of our model is to provide a simple and focused illustration of the difference in information aggregation between voting in odd and even boards. Our model can be extended in a variety of ways. For example, in our model directors can both costlessly acquire private information about the relative merits of the two actions and costlessly participate in voting. It is conceivable that information acquisition may be costly as in Persico (2004), and directors may have to incur private costs in attending board meetings and participating in voting as in Borgers (2004). Moreover, in our model we assume that directors invariably receive valuable information before voting. It is conceivable that sometimes even if directors try, some of them may not get any useful information as in Feddersen and Pensendorfer (1997). In this

case, the uninformed directors may optimally opt for voting abstention. Finally, in our model, directors proceed directly to the formal voting after they obtain information about the performance consequences of the actions. In practice, directors may take part in pre-voting communication that can be modeled as directors taking a straw poll (e.g., Coughlan (2000)) or engaging in cheap talk (e.g., Girardi and Yariv (2007) and Lizzeri and Yariv (2011)).

Making the above extensions to our model undoubtedly will enrich the characterization of board voting. Nevertheless, whether, on average, our model provides a reasonable depiction of the voting process and the revealed difference between odd and even boards bears a first-order effect on the quality of board decisions are ultimately empirical issues. Consequently, rather than seeking to provide a comprehensive model of board voting, we believe that it is more fruitful to take our model to the data. To this end, we turn to a discussion of the empirical implications of our model.

2.2. Model implications

How board's effectiveness influences shareholder value is an important question for the corporate governance research. Existing literature suggests that more effective boards are usually associated with higher firm value and better operational performance. For example, Yermack (1996) finds that a small-size board has more efficient communication and decision-making, and thus is associated with better firm performance. Moreover, firm market valuation is found lower if the board is entrenched and less effective (Bebchuk and Cohen (2005) and Faleye (2007)).

As our model indicates that, the board with an odd number of directors is more effective in decision making than the board with an even number of directors. This effect is mainly due to

the fact that directors are more likely to conform to others' opinion (instead of voting informatively) when an even number of directors are on board than are they when an odd number of directors are on board. Moreover, our model also implies that the better voting efficiency associated with an odd board is more pronounced when information aggregation is particularly important to the firms. These arguments lead to the following implication:

H1: All else equal, firms with an odd board are associated with higher Tobin's q and operating performance than firms with an even board. This relation is stronger when the directors have greater conformity preference and when the firms' need for information aggregation is greater.

Evaluating CEOs and replacing the poorly-performing ones is a key job function of corporate boards. Prior studies show that poor performance is usually associated with higher likelihood of CEO turnover (Coughlan and Schmidt (1985), Warner, Watts and Wruck (1988), and Huson et al. (2001)). Moreover, this turnover-performance sensitivity depends on the board effectiveness. Weisbach (1988) finds that a poorly-performing CEO is more likely to be removed when the board consists of more independent directors. Goyal and Park (2002) measure board effectiveness using the combination of CEO and chairman duties and find that a CEO is less likely to be fired for poor performance if the board is captured. To the extent that our model predicts more efficient decision-making in an odd board, the firm with an odd number of directors should be more likely to fire its CEO in response to poor performance. Thus, our second implication is as follows:

H2: All else equal, firms with an odd board are associated with higher sensitivity of CEO turnover to firm performance than firms with an even board. This relation is stronger when the directors have greater conformity preference and when the firms' need for information aggregation is greater.

In addition to hiring and firing the CEO, another important board function is to provide appropriate managerial incentives through well-designed compensation contracts. A large number of studies show that CEOs in firms with weaker governance receive greater compensation and their pay is less sensitive to firm performance. For example, Core et al. (1999) find that CEO receives higher compensation when the CEO is also the board chair, when the board size is larger, when a greater percentage of outside directors are appointed by the CEO, and when a greater fraction of outside directors are busy directors. Faleye (2007) uses the prevalence of classified board to measure board effectiveness and finds that CEO pay is less sensitive to firm performance when the board is less effective. Given that the odd board is associated with better voting efficiency and information aggregation, CEO pay is expected to be lower and be more sensitive to firm performance for firms with odd boards. These discussions lead to our third implication.

H3: All else equal, firms with an odd board are associated with lower level of CEO compensation and higher pay-for-performance sensitivity than firms with an even board. This relation is stronger when the directors have greater conformity preference and when the firms' need for information aggregation is greater.

3. Data and Summary Statistics

Our starting point is the RiskMetrics database, which covers directors of S&P 1500 companies. We obtain CEO turnover and compensation data from ExecuComp, accounting information from Compustat, and stock price data from CRSP. Our final sample consists of 14,146 firm-year observations from 1997 to 2009.

[Insert Table III.1 Here]

Table III.1 presents descriptive statistics of sample firms. All dollar values are in 2009 dollars, and all continuous variables are winsorized at the 1st and 99th percentiles. The average board of our sample firms has around 9 directors, 67% of which are outside directors. In a median firm, the average dollar-value director ownership is 4.9 million.

The median firm is quite large with market value of equity of \$1,677 million. The sample firms have a median *ROA* of 9.1%, and annual stock return of 7%. Moreover, the median firm has a leverage of 56.1%, and makes considerable investment with *Capex* of 4% of the total sales. On average, about 75% of the CEOs are also the chairman of the board, and their tenure is 5 years at median. The median firm has a Tobin's *Q* of 1.48 and pays \$3.1 million annual compensation to the CEO.

We also split the even board and odd board subsamples, and present the respective statistics in the two subsamples. We find that there are 7,532 (54%) observations of boards with an odd number of directors and 6,614 (46%) observations with an even number of directors. Comparisons between the subsamples of firms with an odd board and an even board show systematic differences between the two types of firms.

In comparison to firms with an even board, those with an odd board have higher Tobin's *Q*, smaller boards, are younger, have simpler corporate structure with a smaller number of segments, and use less leverage. Furthermore, comparisons based on median show that firms with an odd board are smaller in size, as measured by the market value of equity, have better operating performance, as measured by return-on-assets (*ROA*), and pay less to their CEOs, than those of firms with an even board.

4. Empirical Results

4.1. Firm Value

We begin our investigation of the impact of odd boards by examining firm value, measured by Tobin's Q. The results are reported in Table III.2. In all of the regression models, we include an extensive set of control variables relating to board, firm and CEO characteristics. We also control for industry fixed and year fixed effects. Here and throughout our analysis, all standard errors are adjusted for heteroscedasticity and firm clustering.

[Insert Table III.2 Here]

In the baseline regression model, we include the odd dummy, which takes a value of one if the firm has an odd board and zero otherwise, the big board dummy, which takes a value of one if the board size is above the sample median value and zero otherwise, and other controls. Column (1) of Table III.2 shows that the coefficient of the *Odd* dummy is positive at 0.064 and significant at the 1% level. Thus, in comparison to firms with even boards, those with an odd board have a higher Tobin's Q of 0.064, relative to the sample median of 1.48. The economic magnitude is also sizeable: Given that the sample median book value of total asset is \$1,695 million, an odd board is associated with \$108 million ($0.064 \times 1,695$) higher firm value. The coefficient of big board dummy, on the other hand, is negative at -0.18 and significant at the 1% level, suggesting that the board size bears a negative effect on firm value, consistent with Yermack (1996).

Our theoretical arguments suggest that the positive effect of odd boards on firm value strengthens as the directors' tendency to conformity increases. To test this prediction, in the second regression model we use CEO tenure to proxy for the board's tendency to conformity, as the directors are more likely to conform when the CEO is more entrenched (longer tenure).

Consistent with our prediction, Column (2) shows that the coefficient of the interaction term between *Odd* dummy and *CEO tenure*, $Odd \times CEO\ tenure$, is positive and significant at the 1% level.

To the extent that directors are more likely to vote informatively (less likely to conform) when they have a large financial stake at the firms, we further use director ownership as a proxy for conformity tendency (higher director ownership, less likely to conform), and include the interaction $Odd \times Director\ ownership$ in Column (3). The coefficient of this interaction term is negative and significant at the 5% level. This result indicates that the odd number effect is more evident when the director ownership is lower (directors are more likely to conform), which is consistent with our theory.

The odd number effect on firm value may also depend on the firm's information environment: Board voting efficiency is more important when the firm operates in an information sensitive environment, such as a high R&D firm. To examine this possibility, we further interact *Odd* with firm's R&D expenditure in Column (4). Supporting the above view, the interaction, $Odd \times R\&D$, is positive and significant at the 1% level.⁴⁵

To address the concern that our results may be driven by some unobserved firm characteristics, we control for firm fixed effects in Column (5), and still find a significantly positive coefficient on *Odd* dummy.

In summary, an odd board firm has a higher firm valuation than an even board firm; this effect is more pronounced when directors have stronger tendency to conformity (proxied by lower director ownership and higher CEO tenure), and when information aggregation is more

⁴⁵ In an unreported analysis, we also examine the interaction $Odd \times Big\ board\ dummy$ and find that its coefficient is negative and significant. This result indicates that the odd board effect is bigger for a small board than a big board.

important (proxied by high R&D expenditure). This evidence is consistent with our first hypothesis (H1).

4.2. *Firm Operating Performance*

We further examine the impact of odd boards on firms' operating performance, measured by ROA. Table III.3 presents the regression results. In consistent with Table III.2, we include in the regression models the same set of control variables relating to board, firm and CEO characteristics.

[Insert Table III.3 Here]

Column (1) of Table III.3 shows that the coefficient of odd dummy is 0.179 and significant at the 5% level. Thus, in comparison to firms with an even board, those with an odd board exhibit significantly better operating performance. Moreover, we include the interaction term between the odd dummy with the CEO tenure and director ownership in Columns (2) and (3), respectively. Consistent with Table III.2, the coefficients on *Odd* $\times$ *CEO tenure* is significantly positive, while the coefficient on *Odd* $\times$ *Director ownership* is significantly negative. In addition, we include the interaction term between the odd dummy with the firm's R&D expenditure in Column (4) to further examine the impact of firms' information environment on the positive odd board effect. Again we find that in this regression, the interaction term is positive and significant at the 1% level. Also, Table III.3 shows that the coefficient of the big board dummy is consistently negative and significant, suggesting that firms with a large board tend to underperform relative to firms with a small board. To examine the robustness of our findings, we control for firm fixed effects in Column (5), and we still find a positive and significant coefficient on *Odd* indicator.

The empirical results in Tables III.2 and III.3 support our prediction that firms with an odd number of directors have better firm performance than the ones with an even number of directors, and this odd number effect is more evident when the directors have stronger conformity preference and when information aggregation is more important for the firm.

4.3. *CEO Turnover*

To further our understanding of how an odd board contributes to better firm performance, we examine the CEO turnover decision in this section. In particular, we analyze the effect of odd boards on the sensitivity of CEO turnover to firm performance. Using logit analysis, we estimate the probability of CEO turnover. The dependent variable in the logit regressions is the CEO turnover indicator, which equals one if the CEO is in his last year in office, and zero otherwise. Based on the recent findings by Kaplan and Minton (2010) and Jenter and Lewellen (2010), we do not separate turnover events into forced and unforced ones. Kaplan and Minton (2010) show that the determinants of forced turnovers are similar to those of voluntary turnovers, because turnovers labeled as unforced may not be *de facto* voluntary. Furthermore, Jenter and Lewellen (2010) suggest that treating all turnovers as forced ones and including all of them as turnover events in the estimation of probability of turnover can avoid the bias caused by misclassifying forced ones as voluntary ones.⁴⁶

[Insert Table III.4 Here]

Table III.4 presents the results of the logit estimation. The key explanatory variables are the odd-dummy and firm stock return performance over the previous three years. We use three-year performance measure because using short-term performance (e.g., performance in the

⁴⁶ Nevertheless, we perform robustness checks by deleting those events where CEO departures are likely to be due to retirements, namely CEOs who are either over 60 or over 65. We find similar results as in the full sample.

previous 12 or 24 months) tends to under-estimate turnover-performance sensitivities (Jenter and Lewellen (2010)).

Column (1) of Table III.4 Panel A shows that the coefficient of *Odd* dummy is 0.138 and significant at the 1% level, indicating that firms with odd boards are more likely to experience CEO turnover relative to firms with even boards. Moreover, consistent with findings in the prior studies, the coefficients of the firm's stock return performance is negative and significant at the 1% level, indicating that for both firms with an odd- or an even board CEO turnover is more likely to ensue subsequent to poor firm performance.

To examine the potential difference in the performance sensitivity of CEO turnover between firms with an even board and those with an odd board, in the second regression we include the interaction terms between odd dummy with past stock performance. Column (2) shows that the coefficient on the interaction term, $Odd \times 3\text{-year return}$, is negative and significant. This result indicates that firms with an odd board are more likely to fire CEO in response to poor firm performance, consistent with H2.

We control for firm fixed effects in Column (3), in which the coefficient of $Odd \times 3\text{-year return}$ is still negative and significant: Firms with an odd board have stronger turnover to performance sensitivity than firms with an even board.

We further conduct the sub-sample analysis on CEO turnover in Panel B of Table III.4. In the first two columns of Panel B, we split our full sample into two subsamples based on the sample median director ownership. The interaction, $Odd \times 3\text{-year return}$, is -0.236 in the low director ownership subsample, and -0.138 in the high director ownership subsample, indicating that the economic magnitude of $Odd \times 3\text{-year return}$ is larger in the subsample of low director

ownership. The result supports our theory that the effect of odd board in enhancing board's voting efficiency is more pronounced when directors have a stronger tendency to conformity.

In Columns (3) and (4) of Panel B, we divide the sample based on the sample median of CEO tenure. We find that positive association between odd board and stock performance is more evident in the subsample of longer CEO tenure, consistent with our view that odd board can improve board's voting efficiency particularly when the directors are more likely to conform.

In the last two columns of Panel B, we conduct the subsample analysis based on R&D expense. The coefficient on $Odd \times 3\text{-year return}$ is -0.192 (-0.138) for the high (low) R&D subsample, and is significant at the 1% (10%) level. In terms of both economic magnitude and statistical significance, the effect of odd board in enhancing CEO turnover-performance sensitivity is more pronounced for the high R&D firms, which is also consistent with our theory.

In summary, Table III.4 provide evidence that an odd board is more effective in removing poorly performing CEO than an even odd, and this relation is stronger when director ownership is lower, when CEO tenure is longer, and when it is a high R&D firm. These results are consistent with H2.

4.4. *CEO Compensation*

Determining the CEO compensation scheme is another important job function of the board. In this section, we examine the effects of odd boards on both the level of CEO compensation and the sensitivity of the compensation to firm performance. Table III.5 contains the results of this analysis. The key variables in the regressions models in Table III.5 include the odd dummy and the firm's past 3 year stock return.

[Insert Table III.5 Here]

The first regression model examines the total compensation to CEO. To alleviate the influence of extreme observations on the regression result, we use the natural logarithm of total compensation as the dependent variable. Column (1) of Table III.5 Panel A shows that the coefficient of odd dummy is -0.037 and is significant at the 5% level, indicating that CEOs of firms with an odd board tend to receive around 4% less total compensation. On the other hand, the coefficients of firm stock performance is positive and significant, indicating that good past performance leads to high compensation to CEO. A possible reason behind the lower total compensation might be that CEO compensation for firms with an odd board has lower performance sensitivity so that less pay is needed to compensate CEOs for bearing the compensation risk. To examine this possibility, in Column (2) we examine the effect of odd boards on the performance sensitivity of CEO compensation. Column (2) shows that the coefficient of the interaction between odd dummy and stock return is positive and significant. Thus, in comparison to that of firms with an even board, CEO compensation of firms with an odd board is more closely tied to firm performance.

We control for firm fixed effects in Column (3), and find similar results; The firms with an odd board pay less to their CEO and have stronger pay-for-performance sensitivity.

It is possible that the CEO compensation schedule is designed by the compensation committee rather than the entire board. To address this possibility, in Columns (4) and (5) we add an indicator variable, *Odd compensation committee*, to flag whether the compensation committee consists of an odd number of directors. We find that the coefficient on *Odd compensation committee* is negative and significant, suggesting that the CEO is paid less when an odd number of directors are in the compensation committee. Moreover, the interaction term

Odd compensation committee×*3-year return* has a positive and significant coefficient, which indicates that the pay-for-performance sensitivity is higher in firms with an odd number of directors in the compensation committee.

In Panel B of Table III.5, we conduct subsample analysis on CEO compensation, and the results are generally consistent with our prediction H3 (except for the subsample analysis on R&D). In Columns (1) and (2), we divide the sample by the median director ownership. The interaction *Odd*×*3-year return* has a significantly positive coefficient in the low director ownership subsample, while its coefficient is insignificant in the subsample of high director ownership. In Columns (3) and (4), we find that the coefficient on *Odd*×*3-year return* is 0.04 (0.018) and is significant (insignificant) for the subsample of long (short) CEO tenure. These results indicate that the higher pay-for-performance sensitivity associated with an odd board is mostly driven by the subsample of lower director ownership and longer CEO tenure.

Overall, the empirical evidence supports our H3 that an odd board is associated with lower CEO compensation and higher pay-for-performance sensitivity, and the results are more pronounced for the boards of stronger conformity preference.

5. Robustness Tests

In the regression models in the previous section, we tried to mitigate the problem associated the endogenous nature of boards' even-odd characteristics by explicitly including in the models a comprehensive list of control variables. To further substantiate our results, we conduct the following robustness tests.

5.1. *Announcement Effects of Board Changes*

To provide additional evidence on the positive valuation effect of odd boards, we examine the wealth effect of announcements of changes to boards where an increase in the number of directors turns an odd board into an even board or turns an even board into an odd board.

We search Factiva for the announcement and exclude those with confounding news. For our sample, we identify 561 director appointment announcements that are not surrounded by other corporate news. Among them, there are 280 cases in which the board number changes from an even number to an odd number. We compute the market model cumulative abnormal return (CAR) over windows $(-1, +1)$, $(-2, +2)$, and $(-3, +3)$, where date 0 is the date of announcement. The market model parameters are estimated using 200 trading days of return data ending 11 days before the appointment announcement. The CRSP value-weighted return is used as a proxy for the market return.

[Insert Table III.6 Here]

Table III.6 Panel A contains the CARs computed for the whole sample, the subsample where an even board is changed to an odd board, and the subsample where an odd board is changed to an even board. The first column of Table III.6 shows that for the full sample, CARs for all three event windows are positive, but only $CAR(-2, +2)$ is significant at 5% level. In the subsamples, however, the CARs for all three windows are positive and significant when an increase in the number of directors changes an even board to an odd board. Taking $CAR(-3,+3)$ for example, the firm experiences 1% cumulative abnormal returns on average at the news of an even-to-odd appointment. On the contrary, the CARs for the three windows are all of negligible magnitude and statistically insignificant when an increase in the number of directors changes an

odd board to an even board. Moreover, comparisons in both the mean and the median CARs between the two subsamples show that other than the (-1, +1) window, the differences are all positive and significant. Taken together, consistent with our prior findings, these results suggest that switching from an even board to an odd board increases firm value, though the reverse does not lead to a decline in firm value.

It is possible that changing to odd board might suggest some fundamental differences in board characteristics or firm characteristics, which results in positive market reactions. To mitigate this concern, we conduct the multivariate regression of announcement returns on change to odd dummy and the same control variables in Table III.2. The results are reported in Table III.6 Panel B. The coefficient estimates on change to odd dummy are consistently positive and significant at the 10%, 5% and 5% level in the regressions of CAR (-1, 1), CAR (-2, 2) and CAR (-3, 3), respectively.

5.2. *The Heckman two-step procedure*

As the second approach to address the endogeneity problem, we use the two-step Heckman procedure (Heckman (1979)). In the first step of the Heckman procedure, we estimate a probit model of the probability that a firm has an odd board. Specifically, denote the odd board dummy as C_{it} : $C_{it} = 1$ if at time t firm i has an odd board, and $C_{it} = 0$ otherwise. The probit model estimates

$$\text{Prob}(C_{it} = 1) = \Phi(\alpha_1 Z_{it} + \alpha_2 IV_{it} + u_{it}), \quad (1)$$

where $\Phi(\bullet)$ is the standard normal cumulative distribution function, Z_{it} is a vector of the i^{th} firm's publicly observable characteristics, IV_{it} is a vector of instruments for the odd board dummy, and u_{it} is the disturbance term that includes the firm's publicly unobservable characteristics. The probit model regression provides the estimates for the vectors of coefficients α_1 and α_2 .

In the second step of the test, we estimate firm performance and governance variables Y_{it} using an OLS regression:

$$Y_{it} = \beta_0 + X_{it}\beta_1 + C_{it}\beta_2 + \lambda\beta_3 + v_{it}, \quad (3)$$

where X_{it} represents the set of publicly observable characteristics of the i^{th} firm, λ is the inverse Mills ratio that equals to

$$\begin{aligned} & \phi(-Z_{it}\alpha_1 - IV_{it}\alpha_2) / \Phi(-Z_{it}\alpha_1 - IV_{it}\alpha_2) \text{ if } C_{it} = 1; \\ & -\phi(-Z_{it}\alpha_1 - IV_{it}\alpha_2) / (1 - \Phi(-Z_{it}\alpha_1 - IV_{it}\alpha_2)) \text{ if } C_{it} = 0 \end{aligned}$$

which corrects for self-selection bias, and v_{it} is the disturbance term.⁴⁷ The coefficient of interest is β_2 , which measures the pure effect of odd board on firm performance and corporate governance.

We use two instrumental variables. The first is the prevalence of odd boards in the firm's industry, which is computed as the ratio of the number of companies with an odd board to the total number of companies in the firm's industry. The second is the prevalence of odd boards in the state in which the firm is located, which is measured as the ratio of the number of companies with an odd board to the total number of companies in the firm's state. Since peer firms in the

⁴⁷ The Heckman model with the dummy variable is called a treatment effect model.

same industry or geographic region tend to face similar product market, factor market, and legal environment, an individual firm is likely to share a similar propensity to have an odd board as the peer firms. In other words, the instruments are likely to satisfy the relevance condition. Furthermore, due to the exogeneity of industry(state)-level variables, there are no clear reasons to believe that these two instruments affect firm performance and corporate governance practice after directly controlling for various firm characteristics. Thus, the instruments are also likely to satisfy the exogeneity condition.

[Insert Table III.7 Here]

In Table III.7, we find that in the first-stage probit regression, the coefficient estimates on industry odd board prevalence and state odd board prevalence are 2.591 and 2.374, respectively, and are significant at the 1% level, which provides the evidence that two instruments meet the relevance condition. We also find that firms with odd boards are younger and smaller firms, and less likely to have big boards. In the second-stage OLS regression of Tobin's Q, we find that the coefficient on the odd dummy is 0.611 and is significant at the 5% level, indicating that after controlling for self-selection bias, the effect of the odd board on the firm value is still positive. To test whether these two instruments meet exogeneity condition, we conduct the overidentification test and we find that the *p*-value of the test is 0.659, indicating that we cannot reject the null hypothesis that at least one instrument is valid instrument. In Column (3) we report the second-stage OLS regression ROA and find that, after controlling for self-selection bias, the coefficient of *Odd* dummy is still positive and significant at the 5% level. In Columns (4) and (5), we report the results of the second-stage probit and OLS regressions of CEO turnover and compensation, respectively. The coefficient estimates on the interaction *Odd*×3-

year return are significantly negative in the turnover regression, and significantly positive in the compensation analysis.

In conclusion, the results of Heckman treatment regression are generally consistent with those of OLS and logit regression, suggesting that our results are robust to controlling for the endogeneity problem.

5.3. *The difference in difference regression*

Another robustness test we perform is the difference in difference regression. In untabulated test, we regress the changes in Tobin's Q and ROA on two dummies, change to odd and change to even, and the changes in the time-variant control variables, including the change in return, the change in Capex, the change in R&D, the change in Ln(MV), and the change in leverage. Change to odd (even) dummy is defined as 1 if the board changes from even (odd) board to odd (even) board, and 0 otherwise. The coefficient estimate on change to odd dummy in the regression of change in Tobin's Q and in the regression of change in ROA is 0.006 and 0.029, respectively, and is significant at the 5% level in both regressions, while that on change to even dummy is not significant in both regressions. The results suggest that the change from even board to odd board leads to significant increases in firm value and operating performance.

5.4. *Controlling for board size*

As we know board size is an important determinant of the firm performance, it is possible that odd board is a proxy for the board size. To address this concern, in untabulated tests, we define board size dummy for individual odd number and its adjacent two even numbers. For

example, board size dummy (456) is defined as 1 if the number of directors is 4, 5 or 6, and 0 otherwise. By including the board size dummies in the regression, the board size is well controlled, while the even-odd variability is reserved. Since two adjacent board size dummies, for example board size dummy (456) and board size dummy (678), overlap each other, we run the regressions using two subsamples individually. One subsample includes firms having 4, 5, 6, 8, 9, 10, 12, 13, 14, 16, 17, and 18 directors and the other includes firms having 6, 7, 8, 10, 11, 12, 14, 15, 16, 18, 19, and 20 directors. Our results of Tobin's Q, operating performance, CEO turnover and CEO pay hold in the regressions of both subsamples after controlling for the board size dummies.

6. Conclusion

This paper examines the voting efficiency of corporate boards. We hypothesize that in comparison to even boards, odd boards derive higher voting efficiency by enabling better aggregation of directors' information. Our empirical analysis provides empirical evidence that is consistent with the implications of the model. In particular, we find that in comparison to firms with an even board, those with an odd board have higher firm value and better operating performance. Moreover, cross-sectional variations in the differences in performance between the two types of firms display patterns that are consistent with greater voting efficiency of odd boards. Finally, our analysis reveals that odd boards strengthen corporate governance by increasing the CEO turnover-performance sensitivity, and by reducing total CEO compensation while increasing the pay-for-performance sensitivity.

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Appendix 1: Variable Definitions

This appendix provides a detailed description of the construction of all the variables used in the tables.

Variable	Definitions
Odd dummy	One if an odd number of directors are on board, and zero otherwise.
Big board dummy	One if the number of directors is greater than the sample median and zero otherwise.
Independent director proportion	The ratio of the number of independent directors over the total number of directors.
Director ownership	The average number of shares owned by directors times the stock price at the end of fiscal year.
Tobin's Q	Market value of assets (total book value of assets minus book value of equity plus market value of equity) over book value of assets.
ROA	Return on total assets, calculated as (Operating income before depreciation – Net interest expense – Cash taxes – Change in net working capital) / Total assets.
Return	The buy-and-hold return on the firm's stock for the prior twelve months.
3-year return	The buy-and-hold return on the firm's stock for the prior thirty-six months.
Sale growth	The ratio of sales over previous year sales.
Capx/sale	Capital expenditure divided by sale.
R&D/sale	Research and development expense divided by sale.
MV	The number of shares outstanding times the stock price at the end of fiscal year.
Leverage	The book value of total asset minus book value of equity divided by the book value of total assets.
No. of segments	The number of segments the firm has.
Firm age	The number of years since the firm first appears in CRSP.
Return volatility	The standard deviation of monthly stock return for the prior sixty months.
CEO duality dummy	One if the CEO is also the chairman of the board and zero otherwise.
CEO tenure	The number of years since the person became CEO.
CEO total pay	The variable <i>TDC1</i> in Execucomp, which consists of salary, bonus, value of restricted stock granted, value of options granted (using Black-Scholes), long-term incentive payouts, and other compensation.
Turnover dummy	One if the CEO is in his last year in office, and zero otherwise
Industry odd board prevalence	The ratio of the number of firms with the odd board in the same industry to the total number of firms in that industry.
State odd board prevalence	The ratio of the number of firms with the odd board in the same state to the total number of firms in that state.

Appendix 2

Proof of Proposition 1: To examine if informative voting is an equilibrium strategy, consider director 1's voting decision when all the other directors follow the informative voting strategy. In the following, we define a *voting profile* (k^0, k^1) as an outcome in which among directors other than director 1, a k^0 number vote for $a=0$ and k^1 vote for $a=1$.

Suppose first that n is an odd number. Given voting rule $k_R = (n + 1)/2$, director 1's voting strategy is determined by considering the pivotal case $((n-1)/2, (n-1)/2)$, i.e., the case in which his vote changes the board's choice of action. Since the other directors follow the informative voting strategy, in this pivotal case the other directors' collective information $\sum_{i=2}^n \phi_i = 0$. Thus, when $\phi_1 = 1$ ($\phi_1 = -1$), director 1 views the new strategy as providing a strictly positive (negative) expected performance improvement. Consequently, based on the performance preference, director 1 strictly prefers to follow the informative voting strategy.

To see the effect of conformity preference on director 1's voting decision, note first that in the pivotal case director 1 can always ensure himself to be in conformity with the board's decision irrespective of which action he votes for. Thus, in the pivotal case the conformity preference leaves director 1 indifferent between voting for $a=1$ and for $a=0$. Consider next a non-pivotal case (k^0, k^1) , where $k^0 \neq k^1$. If $k^0 < k^1$, the board will choose $a=1$ independent of director 1's vote. In this case, by voting for $a=1$ director 1 avoid the disconformity cost. However, by voting for $a=1$, director 1 will incur the disconformity cost if the voting profile for the other directors is (k^1, k^0) , in which case the board chooses action $a=0$. Conversely, by voting for $a=0$, director 1 avoids the disconformity cost in the case of (k^1, k^0) , but incurs the cost in the case of (k^0, k^1) . Since the ϕ_i s are uncorrelated, director 1 view the profiles (k^0, k^1)

and (k^1, k^0) as equally likely irrespective of what ϕ_1 he observes. Thus, these two pairing non-pivotal case leaves director 1 indifferent between voting for $a=1$ and for $a=0$. When n is an odd number, there are $n-1$ directors other than director 1. These $n-1$ directors produce a total of n possible voting profile, namely, $(n-1, 0), \dots, (0, n-1)$. Excluding the pivotal case, there is an *even* number $((n-1))$ of non-pivotal cases. Thus, each non-pivotal case (k^0, k^1) , where $k^0 \neq k^1$, can be uniquely paired with an equally likely non-pivotal case $(k^1, k^0,)$. Consequently, in all the non-pivotal cases, conformity preference also leaves director 1 indifferent between voting for $a=1$ and for $a=0$. In sum, for an odd board, the conformity preference does not produce a strict preference for director 1 between the two actions.

Taken together, the above discussions suggest that when other directors follow informative voting strategy, Director 1 also prefers to adopt the same strategy. Thus, in an odd board, informative voting strategy is an equilibrium strategy for the directors.

Suppose next that n is an even number. If the voting rule $k_R = (n/2) + 1$, director 1 is pivotal when the voting profile for the other directors is $((n/2)-1, n/2)$. Since the other directors follow the informative voting strategy, in this pivotal case the other directors' collective information $\sum_{i=2}^n \phi_i = 1$. Thus, if $\phi_1 = 1$ ($\phi_1 = -1$), director 1 views the new strategy as providing a strictly positive (zero) expected performance improvement, and based on performance preference director 1 strictly (weakly) prefers to vote for $a=1$ ($a=0$).

Consider next the effect of conformity preference on director 1's voting decision. In the pivotal case, the conformity preference leaves director 1 indifferent between the two actions. Consider the $(n-1)$ non-pivotal cases. Since n is even, there is an *odd* number of non-pivotal cases. Consequently, there is one non-pivotal case that does not have an equally probable pairing

non-pivotal case. It is easy to see that this unpaired non-pivotal case corresponds to the profile $(n/2, (n/2)-1)$. Given this profile, the board will adopt action $a=0$, so director 1 strictly prefers to vote for $a=0$. Combining the pivotal and the non-pivotal cases, the conformity preference produces a strict preference for director 1 to vote for $a=0$.

The discussion indicates that when n is even, the conformity preference reinforces the performance preference, so that upon observing $\phi_1 = -1$ director 1 strictly prefers to vote for $a=-1$. However, when director 1 observes $\phi_1 = 1$ conformity preference conflicts with the performance preference. In this case, by voting for $a=1$ and ensuring that the board adopts $a=1$ in the pivotal case $((n/2)-1, n/2)$, director 1 derives an expected gain of

$$\binom{\frac{n}{2}}{n-1} \left(\frac{1}{2}\right)^{n-1} \beta = \frac{(n-1)!}{\frac{n}{2}! \left(\frac{n}{2}-1\right)!} \left(\frac{1}{2}\right)^{n-1} \beta.$$

However, voting for $a=1$ imposes an expected discomformity cost due to non-pivotal case $((n/2)-1, n/2)$ of $\binom{\frac{n}{2}}{n-1} \left(\frac{1}{2}\right)^{n-1} u_m$. If $\beta \geq u_m$, director 1 is better off voting for $a=1$ after getting $\phi_1 = 1$, so informative voting is an equilibrium strategy. In contrast, if $\beta < u_m$, the discomformity cost dominates the gain from enabling better board decision, so director 1 strictly prefers to vote for $a=1$ upon observing $\phi_1 = 1$. It follows therefore that if $\beta < u_m$ informative voting cannot be an equilibrium strategy.

Table III. 1 Summary Statistics

The sample consists of 7,532 firm-year observations with an odd number of directors and 6,614 firm-year observations with an even number of directors from 1997 to 2009. We collect the information of the board of director from RiskMetrics, accounting information from Compustat, stock price data from CRSP, and CEO compensation and turnover information from ExecuComp. Definitions of all variables are provided in the appendix. All dollar values are in 2009 dollars. All continuous variables are winsorized at the 1st and 99th percentiles. The symbols ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	Full sample		Odd-number subsample (A)		Even-number subsample (B)		Test of difference: (A)-(B)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Number of director	9.36	9	9.26	9	9.46	10	-0.20***	-1.00***
Independent director proportion (%)	67.74%	70%	67.43%	71.42%	68.08%	70%	-0.65%**	1.42%***
Director ownership (\$M)	23.753	4.956	23.222	4.969	0.378	0.067	24.363	4.943
Stock return	10.4%	7%	10.3%	6.7%	10.4%	7.3%	-0.1%	-0.7%
Sale growth	111%	108%	111%	108%	111%	108%	-0.2%	0.1%
Capex	7.3%	4%	7.3%	4%	7.4%	4.2%	-0.1%	-0.2%
R&D	3.9%	0%	3.9%	0%	3.9%	0%	0%	0%
MV(\$M)	6,995	1,677	6,876	1,594	7,130	1,778	-254	-184***
Leverage	0.551	0.561	0.547	0.561	0.555	0.562	-0.007**	-0.002*
No. of segments	2.43	2.00	2.41	2.00	2.46	2.00	-0.05*	0.000**
Firm age	24.52	19.00	24.09	18.00	25.01	20.00	-0.92***	-2.000***
Return volatility	11.7%	10.4%	11.7%	10.4%	11.7%	10.4%	0%	0%
CEO duality	0.74	1.00	0.74	1.00	0.74	1.00	0.00	0.00
CEO tenure	6.96	5.00	7.03	5.00	6.88	5.00	0.15	0.000*
Tobin's Q	1.88	1.48	1.91	1.48	1.86	1.48	0.05**	0.00
ROA	9%	9.1%	9.1%	9.1%	8.9%	9%	0.2%	0.2%*
CEO turnover	0.116	0.00	0.125	0.00	0.107	0.00	0.018***	0.00***
CEO total pay (\$K)	5,473	3,147	5,341	3,012	5,625	3,271	-284**	-259***

Table III. 2 Firm Value and Odd Board

The sample consists of 7,532 firm-year observations with an odd number of directors and 6,614 firm-year observations with an even number of directors from 1997 to 2009. The dependent variable is Tobin's Q, calculated as market value of assets (total book value of assets minus book value of equity plus market value of equity) over book value of assets. Odd dummy is equal to 1 if the number of directors on the board is the odd number and 0 otherwise. All other controls are defined in Appendix. Two-digit SIC code dummies are used to control for industry fixed effects. In Columns (1)-(4), we control for industry fixed effects. In Column (5) we control for the firm fixed effects. The *p*-values in parentheses are based on standard errors adjusted for heteroscedasticity and firm clustering. The symbols ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
Odd _{<i>t-1</i>}	0.064*** (0.001)	0.003 (0.908)	0.066*** (0.000)	-0.024 (0.246)	0.030** (0.049)
Odd _{<i>t-1</i>} ×CEO tenure _{<i>t-1</i>}		0.009*** (0.001)			
Odd _{<i>t-1</i>} ×Director ownership _{<i>t-1</i>}			-0.109** (0.027)		
Odd _{<i>t-1</i>} ×R&D _{<i>t-1</i>}				0.229*** (0.000)	
Bigboard dummy _{<i>t-1</i>}	-0.180*** (0.000)	-0.179*** (0.000)	-0.182*** (0.000)	-0.205*** (0.000)	-0.121*** (0.001)
Independent director proportion _{<i>t-1</i>}	-0.001 (0.272)	-0.001 (0.269)	-0.002** (0.031)	-0.000 (0.688)	-0.002* (0.076)
Director ownership _{<i>t-1</i>}	1.671*** (0.000)	1.654*** (0.000)	0.188*** (0.003)	1.527*** (0.000)	-0.143 (0.690)
Return _{<i>t-1</i>}	0.277*** (0.000)	0.278*** (0.000)	0.274*** (0.000)	0.260*** (0.000)	0.302*** (0.000)
ROA _{<i>t-1</i>}	6.004*** (0.000)	5.994*** (0.000)	5.973*** (0.000)	5.300*** (0.000)	1.328*** (0.001)
Sale growth _{<i>t-1</i>}	0.067 (0.220)	0.068 (0.213)	0.070 (0.208)	0.073 (0.198)	0.052 (0.259)
Capex _{<i>t-1</i>}	-0.260 (0.129)	-0.257 (0.132)	-0.280 (0.105)	-0.232 (0.175)	-0.049 (0.170)
R&D _{<i>t-1</i>}	4.040*** (0.000)	4.038*** (0.000)	3.980*** (0.000)	2.274*** (0.000)	0.233 (0.632)
Ln(MV) _{<i>t-1</i>}	0.154*** (0.000)	0.154*** (0.000)	0.178*** (0.000)	0.187*** (0.000)	0.047* (0.082)
Leverage _{<i>t-1</i>}	-0.054 (0.671)	-0.055 (0.666)	-0.065 (0.615)	-0.267** (0.032)	-0.107 (0.430)
Segment number _{<i>t-1</i>}	-0.049*** (0.000)	-0.049*** (0.000)	-0.049*** (0.000)	-0.058*** (0.000)	-0.029** (0.011)
Ln(firmage) _{<i>t-1</i>}	-0.031 (0.138)	-0.032 (0.137)	-0.037* (0.089)	-0.036 (0.103)	-0.431*** (0.000)
Volatility _{<i>t-1</i>}	1.128*** (0.006)	1.124*** (0.006)	1.223*** (0.004)	2.290*** (0.000)	1.557*** (0.001)
Duality _{<i>t-1</i>}	-0.060** (0.033)	-0.061** (0.031)	-0.068** (0.019)	-0.077*** (0.009)	0.006 (0.831)
CEO tenure _{<i>t-1</i>}	0.005** (0.025)	0.001 (0.781)	0.006*** (0.010)	0.006** (0.020)	0.002 (0.429)
Constant _{<i>t-1</i>}	0.041 (0.788)	0.078 (0.612)	-0.013 (0.938)	0.008 (0.961)	2.707*** (0.000)
Year FE	Yes	Yes	Yes	Yes	Yes

Industry FE	Yes	Yes	Yes	Yes	
Firm FE					Yes
Observations	14146	14146	14146	14146	14146
Adj R ²	45%	45%	44%	43%	75%

Table III. 3 Operating Performance and Odd Board

The sample consists of 7,532 firm-year observations with an odd number of directors and 6,614 firm-year observations with an even number of directors from 1997 to 2009. The dependent variable is ROA, where ROA is calculated as (Operating income before depreciation – Net interest expense – Cash taxes – Change in net working capital) deflated by total asset. Odd dummy is equal to 1 if the number of directors on the board is the odd number and 0 otherwise. All other controls are defined in Appendix. Two-digit SIC code dummies are used to control for industry fixed effects. In Columns (1)-(4), we control for industry fixed effects. In Column (5) we control for the firm fixed effects. The p -values in parentheses are based on standard errors adjusted for heteroscedasticity and firm clustering. The symbols ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
Odd $_{t-1}$	0.179** (0.020)	-0.069 (0.790)	0.281*** (0.001)	0.281 (0.201)	0.159* (0.095)
Odd $_{t-1}$ × CEO tenure $_{t-1}$		0.043* (0.095)			
Odd $_{t-1}$ × Director ownership $_{t-1}$			-0.303** (0.018)		
Odd $_{t-1}$ × R&D $_{t-1}$				1.685*** (0.001)	
Bigboard dummy $_{t-1}$	-0.187* (0.058)	-0.626*** (0.007)	-0.316** (0.014)	-0.457 (0.248)	-0.118 (0.514)
Independent director proportion $_{t-1}$	0.000 (0.951)	0.009 (0.151)	0.001 (0.883)	0.012 (0.262)	0.004 (0.428)
Director ownership $_{t-1}$	-0.053 (0.927)	0.016 (0.945)	0.241* (0.100)	-0.635 (0.271)	-0.045 (0.671)
Return $_{t-1}$	1.668*** (0.000)	2.152*** (0.000)	1.802*** (0.000)	2.020*** (0.000)	1.603*** (0.000)
ROA $_{t-1}$	0.726*** (0.000)	0.842*** (0.000)	0.539*** (0.000)	0.842*** (0.000)	0.267*** (0.000)
Sale growth $_{t-1}$	-1.313*** (0.000)	-4.062*** (0.000)	-0.706** (0.040)	-4.338* (0.083)	-0.110 (0.742)
Capex $_{t-1}$	-0.947 (0.140)	0.502 (0.673)	1.853* (0.090)	-0.355 (0.873)	-3.060** (0.026)
R&D $_{t-1}$	-3.976*** (0.001)	-8.996*** (0.000)	-3.594** (0.027)	-6.059*** (0.000)	-6.817** (0.028)
Ln(MV) $_{t-1}$	0.294*** (0.000)	0.482*** (0.000)	0.417*** (0.000)	0.435*** (0.002)	0.713*** (0.000)
Leverage $_{t-1}$	0.207 (0.523)	-1.520*** (0.009)	-0.607 (0.149)	-1.104 (0.446)	2.298*** (0.009)
Segment number $_{t-1}$	-0.076*** (0.004)	-0.009 (0.885)	-0.156*** (0.000)	0.034 (0.685)	-0.144*** (0.006)
Ln(firmage) $_{t-1}$	-0.065 (0.228)	-0.256* (0.052)	-0.036 (0.635)	-0.274 (0.107)	0.392 (0.222)
Volatility $_{t-1}$	-6.004*** (0.000)	-4.099* (0.085)	-9.430*** (0.000)	-9.265*** (0.009)	0.623 (0.793)
Duality $_{t-1}$	-0.259*** (0.007)	-0.316 (0.159)	-0.347*** (0.003)	-0.356*** (0.010)	-0.157 (0.314)
CEO tenure $_{t-1}$	0.019*** (0.002)	-0.017 (0.356)	0.019** (0.022)	0.013 (0.529)	-0.001 (0.916)
Constant	2.637*** (0.000)	2.073 (0.744)	3.677*** (0.000)	4.483** (0.034)	-1.231 (0.461)
Year FE	Yes	Yes	Yes	Yes	Yes

Industry FE	Yes	Yes	Yes	Yes	
Firm FE					Yes
Observations	14066	14066	14066	14066	14066
Adj R ²	64%	63%	64%	63%	74%

Table III. 4 CEO Turnover and Odd Board

The sample consists of 7,532 firm-year observations with an odd number of directors and 6,614 firm-year observations with an even number of directors from 1997 to 2009. Turnover is a dummy variable defined as 1 if the CEO is in his last year in office, and zero otherwise. Odd dummy is equal to 1 if the number of directors on the board is the odd number and 0 otherwise. All other controls are defined in Appendix. Two-digit SIC code dummies are used to control for industry fixed effects. Panel A presents the full sample analysis and Panel B presents the subsample analysis. The *p*-values in parentheses are based on standard errors adjusted for heteroscedasticity and firm clustering. The symbols ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A Full Sample Analysis

	(1)	(2)	(3)
Odd dummy $t-1$	0.138*** (0.009)	0.219*** (0.000)	0.018** (0.013)
Odd $t-1$ × 3-year return		-0.171*** (0.000)	-0.018*** (0.001)
3-year return	-0.116*** (0.001)	0.019** (0.047)	0.003** (0.046)
ROA $t-1$	-0.616 (0.165)	-0.738* (0.091)	-0.137* (0.076)
Bigboard dummy $t-1$	0.267*** (0.000)	0.271*** (0.000)	0.037*** (0.002)
Independent director proportion $t-1$	0.003* (0.060)	0.003* (0.060)	0.000 (0.149)
Director ownership $t-1$	0.320 (0.465)	0.266 (0.546)	0.148* (0.087)
Ln(MV) $t-1$	0.038* (0.077)	0.028 (0.191)	0.005 (0.494)
Leverage $t-1$	-0.037 (0.810)	-0.026 (0.867)	-0.042 (0.271)
Segment number $t-1$	0.001 (0.938)	0.002 (0.919)	-0.002 (0.514)
Ln(firm age) $t-1$	0.008 (0.816)	0.013 (0.720)	-0.056*** (0.001)
Volatility $t-1$	2.061*** (0.002)	1.818*** (0.005)	-0.252* (0.085)
Duality $t-1$	0.099 (0.122)	0.098 (0.127)	0.007 (0.416)
Tenure $t-1$	0.009** (0.016)	0.009** (0.017)	0.014*** (0.000)
Constant	-35.575	-35.514	0.009
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	
Firm FE			Yes
Observations	14344	14344	14344
Pseudo R ²	2.5%	2.6%	17.1%

Panel B Subsample Analysis

	Low director ownership subsample (1)	High director ownership subsample (2)	Short CEO tenure subsample (3)	Long CEO tenure subsample (4)	Low R&D subsample (5)	High R&D subsample (6)
Odd dummy $t-1$	0.197** (0.017)	0.254*** (0.002)	0.074 (0.384)	0.340*** (0.000)	0.177** (0.031)	0.269*** (0.001)
Odd $t-1$ × 3-year return	-0.236** (0.014)	-0.138*** (0.009)	-0.164** (0.014)	-0.198*** (0.002)	-0.138* (0.096)	-0.192*** (0.002)
3-year return	0.003 (0.968)	0.020** (0.039)	0.014 (0.167)	0.032 (0.136)	0.002 (0.970)	0.026*** (0.008)
ROA $t-1$	-0.418 (0.533)	-0.852 (0.166)	-0.882 (0.198)	-0.496 (0.418)	-1.636** (0.016)	-0.644 (0.297)
Bigboard dummy $t-1$	0.334*** (0.000)	0.182* (0.059)	0.193* (0.057)	0.339*** (0.000)	0.311*** (0.001)	0.227** (0.012)
Independent director proportion $t-1$	0.004 (0.104)	0.003 (0.266)	0.001 (0.663)	0.005** (0.039)	0.004 (0.133)	0.003 (0.218)
Director ownership $t-1$			1.161* (0.088)	-0.624 (0.324)	1.125* (0.052)	-0.669 (0.328)
Ln(MV) $t-1$	0.004 (0.904)	0.052* (0.099)	-0.019 (0.566)	0.053* (0.064)	0.058* (0.075)	0.008 (0.786)
Leverage $t-1$	-0.049 (0.820)	0.088 (0.699)	-0.416* (0.073)	0.234 (0.273)	-0.214 (0.368)	0.003 (0.990)
Segment number $t-1$	-0.046* (0.077)	0.040 (0.103)	-0.034 (0.219)	0.034 (0.155)	-0.023 (0.381)	0.024 (0.325)
Ln(firm age) $t-1$	-0.025 (0.578)	0.060 (0.310)	-0.012 (0.821)	0.041 (0.432)	0.003 (0.950)	0.018 (0.712)
Volatility $t-1$	0.909 (0.319)	2.520*** (0.008)	2.673*** (0.004)	0.222 (0.748)	3.753*** (0.000)	0.908 (0.326)
Duality $t-1$	-0.004 (0.959)	0.197** (0.037)	0.135 (0.133)	0.130 (0.195)	0.213** (0.017)	-0.037 (0.692)
Tenure $t-1$	0.024*** (0.000)	0.001 (0.877)			0.017*** (0.001)	0.003 (0.626)
Constant	-36.319	-18.714	-18.427	-20.654	-36.038	-35.911***
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7233	7111	6893	7451	7917	6427
Pseudo R ²	3.5%	3.5%	3.9%	3.8%	3.8%	3.0%

Table III. 5 CEO Compensation and Odd Board

The sample consists of 7,532 firm-year observations with an odd number of directors and 6,614 firm-year observations with an even number of directors from 1997 to 2009. The dependent variable is Ln(CEO total compensation), where total compensation is Item *TDC1* in Execucomp, which consists of salary, bonus, value of restricted stock granted, value of options granted (using Black-Scholes), long-term incentive payouts, and other compensation. Odd dummy is equal to 1 if the number of directors on the board is an odd number and 0 otherwise. All other controls are defined in Appendix. Two-digit SIC code dummies are used to control for industry fixed effects. Panel A presents the full sample analysis and Panel B presents the subsample analysis. The *p*-values in parentheses are based on standard errors adjusted for heteroscedasticity and firm clustering. The symbols ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A Full Sample Analysis

	(1)	(2)	(3)	(4)	(5)
Odd $_{t-1}$	-0.037** (0.017)	-0.048*** (0.009)	-0.020 (0.178)		
Odd $_{t-1} \times 3$ -year return		0.036** (0.018)	0.029** (0.031)		
Odd Compensation Committee $_{t-1}$				-0.036* (0.054)	-0.040** (0.036)
Odd Compensation Committee $_{t-1} \times 3$ -year return					0.024* (0.085)
3-year return	0.021** (0.040)	0.002 (0.747)	0.007 (0.137)	0.013 (0.245)	-0.000 (0.973)
ROA $_{t-1}$	-0.230 (0.229)	-0.222 (0.307)	0.163 (0.168)	-0.315 (0.104)	-0.244 (0.140)
Bigboard dummy $_{t-1}$	0.041 (0.120)	0.045 (0.109)	-0.004 (0.876)	0.033 (0.253)	0.014 (0.634)
Independent director proportion $_{t-1}$	0.005*** (0.000)	0.006*** (0.000)	0.001 (0.120)	0.005*** (0.000)	0.005*** (0.000)
Director ownership $_{t-1}$	-0.425*** (0.000)	-0.426*** (0.000)	-0.030 (0.102)	-0.382*** (0.000)	-0.383*** (0.000)
Ln(MV) $_{t-1}$	0.456*** (0.000)	0.458*** (0.000)	0.262*** (0.000)	0.469*** (0.000)	0.463*** (0.000)
Leverage $_{t-1}$	0.671*** (0.000)	0.671*** (0.000)	0.017 (0.854)	0.574*** (0.000)	0.644*** (0.000)
Segment number $_{t-1}$	0.011 (0.151)	0.011 (0.203)	0.013 (0.165)	0.013 (0.121)	0.015* (0.075)
Ln(firm age) $_{t-1}$	-0.031* (0.056)	-0.026 (0.176)	-0.012 (0.785)	-0.042** (0.013)	-0.023 (0.169)
Volatility $_{t-1}$	2.037*** (0.000)	1.464*** (0.000)	0.508 (0.229)	2.039*** (0.000)	1.818*** (0.000)
Duality $_{t-1}$	0.094*** (0.000)	0.086*** (0.001)	0.007 (0.757)	0.099*** (0.000)	0.099*** (0.000)
Tenure $_{t-1}$	-0.004** (0.034)	-0.004* (0.057)	-0.001 (0.769)	-0.003 (0.143)	-0.003 (0.142)
Constant	3.801*** (0.000)	3.786*** (0.000)	6.074*** (0.000)	3.690*** (0.000)	4.128*** (0.000)
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes		Yes	Yes
Firm FE			Yes		
Observations	12329	12329	12329	10377	10377
Adj R ²	52%	51%	75%	51%	51%

Panel B Subsample Analysis

	Low director ownership subsample (1)	High director ownership subsample (2)	Short CEO tenure subsample (3)	Long CEO tenure subsample (4)	Low R&D subsample (5)	High R&D subsample (6)
Odd dummy $t-1$	-0.036* (0.065)	-0.027 (0.302)	-0.030 (0.189)	-0.063** (0.014)	-0.065** (0.011)	-0.036 (0.152)
Odd $t-1$ × 3-year return	0.034** (0.030)	-0.006 (0.460)	0.018 (0.366)	0.040** (0.046)	0.076*** (0.009)	0.018 (0.387)
3-year return	-0.010 (0.459)	0.038*** (0.005)	0.021 (0.177)	-0.001 (0.952)	-0.027 (0.123)	0.007* (0.085)
ROA $t-1$	0.306** (0.050)	-0.450** (0.032)	0.017 (0.923)	-0.031 (0.870)	0.055 (0.869)	-0.373 (0.164)
Bigboard dummy $t-1$	0.061*** (0.008)	0.045 (0.147)	0.082*** (0.002)	0.065** (0.017)	0.058 (0.142)	0.014 (0.714)
Independent director proportion $t-1$	0.004*** (0.000)	0.007*** (0.000)	0.003*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.005*** (0.000)
Director ownership $t-1$			-0.239*** (0.000)	-0.685*** (0.000)	-0.529*** (0.000)	-0.396*** (0.000)
Ln(MV) $t-1$	0.459*** (0.000)	0.453*** (0.000)	0.462*** (0.000)	0.458*** (0.000)	0.451*** (0.000)	0.456*** (0.000)
Leverage $t-1$	0.443*** (0.000)	0.732*** (0.000)	0.590*** (0.000)	0.721*** (0.000)	1.032*** (0.000)	0.375*** (0.000)
Segment number $t-1$	0.031*** (0.000)	-0.016* (0.055)	0.022*** (0.002)	0.003 (0.683)	0.019 (0.115)	0.005 (0.665)
Ln(firm age) $t-1$	-0.075*** (0.000)	0.012 (0.519)	-0.063*** (0.000)	0.004 (0.818)	-0.018 (0.578)	-0.011 (0.608)
Volatility $t-1$	2.334*** (0.000)	1.473*** (0.000)	2.717*** (0.000)	2.298*** (0.000)	1.921** (0.029)	0.857*** (0.034)
Duality $t-1$	0.111*** (0.000)	0.106*** (0.000)	0.080*** (0.001)	0.101*** (0.000)	0.110*** (0.004)	0.059 (0.101)
Tenure $t-1$	-0.001 (0.597)	-0.006*** (0.000)			-0.002 (0.501)	-0.005* (0.095)
Constant	3.709*** (0.000)	3.614*** (0.000)	3.665*** (0.000)	3.302*** (0.000)	3.436*** (0.000)	4.081*** (0.000)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6418	5911	5865	6464	6605	5724
Adj R ²	47%	41%	48%	39%	44%	49%

Table III. 6 Market Reaction towards Director Appointment

The sample consists of 561 director appointments from 1997 to 2009, among which 280 appointments make the number of board directors change from even to odd number and 281 make it change from odd to even number. The director appointment announcement dates are from Capital IQ and manually checked with Factiva. The abnormal stock return is calculated using the market model. The market model parameters are estimated using 200 trading days of return data ending 11 days before the appointment announcement. The CRSP value-weighted return is used as a proxy for the market return. The symbols ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Univariate Test

	Full Sample (561 Obs.)		Change to Odd: A (280 Obs.)		Change to Even: B (281 Obs.)		(A) - (B)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
CAR(-1, 1)	0.003	0.001	0.005*	0.001***	0.001	0.001	(0.227)	(0.235)
CAR(-2, 2)	0.005**	0.001**	0.009***	0.003	0.001	0.000*	(0.067)*	(0.200)
CAR(-3, 3)	0.004	-0.000	0.010**	0.002**	-0.001	-0.002	(0.037)**	(0.042)**

Panel B: Multivariate Test

VARIABLES	(1) CAR(-1, 1)	(2) CAR(-2, 2)	(3) CAR(-3, 3)
Change to Odd	0.008* (0.057)	0.013** (0.016)	0.016** (0.012)
Bigboard dummy	-0.002 (0.764)	0.000 (0.953)	0.005 (0.581)
Independent director proportion	0.000 (0.268)	0.000 (0.554)	-0.000 (0.804)
Director ownership	0.000 (0.937)	0.000 (0.845)	0.000 (0.901)
Return	0.003 (0.575)	0.011 (0.156)	0.021** (0.031)
ROA	-0.052 (0.284)	-0.047 (0.448)	-0.125* (0.074)
Sale growth	-0.004 (0.698)	-0.001 (0.932)	0.002 (0.922)
Capex	0.007 (0.843)	0.027 (0.534)	0.013 (0.805)
R&D	-0.045 (0.240)	-0.068 (0.201)	-0.014 (0.819)
Ln(MV)	0.001 (0.731)	-0.001 (0.547)	-0.004 (0.207)
Leverage	-0.010 (0.476)	-0.014 (0.447)	-0.025 (0.234)
Segment number	-0.001 (0.504)	-0.000 (0.811)	-0.000 (0.826)
Ln(firmage)	0.004 (0.144)	0.005 (0.146)	0.006 (0.210)
Volatility	0.044 (0.492)	0.010 (0.913)	-0.086 (0.372)
Duality	0.007	0.010	0.014*

	(0.191)	(0.155)	(0.068)
CEO tenure	0.000	0.000	-0.000
	(0.654)	(0.971)	(0.597)
Constant	-0.011	0.014	0.104**
	(0.667)	(0.743)	(0.049)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	528	528	528
Adj R ²	0.154	0.172	0.163

Table III. 7 Controlling for Self-Selection Bias

The sample consists of 14,146 firm-year observations based on RiskMetrics/CRSP/Compustat merged data from 1997 to 2009. Tobin's Q is calculated as market value of assets (total book value of assets minus book value of equity plus market value of equity) over book value of assets. ROA is the return on asset, calculated as (Operating income before depreciation – Net interest expense – Cash taxes – Change in net working capital) deflated by total asset. Turnover is a dummy variable defined as 1 if the CEO is in his last year in office, and zero otherwise. CEO total compensation is Item *TDC1* in Execucomp, which consists of salary, bonus, value of restricted stock granted, value of options granted (using Black-Scholes), long-term incentive payouts, and other compensation. Odd dummy is equal to 1 if an odd number of directors are on board and 0 otherwise. Industry odd board prevalence is measured as the ratio of the number of firms with the odd board in the same industry to the total number of firms in that industry. State odd board prevalence is measured as the ratio of the number of firms with the odd board in the same state to the total number of firms in that state. All other controls are defined in Appendix. Two-digit SIC code dummies are used to control for industry fixed effects. The *p*-values in parentheses are based on standard errors adjusted for heteroscedasticity and firm clustering. The symbols ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

VARIABLES	1 st stage	2 nd stage	2 nd stage
	Odd dummy	Tobin's <i>Q</i>	ROA
	(1)	(2)	(3)
Odd dummy $_{t-1}$		0.611** (0.016)	3.545** (0.010)
<i>Instrument variables:</i>			
Industry odd board prevalence $_{t-1}$	2.591*** (0.000)		
State odd board prevalence $_{t-1}$	2.374*** (0.000)		
<i>Control variables:</i>			
Big board dummy $_{t-1}$	-0.582*** (0.000)	-0.300*** (0.000)	-1.057*** (0.001)
Independent director proportion $_{t-1}$	-0.001** (0.042)	-0.001 (0.189)	0.002 (0.513)
Director ownership $_{t-1}$	-0.006* (0.061)	1.643*** (0.000)	0.251 (0.727)
Stock Return $_{t-1}$	0.032 (0.313)	0.273*** (0.000)	-1.752*** (0.000)
ROA $_{t-1}$	0.574*** (0.001)	6.139*** (0.000)	0.531*** (0.000)
Sale growth $_{t-1}$	-0.011 (0.829)	0.070* (0.060)	-0.660*** (0.001)
Capex $_{t-1}$	0.177* (0.081)	-0.359*** (0.001)	1.764*** (0.002)
R&D $_{t-1}$	0.431*** (0.007)	4.041*** (0.000)	-3.450 (0.000)
Ln(MV) $_{t-1}$	-0.073*** (0.000)	0.169*** (0.000)	0.495*** (0.000)
Leverage $_{t-1}$	-0.160*** (0.010)	-0.042 (0.402)	-0.441 (0.124)
Number of segments $_{t-1}$	-0.008 (0.247)	-0.047*** (0.000)	-0.148 (0.000)
Ln(firm age) $_{t-1}$	-0.089*** (0.000)	0.012 (0.406)	0.089*** (0.263)
Return volatility $_{t-1}$	0.230 (0.412)	1.141*** (0.000)	-10.196*** (0.000)

Duality dummy $t-1$	0.031 (0.245)	-0.065*** (0.001)	-0.371*** (0.000)
Tenure $t-1$	0.002 (0.126)	0.005*** (0.000)	-0.014** (0.026)
Constant $t-1$	-2.017*** (0.000)	0.572 (0.308)	1.830 (0.570)
Year fixed effect	Yes	Yes	Yes
Industry fixed effect	No	Yes	Yes
Observations	14,146	14,146	14,066
Rho		-0.155	-0.526
Chi-2 statistic		2.15	38.29***

VARIABLES	2 nd stage Turnover (4)	2 nd stage Ln(CEO compensation) (5)
Odd dummy $t-1$	-0.017 (0.975)	0.301 (0.193)
Odd dummy $t-1$ × 3 year return	-0.086*** (0.000)	0.023** (0.021)
<i>Instrument variables:</i>		
Industry odd board prevalence $t-1$		
State odd board prevalence $t-1$		
<i>Control variables:</i>		
Big board dummy $t-1$	0.17 (0.161)	-0.042 (0.455)
Independent director proportion $t-1$	0.002* (0.075)	0.005*** (0.000)
Director ownership $t-1$	0.13 (0.589)	-0.428*** (0.000)
3 year return $t-1$	0.011 (0.108)	0.000 (0.909)
ROA $t-1$	-0.354 (0.150)	-0.259** (0.028)
Ln(MV) $t-1$	0.012 (0.494)	0.466*** (0.000)
Leverage $t-1$	-0.014 (0.881)	0.701*** (0.000)
Number of segments $t-1$	0.001 (0.905)	0.014*** (0.006)
Ln(firm age) $t-1$	0.004 (0.878)	-0.021* (0.068)
Return volatility $t-1$	1.070*** (0.007)	1.992*** (0.000)
Duality dummy $t-1$	0.054 (0.127)	0.091*** (0.000)
Tenure $t-1$	0.005** (0.012)	-0.005*** (0.000)
Constant	-11.273	3.364*** (0.000)
Year fixed effect	Yes	Yes
Industry fixed effect	Yes	Yes
Observations	14,344	12,329
Rho	0.082	-0.311
Chi-2 statistic	0.579	4.26**