AGENCY COSTS IN THE ERA OF ECONOMIC CRISIS: THE ENHANCED CONNECTION BETWEEN CEO COMPENSATION AND CORPORATE CASH HOLDINGS

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This Article reports the results of an empirical study that suggest that the current economic crisis has changed managerial behavior in the United States in a way that may impede economic recovery. The study finds a strong, statistically significant, and economically meaningful, positive correlation between CEO total annual compensation and corporate cash holdings during the economic crisis in the years 2008—2010. Such a significant correlation did not exist in prior years. The empirical findings suggest that high CEO compensation increases managerial risk-aversion in times of crisis. The Article considers several explanations for these empirical findings, some of which imply a market failure. The study has implications for the discussion on managerial pay arrangements and the implementation of the Dodd–Frank Act concerning say on pay.

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INTRODUCTION

The Great Recession shocked the market system and highlighted the vulnerability of companies to economic changes. One important business practice that has changed is the substantial increase in money holdings by companies.[1] The corporate practice of maintaining sizable cash holdings contributes to the low level of activity in the market and the continued economic decline.[2] Recent reports indicate that companies hold about $2 trillion in cash.[3]

Managers of companies decide how much cash and cash equivalents to hold. Understanding the factors that influence these managers' decision-making and specifically studying the influence of the Great Recession can shed light on the corporate practice of cash holdings and on managerial behavior in general. In the past, managers have been accused of hoarding money and using the company's cash reserves for empire building, i.e., promoting their own interests, rather than investing in the existing operations of the company or distributing money back to the shareholders.[4] Therefore, this Article examines whether there is a correlation between the size of firms' cash holdings and management's personal benefits.

This Article's study indeed finds a strong correlation between corporate cash retention and CEO compensation.[5] This correlation has greatly intensified in

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1.   *See, e.g.*, Justin Lahart, *Companies Cling to Cash—Coffers Swell to 51-Year High as Cautious Firms Put Off Investing in Growth*, WALL ST. J., Dec. 10, 2010, at A1 ("[N]onfinancial companies in the U.S. were sitting on $1.93 trillion in cash and other liquid assets at the end of September . . . . Cash accounted for 7.4% of the companies' total assets—the largest share since 1959.").

2.   *See id.* ("The cash pooling up at companies has the potential to help the economy grow more vigorously and bring unemployment lower—*if they start spending it* on new plants, equipment and employees." (emphasis added)).

3.   *Id.*

4.   *See, e.g.*, John C. Coffee, Jr., *Regulating the Market for Corporate Control: A Critical Assessment of the Tender Offer's Role in Corporate Governance*, 84 COLUM. L. REV. 1145, 1167–69 (1984) ("Those who take a 'behavioral' view of the modern corporation have long argued that firms tend to maximize size, not profits.").

5.   The finding is statistically significant, above the 99% level.

magnitude over the last three years.[6] The results are also economically meaningful—an average increase of 10% in the CEO's annual compensation is associated with an average of 3% increase in the firm's money holdings (an elasticity[7] of about 0.3), after controlling for firm size and industry.[8]

Furthermore, the study finds that the correlation between CEO compensation and cash holdings became statistically significant from 2008 through 2010. Additionally, the correlation increased dramatically when compared with the 2006–2007 period, which preceded the economic crisis.[9] (This dramatic increase in the correlation is robust and is supported even at a confidence-level range of more than 95%.) Thus, the study suggests that after the economic crisis, managerial behavior changed and managerial sensitivity to incentives adjusted accordingly in a way that is markedly different from prior, non-crisis practices.

This Article also examines each firm's level of short-term debt (measured as debt in current liabilities). Similar to cash retention, the amount a company is leveraged also indicates the manager's choice regarding the firm's risk level,[10] though in the opposite direction. Specifically, high levels of short-term debt increase the firm's risk in times of fear of an imminent double-dip recession.[11] I found a statistically significant negative correlation between CEO compensation and the firm's short-term debt in 2010.

Lastly, this Article also finds a weak correlation between the firm's cash holdings during the economic crisis and whether or not a manager was above the median age.[12] The results suggest that managers who are over the median CEO age (54 years old) tend to hold, on average, more cash.

Determining the reasons for keeping this cash is beyond the scope of this study, but several competing explanations for the empirical results can be considered. Generally, the explanations fall into three classes, which are identified in this Article. First, the economic crisis created a new environment with different external forces operating on managers, and these external forces are correlated with both pay and cash holdings. Second, during the financial crisis, CEOs required special skills to navigate through the demands of the crisis. And the crisis

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6. *See infra* Part II.C.

7. In economics, the term elasticity denotes the ratio of the percent change in one variable to the percent change in another variable.

8. *See infra* Part II.C.

9. The magnitude of the coefficient (on a log-scale) has more than doubled. *See infra* Part II.C.

10. *Cf., e.g.*, Kate Litvak, *Defensive Management: Does the Sarbanes–Oxley Act Discourage Corporate Risk-Taking?* (3rd Annual Conference on Empirical Legal Studies Papers Univ. of Texas Law Sch., Law and Economics Research Paper No. 108, 2008), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1120971 (looking at various proxies for risk, including cash holdings and debt levels, and studying the influence of the Sarbanes–Oxley Act on corporate risk).

11. Short-term debt increases the risk, because if there is indeed a double-dip recession in the near future then the firm will have to pay back the short-term debt at a time when it is most difficult to do so.

12. *See infra* Part II.B.

has accentuated certain executive traits that are correlated with pay level. Lastly, following the economic crisis, managerial behavior changed to correspond to adjustments in the manager's level of risk. And the manager's level of risk is positively correlated with her compensation. The Article considers a few explanations for the study's empirical findings that look at agency costs, skill, and corporate governance.[13]

One of these explanations focuses on the manager's risk-aversion.[14] The link between the manager's personal welfare and the firm's performance may have tightened following the financial crisis. Before the crisis, the effect of poor performance on the manager could have been mitigated by special arrangements— such as golden parachutes, post-retirement consulting contracts, and perpetual thrones—which are triggered upon dismissal and provide some substitute for lost income.[15] In addition, anti-takeover mechanisms likely have shielded the manager from the consequences of poor performance by entrenching the manager regardless of her performance.[16] However, it appears that following the financial crisis, firms face an increased risk of total failure and collapse.[17] Unlike the risk of an

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13.   *See infra* Part II.D.

14.   For ease of composition, I use the term *risk-aversion* to describe a preference for lower levels of risk, which may also be caused by a movement on the manager's risk tolerance function because of a change in outcome distributions and not necessarily by a change of the function itself.

15.   In addition to golden parachutes, which are generous payments to departing managers, managers may receive "post-retirement consulting contracts," see Lucian A. Bebchuk & Jesse M. Fried, *Pay Without Performance: Overview of the Issues*, 30 J. CORP. L. 647, 666 (2005) (discussing the award of "post-retirement consulting contracts" as "stealth compensation" to CEOs); *cf.* Mira Ganor, *Salvaged Directors or Perpetual Thrones?*, 5 VA. L. & BUS. REV. 267, 292 (2010) (comparing golden parachutes and post-retirement consulting contracts to perpetual thrones and arguing that the former "amount to simple monetary transfers to the agents of the target" while "perpetual throne grants . . . also bestow power in the form of actual seats on the acquirer's board").

16.   Some anti-takeover defenses can prevent a hostile takeover. *See, e.g.*, Lucian Arye Bebchuk, *The Case Against Board Veto in Corporate Takeovers*, 69 U. CHI. L. REV. 973, 976 (2002) ("[I]n most states, boards may install and maintain poison pills that prevent an acquisition."); Lucian Arye Bebchuk et al., *The Powerful Antitakeover Force of Staggered Boards: Theory, Evidence, and Policy*, 54 STAN. L. REV. 887, 890 (2002) ("[S]taggered boards make it extremely difficult for a hostile bidder to gain control over the incumbents' objections."); *cf.* Dynamics Corp. of Am. v. CTS Corp., 805 F.2d 705, 715 (7th Cir. 1986) (observing that in the case at issue "the . . . poison pill was designed to keep CTS from being sold . . . so that, in the end, the current management and directors would keep their jobs").

17.   *See, e.g.*, Colin Barr, *Failure is Less of an Option*, CNN.COM (Apr. 8, 2011, 3:39 PM), http://finance.fortune.cnn.com/2011/04/08/failure-is-less-of-an-option/ (Barr analyzes Dun & Bradstreet's report that looks at U.S. business failures, including businesses that ceased to exist but are not necessarily formally in bankruptcy. In 2006, about 35 million U.S. businesses failed while in the following years, 2007–2010, 52, 72, 101, and 88 million businesses failed, respectively.). It should be noted that the firm's specific risk of failure, as perceived by the CEO, may be influenced by these numbers but not necessarily in a linear relation, and it may have a lagged effect.

acquisition by a hostile bidder, the obliteration of the firm will likely have a personal effect on a manager that cannot be mitigated by golden parachutes, nor can it be prevented by anti-takeover mechanisms.

Thus, I argue that part of this increase in risk-aversion may be attributed to highly compensated managers who find it difficult to obtain a comparable alternative position in case they fail and thus lose their current job.[18] Most managers who lose their position may struggle to find a new comparable managerial position, but the higher-paid ones stand to lose more from the fall. Moreover, they may have less to gain from taking on more risk. A lower-compensated manager, in contrast, will lose less relative to her prior position and will experience a shorter fall and a softer landing. At the same time, if a lower-compensated manager takes on more risk and the risk pays off, she may gain more from it than her higher-compensated counterpart, because it may enable the lower-compensated manager to climb up the compensation scale. To be sure, a higher-compensated manager will gain from a successful gamble both in terms of prestige and in the increased value of her equity stake in the company.[19] However, a lower-compensated manager may stand to gain more from a successful gamble because the long-term effects of her success may mean that she is able to improve her position and potentially reach the higher-compensation level, including obtaining an increased equity interest.

There are business-motivated reasons for holding large amounts of cash. Large amounts of cash can help a company hedge against the risk of increased interest rates, or even a market-wide lending deficiency.[20] Yet, the magnitude and incidence of the cash-hoarding practice currently raises concerns of market failure. Increased cash holdings can come at the expense of investing in the company's operations, and cash-hoarding augments the economic crisis.[21] Ideally, we should encourage management to divert this cash into avenues that can help stimulate the economy.[22] The market may be caught in a type of prisoner's dilemma, whereby only a simultaneous, concentrated reduction of cash holdings by all firms will help

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18. Downturns, such as the current one, may be associated with higher unemployment levels and fewer job openings, and thus may make it more difficult for an ousted CEO to find alternative employment. On the other hand, one can argue that in bad economic times it is harder to attribute the firm's poor performance to the ousted CEO rather than to the state of the economy. However, even if it is the state of the economy that explains the poor performance, it is still apparent that the ousted CEO did not manage to navigate the firm successfully during such challenging times. Firms hiring in bad economic times are in need of managers who can help them weather the bad times, and thus the ousted CEO may be disadvantaged.

19. The equity stake of a higher-compensated manager is likely to be even higher than that of a lower-compensated manager.

20. *See generally* David Romer, *A Simple General Equilibrium Version of the Baumol-Tobin Model*, 101 Q.J. ECON. 663 (1986).

21. *See* Lahart, *supra* note 1.

22. During an economic crisis, the economic efficiency of the firm's investment could be higher than the investment profitability to the firm because the investment could have positive effects on the market, such as reducing unemployment and stimulating demand.

the economy and will thus also be beneficial for each individual firm. The effect of the increased managerial risk-aversion on the level of the corporate cash holdings is likely to be suboptimal for well-diversified shareholders, who may benefit from a concentrated lowering of cash holdings across all the firms.

The results of this study illustrate the risk of high managerial compensation in the face of the decoupling of ownership and control. Increased compensation provides an incentive for the managers to refrain from risk-taking and to accumulate potentially excessive amounts of cash, which could harm the shareholders and the market. The findings of my study suggest that there is indeed an urgent need for managerial-compensation reform as other academic studies have argued. Scholars have criticized the decoupling of managerial pay from performance for lack of efficient incentives for managers to perform.[23] The popular resentment toward generous compensation packages echoes this criticism and views this compensation as an unjust windfall.[24] The findings of this study provide yet another explanation: Excessively high managerial compensation may not only present fairness concerns and suppress proper incentives, but it may, in fact, be stifling economic growth by providing distortive incentives for managers.

This Article suggests that the discussion about optimal managerial-compensation arrangements should be broadened to also encompass measures to curtail excessive managerial risk-aversion. Currently, efforts to improve compensation arrangements are focused on measures to decrease excessive managerial risk-seeking, in hopes of preventing another economic crisis.[25] However, in order to help stimulate the economy, compensation arrangements should also address managerial risk-aversion. For example, when investors and regulators assess the new requirements of the Dodd–Frank Act[26] that relate to firm pay practices, the fallout of excessive managerial risk-aversion should be taken into account.

The Article proceeds as follows. Part I describes the practice of cash hoarding and reviews prior literature and financial studies about managerial compensation and cash holdings. Part II describes the empirical study and summarizes the statistical results. This Part also includes possible interpretations of the statistical findings.

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23. *See* LUCIAN BEBCHUK & JESSE FRIED, PAY WITHOUT PERFORMANCE: THE UNFULFILLED PROMISE OF EXECUTIVE COMPENSATION (2004).

24. *See, e.g.*, Emergency Economic Stabilization Act of 2008, Pub. L. No. 110-343, § 302, 122 Stat. 3765, 3803–06 (2008) (codified at 26 U.S.C. § 162(m)(5) (2012)) (limiting tax deductions for executives whose companies received Troubled Asset Relief Program ("TARP") funds).

25. *See, e.g.*, Lucian A. Bebchuk & Jesse M. Fried, *Paying for Long-Term Performance*, 158 U. PA. L. REV. 1915, 1917 (2010) ("The crisis of 2008–2009 has led to widespread recognition that pay arrangements that reward executives for short-term results can produce incentives to take excessive risks.").

26. Dodd–Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, §§ 951–957, 124 Stat. 1376, 1891–1907 (2010) [hereinafter Dodd–Frank Act].

I. Managerial Compensation and Cash Holdings: A Literature Review

To illustrate the significance of corporate cash holdings, one has only to look at the total amount of cash on the balance sheets of non-financial companies in the United States, which is almost $2 trillion.[27] This is more than twice the size of the stimulus package that was introduced by Congress to boost the economy by increasing governmental spending and cutting taxes.[28] Yet, the current financial literature about cash holdings predates the financial crisis and does not cover data from 2008. To the best of my knowledge, this is the first article that focuses on non-financial institutions, compares the financial-crisis period to the pre-crisis period, and identifies a fundamental change in the market.

The market changes during the financial crisis did not merely manifest themselves as a market-wide increase in the level of cash holdings.[29] Rather, the financial crisis has changed the relationship between corporate cash holdings and explanatory variables such as the CEO's compensation.[30] Although financial literature reveals a consistent increase in cash holdings,[31] it does not cover the financial-crisis period and thus does not uncover the change in the effect of the explanatory variables in recent years and, in particular, the evolving effect of the size of total annual managerial compensation. This Part of the Article now turns to a summary of some of the prominent existing literature from the fields of corporate cash holdings and executive compensation.

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27.   *See* Lahart, *supra* note 1.

28.   *See* American Recovery and Reinvestment Act of 2009 (Stimulus Bill), Pub. L. No. 111-5, 123 Stat. 115; *Times Topics Economic Stimulus*, N.Y. TIMES (Dec. 15, 2010), http://web.archive.org/web/20110719022302/http://topics.nytimes.com/top/reference/times topics/subjects/u/united_states_economy/economic_stimulus/index.html (past version accessed by searching in the Internet Archive index) ("In February 2009, Democrats in Congress passed a $787 billion stimulus bill requested by President Obama to shore up a reeling economy. By the end of that year, most economists had concluded that the package had helped stave off a far deeper recession. . . . By replacing money not being spent by businesses or consumers, a stimulus is meant to put a floor under a recession and pave the way for a return to growth.").

29.   Such a change would be captured statistically by an increased intercept, the alpha, of the regression models described below.

30.   This is denoted statistically by the change of the coefficients, the betas, of the regression.

31.   *See, e.g.*, Thomas W. Bates et al., *Why Do US Firms Hold So Much More Cash Than They Used To?* 1 (Ohio St. Univ. Fisher Coll. of Bus., Working Paper No. 2007-03-006, 2008), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=927962 ("We document a secular increase in the cash holdings of the typical firm from 1980–2006.").

A. Corporate Cash Holdings

Harford, Mansi, and Maxwell conducted an important study that examines trends in U.S. corporate cash holdings.[32] They studied the relationship between corporate governance and cash holdings from 1993 to 2004.[33] Their main finding was that a firm's corporate governance is positively correlated with its cash holdings.[34] Their survey of prior literature, however, revealed mixed evidence regarding the effect of cash holdings on shareholder value, including cross-country studies that found a negative relation between shareholder rights and cash holdings.[35] In contrast, their study found a positive correlation between managerial pay sensitivity—measured by the ratio of the equity-based compensation to the total compensation of the top five executives—and the firm's cash holdings.[36] They hypothesized that weak corporate governance allows executives to quickly use the firm's cash on acquisitions, including inefficient acquisitions that decrease shareholder value.[37] Nevertheless, such acquisitions have a potentially positive effect on the executives' own wealth.[38]

Bates, Kahle, and Stulz conducted another major study that analyzed the practice of corporate cash holdings in the United States.[39] The authors described four motives to hold cash: (1) avoiding transaction costs associated with converting other assets into cash; (2) avoiding adverse effects of shocks in cash flows and restrictions on external finance; (3) deferring tax payments on foreign earnings; and (4) not returning cash to shareholders due to agency costs associated with entrenched managers.[40] They studied the reasons for the continuing increase in cash holdings in the United States from 1980 to 2006.[41] They found that the increase in cash holdings included firms of all sizes and was not restricted to firms with foreign income.[42] They further reported that the increase in cash holdings in their sample was restricted to the non-dividend-paying firms.[43] They also analyzed the connection between idiosyncratic volatility and cash holdings.[44] They examined the effects of cash-flow risk, measured as the standard deviation of

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32.   Jarrad Harford et al., *Corporate Governance and Firm Cash Holdings* (AFA 2006 Boston Meetings Paper, 2006), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=595150.

33.   *See id.* at 10.

34.   *Id.* at 2–3.

35.   *Id.* at 1–2.

36.   *Id.* at 3.

37.   *Id.*

38.   *Id.*

39.   *See* Bates et al., *supra* note 31.

40.   *Id.* at 5–7.

41.   *See generally id.*

42.   *Id.* at 9–14 ("[W]e conclude that the secular increase in cash ratios is not driven by the largest firms in our sample, and is markedly more pronounced in smaller firms.").

43.   *Id.* at 11 ("There is a dramatic increase in the cash ratio among the non-dividend payers, but not for the dividend payers.").

44.   *Id.* at 12–14, 31–32.

industry cash-flow-to-assets and attributed it to idiosyncratic risk.[45] They found that increased cash-flow risk was associated with increased cash holdings.[46]

B. Executive Compensation

There is an extensive body of literature on optimal management compensation, risk, and incentives that focuses on option grants and other similar benefits[47] that are sensitive to the stock price.[48] Shareholder and academic criticisms of the decoupling of CEO pay from performance were followed by a dramatic increase in stock option grants in the 1990s.[49] One intriguing explanation for this inflation in option grants was offered by Kevin Murphy, who attributed the inflation to the boards of directors' misperception of the true cost of the option grants to the shareholders.[50] These payment instruments, however, have the ability to change the executive's level of risk-aversion and to affect the value of the firm.[51] On the one hand, the options give the executive incentives to adopt risky projects, because the value of options increases with the volatility of the stock.[52] On the other hand, the options may increase the executives' level of risk and incentivize the manager to refrain from risky projects.[53]

Bebchuk and Grinstein made important contributions to the literature in the area of management compensation.[54] They found support for Jensen's theory that expansions in firm size lead to subsequent increases in managerial compensation, providing an incentive for managerial empire building.[55]

45.	*Id.*

46.	*Id.*

47.	Such as convex payments.

48.	For a survey of the literature on executive compensation, see Kevin J. Murphy, Executive Compensation (Apr. 1998) (unpublished manuscript), *available at* http://ssrn.com/abstract=163914.

49.	*Id.* at 22.

50.	Kevin J. Murphy, *Explaining Executive Compensation: Managerial Power vs. the Perceived Cost of Stock Options,* 69 U. CHI. L. REV. 847 (2002).

51.	*See* Nengjiu Ju et al., Options, Option Repricing in Managerial Compensation: Their Effects on Corporate Investment Risk 22 (Jan. 23, 2006) (unpublished manuscript), *available at* www.ccfr.org.cn/cicf2006/cicf2006paper/20060126203214.pdf ("Relative to the optimal risk level for the firm, a call-type contract can induce both over or under investment in risk depending on managerial risk-aversion.").

52.	*See, e.g.*, Murphy, *supra* note 48, for a survey of the literature on executive compensation including the literature that studies the effects of option grants on risk-averse managers.

53.	*See* Ju et al., *supra* note 51, at 2 ("[A] risk-averse manager may choose a lower risk level if more call options are included in her compensation package. This is because, even though more call options increase the expected payoff, they also increase the risk level of the payoff.").

54.	*See* Lucian Bebchuk & Yaniv Grinstein, *Firm Expansion and CEO Pay* (Harvard Law Sch. John M. Olin Ctr. for Law, Econ., & Bus., Discussion Paper No. 533, 2005), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=838245.

55.	*Id.* at 23 ("[W]e have found a positive and economically meaningful correlation between CEO compensation and the CEO's past decisions to increase firm size.").

Interestingly, Bebchuk and Grinstein also found that CEO compensation was not negatively correlated with decisions to decrease the firm's size.[56]

The failure to properly construct managerial-compensation packages and the danger associated with the distortive incentives of the current practices of management compensation was duly stressed by Bebchuk and Fried before the current financial crisis. In their renowned book, they forewarned of the dangers of excessive risk-taking by executives.[57] After failing to timely heed the warnings of Bebchuk and Fried, regulators have attempted to address the challenge of properly incentivized managerial compensation following the financial crisis. The Dodd–Frank Act includes new requirements concerning managerial compensation that went into effect only recently,[58] including a precatory, non-binding shareholder resolution on executive compensation, commonly known as say on pay.[59] With this new power in the hands of the shareholders, it is of great importance to enhance the understanding of the incentives provided by executive compensation packages as they may change with the economic environment.

II. THE EMPIRICAL STUDY

A. Data and the Basic Model

Using the Compustat Database, I collected financial data about active non-financial[60] companies incorporated in the United States who trade their capital mainly in the United States. The sample covers the years from 2002 to 2010, which includes the years of the financial crisis commonly known as the Great Recession. The study excluded companies with dual-class capital structures[61] and companies whose CEOs owned at least 10% of the outstanding equity of the

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56.   *Id.* ("We have also found an asymmetry between size increases and decreases: while size increases are positively correlated with subsequent CEO pay, size decreases are not negatively correlated with subsequent CEO pay.").

57.   *See* BEBCHUK & FRIED, *supra* note 23.

58.   *See* U.S. SENATE COMMITTEE ON BANKING, HOUSING, & URBAN AFFAIRS, DODD–FRANK WALL STREET REFORM: CONFERENCE REPORT SUMMARY (2010) *available at* http://banking.senate.gov/public/_files/070110_dodd_frank_wall_street_reform_comprehen sive_summary_final.pdf.

59.   *Id.* Precatory shareholder resolutions, though non-binding, still may have an effect on the firm. *Cf.* Mira Ganor, *Why Do Managers Dismantle Staggered Boards?*, 33 DEL. J. CORP. L. 149, 155–59 (2008).

60.   Financial companies are subject to different regulations. *See, e.g.*, Lucian A. Bebchuk & Alma Cohen, *The Costs of Entrenched Boards*, 78 J. FIN. ECON. 409, 418 (2005) (excluding real estate investment trusts from the sample because such corporations "have their own special governance structure and entrenching devices"); Robert Daines, *Does Delaware Law Improve Firm Value?*, 62 J. FIN. ECON. 525, 530 (2001) (omitting financial firms from the tested sample because the special federal regulations may influence the corporate governance of such firms).

61.   Firms with a dual-class capital structure present a unique case of corporate governance. *See, e.g.*, Bebchuk & Cohen, *supra* note 60, at 418 ("We exclude firms with a dual class structure; in such firms, the holding of superior voting rights is likely to be the key for entrenching incumbents.").

company, because these companies form a special case of corporate governance and may require different agent incentives.[62] I also excluded companies classified as operating in the utility industry, because such companies may be subject to special regulations regarding cash reserves.[63] I supplemented the Compustat data with Entrenchment Index data of the company as a control variable to account for the variations in corporate governance between firms.[64] I also included corporate governance variables from the Corporate Library database, including, *inter alia*, the percentage of insider directors and a dummy variable that indicates whether the majority of the firm's outstanding shares are held by institutional investors. For each year tested, I included in the sample only firms that had the same CEO serving during both the tested year and the previous year, so that the lagged variables would be meaningful and could be included in the test of agency costs.

I took the amount of cash and cash equivalents reserved by the firm as the dependent variable in the test. The explanatory variable of this study is the lagged total annual compensation of the CEO. For example, for the year 2010, the cash held by the company is the dependent variable and the annual compensation of the CEO in 2009 is taken as the explanatory variable. I looked for a linear relation between the log of the cash and cash equivalents[65] (*Log(Cash)*) and the log of the

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62. The high ownership of the CEOs indicates that these managers are more than pure agents of their firm. When we have a sample that includes observations that fall into two categories, the safest thing to do is to perform a regression on each category separately, thus allowing for the constant and the coefficients of each category to be different. This is mathematically equivalent to adding a dummy variable together with all its interactions with all the independent variables. Sometimes, however, this is impractical, because it would reduce the degrees of freedom by too much, and in such cases one omits the interactive variables. But in this case, one implicitly assumes that the coefficients do not vary much between categories. However, it is always preferable to take the first approach if the number of observations is sufficient. In the study reported in this Article, I chose to narrow the sample and focus on only one category of CEOs, rather than use a dummy variable, because I am interested in learning about the characteristics of the agents who are in a relatively pure agency relationship with the firm and not those who own a significant equity ownership of the firm.

63. I used Fama & French's 12 industry definitions and exclude industry number 8, the utility sector, which covers SIC codes 4900–4949. *Cf.* Bates et al., *supra* note 31, at 8 (excluding SIC codes 4900–4999).

64. Bebchuk, Cohen, and Ferrell define the Entrenchment Index to denote how many out of the six salient anti-takeover measures a company employs. The measures included in the Entrenchment Index are staggered boards, supermajority requirements for mergers and/or for charter amendments, limits to shareholder bylaws amendments, poison pills, and golden parachute arrangements. *See* Lucian A. Bebchuk et al., *What Matters in Corporate Governance?* 22 REV. FIN. STUD. 783, 784–85 (2009) (reporting a correlation between the Entrenchment Index and both reduced firm value and lower stock returns). The data posted on Lucian Bebchuk's website reporting the Entrenchment Index end with 2008. I used data for 2008, the last year available from the website of Bebchuk, under the assumption that the corporate governance remained the same during the next two years.

65. I used Compustat's variable CH rather than the variable CHE, which in addition to CH also includes short-term investments, because I want to focus on funds that are not invested where the missed potential use of these funds is more pronounced.

lagged total CEO compensation[66] (*Log(LagPay)*), controlling for various firm and CEO characteristics.[67]

The logarithm function is used because when we look at the log of monetary values, the effect of inflation becomes an additive constant once the log is taken: *log[X(1+i)] = log(X) + log (1+i),* where *X* is the monetary value and *i* is the inflation rate. In addition, the log transformation is used to prevent bias toward very large companies. By definition, after taking the logs, the regression coefficient (the beta) of the model is the elasticity.

B. Control Variables and Robustness Checks

The study's empirical results are robust and are not weakened by the inclusion of additional controls for variables that might affect a corporation's decision to maintain a particular level of cash reserves. These variables include the firm's corporate governance (measured by the Entrenchment Index,[68] percentage of directors who are insiders, and institutional investors' holdings) and firm performance (measured by Tobin's q[69] and the return-on-assets ("ROA")). To be sure, each of the aforementioned controls affects the firm's money-holdings decision, yet the effect of the CEO's annual compensation is significant even in a multi-variable regression that takes into account these additional effects.

Some variables may affect both the cash reserves (the dependent variable) and the total CEO compensation (the explanatory variable). Thus, including these variables as controls in a multi-variable regression helps isolate the direct connection between the explanatory variable and the dependent variable. For example, a larger company may need and keep larger sums of cash while it also may compensate its CEO more than a smaller company. Thus, checking the correlation between the retained cash of the company and the managerial compensation without controlling for the company's size will provide a biased

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66. The total yearly compensation is denoted by ExecuComp by TDC1. It includes salary, bonus, other annual, total value of restricted stock granted, total value of stock options granted (using Black-Scholes), long-term incentive payouts, and all other total. *See* Executive Compensation Data Items, CAPITAL IQ COMPUSTAT (2001), *available at* http://web.archive.org/web/20110324154209/http://umi.compustat.com/docs-mi/help/exec defs.htm (past version accessed by searching in the Internet Archive index).

67. *See infra* Part II.B. for a description of the controls used in the study.

68. The Entrenchment Index is defined by Bebchuk, Cohen, and Ferrell to include the six salient anti-takeover mechanisms. *See* Bebchuk et al., *supra* note 64, at 783.

69. Tobin's q is the ratio of the market value of assets to replacement cost of assets. Following S. Kaplan and L. Zingales, *Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints?,* Q.J. ECON. 112, 169–216 (1997). P; Gompers et al., *Corporate Governance and Equity Prices,* Q.J. ECON. 118, 107–55 (2003). Lucian Bebchuk et al., *Does the Evidence Favor State Competition in Corporate Law?*, 90 CAL. L. REV. 1775–1821 (2002); Lucian A. Bebchuk & Alma Cohen, *The Costs of Entrenched Boards*, 78 J. FIN. ECON. 409–33 (2005), I measure Tobin's q as the ratio of (1) the sum of the book value of assets plus the market value of common stock minus the sum of book value of common stock and balance sheet deferred taxes, and (2) the book value of assets. *See* Bebchuk et al., *supra* note 64, at 800.

result that will include the size effects. Similarly, other control variables may influence the company's level of cash reserves, as well as the CEO's compensation.[70]

I included as first control variables, the total assets of the firm (as *Log(Size)*), the firm's market value (as *Log(MarketValue)*), the log of the Tobin's q of the firm,[71] the CEO's percentage holdings in the total outstanding equity of the firm, the value of the CEO's restricted stock, the total value of the CEO's holdings in the firm, the firm's gross sales, industry (based on the Fama-French 12 industry sectors), and the Entrenchment Index. In some of the regressions, I included the tenure and gender of the CEO and a dummy variable[72] (the dummy variable indicated whether the CEO was older than the median age of the CEOs in the sample as additional control variables). Capital expenditures, working capital, the total amount of dividends (excluding stock dividends), in-process research and development expense, total research and development expense, cash flow of funds used for acquisitions, leverage (defined as long-term debt plus debt in current liabilities over book value of equity plus debt), return on assets (ROA - EBITDA over lagged total assets), lagged total assets, and market-to-book ratio were also used as controls.

I also included as control variables the log of the working capital of the company and the log of the sales of the company, in addition to the log of the total assets of the company. Accounting and financial ratios, such as working capital to total assets and sales to total assets, are important control variables. Models such as the Altman's Z-score include weighted combinations of these ratios to predict companies' failure.[73] These ratios appear implicitly in the regressions of this study, because the differences of logs of variables are equivalent to the log of the ratio of these variables.

I took the beta of the firm with the market as a proxy for the firm's risk. Riskier firms may require more cash holdings in times of economic crisis and may also need to compensate their CEOs both for the increased personal risk associated with working for such a firm and for the special skill required to run such a special firm. Thus, I included in the multi-variable regression a control variable for the firm's beta with the market as reported by the Center for Research in Security Prices ("CRSP").

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70. For example, controlling for firm performance is also important because CEO compensation can capture the skill of the CEO and the latter may influence the level of the company's cash holdings. *Cf.* Robert Daines et al., *The Good, the Bad, and the Lucky: CEO Pay and Skill* (Univ. of Pa. Law Sch. Inst. for Law & Econ., Research Paper No. 05 07, 2005), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=622223 (studying the positive correlation between CEO pay and CEO skill and finding that the CEO equity-based compensation is positively correlated with higher return on assets).

71. Tobin's q is the ratio of the market value of assets to replacement cost of assets. For an explanation of how I measure Tobin's q, see discussion *supra* note 69.

72. A dummy variable is a binary variable that takes the values of 0 or 1, and indicates to which of two categories the observation is classified.

73. *See, e.g.*, Edward I. Altman, *Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy*, 23 J. FIN. 589 (1968).

Following the lead of Harford et al., I controlled for the CEO's pay sensitivity.[74] I included the log of the ratio of the CEO's equity-based compensation to her total compensation as a control variable to some of the multi-variable regressions. However, the coefficient of the pay sensitivity control variable is not statistically significant in these regressions; it is very small, and its inclusion in the regression does not significantly affect the coefficient of the log of the total CEO compensation.[75] I also controlled for the value of a manager's equity holdings, her restricted shares, and her percentage holdings.

Following Bates et al., I controlled for cash-flow effects and added the log of the firm's cash flow to the 2010 multi-variable regression that also includes controls for industry effects.[76] The coefficient of the log of the firm's cash flow is negative and statistically significant at the 90% level. The control variable does not significantly affect the coefficient of the manager's total annual compensation. Similarly to Bates et al., I also controlled for dividend payments and included a dummy variable denoting whether the firm pays dividends. The 2010 coefficient of the dummy variable in a multi-variable regression is negative and statistically significant at the 90% level. However, the dummy variable does not significantly affect the main results of this study.

I also controlled for the age of the manager. In general, the age of the manager is relevant to this study because an older manager might find it more difficult to find a comparable job in the event that she is dismissed. Being aware of that, she might be inclined to take more precautions and less risk, and especially retain more cash for the company.[77] The age of the manager may also be correlated with her total compensation—a more seasoned manager may be compensated more generously for her proven experience. Thus, the age of the manager should serve as a control variable. Indeed, in a multi-variable regression, the age of the

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74.   *See supra* note 32 and accompanying text.

75.   I excluded an insignificant amount of outlier firms for which the equity part of the total compensation of the manager was less than 10% of her total compensation.

76.   Following Bates et al., *supra* note 31, I calculated each firm's cash flow as the operating income before depreciation, but after interest, dividends, and taxes. I did not include a separate variable that looks at the industrial cash-flow volatility because the industry dummy variables control for all industry specific effects and capture special industry-wide risk effects. In addition, in this particular regression, a variable that uses the standard deviation of the cash flow for previous years as a proxy for the risk will misidentify a positive increasing upward trend as a risk.

77.   The age of the CEO can influence the CEO's appetite for risk in different directions. On the one hand, it is likely to be more difficult for an older CEO to find an alternative job, and this will influence her to be more conservative and take less risks that may cost her her job. On the other hand, assuming the manager is not able to replace her job with a comparable position, then the closer she is to retirement, the less she stands to lose from being ousted from her managerial position, and; thus she may be more willing to take more risks. The empirical results that find a positive correlation between age and cash holdings, which is a proxy for risk, seem to suggest that the former of these two competing effects is stronger in the sample. *Cf., e.g.*, Ganor, *supra* note 59, at 160 (weighing possible effects that the age of the manager may have on her personal incentives and thus on her corporate decisions).

CEO had a positive, though not statistically significant, effect on the cash holdings of the company. Alternatively, instead of using the exact age, we can employ a dummy control variable that indicates whether the CEO is older than the median age of 54.[78] With this technique, the statistical significance of the claimed correlation with age improves (to as much as 95% in some of the regressions). The rationale is that the age group of the CEO is more relevant than the precise age. I find that, if the CEO is above the median age, then on average the company will hold about 17% more cash (beta of 0.07). Although with 90% confidence, the results indicate that the company will hold between 2% and 35% more in cash.

There are studies that suggest that gender may affect the risk tolerance of people.[79] To the extent that female CEOs are more risk-averse than male CEOs, one may expect female CEOs to hold more cash as a precaution. If the gender of the CEO also affects her compensation, then it should be used as a control variable. The coefficient of a gender dummy variable with 1 denoting a female CEO, came out positive in the regression, indicating a possible increase in cash holdings due to the gender of the CEO; however, this result was not statistically significant, and with less than 4% of the CEOs in the sample being female, there is not sufficient data to draw any inference from this result.

I also controlled for nonlinearity. In principle, one might imagine that *Log(Cash)* is a nonlinear function of *Log(Size)*. *Log(LagPay)* is also correlated with *Log(Size)*. Thus, we might be concerned that the positive results reported in the next section are an artifact solely of the nonlinearity in the relationship of *Log(Cash)* to *Log(Size)*. To rule that out, I added $Log(Size)^2$ to the regression. While a quadratic function of *Log(Size)* describes *Log(Cash)* better, the fact that the beta coefficient of *Log(LagPay)* did not change by more than a standard deviation (as a result of including the quadratic control term) is a strong indication that the effect I report on is separate from the nonlinearity in *Log(Size)*. To be more specific, I added $\delta Log(Size)^2 = (Log(Size)-Average[Log(Size)])^2$ as an extra control variable, assuming the following relation:

$Log(Cash) = \alpha' + \beta'_1 \, Log(LagPay) + \beta'_2 \, Log(Size) + \beta'_3 \, \delta Log(Size)^2 +$ *(other variables).*

I then compared the resulting regression coefficients to those of the linear model. In the same vein, I also added $\delta Log(MarketValue)^2$, $\delta Log(Tobin's \, q)^2$, and the cross-terms $\delta Log(Size)\delta Log(MarketValue)$, $\delta Log(Size)\delta Log(Tobin's \, q)$, and $\delta Log(MarketValue)\delta Log(Tobin's \, q)$. The coefficient β'_3 of $\delta Log(Size)^2$ is indeed nonzero (at above the 99% confidence level). Furthermore, the coefficient of $\delta Log(Size)\delta Log(Tobin's \, q)$ is nonzero at a similar confidence level, the coefficient of $\delta Log(MarketValue)^2$ is nonzero at the 98% confidence level, and the coefficient

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78. Using a dummy variable rather than using the exact age in this case allows us to test for a connection that is not linear with age. For example, it may be that managers who are 41 years old behave similarly to managers who are 36 years old, while managers who are 54 years old behave significantly differently than managers who are 49 years old, even though in both cases the age difference is the same in terms of years.

79. *See, e.g.*, Brad M. Barber & Terrance Odean, *Boys Will Be Boys: Gender, Overconfidence, and Common Stock Investment*, 116 Q.J. ECON. 261, 264 (2001).

of $\delta Log(Size)\delta Log(MarketValue)$ is nonzero at the 92% confidence level. This is not unexpected. It simply indicates that a nonlinear expression better approximates the relation between *Log(Cash)* and *Log(Size), Log(MarketValue),* and *Log(Tobin's q)*. Nevertheless, the coefficient β'_1 is very close to β_1 (within less than half of a standard deviation), which suggests that the effect of *Log(LagPay)* is not due to the nonlinearity in *Log(Size), Log(MarketValue),* or *Log(Tobin's q)*.

To eliminate much of the ambiguity related to potential nonlinearities, I performed a robustness test by matching companies in pairs with similar *Log(Size)* and taking the difference of *Log(Cash)* between the two companies of the pair. The dependent variable is *ΔLog(Cash)*. The explanatory variable will be *ΔLog(LagPay)*—the difference of the *Log(LagPay)* of the two companies in the pair. *ΔLog(Size)* and other differences will be taken as control variables. For this purpose, within each industry code, I sorted the companies according to increasing *Size* and matched them in pairs. The coefficient of *ΔLog(LagPay)* came out statistically significant above the 99% confidence level.

Lastly, outliers that were excluded from the sample include firms whose CEOs were over 70 years old in the year tested. Such CEOs may have different incentives and risk-tolerance levels because of their age. For example, Berkshire Hathaway, Inc., with its legendary CEO Warren Buffett, was excluded from the sample both because of Mr. Buffett's age and also because Berkshire Hathaway is a holding company with exceptionally high levels of cash holdings that are used for its acquisitions. The final 2010 sample consists of 579 observations.

C. Results and Analysis

The results of the ordinary least squares ("OLS") regression for the years 2002–2010 are listed in tables at the end of this Article. The tables differ by the various controls that were included, but they portray a similar picture. We can see representative results of the OLS regressions in Table 2 below.

In particular, the results of the OLS regression for 2010 suggest that:

Log(Cash Holdings) = (-1.62±0.16) + (0.34±0.07)Log(Total Annual CEO Compensation) + Controls + (statistical error).

The expected elasticity is therefore 0.34, and it follows that for every 10% increase in the CEO's total annual compensation there is a corresponding increase of approximately 3.4% in the firm's cash holdings.[80] The study finds that the manager's total annual compensation has a significant effect on money hoarding during the economic crisis in the years 2008–2010. The study did not find a similar effect in the years 2003–2007. In these years, preceding the financial crisis, the manager's total annual compensation had a significantly smaller effect on money hoarding.

Thus, this study finds that after the financial crisis, the total value of the manager's annual compensation is positively correlated with the corporate cash holdings. Isolating the equity-based portion of the annual compensation provided a

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80. $1.10^{0.34} \approx 1.034$, i.e., an increase by 3.4%.

weaker effect than that associated with the total compensation. The study did not find a similar connection between corporate cash holdings and the value of the restricted, equity-based compensation of the manager; the value of the manager's equity; the ratio of the manager's non-equity-based compensation to her total compensation; or the manager's percentage holdings.

The results do not support the hypothesis that a CEO's percentage holdings and value of restricted stock have a strong effect on the cash holdings of the firm in my sample. A possible explanation for this may be that the manager can hedge against the risk associated with her equity holdings.[81] In addition, equity compensation, especially of the type of options, provides incentive in opposite directions.[82] On the other hand, the manager faces the risk of losing her total annual compensation, not just the value of her equity holdings, if she is no longer employed by the company. The results support the conjecture that in times of severe economic crisis (amidst fear of total failure and not just fear of decline in the value of the stock) total annual managerial compensation may affect the manager's level of risk-aversion and affect firm value. Interestingly, the coefficient of the log of ExecuComp's estimated payments in the event of change in control, which could reduce the manager's risk-aversion by insuring the manager against certain types of failure, came out negative but not statistically significant in a multi-variable regression.

A few variables, including Tobin's q (the ratio of the market value of assets to replacement cost of assets, which is a measure of firm value), the total assets of the firm, specific industries, the firm's leverage, and age group also came out statistically significant as controls in most of the multi-variable regressions. This suggests that these variables affect the level of corporate cash holdings. The inclusion of these variables, however, did not significantly affect the coefficient of the regression between the cash holdings and the total annual compensation of the manager. These results suggest that agency costs may influence the level of corporate cash holdings.

To control for corporate governance, I included the Entrenchment Index, which increases with the level of entrenchment. I found a fairly strong negative correlation between the Entrenchment Index and corporate cash holdings in the years 2006–2007, prior to the economic crisis. This suggests that strong corporate governance may have influenced managers to retain more cash, rather than spend resources on empire building, in the pre-crisis period. However, this correlation does not seem to have withstood the economic crisis. The correlation between the

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81.   *See, e.g.*, Eli Ofek & David Yermack, *Taking Stock: Equity-Based Compensation and the Evolution of Managerial Ownership*, 55 J. FIN. 1367, 1367–68 (2000) (reporting that managers can hedge the risk of equity-based compensation, yet companies justify the use of equity-incentive compensation by arguing that it helps reduce agency problems). *Cf.* Henry T.C. Hu & Bernard Black, *The New Vote Buying: Empty Voting and Hidden (Morphable) Ownership*, 79 S. CAL. L. REV. 811, 831–32 (2006) (analyzing managers' custom of hedging their personal exposure by purchasing financial instruments such as zero-cost collar).

82.   *See supra* notes 55–56 and accompanying text.

Entrenchment Index and cash holdings in the years 2009–2010 is weaker and not even statistically significant in this special period.

This finding suggests that managers who face lower corporate governance levels may nonetheless choose to reserve cash and not use it in a time of economic crisis. When a firm has a high Entrenchment Index, the company has significant anti-takeover mechanisms in place that may help protect the manager against losing her job even if the firm's performance fails to meet expectations. However, anti-takeover mechanisms cannot protect the manager from a total collapse of the firm. Economic crisis may not only result in poor performance, but also may increase the risk of a total collapse of the firm that may cost the manager her job, regardless of how entrenched she may be.

I performed a robustness test to check the hypothesis that managerial risk-aversion influences the firm's cash-holdings level during uncertain financial times, and I looked at the firm's levels of short-term debt (measured as debt in current liabilities) as an alternative measure for risk.[83] While both cash retention and leverage serve as proxies for the firm's risk, they operate in opposite directions. High levels of short-term debt increase the firm's risk in times of fear concerning imminent deterioration in the financial markets, as in 2010, because short-term debt entails the obligation to repay the debt in the foreseeable, troubled period. High levels of cash, on the other hand, decrease the firm's risk when there are fears about the stability of financial markets, because cash reserves can diminish the firm's reliance on financial markets. Table 5 below presents the results of the OLS regressions with short-term debt as the dependent variable.

I found a negative correlation between the CEO's compensation and the firm's short-term debt in 2010. The correlation is both statistically significant (above the 98% level) and economically meaningful. On the other hand, the coefficient between the CEO's compensation and the firm's short-term debt was not statistically significant in any of the years from 2006 to 2009. This finding is consistent with the hypothesis of a connection between the CEO's compensation and the level of corporate risk-taking in times of extreme financial crisis.

In order to gain a better understanding of the results of the empirical study, I divided the 2010 sample into five groups of firms by size. Rerunning the regression on each quintile separately, I found that the correlation between the CEO's compensation and the firm's cash holdings in each of the first four quintiles is statistically significant and economically meaningful, similar to the result of the regression on the entire sample. However, the regression on the largest firms, the firms in the fifth quintile, returned different results—the coefficient was not statistically significant and was less than one-third. This suggests that the CEOs of the largest firms follow a different pattern of behavior. The results of these regressions are reported in Table 8 below.

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83.   *Cf., e.g.*, Litvak, *supra* note 10 (looking at various proxies for risk, including cash holdings and debt levels, and studying the influence of the Sarbanes–Oxley Act on corporate risk).

The reason for this difference requires a separate study, yet I hypothesize a few explanations. For example, being in the spotlight, larger firms are generally subject to more scrutiny by the press and large investors, which may curtail managerial behavior. Additionally, the notion of *too big to fail*[84] may provide anxious managers of big firms sufficient comfort, thus mitigating the need to increase the firm's cash holdings.

Finally, the study also looked at the year 2002. That year was challenging for the economy following the 9/11 terrorist attacks, the technology bubble burst, and the stock market crash. The results of the regression on the 2002 sample, reported in Table 10 below, revealed a statistically significant and economically meaningful correlation between the CEO's compensation and the firm's cash holdings, though much lower than the correlation found in 2010. Not surprisingly, since the technology industry played a major role in the financial instabilities of 2002, the coefficient of the dummy variable for the technology sector is positive, economically meaningful, and statistically significant. This suggests that firms in the technology sector generally tend to hold more cash. I conducted a further analysis of the 2002 sample by separating the companies into two distinct sets—those that are in the technology sector and those that are not—and I re-analyzed each set separately. The coefficient between CEO compensation and cash holdings increased with the exclusion of the technology sector.

D. Exploring Alternative Explanations for the Empirical Results

The empirical study found a strong correlation between CEO compensation and indicators of corporate risk-taking (measured by corporate cash holdings and short-term debt) in 2010. These results support the hypothesis that agency costs influence the level of corporate risk-taking and that in 2010, higher levels of compensation were associated with lower levels of risk-taking. A manager becomes more risk-averse with the increase in her total annual compensation and consequently retains more cash in a weak economy. A manager, unlike well-diversified shareholders, may be overly exposed to the specific risk of the firm's failure.[85] Such a failure would have a profound personal effect on the

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84.   *Definition of Too Big to Fail,* OXFORDDICTIONARIES.COM, https://oxford dictionaries.com/definition/english/too%2Bbig%2Bto%2Bfail___1 (last visited Feb. 12, 2013) ("[A] financial organization or other business [that is] so important to the economy of a country that a government or central bank must take measures to prevent it from ceasing to trade or going bankrupt . . . .").

85.   *See, e.g.*, Yakov Amihud & Baruch Lev, *Risk Reduction as a Managerial Motive for Conglomerate Mergers*, 12 BELL J. ECON. 605, 605 (1981) ("[M]anagers . . . engage in conglomerate mergers to decrease their largely undiversifiable 'employment risk.'"); John C. Coffee, Jr., *Shareholders Versus Managers: The Strain in the Corporate Web*, 85 MICH. L. REV. 1, 15–16 (1986) ("Because the manager cannot spread his risks, or escape them safely in the event of insolvency, he is economically wedded to his firm. The implications of this point are at once obvious and far reaching: managers will be more risk-averse than their shareholders."); Note, *The Conflict Between Managers and Shareholders in Diversifying Acquisitions: A Portfolio Theory Approach*, 88 YALE L.J. 1238, 1241–44 (1979); *cf.* Henry T.C. Hu, *Risk, Time, and Fiduciary Principles in Corporate Investment*,

manager because the manager's employment and reputation are connected to the performance of the company. Therefore, the classic separation of ownership and control coupled with the relative lack of diversification of managers' interests in the firm might provide at least a partial explanation for the troubling phenomenon of increased cash holdings.[86]

However, the statistical connection between CEO compensation and the level of corporate risk measured in the regressions can be a result of an omitted variable that is correlated with both CEO compensation and the level of corporate risk in times of financial crisis. Indeed, alternative hypotheses may explain the empirical findings reported in this Article.

The skill of the CEO may have a cross-effect on both the explanatory variable and the independent variable. Higher skill may lead to higher compensation. Higher skill could also lead to the CEO realizing the need for more precaution in times of financial crisis and thus result in higher cash reserves and lower short-term debt. Thus, it is possible to explain the statistical results reported in this study based on the hypothesis that more-skilled CEOs are better compensated and more-skilled CEOs also choose to hold more cash and decrease short-term debt in the face of a deteriorating economy.

There is evidence that supports the assumption that more-skilled CEOs are better compensated than less-skilled CEOs. Bob Daines et al. looked at managers' skill, defined as a combination of both talent and effort, and measured by the performance of the firm using the ratio of return on assets.[87] This important study found that CEOs' compensation is connected to the CEOs' skill.[88]

There is an optimal value of cash holdings for any given level of risk tolerance of diversified shareholders. Although it is outside the scope of this study to estimate that optimal level, and the related level of short-term debt, I assume that skilled CEOs come closer to attaining the optimal level than less-skilled ones. This by itself cannot completely explain the findings reported in the previous section because the CEO's error could be in either direction—either above or below the target level of cash holdings—but if we further assume that less-skilled CEOs, as a group, tend to systematically underestimate risk in comparison to more-skilled CEOs, we can make a connection between cash holdings and executive compensation. If less-skilled CEOs are both paid less than skilled CEOs and underestimate risk compared to skilled CEOs, then the correlation between the CEO's compensation and the firm's risk levels can be explained by the skill of the CEO. To be sure, in times of financial crisis and uncertainty, lack of skill can also manifest itself as excessive risk-avoidance, whereas skilled managers choose an

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38 UCLA L. REV. 277, 306–32 (1990) (analyzing managerial risk-taking, including the effects of various compensation practices and psychological factors, and showing that it is likely to depart from the optimal risk-taking level of diversified shareholders).

     86.   *See* Lahart, *supra* note 1, for the likely connection between increased corporate cash holdings and economic decline. *Cf.* Coffee, *supra* note 85, at 23 ("[T]he manager wants to hoard cash and assets to protect against future contingencies.").

     87.   *See* Daines et al., *supra* note 70.

     88.   *See id.* at 27–28.

optimal level of risk, which is neither too high nor too low. The skill assumption relies on an assumption that unskilled CEOs consistently hit below that optimal level, as opposed to being equally likely to miss the target in either direction.

This skilled-CEO assumption is a plausible and valid hypothesis that offers an alternative explanation to the agency-costs hypothesis, which attributes the correlation between corporate cash holdings and CEO compensation to the manager's increased risk-aversion in times of economic crisis. Both effects may have influenced the empirical results found in this Article, and at this stage, it is hard to rule out either of them. The study partly tested the skilled-CEO assumption by adding control variables that proxy the CEO's skill to the multi-variable regressions. Under the skilled-CEO hypothesis, the coefficient of the control variables for skill should be positively correlated with the corporate cash holdings and negatively correlated with the level of short-term debt. Furthermore, if the main reason for the reported correlation between compensation and risk is due to CEO skill, we would expect the inclusion of the skill-control variables in the multi-variable regressions to significantly lower the magnitude of the compensation coefficient. As a proxy for the CEO's skill, I used two measures of the company's performance—Tobin's q and the ROA. However, as can be seen in Tables 2–10, which report the statistical findings, the coefficient of compensation does not appear to suffer significantly from the inclusion of these control variables. Ideally, it would be good to have a measure of CEO skill that does not rely on the company's parameters, but such a measure is hard to obtain. Instead, we can refine the measure of skill by adjusting it to industry to eliminate industry-wide effects, similar to the technique employed by Daines et al.[89] Once again, this did not significantly change the statistical results for CEO compensation in 2010.

Furthermore, unlike CEO compensation, firm performance is not significantly correlated with the firm's short-term debt in 2010. Therefore, it is hard to explain the results regarding anti-correlation between CEO compensation and short-term debt using this argument.

While this Article cannot rule out skill as an alternative explanation for the results, in my personal opinion, the empirical findings seem to better fit the main hypothesis presented in the paper regarding agency costs. CEO skill may well have had an effect on the managerial decision, but the totality of the empirical evidence leads me to tend toward the agency-cost hypothesis as the explanation for the major part of the correlation between CEO compensation and proxies for corporate risk.

It should be noted that a panel data model will not help isolate the effects of skill. I expect the effect of skill to be time-variant and to change because of the crisis; thus, the randomness effects attributed to skill cannot be controlled with the use of a panel model. While, arguably, skill does not change over time, the effect that skill has over the dependent variable is not time-invariant, especially in times of crisis.

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89.   *Id.*

The study by Daines et al. found that equity-based compensation is connected with the manager's skill and did not find a similar connection with non-equity-based compensation.[90] This distinction between the two types of compensation may suggest that it is the personal incentives of the agent that influence the corporate decisions, rather than merely her talent. Similarly, the difficulty of measuring risk-adjusted performance raises another important concern about the connection between skill and pay. Henry Hu, in his profound analysis of risk-taking and managerial behavior, explains that in determining the manager's compensation as a function of skill, the perceived performance of the manager is taken into account and so managers have an incentive to take unrecognized risks that lead to overestimated performance and excessive compensation.[91]

There is yet another alternative, albeit tentative, explanation for this Article's empirical finding of a strong correlation between CEO compensation and corporate risk in 2010. This explanation is related to the level of corporate governance and monitoring processes. A strong, independent board of directors and a substantial interest by institutional investors may affect both CEO compensation and the level of cash holdings and short-term debt.[92] As a result, it may be that in the midst of the Great Recession, independent directors and institutional investors scrutinized firms more closely, resulting in both lower CEO compensation and lower cash holdings. Since the positive and strong correlation between CEO pay and cash holdings in 2010 also indicates that lower CEO compensation was associated with lower corporate cash holdings, the degree of independent monitoring might be responsible for the empirical result. However, in my opinion this explanation is less convincing. After all, control variables for the percentage of inside directors and institutional investors were not statistically significant when added to the multi-variable regressions and did not significantly change the statistical results regarding the correlation between the CEO's compensation and the corporate cash holdings in 2010.

CONCLUSION

This Article has studied the evolution of the practice of cash hoarding following the Great Recession. The empirical study's results suggest that managerial behavior, as evidenced by the elasticity of cash holdings as a function of total CEO compensation, changed significantly in 2008, with economically meaningful implications. The effect was somewhat diminished the following year, which may be attributed to the growth of GDP that followed the government stimulus of the second half of 2009. But the effect peaked again in 2010. In particular, the study found that managerial compensation following the Great Recession became positively correlated with levels of corporate cash holdings,

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90.   *Id*.
91.   *See* Hu, *supra* note 85, at 325.
92.   *See, e.g.*, Michael E. Murphy, *Assuring Responsible Risk Management in Banking: The Corporate Governance Dimension,* 36 DEL. J. CORP. L. 121, 141 (2011) ("[T]he independent directors on the board are the only internal control center capable of regulating executive compensation . . . .").

suggesting that agency costs contribute to cash retention in times of financial distress.

High managerial compensation may influence managers to be more risk-averse and thus affect managers' decisions to retain cash. Since diversified shareholders are likely to be less risk-averse than the managers in times of financial crisis, when it is harder to find a comparable alternative job and the probability of complete failure is greater, it may well be that systemic cash hoarding occurs at a suboptimal level at the expense of shareholder value. Thus, the influence of the size of managerial compensation on managers' risk tolerance should be taken into account when evaluating managerial pay.

To be sure, the managers who hold cash may be waiting for an opportunity to invest the cash and are not just reserving the cash in case the need arises. It may also be the case that U.S. taxes on foreign income account for some of the cash hoarding. Yet these explanations do not seem to address the correlation between cash holdings and the managers' annual compensation. Nor do these explanations provide an answer to why there is a change in the elasticity of the cash holdings as a function of managers' annual compensation in the years following the financial crisis.

Since the Great Recession shocked the market, it is not surprising that the market has reacted in ways that could not have been predicted by simply studying market behavior during previous post-crisis years. The positive and economically meaningful correlation between managerial compensation and corporate cash holdings may well be but one such reaction. Further study of the new connections in the recalibrated economic system will enhance our understanding of corporate governance and help implement and tailor new measures, such as the Dodd–Frank's say on pay provisions,[93] to better fit current market needs.

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93. Dodd–Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, § 951, 124 Stat. 1376, 1899 (2010) (codified at 15 U.S.C. § 78n-1); *see, e.g.*, Lisa M. Fairfax, *Sue on Pay: Say on Pay's Impact on Directors' Fiduciary Duties*, 55 Ariz. L. Rev. 17–21 (describing and analyzing the emergence of say-on-pay).

Table 1: **Description of the Variables Used in the Regression Models**

A list of some of the control variables used in the regressions and their respective definitions in the applicable databases.

Control Variables	Definition
Acquisitions	Acquisitions (AQC)—cash outflow of funds used for and/or the costs relating to acquisition of a company in the current year or effects of an acquisition in a prior year carried over to the current year.
Beta	The firm's beta with the market (calculated by CRSP).
CapitalExpenditures	Capital Expenditures (CAPX)—the funds used for additions to property, plant, and equipment, excluding amounts arising from acquisitions (for example, fixed assets of purchased companies). This item includes property and equipment expenditures.
Cash	Cash and cash equivalents.
Cashflow	Operating income before depreciation after interest, dividends, and taxes.
CEO's % Holdings	The CEO's percentage holdings.
CEO'sAge>Median	A dummy variable indicating whether the CEO's age is above or below the median CEO's age.
Dividends on C/S	Dividends Common/Ordinary (DVC)—the total amount of dividends (other than stock dividends) declared on the common/ordinary capital of the company, based on the current year's net income.
EntrenchmentIndex	The Entrenchment Index as defined by Bebchuk, Cohen, and Ferrell.
IndustrySector #	The firm's industry based on the Fama-French 12 industry sectors.
IndustrySector 1	Consumer Non-Durables—Food, Tobacco, Textiles, Apparel, Leather, Toys
IndustrySector 10	Healthcare, Medical Equipment, and Drug
IndustrySector 12	Other—Mines, Constr, BldMt, Trans, Hotels, Bus Serv, Entertainment
IndustrySector 2	Consumer Durables—Cars, TVs, Furniture, Household Appliances
IndustrySector 3	Manufacturing—Machinery, Trucks, Planes, Off Furn, Paper, Com Printing
IndustrySector 4	Energy—Oil, Gas, and Coal Extraction and Products
IndustrySector 5	Chemicals and Allied Products
IndustrySector 6	Computers, Software, and Electronic Equipment

IndustrySector 7	Telephone and Television Transmission
IndustrySector 9	Wholesale, Retail, and Some Services (Laundries, Repair Shops)
InProcessR&D	In Process R&D Expense (RDIP)–the portion of R&D considered to be "purchased" and written off immediately upon acquisition if the R&D items are deemed not to have an alternative use.
LagPay	Lagged total yearly compensation, which includes salary, bonus, other annual, total value of restricted stock granted, total value of stock options granted (using Black-Scholes), long-term incentive payouts, and all other total.
Leverage	The long-term debt plus debt in current liabilities over long-term debt plus debt in current liabilities plus the total Common Equity (CEQ).
Market-to-Book	The ratio of the current share price to the book value per share.
MarketValue	Market Value (MKVALT)
R&DExpense	Research and Development Expense (XRD)–all costs incurred during the year that relate to the development of new products or services.
ROA	Return on assets ratio of EBITDA over lagged total assets.
Sales	The firm's gross sales (the amount of actual billings to customers for regular sales completed during the period) reduced by cash discounts, trade discounts, and returned sales and allowances for which credit is given to customers, for each operating segment.
Size	Total Asset
STDEV	The firm's annual standard deviation of returns (calculated by CRSP).
Tobin'sQ	Tobin's Q, the ratio of the market value of assets to replacement cost of assets.
Total Dividends	Dividends Total (DVT)—total amount of dividends, other than stock dividends, declared on all equity capital of the company, based on the current year's net income
WorkingCapital	Working Capital (Balance Sheet) (WCAP)—the difference between total current assets minus total current liabilities as reported on a company's Balance Sheet.

Table 2: **Corporate Cash Holdings and Executive Compensation –
OLS Results**

The dependent variable in the regressions is the log of the firm's cash and cash equivalents. LagPay is the lagged total yearly compensation of the firm's CEO. Size is the value of the total assets of the firm. LagSize is the lagged value of the total assets of the firm. Tobin'sQ is the ratio of the market value of assets to replacement cost of assets. CEO'sAge>Median is a dummy variable indicating whether the CEO's age is above or below the median CEO's age. Acquisitions is the cash outflow of funds used for and/or the costs relating to acquisition of a company in the current year or effects of an acquisition in a prior year carried over to the current year. ROA is the return on assets ratio of EBITDA over lagged total assets. Leverage is the long-term debt plus debt in current liabilities over long-term debt plus debt in current liabilities plus the total common equity. Sales are the firm's gross sales (the amount of actual billings to customers for regular sales completed during the period) reduced by cash discounts, trade discounts, and returned sales and allowances for which credit is given to customers for each operating segment. WorkingCapital is the difference between total current assets minus total current liabilities as reported on a company's Balance Sheet. The sample includes only firms whose CEO served in both the lagged year and the sample year. The data was taken from Compustat, ExecuComp, and the Corporate Library databases and does not include financial firms and firms operating in the utility sector. (The t-statistic is reported in parentheses. The notations ***, **, * indicate significance at the 99%, 95%, and 90% levels, respectively.)

	2003	2004	2005	2006	2007	2008	2009	2010
Intercept	-1.02975***	-1.23811***	-1.20843***	-1.53038***	-1.17396***	-1.3146***	-1.16701***	-1.62467***
	(-7.84171)	(-9.34133)	(-8.89763)	(-8.63972)	(-6.87731)	(-9.37391)	(-7.90573)	(-9.90935)
LogLagPay	0.07469	0.06027	0.08816*	0.11344*	0.09156	0.17652***	0.14225**	0.34626***
	(1.49599)	(1.15035)	(1.66089)	(1.82087)	(1.34516)	(3.37916)	(2.45034)	(5.31662)
LogSize	0.55333**	0.87255***	0.63763***	0.69622***	0.68989***	0.30725	1.42512***	0.65966***
	(2.37568)	(3.51581)	(2.79121)	(2.73885)	(2.79372)	(1.42077)	(4.33812)	(2.77174)
LogTobin'sQ	0.59462***	0.51667***	0.46689***	0.69575***	0.42546***	0.54259***	0.53201***	0.35165***
	(6.15505)	(5.33705)	(5.01215)	(5.68276)	(3.9906)	(5.44811)	(4.77693)	(3.42602)
IndustrySector 1	-0.00234	-0.06521	-0.15777**	-0.15838*	-0.14788*	-0.19316***	-0.06064	-0.18382***
	(-0.0316)	(-0.89872)	(-2.08447)	(-1.94874)	(-1.85911)	(-2.83286)	(-0.89413)	(-2.73363)
IndustrySector 2	0.13282	-0.03444	-0.00214	0.02535	-0.08273	0.04969	0.0841	0.16942
	(1.28262)	(-0.34833)	(-0.02154)	(0.21213)	(-0.73474)	(0.44754)	(0.69388)	(1.61678)
IndustrySector 4	-0.0194	0.02456	-0.11368	-0.14209	-0.13667	-0.2883***	-0.00887	0.00232
	(-1.8147)	(0.26339)	(1.28699)	(-1.5193)	(-1.4805)	(-3.9407)	(-0.11546)	(0.03236)
IndustrySector 5	-0.22727***	-0.11582	-0.08384	-0.1068	-0.11457	-0.15639*	-0.12374*	-0.04529
	(-2.76189)	(-1.37072)	(-1.00209)	(-1.23972)	(-1.36217)	(-1.86222)	(-1.69655)	(-0.61426)
Ind.Sector6(tech)	0.19582***	0.16481***	0.18319***	0.20402***	0.14159***	0.17606***	0.13516***	0.16469***
	(3.98274)	(3.68817)	(4.15512)	(4.05742)	(2.91912)	(3.96112)	(3.09991)	(3.83936)
IndustrySector 9	-0.05912	-0.10405*	-0.03324	-0.28564***	-0.25373***	-0.12749**	-0.11883*	0.19693***
	(-1.00796)	(-1.94883)	(-0.60917)	(-3.61842)	(-3.46069)	(-2.3655)	(-1.91391)	(-3.21977)
CEO'sAge>Med	-0.03436	0.00522	-0.0252	-0.02479	0.00291	-0.02828	0.00942	0.031345
	(-0.97639)	(0.15503)	(-0.75456)	(-0.65105)	(0.07786)	(-0.86914)	(0.28388)	(0.96595)
ROA	-0.24108	-0.12409	-0.23464**	-1.10968***	-0.15875	-0.05103	-0.77137***	0.05942
	(-1.33947)	(-0.78046)	(-2.05073)	(-3.78059)	(-0.68506)	(-0.27878)	(-2.78694)	(0.23276)

	2003	2004	2005	2006	2007	2008	2009	2010
Leverage	3.72E-05	0.006282	-0.10481[*]	-0.00857	-0.33526[***]	-0.44946[***]	-0.12449[*]	-0.23303[***]
	(0.26563)	(1.22531)	(-1.80055)	(0.11874)	(-3.26536)	(-5.5944)	(-1.67725)	(-2.63882)
LogSales	0.03014	-0.04623	-0.13834[**]	0.0403	-0.259[***]	-0.16728	-0.07954	-0.06456
	(0.40224)	(-0.59891)	(-1.98937)	(0.41583)	(-2.99114)	(-2.22415)	(-1.02556)	(-0.83505)
Acquisitions/Size	-0.30877	-0.51996[*]	-0.76738[***]	-0.81018[***]	-0.26813	-0.10956	-1.10394[***]	-0.7[***]
	(-0.82241)	(-1.92232)	(-2.80976)	(-2.69243)	(-1.11423)	(-0.41476)	(-2.97904)	(-2.60961)
LogLagSize	-0.02511	-0.18463	0.07498	-0.11071	0.19335	-0.16728[**]	-0.90666[***]	-0.17962
	(-0.10728)	(-0.77839)	(0.33435)	(-0.44233)	(0.81471)	(-2.22415)	(-2.69942)	(-0.77121)
LogWorkingCap	0.37239[***]	0.35452[***]	0.41898[***]	0.42182[***]	0.36632[***]	0.43669[***]	0.54112[***]	0.47717[***]
	(8.3092)	(8.05786)	(8.3779)	(8.42565)	(7.10059)	(9.93025)	(10.505)	(9.22281)
Observations	621	653	634	483	468	662	585	579
Adj.R-Squared	0.625773	0.683138	0.668981	0.678604	0.702707	0.678673	0.723032	0.721891

**Table 3: Corporate Cash Holdings and Executive Compensation –
OLS Results with the CEO's Percentage Holdings**

The dependent variable in the regressions is the log of the firm's cash and cash equivalents. LagPay is the lagged total yearly compensation of the firm's CEO. Size is the value of the total assets of the firm. Tobin'sQ is the ratio of the market value of assets to replacement cost of assets. CEO's%Holdings is a variable that measures the CEO's percentage holdings. CEO'sAge>Median is a dummy variable indicating whether the CEO's age is above or below the median CEO's age. The sample includes only firms whose CEO served in both the lagged year and the sample year. The EntrenchmentIndex measures the firm's corporate governance based on the EntrenchmentIndex defined by Bebchuk, Cohen, and Ferrell. The MarketValue is the market value of common shares outstanding at year end. The data was taken from Compustat, ExecuComp, and the Corporate Library databases and does not include financial firms and firms operating in the utility sector. (The t-statistic is reported in parentheses. The notations ***, **, * indicate significance at the 99%, 95%, and 90% levels, respectively.)

	2006	**2007**	**2008**	**2009**	**2010**
Intercept	-1.23149***	-1.19061***	-1.19983***	-1.06703***	-1.60915***
	(-6.13667)	(-6.03672)	(-7.19287)	(-5.65939)	(-7.90675)
LogLagPay	0.11458*	0.11628	0.23218***	0.17698***	0.31022***
	(1.81422)	(1.61268)	(4.18478)	(2.66425)	(4.26419)
IndustrySector 1	-0.15398*	-0.10664	-0.19695**	-0.10054	-0.22038***
	(-1.64367)	(-1.10973)	(-2.38501)	(-1.15669)	(-2.62042)
IndustrySector 2	0.01416	0.05903	0.22097*	0.13773	0.23844*
	(0.11969)	(0.48936)	(1.74213)	(0.97894)	(1.83999)
IndustrySector 3	-0.02383	0.05153	0.01019	0.00413	0.05214
	(-0.36149)	(0.74108)	(0.15906)	(0.06491)	(0.82673)
IndustrySector 4	-0.51753***	-0.40366***	-0.47743***	-0.38972***	-0.34201***
	(-5.63362)	(-4.38656)	(-5.54980)	(-4.45309)	(-4.17867)
IndustrySector 5	-0.07152	-0.09222	-0.17828**	-0.10011	-0.04842
	(-0.71683)	(-0.89135)	(-1.80544)	(-1.05071)	(-0.51732)
IndustrySector 6	0.28902***	0.34055***	0.30034***	0.25595***	0.26895***
	(4.47090)	(5.01884)	(4.95033)	(4.13795)	(4.40026)
IndustrySector 7	-0.07940	-0.14660	-0.10788	-0.17127	-0.32866**
	(-0.43004)	(-0.72848)	(-0.69505)	(-1.06902)	(-2.17772)
IndustrySector 9	-0.22080***	-0.18307**	-0.12224*	-0.11894	-0.13923**
	(-2.75603)	(-2.35136)	(-1.92134)	(-1.59686)	(-1.96555)
IndustrySector 10	0.00666	0.13826*	0.11119	0.00106	-0.01494
	(0.08165)	(1.72829)	(1.55334)	(0.01470)	(-0.21221)
CEO's%Holdings	-3.44194***	-1.40063	-0.44954	-2.86779**	-0.89471
	(-2.66935)	(-1.09940)	(-0.42748)	(-2.33015)	(-0.74101)
CEO'sAge>Median	-0.01643	0.05845	0.00412	0.06913*	0.07130*
	(-0.41165)	(1.44136)	(0.11423)	(1.79704)	(1.90549)
EntrenchmentIndex	-0.03327*	-0.03141*	-0.04719***	-0.01465	-0.00114

	2006	**2007**	**2008**	**2009**	**2010**
	(-1.92162)	(-1.88446)	(-3.26907)	(-0.96921)	(-0.07695)
LogSize	0.80964[***]	0.53044[***]	0.45059[***]	0.43609[***]	0.53151[***]
	(4.87147)	(3.04982)	(4.81340)	(3.03872)	(3.35388)
LogMarketValue	0.05060	0.32436[*]	0.36003[***]	0.37140[***]	0.26057
	(0.30246)	(1.85491)	(3.93530)	(2.57612)	(1.62041)
LogTobin'sQ	0.56689[**]	0.19414	-0.02863	0.06154	0.21577
	(2.27211)	(0.74363)	(-0.16414)	(0.26501)	(0.87910)
Observations	564	568	760	658	673
Adj. R-Squared	0.614701	0.618482	0.59539	0.610052	0.620278

Table 4: **Corporate Cash Holdings and Executive Compensation –
OLS Results with the Firm's Beta**

The dependent variable in the regressions is the log of the firm's cash and cash equivalents. LagPay is the lagged total yearly compensation of the firm's CEO. Size is the value of the total assets of the firm. Tobin'sQ is the ratio of the market value of assets to replacement cost of assets. CEO'sAge>Median is a dummy variable indicating whether the CEO's age is above or below the median CEO's age. Acquisitions is the cash outflow of funds used for and/or the costs relating to acquisition of a company in the current year or effects of an acquisition in a prior year carried over to the current year. ROA is the return on assets ratio of EBITDA over lagged total assets. Leverage is the long-term debt plus debt in current liabilities over long-term debt plus debt in current liabilities plus the total common equity. Sales are the firm's gross sales (the amount of actual billings to customers for regular sales completed during the period) reduced by cash discounts, trade discounts, and returned sales and allowances for which credit is given to customers for each operating segment. WorkingCapital is the difference between total current assets minus total current liabilities as reported on a company's Balance Sheet. The sample includes only firms whose CEO served in both the lagged year and the sample year. Beta is the firm's beta with the market. The data was taken from Compustat, ExecuComp, and the Corporate Library databases and does not include financial firms and firms operating in the utility sector. (The t-statistic is reported in parentheses. The notations ***, **, * indicate significance at the 99%, 95%, and 90% levels, respectively.)

	2006	2007	2008	2009	2010
Intercept	-1.54367***	-1.20367***	-1.42014***	-1.26097***	-1.8523***
	(-8.22017)	(-6.75359)	(-9.33277)	(-7.84434)	(-9.94906)
LogLagPay	0.11237*	0.08807	0.1882***	0.17262**	0.36672***
	(1.80457)	(1.29261)	(3.64584)	(2.82283)	(5.6288)
LogSize	0.59778***	0.88188***	0.69595***	0.53325***	0.51976***
	(5.86493)	(8.64681)	(8.40694)	(6.0609)	(5.8933)
LogTobin'sQ	0.69653***	0.436***	0.592***	0.4787***	0.38773***
	(5.65102)	(4.0473)	(5.62792)	(4.28567)	(3.76186)
IndustrySector 1	-0.15505*	-0.13634*	-0.19365***	-0.05592	-0.16615**
	(-1.87255)	(-1.69938)	(-2.83636)	(-0.82072)	(-2.48395)
IndustrySector 2	0.02681	-0.08728	0.05896	0.07895	0.14009
	(0.22407)	(0.77583)	(0.5314)	(0.72398)	(1.33609)
IndustrySector 4	-0.1469	-0.13466	-0.32561***	-0.00059	-0.05007
	(-1.53289)	(-1.45734)	(-4.28957)	(-0.00756)	(-0.67385)
IndustrySector 5	-0.10575	-0.11633	-0.15467*	-0.09506	-0.0432
	(-1.22489)	(-1.38164)	(-1.84062)	(-1.28325)	(-0.59046)
IndustrySector 6	0.20575***	0.14400***	0.19223***	0.14443***	0.16787***
	(4.09128)	(2.96135)	(4.36121)	(3.29635)	(3.93388)
IndustrySector 9	-0.27842***	-0.25799***	-0.12988**	-0.12075*	-0.17356***
	(-3.52537)	(-3.53226)	(-2.41069)	(-1.93209)	(-2.83496)
CEO'sAge>Median	-0.02526	0.00295	-0.02852	0.00772	0.02517
	(-0.66327)	(0.07873)	(-0.8758)	(0.23114)	(0.77947)
ROA	-1.08759***	-0.21925	-0.20374	-0.30464	0.19841

	2006	2007	2008	2009	2010
	(-3.78868)	(-0.98404)	(-1.27967)	(-1.31121)	(0.82917)
Leverage	-0.00642	-0.33527***	-0.46631***	-0.13247*	-0.26115***
	(0.08839)	(-3.26454)	(-5.7479)	(-1.74297)	(-2.9495)
Beta	0.01035	0.02957	0.07143	0.00207	0.10898***
	(0.31082)	(0.67197)	(1.5843)	(0.06772)	(2.61277)
Acquisitions/Size	-0.74445***	-0.38252*	-0.33147	-0.69655*	-0.54529**
	(-2.79631)	(-1.93604)	(-1.42758)	(-1.94764)	(-2.30212)
LogSales	0.03105	-0.25298***	-0.13776*	-0.12106	-0.07589
	(0.32702)	(-2.94343)	(-1.88499)	(-1.58974)	(-0.99518)
LogWorkingCap	0.41954***	0.36272***	0.4263***	0.56287***	0.44833***
	(8.19278)	(7.700707)	(9.61412)	(10.72357)	(8.50214)
Observations	483	468	662	580	579
Adj. R-Squared	0.678536	0.702567	0.678223	0.722926	0.724938

Table 5: Short-Term Debt and Executive Compensation – OLS Results

The dependent variable in the regression is the log of the debt in current liabilities. LagPay is the lagged total yearly compensation of the CEO of the firm. Cash is the cash and cash equivalents of the firm. Size is the value of the total assets of the firm. Tobin'sQ is the ratio of the market value of assets to replacement cost of assets. A dummy variable indicating whether the CEO's age is above or below the median CEO's age. Acquisitions is the cash outflow of funds used for and/or the costs relating to acquisition of a company in the current year or effects of an acquisition in a prior year carried over to the current year. ROA is the return on assets ratio of EBITDA over lagged total assets. Leverage is the long-term debt plus debt in current liabilities over long-term debt plus debt in current liabilities plus the total common equity. Sales are the firm's gross sales (the amount of actual billings to customers for regular sales completed during the period) reduced by cash discounts, trade discounts, and returned sales and allowances for which credit is given to customers for each operating segment. WorkingCapital is the difference between total current assets minus total current liabilities as reported on a company's Balance Sheet. The sample includes only firms whose CEO served in both the lagged year and the sample year. The data was taken from Compustat, ExecuComp, and the Corporate Library databases and does not include financial firms and firms operating in the utility sector. (The t-statistic is reported in parentheses. The notations ***, **, * indicate significance at the 99%, 95%, and 90% levels. respectively.)

	2006	2007	2008	2009	2010
Intercept	-2.34076***	-2.82882***	-2.33312***	-2.48426***	-1.59503***
	(-5.07245)	(-6.19255)	(-5.92209)	(-5.63254)	(-3.84816)
LogLagPay	-0.20164	-0.24032	-0.0369	0.05812	-0.36391**
	(-1.30715)	(-1.41594)	(-0.25153)	(0.35641)	(-2.3627)
LogCash	-0.1198	-0.06499	0.16383*	0.05564	-0.07556
	(-1.1248)	(-0.56306)	(1.68639)	(0.51494)	(-0.80255)
LogSize	1.15825*	2.01178***	0.43984	-0.03347	1.64197***
	(1.95327)	(3.06202)	(0.84192)	(0.03835)	(3.1471)
LogTobin'sQ	-0.10842	0.32638	-0.30648	-0.39799	0.121104
	(-0.36221)	(1.11698)	(-1.12238)	(-1.26087)	(0.51976)
IndustrySector 1	0.17565	0.31322	0.16609	0.02364	0.06681
	(0.99859)	(1.627)	(1.06843)	(0.14102)	(0.45516)
IndustrySector 2	-0.16207	-0.19607	0.32192	-0.38552	0.46317**
	(-0.53181)	(-0.688)	(1.20832)	(-1.20994)	(2.19656)
IndustrySector 4	-0.30027	-0.37636	-0.35229*	-0.33479	-0.49941**
	(-1.40434)	(-1.54472)	(-1.90308)	(-1.53097)	(-2.50493)
IndustrySector 5	0.40438**	0.36996**	0.31069*	0.29488*	0.14357
	(2.23093)	(1.99666)	(1.73319)	(1.7036)	(0.93756)
IndustrySector 6	-0.02765	-0.03936	-0.12967	0.06519	-0.08487
	(-0.22693)	(-0.31306)	(-1.13902)	(0.5364)	(-0.82557)
IndustrySector 9	0.08194	0.23954	0.16882	-0.0288	0.05748
	(0.44283)	(1.31978)	(1.31926)	(-0.18099)	(0.41471)
CEO'sAge>Median	0.03272	0.05314	-0.11227	-0.04713	-0.07956
	(0.37358)	(0.59109)	(-1.44915)	(-0.54422)	(-1.0667)

	2006	2007	2008	2009	2010
ROA	-0.31169	-1.28423[*]	-0.4346	0.30578	-0.19639
	(-0.4573)	(-1.74965)	(-0.88533)	(0.69061)	(-0.55375)
LogSales	-0.04207	-0.2399	0.28698	-0.05263	-0.2723
	(-0.17403)	(-1.02972)	(1.61871)	(0.80146)	(-1.53457)
Acquisitions/Size	0.41035	-0.49298	1.79269[***]	2.09009[**]	-0.37598
	(0.58921)	(-0.79561)	(2.73754)	(0.02196)	(-0.59921)
LogLagSize	0.51276	-0.09852	0.56209	1.39992	0.06595
	(0.86353)	(-0.15431)	(1.02893)	(1.58232)	(0.132)
LogWorkingCap	-0.32631[***]	-0.09852[*]	-0.35419[***]	-0.36925[***]	-0.19062[*]
	(-2.75707)	(-1.77707)	(-3.25268)	(-2.67354)	(-1.93814)
Observations	370	370	496	418	560
Adj. R-Squared	0.42828	0.47343	0.405803	0.392161	0.393122

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Table 6: **Reduced-Form Regressions for 2010**

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The dependent variable in the regressions is the log of the firm's cash and cash equivalents. LagPay is the lagged total yearly compensation of the firm's CEO. Size is the value of the total assets of the firm. Tobin's q is the ratio of the market value of assets to replacement cost of assets. CEO'sAge>Median is a dummy variable indicating whether the CEO's age is above or below the median CEO's age. Acquisitions is the cash outflow of funds used for and/or the costs relating to acquisition of a company in the current year or effects of an acquisition in a prior year carried over to the current year. ROA is the return on assets ratio of EBITDA over lagged total assets. Leverage is the long-term debt plus debt in current liabilities over long-term debt plus debt in current liabilities plus the total common equity. Sales are the firm's gross sales (the amount of actual billings to customers for regular sales completed during the period) reduced by cash discounts, trade discounts, and returned sales and allowances for which credit is given to customers for each operating segment. WorkingCapital is the difference between total current assets minus total current liabilities as reported on a company's Balance Sheet. The sample includes only firms whose CEO served in both the lagged year and the sample year. Beta is the firm's beta with the market. The data was taken from Compustat, ExecuComp, and the Corporate Library databases and does not include financial firms and firms operating in the utility sector. (The t-statistic is reported in parentheses. The notations ***, **, * indicate significance at the 99%, 95%, and 90% levels, respectively.)

Intercept	-2.18707***
	(-9.5)
LogLagPay	1.25223***
	(19.45104)
Observations	654
Adj. R-Squared	0.36623

Intercept	-1.34833***
	(-6.62233)
LogLagPay	0.34869***
	(4.37465)
LogSize	0.69969***
	(15.64316)
Observations	654
Adj. R-Squared	0.53867

Intercept	-1.45881***
	(-7.40245)
LogLagPay	0.26689***
	(3.43137)
LogSize	0.76752***
	(17.35593)
LogTobin'sQ	0.73395***
	(7.02347)
Observations	654
Adj. R-Squared	0.57055

Intercept	-1.4353***
	(-7.27096)
LogLagPay	0.26508***
	(3.41173)
LogSize	0.76047***
	(17.12972)
LogTobin'sQ	0.62241***
	(4.94383)
ROA	0.46811
	(1.58453)
Observations	654
Adj. R-Squared	0.571547

Intercept	-1.51685***
	(-7.96345)
LogLagPay	0.2721***
	(3.6228)
LogSize	0.84437***
	(19.14054)
LogTobin'sQ	0.56777***
	(5.47474)
Leverage	-0.61517***
	(-6.93829)
Observations	654
Adj. R-Squared	0.59959

Intercept	-1.4725***
	(-7.46197)
LogLagPay	0.26503***
	(3.40788)
LogSize	0.68358***
	(8.26755)
LogTobin'sQ	0.72317***
	(6.89734)
LogSales	0.09249
	(1.2014)
Observations	654
Adj. R-Squared	0.570844

Intercept	-1.84831***
	(-8.36862)
LogLagPay	0.30735***
	(3.953)
LogSize	0.77047***
	(17.59527)
LogTobin'sQ	0.848644***
	(7.86849)
Beta	0.17517***
	(3.76304)
Observations	654
Adj. R-Squared	0.579073

Intercept	-1.94377***
	(-9.12443)
LogLagPay	0.31642***
	(4.22681)
LogSize	0.84989***
	(19.51021)
LogTobin'sQ	0.68799***
	(6.47956)
Leverage	-0.63363***
	(-7.2316)
Beta	0.19121***
	(4.26178)
Observations	654
Adj. R-Squared	0.609906

Intercept	-1.60553***
	(-8.43245)
LogLagPay	0.29368***
	(3.94255)
LogSize	0.79133***
	(18.71962)
LogTobin'sQ	0.59405***
	(5.91137)
IndustrySector 1	-0.22788***
	(-2.89653)
IndustrySector 2	0.23335*
	(1.80439)
IndustrySector 4	-0.32264***
	(-4.30912)
IndustrySector 5	-0.04263
	(-0.48511)
IndustrySector 6	0.26977***
	(5.47674)
IndustrySector 9	-0.15464**
	(-2.49019)
Observations	654
Adj. R-Squared	0.616076

Table 7: **Corporate Cash Holdings and Executive Compensation –**
OLS Results with Industry Interactive Variables

The dependent variable in the regression is the log of the firm's cash and cash equivalents in 2010. LagPay is the lagged total yearly compensation of the firm's CEO. Size is the value of the total assets of the firm. Tobin'sQ is the ratio of the market value of assets to replacement cost of assets. Leverage is the long-term debt plus debt in current liabilities over long-term debt plus debt in current liabilities plus the total common equity. InteractiveInd. # is an interactive variable between LogLagPay and the numbered IndustrySector dummy variable. The sample includes only firms whose CEO served in both the lagged year and the sample year. The data was taken from Compustat, ExecuComp, and the Corporate Library databases and does not include financial firms and firms operating in the utility sector. (The t-statistic is reported in parentheses. The notations ***, **, * indicate significance at the 99%, 95%, and 90% levels, respectively.)

Panel A		Panel B (without firms in Industry Sector #1)	
Intercept	-1.63938***	**Intercept**	-1.61561***
	(-6.37624)		(-6.31469)
LogLagPay	0.29696***	**LogLagPay**	0.28426***
	(3.40055)		(3.24002)
LogSize	0.85825***	**LogSize**	0.86225***
	(20.25403)		(19.96213)
LogTobin'sQ	0.45076***	**LogTobin'sQ**	0.42128***
	(4.50927)		(4.10055)
IndustrySector 1	-2.48787***	**IndustrySector 2**	1.06973
	(-2.91734)		(0.92996)
IndustrySector 2	1.02774	**IndustrySector 4**	0.042745
	(0.88823)		(0.06275)
IndustrySector 4	0.08741	**IndustrySector 5**	0.56842
	(0.12759)		(0.5934)
IndustrySector 5	0.55118	**IndustrySector 6**	0.85471*
	(0.57218)		(1.89064)
IndustrySector 6	0.84330*	**IndustrySector 9**	-0.98112*
	(1.85443)		(-1.68405)
IndustrySector 9	-0.97844*	**InteractiveInd. 2**	-0.24017
	(-1.66947)		(-0.73967)
InteractiveInd. 1	0.60883***	**InteractiveInd. 4**	-0.10974
	(2.67115)		(-0.59519)
InteractiveInd. 2	-0.22883	**InteractiveInd. 5**	-0.16699
	(-0.70063)		(-0.62609)
InteractiveInd. 4	-0.12086	**InteractiveInd. 6**	-0.1805
	(-0.65176)		(-1.4117)
InteractiveInd. 5	-0.16216	**InteractiveInd. 9**	0.23828
	(-0.60459)		(1.43093)
InteractiveInd. 6	-0.17944	**Leverage**	-0.49186***

	Panel A	Panel B (without firms in Industry Sector #1)	
	(-1.39506)		(-5.53954)
InteractiveInd. 9	0.23772	**Observations**	612
	(1.41911)	**Adj. R-Squared**	0.636089
Leverage	-0.53681***		
	(-6.21313)		
Observations	654		
Adj. R-Squared	0.642298		

Table 8: **Corporate Cash Holdings and Executive Compensation –**
Quintiles OLS Results

The dependent variable in the regressions is the log of the firm's cash and cash equivalents in 2010. The sample was divided into quintiles by company size (companies in Q5 are the largest in terms of assets). LagPay is the lagged total yearly compensation of the firm's CEO. Size is the value of the total assets of the firm. LagSize is the lagged value of the total assets of the firm. Tobin'sQ is the ratio of the market value of assets to replacement cost of assets. CEO'sAge>Median is a dummy variable indicating whether the CEO's age is above or below the median CEO's age. Acquisitions is the cash outflow of funds used for and/or the costs relating to acquisition of a company in the current year or effects of an acquisition in a prior year carried over to the current year. ROA is the return on assets ratio of EBITDA over lagged total assets. Leverage is the long-term debt plus debt in current liabilities over long-term debt plus debt in current liabilities plus the total common equity. Sales are the firm's gross sales (the amount of actual billings to customers for regular sales completed during the period) reduced by cash discounts, trade discounts, and returned sales and allowances for which credit is given to customers for each operating segment. WorkingCapital is the difference between total current assets minus total current liabilities as reported on a company's Balance Sheet. The sample includes only firms whose CEO served in both the lagged year and the sample year. The data was taken from Compustat, ExecuComp, and the Corporate Library databases and does not include financial firms and firms operating in the utility sector. (The t-statistic is reported in parentheses. The notations ***, **, * indicate significance at the 99%, 95%, and 90% levels, respectively.)

	Q1	Q2	Q3	Q4	Q5
Intercept	-1.58186**	-1.81278	-0.14448	-3.69334***	-0.90692*
	(-2.39729)	(-1.2954)	(-0.08447)	(-3.35919)	(-1.93522)
LogLagPay	0.37866**	0.44692***	0.44806**	0.34251**	0.09265
	(2.57807)	(2.68264)	(2.23053)	(2.36281)	(0.76992)
LogSize	-0.45106	1.58624**	-0.69408	1.96849***	0.45734
	(-0.57468)	(2.36827)	(-0.83074)	(3.1628)	(1.24217)
LogTobin'sQ	0.324644	0.24532	0.33052	0.43806	0.24853
	(1.36531)	(1.11377)	(1.33696)	(1.529)	(0.97319)
IndustrySector 1	-0.23903	-0.47895	-0.23887	-0.09676	0.05666
	(-1.0995)	(-3.01821)	(-1.3174)	(-0.73074)	(0.47149)
IndustrySector 2	0.45717**	0.15487	-0.02815	0.20084	0.18578
	(1.8466)	(0.61776)	(-0.14864)	(0.53158)	(0.86005)
IndustrySector 4	0.20203	0.34327	-0.09668	-0.14914	0.05009
	(0.65774)	(1.58102)	(-0.46778)	(-1.08547)	(0.53612)
IndustrySector 5	-0.15208	0.10835	-0.00945	-0.05022	-0.26414*
	(-0.7734)	(0.61937)	(-0.05757)	(-0.32976)	(-1.76415)
Ind.Sector6(tech)	0.21297**	0.16799	0.10452	0.10458	0.07738
	(2.20087)	(1.51895)	(0.98695)	(1.04869)	(0.93615)
IndustrySector 9	-0.1524	-0.37338**	-0.23204	-0.27439**	-0.03939
	(-1.0083)	(-2.423)	(-1.5859)	(-2.28009)	(-0.29954)
CEOAge>Med	0.05356	0.01347	-0.04145	0.09273	0.02971
	(0.63038)	(0.15768)	(-0.51446)	(1.31391)	(0.50987)
ROA	0.90354**	-0.02769	0.08865	-0.48115	0.20374

	Q1	Q2	Q3	Q4	Q5
	(1.6881)	(-0.04099)	(0.14957)	(-0.62261)	(0.29648)
Leverage	-0.56773**	-0.61495**	0.22324	-0.33882*	-0.17635
	(-1.98084)	(-2.22336)	(1.16397)	(-1.71233)	(-1.05124)
LogSales	-0.39713	-0.21307	0.14602	-0.06039	0.17635
	(-1.62913)	(-1.03149)	(0.80954)	(-0.33909)	(1.23481)
Acquisitions/Size	-0.82711	-0.45153	-0.69629	-1.0655*	0.87718
	(-1.18978)	(-0.7425)	(-1.05272)	(-1.85236)	(1.23481)
LogLagSize	1.05108	-1.18597	0.35318	-0.88943*	-0.00147
	(1.44184)	(-1.86563)	(0.54412)	(-1.7077)	(-0.00411)
LogWorkingCap	0.67596***	0.71071***	0.5444***	0.43007***	0.28893***
	(3.27266)	(4.898)	(3.91446)	(4.51034)	(3.66403)
Observations	116	116	116	115	116
Adj. R-Squared	0.400423	0.490351	0.313581	0.438042	0.58485

Table 9: Corporate Cash Holdings and Executive Compensation – OLS Results Including Controls for Volatility

The dependent variable in the regressions is the log of the firm's cash and cash equivalents. LagPay is the lagged total yearly compensation of the firm's CEO. Size is the value of the total assets of the firm. Tobin'sQ is the ratio of the market value of assets to replacement cost of assets. Acquisitions is the cash outflow of funds used for and/or the costs relating to acquisition of a company in the current year or effects of an acquisition in a prior year carried over to the current year. Leverage is the long-term debt plus debt in current liabilities over long-term debt plus debt in current liabilities plus the total common equity. WorkingCapital is the difference between total current assets minus total current liabilities as reported on a company's Balance Sheet. Beta is the firm's beta with the market. STDEV is the firm's annual standard deviation of returns. WorkingCapital is the difference between total current assets minus total current liabilities as reported on a company's Balance Sheet. The sample includes only firms whose CEO served in both the lagged year and the sample year. The data was taken from Compustat, ExecuComp, and the Corporate Library databases and does not include financial firms and firms operating in the utility sector. (The t-statistic is reported in parentheses. The notations ***, **, * indicate significance at the 99%, 95%, and 90% levels respectively.)

	2010
Intercept	-2.41602***
	(-8.26456)
LogLagPay	0.34336***
	(3.65399)
LogSize	0.78976***
	(2.706)
LogTobin'sQ	0.64373***
	(4.48915)
IndustrySector 1	-0.0799
	(-0.99698)
IndustrySector 2	0.13117
	(1.11988)
IndustrySector 4	-0.02673
	(-0.34724)
IndustrySector 5	-0.06894
	(-0.87306)
IndustrySector 6	0.13304*
	(2.02835)
IndustrySector 9	-0.09691
	(-1.31322)
Beta	-0.02588
	(-0.34785)
STDEV	12.87318**
	(2.251)
Leverage	-0.31122***

	2010
	(-2.77941)
Acquisitions/Size	-0.78171
	(-1.93491)
LagSTDEV	1.01066
	(0.32185)
Log WorkingCapital	0.50465***
	(8.15178)
LogLagSize	-0.2526
	(-0.86438)
Observations	355
Adj. R-Squared	0.735737

Table 10: Corporate Cash Holdings and Executive Compensation – 2002 OLS Results

The dependent variable in the regressions is the log of the firm's cash and cash equivalents in 2002. LagPay is the lagged total yearly compensation of the firm's CEO. Size is the value of the total assets of the firm. LagSize is the lagged value of the total assets of the firm. Tobin'sQ is the ratio of the market value of assets to replacement cost of assets. CEO'sAge>Median is a dummy variable indicating whether the CEO's age is above or below the median CEO's age. Acquisitions is the cash outflow of funds used for and/or the costs relating to acquisition of a company in the current year or effects of an acquisition in a prior year carried over to the current year. ROA is the return on assets ratio of EBITDA over lagged total assets. Leverage is the long-term debt plus debt in current liabilities over long-term debt plus debt in current liabilities plus the total common equity. Sales are the firm's gross sales (the amount of actual billings to customers for regular sales completed during the period) reduced by cash discounts, trade discounts, and returned sales and allowances for which credit is given to customers for each operating segment. WorkingCapital is the difference between total current assets minus total current liabilities as reported on a company's Balance Sheet. The sample includes only firms whose CEO served in both the lagged year and the sample year. The data was taken from Compustat, ExecuComp, and the Corporate Library databases and does not include financial firms and firms operating in the utility sector. (The t-statistic is reported in parentheses. The notations ***, **, * indicate significance at the 99%, 95%, and 90% levels, respectively.)

	Entire Sample			Only Tech Industry		W/O Tech Industry	
Intercept	-1.07371***	**Intercept**	-1.31191***	**Intercept**	-0.52774***	**Intercept**	-1.31083***
	(-7.84516)		(-7.74694)		(-3.20856)		(-7.14359)
LogLagPay	0.13625***	**LogLagPay**	0.21949***	**LogLagPay**	0.04176	**LogLagPay**	0.21029***
	(2.89423)		(3.66803)		(0.86298)		(2.97788)
LogSize	0.76008***	**LogSize**	0.66681***	**LogSize**	0.39657	**LogSize**	0.71961***
	(3.36172)		(7.21875)		(1.64284)		(6.22664)
LogTobin'sQ	0.47846***	**LogTobin'sQ**	0.46394***	**LogTobin'sQ**	0.15145	**LogTobin'sQ**	0.55787***
	(3.88559)		(3.79076)		(0.86635)		(3.60351)
IndustrySector 1	-0.07017	**IndustrySector 1**	-0.07933	**CEOAge>Med**	-0.0678	**IndustrySector 1**	-0.07512
	(-0.83789)		(-0.95057)		(-1.19901)		(-0.83028)
IndustrySector 2	0.02077	**IndustrySector 2**	0.03349	**ROA**	-0.50728	**IndustrySector 2**	0.03609
	(0.17631)		(0.28522)		(-1.30986)		(0.28392)
IndustrySector 4	-0.04099	**IndustrySector 4**	-0.05325	**Leverage**	-0.14775	**IndustrySector 4**	-0.05118
	(-0.33927)		(-0.44222)		(-1.55711)		(-0.39358)
IndustrySector 5	-0.22841**	**IndustrySector 5**	-0.22864**	**LogSales**	0.03089	**IndustrySector 5**	-0.23028**
	(-2.4493)		(-2.4642)		(0.26466)		(-2.29863)
Ind.Sector6(tech)	0.248114***	**Ind.Sector6(tech)**	0.8508***	**Acquisitions/Size**	-0.39736	**IndustrySector 9**	0.01781
	(4.65679)		(3.14664)		(-0.89256)		(0.24653)
IndustrySector 9	-0.00156	**IndustrySector 9**	0.00226	**LogLagSize**	0.03522	**CEOAge>Med**	0.02177
	(-0.0242)		(0.03519)		(0.163)		(0.44952)
CEOAge>Med	0.00212	**CEOAge>Med**	0.00172	**LogWorkingCap**	0.4929***	**ROA**	0.04559
	(0.05411)		(0.04414)		(4.59264)		(0.14935)
ROA	-0.11704	**ROA**	-0.05935			**Leverage**	-0.01021
	(-0.4319)		(-0.24423)				(-0.62102)

	Entire Sample			Only Tech Industry		W/O Tech Industry	
Leverage	-0.01079	**Leverage**	-0.01162			**LogSales**	-0.22005[**]
	(-0.7068)		(-0.76686)				(-2.04895)
LogSales	-0.15196[*]	**LogSales**	-0.17516[**]			**Acquisitions/Size**	-1.06249[**]
	(-1.80189)		(-2.10858)				(-2.35199)
Acquisitions/Size	-0.94014[***]	**Acquisitions/Size**	-0.91814[***]			**LogWorkingCap**	0.33922[***]
	(-2.62271)		(-2.65062)				(6.31426)
LogLagSize	-0.0987	**InteractiveInd.6**	-0.17729[**]				
	(-0.43936)		(-2.27241)				
LogWorkingCap	0.35232[***]	**LogWorkingCap**	0.35625[***]				
	(7.51672)		(7.63667)				
Observations	588	**Observations**	588	**Observations**	151	**Observations**	437
Adj. R-Squared	0.622035	**Adj. R-Squared**	0.625296	**Adj. R-Squared**	0.767498	**Adj. R-Squared**	0.573922

Table 11: Correlation Between Residual and Variables – Robustness Check

        Correlations between the absolute value of the residual (calculated using the 2010 sample) and the various explanatory and control variables are shown below. The dependent variable in the regression is the log of the firm's cash and cash equivalents. LagPay is the lagged total yearly compensation of the firm's CEO. Size is the value of the total assets of the firm. LagSize is the lagged value of the total assets of the firm. Tobin'sQ is the ratio of the market value of assets to replacement cost of assets. CEO'sAge>Median is a dummy variable indicating whether the CEO's age is above or below the median CEO's age. Acquisitions is the cash outflow of funds used for and/or the costs relating to acquisition of a company in the current year or effects of an acquisition in a prior year carried over to the current year. ROA is the return on assets ratio of EBITDA over lagged total assets. Leverage is the long-term debt plus debt in current liabilities over long-term debt plus debt in current liabilities plus the total common equity. Sales are the firm's gross sales (the amount of actual billings to customers for regular sales completed during the period) reduced by cash discounts, trade discounts, and returned sales and allowances for which credit is given to customers for each operating segment. WorkingCapital is the difference between total current assets minus total current liabilities as reported on a company's Balance Sheet. The sample includes only firms whose CEO served in both the lagged year and the sample year.

LogLagPay	-0.11130
LogSize	-0.05445
LogTobinsQ	-0.10027
IndustrySector 1	0.11453
IndustrySector 2	-0.06568
IndustrySector 4	0.00294
IndustrySector 5	0.07036
IndustrySector 6(tech)	-0.14127
IndustrySector 9	0.13411
CEOAge>Med	-0.07532
ROA	-0.0716
Leverage	0.14854
Acquisitions/Size	0.09178
LogSales	-0.03434
LogWorkingCap	-0.18089
LogLagSize	-0.06477

Figure 1: Residuals v. Predicted Values – Robustness Check

The residuals and predicted values for Figure 1 were calculated using the 2010 sample. In the OLS regression used for the calculations, the dependent variable is the log of the firm's cash and cash equivalents. LagPay is the lagged total yearly compensation of the firm's CEO. Size is the value of the total assets of the firm. LagSize is the lagged value of the total assets of the firm. Tobin'sQ is the ratio of the market value of assets to replacement cost of assets. CEO'sAge>Median is a dummy variable indicating whether the CEO's age is above or below the median CEO's age. Acquisitions is the cash outflow of funds used for and/or the costs relating to acquisition of a company in the current year or effects of an acquisition in a prior year carried over to the current year. ROA is the return on assets ratio of EBITDA over lagged total assets. Leverage is the long-term debt plus debt in current liabilities over long-term debt plus debt in current liabilities plus the total common equity. Sales are the firm's gross sales (the amount of actual billings to customers for regular sales completed during the period) reduced by cash discounts, trade discounts, and returned sales and allowances for which credit is given to customers for each operating segment. WorkingCapital is the difference between total current assets minus total current liabilities as reported on a company's Balance Sheet. The sample includes only firms whose CEO served in both the lagged year and the sample year.