

Agency Costs in the Era of Economic Crisis – The Enhanced Connection between CEO Compensation and Corporate Cash Holdings

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ABSTRACT

This Article reports results of an empirical study that suggest that the current economic crisis has changed managerial behavior in the US in a way that may impede economic recovery. The study finds a strong, statistically significant and economically meaningful, positive correlation between the CEO total annual compensation and corporate cash holdings during the economic crisis in the years 2008-2010. This correlation did not exist in comparable magnitudes 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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I. Introduction

The Great Recession has introduced a major shock to the market system and has highlighted the vulnerability of companies to economic changes. One important manifestation of the changed business practices in this new financial environment is the substantial increase in money holdings by companies.¹ The practice of maintaining sizable amounts of cash holdings by firms contributes to the low level of activity in the market and the continued economic decline.² Today companies hold about 2 trillion dollars in cash.³

The decision on how much cash and cash equivalents to hold lies with the managers of the company. It is therefore interesting to explore what affects their decision on this matter, and in particular whether there is a change in parameters that govern the amount of cash holdings during the last three years starting with the “Great Recession.” In the past, managers have been accused of hoarding money and of using the company’s cash reserves for empire building, promoting their own interests rather than investing in the existing operations of the company or distributing money back to the shareholders.⁴ Therefore, as a starting point for this Article’s exploration I examine whether there is a correlation between cash holdings of firms and management’s personal benefits.

Indeed, the study reported in this Article finds a strong correlation between cash retention and CEO compensation that has greatly intensified in magnitude over the last three years. The finding is statistically significant at above the 99% level. The results are also economically

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, available at http://online.wsj.com/article/SB10001424052748703766704576009501161973480.html?mod=dist_smartbrief (“nonfinancial 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 *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 See *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.”).

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 of about 0.3), controlling for firm size and industry.

An intriguing finding of the statistical study is that the correlation between CEO compensation and the cash holdings has not just become strongly statistically significant from 2008 through 2010, but that the magnitude of the coefficient (on a log-scale) has more than doubled in comparison to the 2006-2007 pre-economic crisis. 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 following the economic crisis, managerial behavior changed and managerial sensitivity to incentives adjusted accordingly and in a way that is markedly different from prior, non-crisis practices.

The empirical results of the study are robust and not weakened by inclusion of additional controls such as the firm’s corporate governance (measured by the Entrenchment Index,⁵ percentage of directors who are insiders, and institutional investors), and firm performance (measured by Tobin’s Q⁶ 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, and the findings are robust even after accounting for a possible nonlinear dependence on firm size.

This study also examined each firm’s level of short term debt (measured as debt in current liabilities). Similarly to cash retention, leverage also indicates the manager’s choice regarding the firm’s risk level,⁷ though in the opposite direction. Specifically, high levels of

⁵ The Entrenchment Index is defined by Bebchuk, Cohen, and Ferrell to include the six salient antitakeover mechanisms, *see* Lucian A. Bebchuk et al., *What Matters in Corporate Governance?* (Harvard John M. Olin Center for Law, Economics, and Business, Discussion Paper No. 491, 2005) at 41, *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=593423##.

⁶ Tobin’s Q is the ratio of the market value of assets to replacement cost of assets. Following Kaplan and Zingales; Gompers, Ishii, and Metrick; Bebchuk, Cohen, and Ferrell; and Bebchuk and Cohen, 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 id.* at 20.

⁷ *Cf., e.g.,* Kate Litvak, *Defensive Management: Does the Sarbanes-Oxley Act Discourage Corporate Risk-Taking?* (3rd Annual Conference on Empirical Legal Studies Papers U of Texas Law, Law and Econ Research Paper No. 108, 2008), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1120971 (looking at various proxies for risk,

short term debt increase the firm's risk in times of fear of an imminent double-dip recession.⁸ I found a statistically significant and negative correlation between CEO compensation and the firm's short term debt in 2010.

This study also finds a weak positive correlation between the firm's cash holdings during the economic crisis and whether or not the manager is above the median age, though this result was only statistically significant at about the 90% level in some of the regressions in 2010. The result suggests 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: (1) The economic crisis creates a new environment with different external forces operating on managers, and these external forces are correlated with both pay and cash holdings; (2) The economic crisis is a new arena which requires unique skills to navigate through and which accentuates certain traits in managers that are correlated with pay level; and (3) Following the economic crisis, managerial behavior changed to correspond to adjustments in the manager's level of risk which is correlated with her pay.

The first possible explanation for this Article's empirical finding focuses on the level of corporate governance and monitoring processes. A strong independent board of directors and a substantial interest by institutional investors may affect both the CEO's compensation and the level of cash holdings and short term debt.⁹ Thus, it may be that in the midst of the Great Recession independent directors and institutional investors scrutinize the firm more, which led to 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 is associated with lower corporate cash holdings, one can conjecture that the presence or lack of independent monitoring is responsible for the empirical result.

including cash holdings and debt levels, and studying the influence of Sarbanes-Oxley on corporate risk).

⁸ The 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.

⁹ See, e.g., Michael E. Murphy, *Assuring Responsible Risk Management in Banking: The Corporate Governance Dimension*, 36 DEL. J. CORP. L. 121, 141 (2011) ("the independent directors on the board are the only internal control center capable of regulating executive compensation").

In an attempt to verify this hypothesis, control variables for the percentage of inside directors and institutional investors were added to the statistical study as proxies for corporate monitoring. These variables 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.

An alternative explanation is that CEO compensation is correlated with skill,¹⁰ and a more skillful CEO senses that in times of crisis it is prudent to avoid risk and take more precautions, which translates to an increase in cash holdings. 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 optimal level of risk which is neither too high nor too low. There is an optimal level of cash-holdings for every level of risk tolerance, and this argument 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.

Adding control variables for firm performance is one way to test this hypothesis. In the linear regression tests performed for the study reported in this Article, these control variables did not significantly affect the statistical results of a strong correlation between CEO compensation and corporate cash holdings. Furthermore, unlike CEO compensation, firm performance is not significantly correlated with the firm's short term debt in 2010, and so it is hard to explain the results regarding anti-correlation between CEO compensation and short term debt using this argument.

A third hypothesis is that the manager becomes more risk averse¹¹ 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.¹² Such a failure will have a profound effect on the manager personally — the

¹⁰ Cf. Robert Daines et al., *The Good, the Bad, and the Lucky: CEO Pay and Skill* (Univ. of Pennsylvania Institute for Law and Economics, Research Paper Series, 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).

¹¹ 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.

¹² See, e.g., Yakov Amihud and Baruch Lev, *Risk Reduction As a Managerial Motive for Conglomerate Mergers*, 12 BELL J. ECON. 605, 605 (1981) ("managers . . . engage in conglomerate mergers to decrease their largely undiversifiable 'employment risk.'"); Note, *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.¹³

The link between the manager's personal welfare and the firm's performance may well have tightened following the financial crisis. Before the crisis, the effect of poor performance on the manager could have been mitigated by arrangements such as the grant of golden parachutes, post-retirement consulting contracts, and perpetual thrones, which are triggered once the manager is dismissed and provide substitutes for the manager's loss.¹⁴ In addition, anti-takeover mechanisms have shielded the manager from poor performance by entrenching the manager regardless of her performance.¹⁵ However, following the financial crisis, firms seem to face an

Conflict Between Managers and Shareholders in Diversifying Acquisitions: A Portfolio Theory Approach, 88 YALE L.J. 1238, 1241–44 (1979); 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.”); cf. Henry T.C. Hu, *Risk, Time, and Fiduciary Principles in Corporate Investment*, 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).

¹³ Cf., Coffee, Jr., *supra* note 12, at 23 (“the manager wants to hoard cash and assets to protect against future contingencies.”).

¹⁴ 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.”).

¹⁵ Some anti-takeover defenses can prevent a hostile takeover. See, e.g., Lucian A. 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 A. 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.

increased risk of total failure and collapse.¹⁶ Unlike the risk of an acquisition by a hostile bidder, the personal effect of the obliteration of the firm on the manager cannot be mitigated by golden parachutes nor can it be prevented by anti-takeover mechanisms.

Thus, I conjecture that part of this increase in risk aversion can be attributed to the increased difficulty of a highly compensated manager to find a comparable alternative position in case she fails and thus loses her current job, especially in times of weak economic growth.¹⁷ Certainly, 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. The lower compensated manager, in contrast, will lose less relative to her prior position, and will experience a shorter way down and a softer landing. At the same time, if the lower compensated manager takes on more risk and the risk pays off, she may gain more from it than her higher compensated counterpart since it may enable her to climb up the compensation scale. To be sure, the higher compensated manager will gain from a successful gamble both in terms of prestige and in added value to her equity interest that is likely to be even higher than that of the lower compensated manager. However, the successful gamble may have long term effects on the lower compensated manager who can use her success to improve her position and potentially reach that same higher compensation level including the increased equity interest, and thus may well stand to gain more from the gamble.

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”).

¹⁶ See, e.g., Colin Barr, Failure is Less of an Option, (Apr. 8, 2011), <http://finance.fortune.cnn.com/2011/04/08/failure-is-less-of-an-option/> (analyzing Dun & Bradstreet’s report that looks at US business failures, including businesses that ceased to exist but are not necessarily formally in bankruptcy. In 2006 about 35 million US 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.

¹⁷ Downturns, such as the current one, may be associated with higher unemployment levels and less 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.

Of course, there are business motivated reasons for holding large amounts of cash – it can help the company hedge against the risk of increased interest rates, or even a market-wide lending deficiency.¹⁸ Yet, the magnitude and incidence of the cash hoarding practice at present raises the concern of a market failure. The increased cash holdings can come at the expense of investing in the company's operations, and the cash hoarding practice augments the economic crisis.¹⁹ Ideally, we should encourage management to divert this cash into avenues that help stimulate the economy.²⁰ In fact, the market may be caught in a form of a prisoner's dilemma whereby a concentrated reduction of cash holdings by all the firms simultaneously will help the economy, and will thus also be beneficial for each individual firm. The conjectured effect of the apparent increased managerial risk aversion on the level of the corporate cash holdings is likely to be sub-optimal for well diversified shareholders who may benefit from a concentrated lowering of cash holdings across all the firms.

Hence, the third hypothesis proposes that managers with higher compensation, who stand to lose more should the firm fail, keep, on average, more cash on the balance sheet. The finding of a statistically significant correlation between the CEO's compensation and the firm's short term debt in 2010 is also 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.

Under the third hypothesis, these results 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 accumulate potentially excessive amounts of cash. The findings suggest, as do other academic studies that criticize the decoupling of managerial pay and performance for lack of efficient incentives for managers to perform,²¹ and as is echoed by the popular sentiment of resentment towards generous compensation packages and the feeling that they are an unjust windfall, that there is indeed an

¹⁸ See generally David Romer, *A Simple General Equilibrium Version of the Baumol-Tobin Model*, 101 Q.J. ECON. 663 (1986).

¹⁹ See Lahart, *supra* note 2.

²⁰ 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.

²¹ See LUCIAN BEBCHUK AND JESSE FRIED, *PAY WITHOUT PERFORMANCE: THE UNFULFILLED PROMISE OF EXECUTIVE COMPENSATION* (2004) (Harvard University Press, Cambridge, MA).

urgent need for managerial compensation reform.²² And the findings of this Article provide yet an additional reason: 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 wrong incentives for managers.

This indicates that the discussion about optimal managerial compensation arrangements should be broadened to encompass also measures to decrease managerial excessive risk-aversion. Currently, the focus of efforts to improve compensation arrangements is on measures to decrease excessive managerial risk-seeking in order to prevent a recurrence of the economic crisis.²³ 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 Act²⁴ that relate to firm pay practices, the fallout of excessive managerial risk-aversion should be taken into account.

The paper proceeds as follows: Part II describes the practice of cash hoarding and reviews prior literature about managerial compensation and cash holdings, including financial studies. Part III describes the empirical study and summarizes the statistical results. This Part also includes possible interpretations of the statistical findings. Part IV concludes.

II Managerial Compensation and Cash Holdings – 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 US – almost 2 Trillion dollars.²⁵ This is more than twice the size of the stimulus package that was introduced by

²² See, e.g., Emergency Economic Stabilization Act, Pub. L. No. 110-343, 122 Stat 3766 (2008) (limiting tax deductions for executives whose companies received Troubled Asset Relief Program (TARP) funds).

²³ See, e.g., Lucian A. Bebchuk and 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.”).

²⁴ The Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, 124 Stat. 1392 (2010).

²⁵ See Lahart, *supra* note 1.

Congress to boost the economy by increasing governmental spending and cutting taxes.²⁶ Yet, the current financial literature about cash holdings predates the financial crisis and does not cover data from 2008 and forward. To the best of my knowledge, this paper is the first to study the financial crisis period, comparing it to the pre-crisis period, and identifying a fundamental change in the market.

As is described in the following Part, the change in the market during the financial crisis does not merely manifest itself in a general propensity adjustment, such as a market-wide increase in the level of cash holdings, keeping everything else equal (which would be captured statistically by an increased intercept, the alpha, of the regression models described below). Rather, the financial crisis has changed the sensitivities of the parameters so that the relationship between corporate cash holdings and explanatory variables, which is denoted statistically by the coefficients, the betas, of the regression, is different. While the existing financial literature reveals a consistent increase in cash holdings as a trend,²⁷ 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 the total annual managerial compensation.

Harford, Mansi, and Maxwell²⁸ conducted one of the main studies that examine the practice of corporate cash holdings in the U.S. They studied the relation between corporate governance and cash holdings from 1993-2004.²⁹ Their main finding is that the firm's corporate

²⁶ The American Recovery and Reinvestment Act of 2009 (Stimulus Bill), Pub. L. No. 111-5, 123 Stat. 115; Times Topics Economic Stimulus http://topics.nytimes.com/top/reference/timestopics/subjects/u/united_states_economy/economic_stimulus/index.html (last visited 8/1/2011) (“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”).

²⁷ See, e.g., Thomas W. Bates et al., *Why Do US Firms Hold So Much More Cash Than They Used To?* (Fisher College of Business Working Paper No. 2007-03-006, 2008) at 1, 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.”).

²⁸ See 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.

²⁹ See *id.*

governance is positively correlated with its cash holdings.³⁰ Their survey of prior literature, however, reveals mixed evidence about the effect of cash holdings on shareholder value, including cross-country studies that find a negative relation between shareholder rights and cash holdings.³¹ In their study, Harford et al. find a positive correlation between managerial pay sensitivity, measured by the ratio of the equity-based compensation to total compensation of the top five managers, and the firm's cash holdings.³² Harford, Mansi, and Maxwell hypothesized that weak corporate governance allows managers to quickly use the firm's cash on acquisitions, including inefficient acquisitions that lower shareholder value.³³ Nevertheless, such acquisitions have a potentially positive effect on the managers' own wealth.³⁴

Another major study that looks at the practice of corporate cash holdings in the U.S. is the work of Bates, Kahle, and Stulz.³⁵ The authors describe 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.³⁶ Bates, Kahle, and Stulz study the reasons for the continuing increase in cash holdings in the US during 1980-2006.³⁷ They found that the increase in cash holdings includes firms of all sizes and is not restricted to firms with foreign income.³⁸ They further report that the increase in cash holdings in their sample is restricted to the non-dividend paying firms.³⁹ Bates, Kahle, and Stulz further studied the connection between idiosyncratic volatility and cash holdings.⁴⁰ They examined the effects of cash flow risk, measured as the standard

³⁰ *Id.* at 2–3.

³¹ *Id.* at 1–2.

³² *Id.* at 3.

³³ *Id.*

³⁴ *Id.*

³⁵ *See* Bates et al., *supra* note 27.

³⁶ *Id.* at 5–7.

³⁷ *See generally id.*

³⁸ *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.”).

³⁹ *Id.* at 11 (“There is a dramatic increase in the cash ratio among the non-dividend payers, but not for the dividend payers.”).

⁴⁰ *Id.* at 12–14; 31–32.

deviation of industry cash-flow-to-assets, and attributed it to idiosyncratic risk.⁴¹ They found that increased cash flow risk is associated with increased cash holdings.⁴²

There is an extensive literature on optimal management compensation, risk, and incentives that focuses on option grants and grants of other convex payments that are sensitive to the stock price.⁴³ Shareholder and academic criticism of the decoupling of CEO pay and performance were followed by a dramatic increase in stock option grants in the 1990s.⁴⁴ One intriguing explanation for this inflation in option grants was offered by Kevin Murphy who has attributed the inflation to the misperception by the board of directors of the true cost of the option grants to the shareholders.⁴⁵ These payment instruments, however, have the ability to change the manager's level of risk aversion and affect the value of the firm.⁴⁶ On the one hand, it is believed that the options give the manager incentives to adopt risky projects since the value of options increases with the volatility of the stock.⁴⁷ On the other hand, it is argued that the options may increase the managers' level of risk and thus incentivize the manager to refrain from risky projects.⁴⁸ An important contribution to the literature was made by Bebchuk and

⁴¹ *Id.*

⁴² *Id.*

⁴³ See, e.g., Kevin J. Murphy, *Executive Compensation*, 1999, available at <http://ssrn.com/abstract=163914> for a survey of the literature on executive compensation.

⁴⁴ *Id.* at 22.

⁴⁵ See Kevin J. Murphy, *Explaining Executive Compensation: Managerial Power vs. the Perceived Cost of Stock Options*, 69 *University of Chicago L. Rev.* 847-869 (2002).

⁴⁶ See Nengjiu Ju et al., *Options, Option Repricing in Managerial Compensation: Their Effects on Corporate Investment Risk*, 2006, at 22, available at www.ccf.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.").

⁴⁷ See, e.g., Murphy, *supra* note 43 for a survey of the literature on executive compensation including the literature that studies the effects of option grants on risk averse managers.

⁴⁸ See Ju et al., *supra* note 46, at 1 ("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.").

Grinstein,⁴⁹ who studied management compensation and found support for Jensen's theory that connects expansions in firm size with subsequent increase in managerial compensation, providing an incentive for managerial empire building.⁵⁰ Interestingly, Bebchuk and Grinstein also found that CEO compensation is not negatively correlated with decisions to decrease the firm's size.⁵¹

The failure to properly construct managerial compensation packages and the danger associated with the distortive incentives in the current practices of management compensation was duly stressed by Bebchuk and Fried before the current financial crisis. In their renowned book,⁵² they forewarned of the dangers of excessive risk taking by managers. Not heeding the warnings of Bebchuk and Fried in time, regulators now attempt to address the challenge of managerial compensation following the financial crisis. The Dodd-Frank Act includes new requirements concerning managerial compensation that went into effect only recently.⁵³ The Act requires a precatory, non-binding, shareholder resolution on executive compensation.⁵⁴ Thus, with this new power in the hands of the shareholders, an enhanced understanding of the incentives provided by managerial compensation packages as they may change with the economic environment is of great importance.

⁴⁹ Lucian Bebchuk and Yaniv Grinstein, *Firm Expansion and CEO Pay* (Harvard Law and Economics Discussion Paper No. 533, 2005, 2007), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=838245.

⁵⁰ *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.”).

⁵¹ *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.”).

⁵² See Bebchuk and Fried, *PAY WITHOUT PERFORMANCE: THE UNFULFILLED PROMISE OF EXECUTIVE COMPENSATION*, *supra* note 21.

⁵³ See *Brief Summary of The Dodd-Frank Wall Street Reform and Consumer Protection Act*, http://banking.senate.gov/public/_files/070110_Dodd_Frank_Wall_Street_Reform_comprehensive_summary_Final.pdf.

⁵⁴ *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 (2008).

III The Empirical Study

A. DATA AND THE BASIC MODEL

Using the Compustat Database, I collected financial data about active non-financial⁵⁵ companies incorporated in the United States who trade their capital mainly in the United States. The sample covers the years 2002-2010, which includes the years of the financial crisis commonly known as “The Great Recession.” I excluded companies with dual class capital structures⁵⁶ and companies whose CEOs owned at least 10% of the outstanding equity of the respective company since these companies form a special case of corporate governance and may require different agent incentives.⁵⁷ I also excluded companies classified as operating in the utility industry, since such companies may be subject to special regulations regarding cash

⁵⁵ Financial companies are subject to different regulations, *see, e.g.*, Lucian Arye Bebchuk & Alma Cohen, *The Cost of Entrenched Boards*, 78 J. FIN. ECON. 409, 418 *available at* <http://ssrn.com/abstract=556987> (excluding REITs 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 (1989), (omitting financial firms from the tested sample because the special federal regulations may influence the corporate governance of such firms).

⁵⁶ Firms with dual class capital structure present a unique case of corporate governance, *see, e.g.*, Bebchuk & Cohen, *supra* note 55, 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.”).

⁵⁷ 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.

reserves.⁵⁸ I supplemented the data with data about the Entrenchment Index of the company as a control variable that measures the corporate governance of the firms.⁵⁹ I also included corporate governance variables from the Corporate Library database, such variables include, inter alia, the percentage of insider directors and a dummy variable that indicates whether or not the majority of the firm's outstanding shares is 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 will 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 equivalents⁶⁰ (Log(Cash)) and the log of the lagged total CEO compensation⁶¹ (Log(LagPay)), controlling for various firm and CEO characteristics.

⁵⁸ 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 27, excluding SIC codes 4900-4999.

⁵⁹ Bebchuk, Cohen, and Ferrell define the Entrenchment Index to denote how many out of the six salient antitakeover 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* Bebchuk et al., *supra* note 5, at 3–4 (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 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.

⁶⁰ 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.

⁶¹ 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* ExecuComp Data Definitions, Executive Compensation Data Items, <http://umi.compustat.com/docs-mi/help/execdefs.htm>.

The logarithm function is used throughout 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 towards very large companies. By definition, after taking the logs the regression coefficient (the beta) of the model is the elasticity.

B. CONTROLS AND ROBUSTNESS CHECKS

A few more variables may affect both the cash reserves (the dependent variable) and the total CEO compensation (the explanatory variable). Thus, including these variables as control variables 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 result that will include the size effects. Similarly, other control variables may influence the level of cash reserves of the company as well as the CEO's compensation.⁶²

Thus, as first control variables I included the total assets of the firm (as $\text{Log}(\text{Size})$), the firm's market value (as $\text{Log}(\text{MarketValue})$), the log of the Tobin's Q of the firm,⁶³ the percentage holdings of the CEO, the value of the restricted stocks of the CEO, 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 addition, the dummy variable indicating whether or not the CEO is older than the median age of the CEOs in the sample, and the tenure and gender of the CEO are used as control variables in some of the regressions performed. Capital expenditures, working capital, the total amount of dividends (excluding stock dividends), in process R&D expense, total research and development expense, cash flow of funds relating to acquisitions, leverage (defined as long term debt plus debt in current liabilities over book value

⁶² 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://ssrn.com/abstract=622223> (studying the positive correlation between CEO pay and CEO skill).

⁶³ 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 *supra* note 6.

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.

Accounting and financial ratios, such as working capital to total assets and sales to total assets, are also important control variables. Models such as the Altman's Z-score include weighted combinations of these ratios to predict companies' failure.⁶⁴ These ratios appear implicitly in the regressions of this study since 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 CRSP.

Following Harford et al., in addition to controlling for the value of a manager's equity holdings, her restricted shares, and her percentage holdings, I also controlled for the CEO's pay sensitivity. 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, is very small, and its inclusion in the regression does not significantly affect the coefficient of the log of the total CEO compensation.⁶⁵

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.⁶⁶ 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 that denotes whether or not the firm pays dividends. The coefficient of the dummy variable in a multi-variable regression is negative and statistically significant at

⁶⁴ See, e.g., Edward I. Altman, *Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy*, 23 J. FIN. 589, (1968).

⁶⁵ 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.

⁶⁶ Following Bates et al., *supra* note 27, 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 the 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.

the 90% level in 2010. However, the dummy variable does not significantly affect the main results of this study.

Outliers that were excluded from the sample include firms whose CEOs were more than 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 is used for its acquisition operations. The final 2010 sample consists of 579 observations.

In general, the age of the manager is relevant to this study because an older manager might find it more difficult to find an alternative comparable job in case she is dismissed, and being aware of that, she might be inclined to take more precautions and less risk, and in particular retain more cash for the company.⁶⁷ The age of the manager may also be correlated with her total compensation — a more seasoned manager may be compensated 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 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 54.⁶⁸ 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.

⁶⁷ 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., Mira Ganor, *Why Do Managers Dismantle Staggered Boards?*, *supra* note 54, at 160 (weighing possible effects that the age of the manager may have on her personal incentives and thus on her corporate decisions.).

⁶⁸ 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.

There are studies that suggest that gender may affect the risk tolerance of people.⁶⁹ 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 that denotes female CEOs by 1, 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.

Another factor that should be controlled for is nonlinearity. In principle, one might imagine that $\text{Log}(\text{Cash})$ is a nonlinear function of $\text{Log}(\text{Size})$, and, since $\text{Log}(\text{LagPay})$ is also correlated with $\text{Log}(\text{Size})$, concerns might be raised that the positive results reported in the next section are an artifact that is solely due to the nonlinearity in the relationship of $\text{Log}(\text{Cash})$ to $\text{Log}(\text{Size})$. To rule that out, I added $\text{Log}(\text{Size})^2$ to the regression. While a quadratic function of $\text{Log}(\text{Size})$ indeed better describes $\text{Log}(\text{Cash})$, the fact that the coefficient (beta) of $\text{Log}(\text{LagPay})$ 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 below is separate from the nonlinearity in $\text{Log}(\text{Size})$. To be more specific, I added $\delta\text{Log}(\text{Size})^2 = (\text{Log}(\text{Size}) - \text{Average}[\text{Log}(\text{Size})])^2$ as an extra control variable, assuming a relation of the form

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

and I compared the resulting regression coefficients to those of the linear model. In the same vein, I also added $\delta\text{Log}(\text{MarketValue})^2$, $\delta\text{Log}(\text{Tobin's } Q)^2$, and the cross-terms $\delta\text{Log}(\text{Size})\delta\text{Log}(\text{MarketValue})$, $\delta\text{Log}(\text{Size})\delta\text{Log}(\text{Tobin's } Q)$, $\delta\text{Log}(\text{MarketValue})\delta\text{Log}(\text{Tobin's } Q)$. The coefficient β'_3 of $\delta\text{Log}(\text{Size})^2$ is indeed nonzero (at above the 99% confidence level). Furthermore, the coefficient of $\delta\text{Log}(\text{Size})\delta\text{Log}(\text{Tobin's } Q)$ is nonzero at a similar confidence level, the coefficient of $\delta\text{Log}(\text{MarketValue})^2$ is nonzero at the 98% confidence level, and the coefficient of $\delta\text{Log}(\text{Size})\delta\text{Log}(\text{MarketValue})$ is nonzero at the 92% confidence level. All this is not unexpected, and it simply indicates that a nonlinear expression better approximates the relation between $\text{Log}(\text{Cash})$ and $\text{Log}(\text{Size})$, $\text{Log}(\text{MarketValue})$, and $\text{Log}(\text{Tobin's } Q)$. Nevertheless, the coefficient β'_1 is very close to β_1 (within less than half a standard-deviation), which suggests that the effect of $\text{Log}(\text{LagPay})$ is not due to the nonlinearity in $\text{Log}(\text{Size})$, $\text{Log}(\text{MarketValue})$, or $\text{Log}(\text{Tobin's } Q)$.

An additional useful robustness test, that will also eliminate much of the ambiguity related to potential nonlinearities, is to match companies in pairs with similar $\text{Log}(\text{Size})$ and take the difference of $\text{Log}(\text{Cash})$ between the two companies of the pair – I'll refer to it as $\Delta\text{Log}(\text{Cash})$ – as the dependent variable. The explanatory variable will be $\Delta\text{Log}(\text{LagPay})$ – the

⁶⁹ See, e.g., Brad M. Barber and Terrance Odean, *Boys Will Be Boys: Gender, Overconfidence, and Common Stock Investment*, Q. J. ECON., 2001 Vol. 116, No. 1, 261–92.

difference of the $\text{Log}(\text{LagPay})$ of the two companies in the pair. $\Delta\text{Log}(\text{Size})$, as well as 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 $\Delta\text{Log}(\text{LagPay})$ came out statistically significant above the 99% confidence level.

C. RESULTS AND ANALYSIS

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

$$\text{Log}(\text{Cash Holdings}) = (-1.62 \pm 0.16) + (0.34 \pm 0.07)\text{Log}(\text{Total Annual CEO Compensation}) + \text{Controls} + (\text{statistical error})$$

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.⁷⁰ 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, which preceded the financial crisis, the manager's total annual compensation had a significantly lower 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 weaker effect than the effect 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.

I did not find support for the hypothesis that the 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.⁷¹ On the other hand, the manager faces the risk of losing their total annual

⁷⁰ $1.10^{0.34} \approx 1.034$, i.e., an increase by 3.4% .

⁷¹ 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 Hu and Bernard Black, *The New Vote Buying: Empty Voting and Hidden (Morphable) Ownership*, 79 S.

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 and amidst fear of total failure, rather than mere decline in the value of the stock, the 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 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 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 that 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 maintain 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, and the correlation between the Entrenchment Index and the 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 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 is sub-optimal. However, anti-takeover mechanisms cannot protect the manager against a total collapse of the firm. Economic crisis may not only result in poor performance but also may increase the risk of total collapse of the firm that may cost the manager her job regardless of how entrenched she may be.

As a robustness test for the hypothesis that managerial risk aversion influences the firm's cash holdings level during uncertain financial times, I looked at the firm's level of short term debt (measured as debt in current liabilities) as an alternative measure for risk.⁷² While both

CAL. L. REV. 811, 831–32 (2006) (analyzing managers' custom of hedging their personal exposure by purchasing financial instruments such as zero-cost collar.)

⁷² Cf., e.g., Kate Litvak, *Defensive Management: Does the Sarbanes-Oxley Act Discourage Corporate Risk-Taking?* (3rd Annual Conference on Empirical Legal Studies Papers U of Texas Law, Law and Econ Research Paper No. 108, 2008), available at

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.

I found a negative correlation between the CEO's compensation and the firm's short term debt in 2010, which 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 2006-2009. 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 find 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, similarly 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 a third. Thus, this suggests that the CEOs of the largest firms follow a different pattern of behavior. The reason for this difference requires a separate study, yet one can 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 the managerial behavior. Additionally, the notion of "*too big to fail*" 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. To be sure, 2002 was a challenging year 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 reveal 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.

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 Sarbanes-Oxley on corporate risk).

D. EXPLORING ALTERNATIVE EXPLANATIONS FOR THE EMPIRICAL RESULTS

The empirical study found a strong correlation between the CEO's 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 are associated with lower levels of risk taking. 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 influences both CEO compensation and the level of corporate risk.

The statistical finding could result only from the influence of an omitted variable that may be strongly correlated with both the manager's compensation and the manager's decision regarding corporate risk in times of financial crisis. Indeed, alternative hypotheses may explain the empirical findings reported in this Article. For completeness, I shall now explore an alternative explanation.

One can argue that 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, indeed, evidence that supports the assumption that more skilled CEOs are better compensated than less skilled CEOs. Bob Daines et al. looked at the manager's 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, and their important study found that CEO compensation is connected with the manager's skill.⁷³

There is an optimal value of cash holdings for any given level of risk tolerance of diversified shareholders. While it is outside the scope of this study to estimate that optimal level, and the related level of short term debt, one can assume that skilled CEOs reach closer to the optimal levels than less skilled ones. This by itself cannot completely explain the findings reported on 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 under-estimate risk in comparison to more skilled CEOs, we can make a connection between cash holdings and executive compensation. Thus, if less skilled CEOs are both paid less than skilled CEOs and underestimate risk compared to

⁷³ See Daines et al., *supra* note 10.

skilled CEOs, then the correlation between the CEO's compensation and the firm's risk level can be explained by the skill of the CEO.

This skilled-CEO assumption is a plausible and valid hypothesis that offers an alternative explanation to the agency-costs hypothesis discussed in the previous Parts of this Article. Both effects may have influenced the empirical results found in this Article and at this stage it is hard to rule either of them out. But we can partly test the skilled-CEO assumption by adding a control variable that proxies the CEO's skill to the multi-variable regressions. Under the skilled-CEO hypothesis, the coefficient of the control variable 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 return on assets (ROA). However, as can be seen in the tables reporting the statistical findings in the exhibits, the coefficient of compensation does not appear to significantly suffer 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, in order to eliminate industry-wide effects, similarly to the technique employed by Daines et al.⁷⁴ Once again, this did not significantly change the statistical results for CEO compensation in 2010.

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

It may also be noted that 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.⁷⁵ 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

⁷⁴ Id.

⁷⁵ Id.

account and thus managers have an incentive to take unrecognized risks that lead to overestimated performance and excessive compensation.⁷⁶

I will now explore yet another alternative explanation for this Article's empirical finding of a strong correlation between CEO compensation and corporate risk in 2010. This tentative 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 the CEO's compensation and the level of cash holdings and short term debt.⁷⁷ Thus, it may be that in the midst of the Great Recession independent directors and institutional investors scrutinize the firm more and lead to 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 is associated with lower corporate cash holdings, one can conjecture that the presence or lack of independent monitoring is 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.

⁷⁶ See Henry T.C. Hu, *Risk, Time, and Fiduciary Principles in Corporate Investment*, 38 UCLA L. REV. 277, 325 (1990).

⁷⁷ See, e.g., Murphy *supra* note 9.

IV Conclusion

This Article has empirically studied the evolution of the practice of cash hoarding following the Great Recession. The results suggest that managerial behavior, as evidenced by the elasticity of cash holdings as a function of total CEO compensation, has changed significantly in 2008 with economically meaningful implications. The effect was somewhat diminished the following year, which may be attributed to the growth and stimulus of the second half of 2009, but peaked again in 2010. In particular, the study found that following the Great Recession managerial compensation has become positively correlated with the level of corporate cash holdings, suggesting that agency costs contribute to cash retention in times of financial distress.

The Article conjectures that high managerial compensation influences the managers to be more risk averse and thus affects the managers' decision to retain cash. Since diversified shareholders are likely to be less risk averse than the managers at times of financial crisis, when it is harder to find a comparable alternative job and the probability of complete failure increases, it may well be that the cash hoarding practice is at a suboptimal level and comes at the expense of shareholder value. Thus, the influence of the size of the managerial compensation on the manager's 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 not just to reserve the cash in case the need arises. It may also be the case that US taxes on foreign income explains parts of the reasons for cash hoarding. Yet these explanations do not seem to address the correlation between the cash holdings and the manager's 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 the manager's annual compensation following the financial crisis.

Since the Great Recession has introduced a major shock to the market system, it is not surprising that the market has reacted in ways that cannot be predicted by simply studying the market behavior in previous post crisis years. The positive and economically meaningful correlation between the 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,⁷⁸ to better fit the current market needs.

⁷⁸ The Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, §951, 124 Stat. 1376, 1899 (2010).

Table I: A list of some of the control variables used in the regressions along with their 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.
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 & equipment expenditures.
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.
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
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.
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.
WorkingCapital	Working Capital (Balance Sheet) (WCAP) - the difference between total current assets minus total current liabilities as reported on a company's Balance Sheet.
R&DExpense	Research and Development Expense (XRD) - all costs incurred during the year that relate to the development of new products or services.
Market-to-Book	The ratio of the current share price to the book value per share.
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).
ROA	Return on assets ratio of EBITDA over lagged total assets.
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.
Size	Total Asset
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 2	Consumer Durables -- Cars, TV's, 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)

IndustrySector 10	Healthcare, Medical Equipment, and Drug
IndustrySector 12	Other -- Mines, Constr, BldMt, Trans, Hotels, Bus Serv, Entertainment
CEO'sAge>Median	A dummy variable indicating whether the CEO's age is above or below the median CEO's age.
EntrenchmentIndex	The Entrenchment Index as defined by Bebchuk, Cohen, and Ferrell.
CEO's % Holdings	The CEO's percentage holdings.
Beta	The firm's beta with the market (calculate by CRSP).
Cash	Cash and cash equivalents.
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.
MarketValue	Market value (MKVALT)
Cashflow	Operating income before depreciation after interest, dividends and taxes.

TABLE II: 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'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. Working Capital 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.
(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*** (-7.84171)	-1.23811*** (-9.34133)	-1.20843*** (-8.9763)	-1.53038*** (-8.63972)	-1.17396*** (-6.87731)	-1.3146*** (-9.37391)	-1.16701*** (-7.90573)	-1.62467*** (-9.90935)
LogLagPay	0.07469 (1.49599)	0.06027 (1.15035)	0.08816* (1.66089)	0.11344* (1.82087)	0.09156 (1.34516)	0.17652*** (3.37916)	0.14225** (2.45034)	0.34626*** (5.31662)
LogSize	0.55333** (2.37568)	0.87255*** (3.51581)	0.63763*** (2.79121)	0.69622*** (2.73885)	0.68989*** (2.79372)	0.30725 (1.42077)	1.42512*** (4.33812)	0.65966*** (2.77174)
LogTobin'sQ	0.59462*** (6.15505)	0.51667*** (5.33705)	0.46689*** (5.01215)	0.69575*** (5.68276)	0.42546*** (3.9906)	0.54259*** (5.44811)	0.53201*** (4.77693)	0.35165*** (3.42602)
IndustrySector1	-0.00234 (-0.0316)	-0.06521 (-0.89872)	-0.15777** (-2.08447)	-0.15838* (-1.94874)	-0.14788* (-1.85911)	-0.19316*** (-2.83286)	-0.06064 (-0.89413)	-0.18382*** (-2.73363)
IndustrySector2	0.13282 (1.28262)	-0.03444 (-0.34833)	-0.00214 (-0.02154)	0.02535 (0.21213)	-0.08273 (-0.73474)	0.04969 (0.44754)	0.0841 (0.69388)	0.16942 (1.61678)
IndustrySector4	-0.0194 (-1.8147)	0.02456 (0.26339)	-0.11368 (1.28699)	-0.14209 (-1.5193)	-0.13667 (-1.4805)	-0.2883*** (-3.9407)	-0.00887 (-0.11546)	0.00232 (0.03236)
IndustrySector5	-0.22727*** (-2.76189)	-0.11582 (-1.37072)	-0.08384 (-1.00209)	-0.1068 (-1.23972)	-0.11457 (-1.36217)	-0.15639* (-1.86222)	-0.12374* (-1.69655)	-0.04529 (-0.61426)
Ind.Sector6(tech)	0.19582*** (3.98274)	0.16481*** (3.68817)	0.18319*** (4.15512)	0.20402*** (4.05742)	0.14159*** (2.91912)	0.17606*** (3.96112)	0.13516*** (3.09991)	0.16469*** (3.83936)
IndustrySector9	-0.05912 (-1.00796)	-0.10405* (-1.94883)	-0.03324 (-0.60917)	-0.28564*** (-3.61842)	-0.25373*** (-3.46069)	-0.12749** (-2.3655)	-0.11883* (-1.91391)	-0.19693*** (-3.21977)
CEOAge>Med	-0.03436 (-0.97639)	0.00522 (0.15503)	-0.0252 (-0.75456)	-0.02479 (-0.65105)	0.00291 (0.07786)	-0.02828 (-0.86914)	0.00942 (0.28388)	0.031345 (0.96595)
ROA	-0.24108 (-1.33947)	-0.12409 (-0.78046)	-0.23464** (-2.05073)	-1.10968*** (-3.78059)	-0.15875 (-0.68506)	-0.05103 (-0.27878)	-0.77137*** (-2.78694)	0.05942 (0.23276)
Leverage	3.72E-05 (0.26563)	0.006282 (1.22531)	-0.10481* (-1.80055)	-0.00857 (0.11874)	-0.33526*** (-3.26536)	-0.44946*** (-5.5944)	-0.12449* (-1.67725)	-0.23303*** (-2.63882)
LogSales	0.03014 (0.40224)	-0.04623 (-0.59891)	-0.13834** (-1.98937)	0.0403 (0.41583)	-0.259*** (-2.99114)	-0.16728 (-2.22415)	-0.07954 (-1.02556)	-0.06456 (-0.83505)
Acquisitions/Size	-0.30877 (-0.82241)	-0.51996* (-1.92232)	-0.76738*** (-2.80976)	-0.81018*** (-2.69243)	-0.26813 (-1.11423)	-0.10956 (-0.41476)	-1.10394*** (-2.97904)	-0.7*** (-2.60961)
LogLagSize	-0.02511 (-0.10728)	-0.18463 (-0.77839)	0.07498 (0.33435)	-0.11071 (-0.44233)	0.19335 (0.81471)	-0.16728** (-2.22415)	-0.90666*** (-2.69942)	-0.17962 (-0.77121)
LogWorkingCap	0.37239*** (8.3092)	0.35452*** (8.05786)	0.41898*** (8.3779)	0.42182*** (8.42565)	0.36632*** (7.10059)	0.43669*** (9.93025)	0.54112*** (10.505)	0.47717*** (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 III: 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'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 Entrenchment Index 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. (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*** (-6.13667)	-1.19061*** (-6.03672)	-1.19983*** (-7.19287)	-1.06703*** (-5.65939)	-1.60915*** (-7.90675)
LogLagPay	0.11458* (1.81422)	0.11628 (1.61268)	0.23218*** (4.18478)	0.17698*** (2.66425)	0.31022*** (4.26419)
IndustrySector 1	-0.15398* (-1.64367)	-0.10664 (-1.10973)	-0.19695** (-2.38501)	-0.10054 (-1.15669)	-0.22038*** (-2.62042)
IndustrySector 2	0.01416 (0.11969)	0.05903 (0.48936)	0.22097* (1.74213)	0.13773 (0.97894)	0.23844* (1.83999)
IndustrySector 3	-0.02383 (-0.36149)	0.05153 (0.74108)	0.01019 (0.15906)	0.00413 (0.06491)	0.05214 (0.82673)
IndustrySector 4	-0.51753*** (-5.63362)	-0.40366*** (-4.38656)	-0.47743*** (-5.54980)	-0.38972*** (-4.45309)	-0.34201*** (-4.17867)
IndustrySector 5	-0.07152 (-0.71683)	-0.09222 (-0.89135)	-0.17828** (-1.80544)	-0.10011 (-1.05071)	-0.04842 (-0.51732)
IndustrySector 6	0.28902*** (4.47090)	0.34055*** (5.01884)	0.30034*** (4.95033)	0.25595*** (4.13795)	0.26895*** (4.40026)
IndustrySector 7	-0.07940 (-0.43004)	-0.14660 (-0.72848)	-0.10788 (-0.69505)	-0.17127 (-1.06902)	-0.32866** (-2.17772)
IndustrySector 9	-0.22080*** (-2.75603)	-0.18307** (-2.35136)	-0.12224* (-1.92134)	-0.11894 (-1.59686)	-0.13923** (-1.96555)
IndustrySector 10	0.00666 (0.08165)	0.13826* (1.72829)	0.11119 (1.55334)	0.00106 (0.01470)	-0.01494 (-0.21221)
CEO's % Holdings	-3.44194*** (-2.66935)	-1.40063 (-1.09940)	-0.44954 (-0.42748)	-2.86779** (-2.33015)	-0.89471 (-0.74101)
CEO'sAge>Median	-0.01643 (-0.41165)	0.05845 (1.44136)	0.00412 (0.11423)	0.06913* (1.79704)	0.07130* (1.90549)
EntrenchmentIndex	-0.03327* (-1.92162)	-0.03141* (-1.88446)	-0.04719*** (-3.26907)	-0.01465 (-0.96921)	-0.00114 (-0.07695)
LogSize	0.80964*** (4.87147)	0.53044*** (3.04982)	0.45059*** (4.81340)	0.43609*** (3.03872)	0.53151*** (3.35388)
LogMarketValue	0.05060 (0.30246)	0.32436* (1.85491)	0.36003*** (3.93530)	0.37140*** (2.57612)	0.26057 (1.62041)
LogTobin'sQ	0.56689** (2.27211)	0.19414 (0.74363)	-0.02863 (-0.16414)	0.06154 (0.26501)	0.21577 (0.87910)
Observations	564	568	760	658	673
Adj. R-Squared	0.614701	0.618482	0.59539	0.610052	0.620278

TABLE IV: 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. Working Capital 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. (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*** (-8.22017)	-1.20367*** (-6.75359)	-1.42014*** (-9.33277)	-1.26097*** (-7.84434)	-1.8523*** (-9.94906)
LogLagPay	0.11237* (1.80457)	0.08807 (1.29261)	0.1882*** (3.64584)	0.17262** (2.82283)	0.36672*** (5.6288)
LogSize	0.59778*** (5.86493)	0.88188*** (8.64681)	0.69595*** (8.40694)	0.53325*** (6.0609)	0.51976*** (5.8933)
LogTobin'sQ	0.69653*** (5.65102)	0.436*** (4.0473)	0.592*** (5.62792)	0.4787*** (4.28567)	0.38773*** (3.76186)
IndustrySector 1	-0.15505* (-1.87255)	-0.13634* (-1.69938)	-0.19365*** (-2.83636)	-0.05592 (-0.82072)	-0.16615** (-2.48395)
IndustrySector 2	0.02681 (0.22407)	-0.08728 (0.77583)	0.05896 (0.5314)	0.07895 (0.72398)	0.14009 (1.33609)
IndustrySector 4	-0.1469 (-1.53289)	-0.13466 (-1.45734)	-0.32561*** (-4.28957)	-0.00059 (-0.00756)	-0.05007 (-0.67385)
IndustrySector 5	-0.10575 (-1.22489)	-0.11633 (-1.38164)	-0.15467* (-1.84062)	-0.09506 (-1.28325)	-0.0432 (-0.59046)
IndustrySector 6	0.20575*** (4.09128)	0.14400*** (2.96135)	0.19223*** (4.36121)	0.14443*** (3.29635)	0.16787*** (3.93388)
IndustrySector 9	-0.27842*** (-3.52537)	-0.25799*** (-3.53226)	-0.12988** (-2.41069)	-0.12075* (-1.93209)	-0.17356*** (-2.83496)
CEO'sAge>Median	-0.02526 (-0.66327)	0.00295 (0.07873)	-0.02852 (-0.8758)	0.00772 (0.23114)	0.02517 (0.77947)
ROA	-1.08759*** (-3.78868)	-0.21925 (-0.98404)	-0.20374 (-1.27967)	-0.30464 (-1.31121)	0.19841 (0.82917)
Leverage	-0.00642 (0.08839)	-0.33527*** (-3.26454)	-0.46631*** (-5.7479)	-0.13247* (-1.74297)	-0.26115*** (-2.9495)
Beta	0.01035 (0.31082)	0.02957 (0.67197)	0.07143 (1.5843)	0.00207 (0.06772)	0.10898*** (2.61277)
Acquisitions/Size	-0.74445*** (-2.79631)	-0.38252* (-1.93604)	-0.33147 (-1.42758)	-0.69655* (-1.94764)	-0.54529** (-2.30212)
LogSales	0.03105 (0.32702)	-0.25298*** (-2.94343)	-0.13776* (-1.88499)	-0.12106 (-1.58974)	-0.07589 (-0.99518)
LogWorkingCap	0.41954*** (8.19278)	0.36272*** (7.700707)	0.4263*** (9.61412)	0.56287*** (10.72357)	0.44833*** (8.50214)
Observations	483	468	662	580	579
Adj. R-Squared	0.678536	0.702567	0.678223	0.722926	0.724938

TABLE V: 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's Q 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. Working Capital 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.

(t-statistic is reported in parentheses. The notations ***, **, and * indicate significance at the 99%, 95%, and 90% levels respectively.)

	2006	2007	2008	2009	2010
Intercept	-2.34076*** (-5.07245)	-2.82882*** (-6.19255)	-2.33312*** (-5.92209)	-2.48426*** (-5.63254)	-1.59503*** (-3.84816)
LogLagPay	-0.20164 (-1.30715)	-0.24032 (-1.41594)	-0.0369 (-0.25153)	0.05812 (0.35641)	-0.36391** (-2.3627)
LogCash	-0.1198 (-1.1248)	-0.06499 (-0.56306)	0.16383* (1.68639)	0.05564 (0.51494)	-0.07556 (-0.80255)
LogSize	1.15825* (1.95327)	2.01178*** (3.06202)	0.43984 (0.84192)	-0.03347 (0.03835)	1.64197*** (3.1471)
LogTobin'sQ	-0.10842 (-0.36221)	0.32638 (1.11698)	-0.30648 (-1.12238)	-0.39799 (-1.26087)	0.121104 (0.51976)
IndustrySector 1	0.17565 (0.99859)	0.31322 (1.627)	0.16609 (1.06843)	0.02364 (0.14102)	0.06681 (0.45516)
IndustrySector 2	-0.16207 (-0.53181)	-0.19607 (-0.688)	0.32192 (1.20832)	-0.38552 (-1.20994)	0.46317** (2.19656)
IndustrySector 4	-0.30027 (-1.40434)	-0.37636 (-1.54472)	-0.35229* (-1.90308)	-0.33479 (-1.53097)	-0.49941** (-2.50493)
IndustrySector 5	0.40438** (2.23093)	0.36996** (1.99666)	0.31069* (1.73319)	0.29488* (1.7036)	0.14357 (0.93756)
IndustrySector 6	-0.02765 (-0.22693)	-0.03936 (-0.31306)	-0.12967 (-1.13902)	0.06519 (0.5364)	-0.08487 (-0.82557)
IndustrySector 9	0.08194 (0.44283)	0.23954 (1.31978)	0.16882 (1.31926)	-0.0288 (-0.18099)	0.05748 (0.41471)
CEO'sAge>Median	0.03272 (0.37358)	0.05314 (0.59109)	-0.11227 (-1.44915)	-0.04713 (-0.54422)	-0.07956 (-1.0667)
ROA	-0.31169 (-0.4573)	-1.28423* (-1.74965)	-0.4346 (-0.88533)	0.30578 (0.69061)	-0.19639 (-0.55375)
LogSales	-0.04207 (-0.17403)	-0.2399 (-1.02972)	0.28698 (1.61871)	-0.05263 (0.80146)	-0.2723 (-1.53457)
Acquisitions/Size	0.41035 (0.58921)	-0.49298 (-0.79561)	1.79269*** (2.73754)	2.09009** (0.02196)	-0.37598 (-0.59921)
LogLagSize	0.51276 (0.86353)	-0.09852 (-0.15431)	0.56209 (1.02893)	1.39992 (1.58232)	0.06595 (0.132)
LogWorkingCap	-0.32631*** (-2.75707)	-0.09852* (-1.77707)	-0.35419*** (-3.25268)	-0.36925*** (-2.67354)	-0.19062* (-1.93814)
Observations	370	370	496	418	560
Adj. R-Squared	0.42828	0.47343	0.405803	0.392161	0.393122

TABLE VI: REDUCED FORM REGRESSIONS FOR 2010 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. Working Capital 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. (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 VII: 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's Q 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 Industry Sector 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. (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*** (-6.37624)	Intercept	-1.61561*** (-6.31469)
LogLagPay	0.29696*** (3.40055)	LogLagPay	0.28426*** (3.24002)
LogSize	0.85825*** (20.25403)	LogSize	0.86225*** (19.96213)
LogTobin'sQ	0.45076*** (4.50927)	LogTobin'sQ	0.42128*** (4.10055)
IndustrySector 1	-2.48787*** (-2.91734)	IndustrySector 2	1.06973 (0.92996)
IndustrySector 2	1.02774 (0.88823)	IndustrySector 4	0.042745 (0.06275)
IndustrySector 4	0.08741 (0.12759)	IndustrySector 5	0.56842 (0.5934)
IndustrySector 5	0.55118 (0.57218)	IndustrySector 6	0.85471* (1.89064)
IndustrySector 6	0.84330* (1.85443)	IndustrySector 9	-0.98112* (-1.68405)
IndustrySector 9	-0.97844* (-1.66947)	InteractiveInd. 2	-0.24017 (-0.73967)
InteractiveInd. 1	0.60883*** (2.67115)	InteractiveInd.4	-0.10974 (-0.59519)
InteractiveInd. 2	-0.22883 (-0.70063)	InteractiveInd.5	-0.16699 (-0.62609)
InteractiveInd.4	-0.12086 (-0.65176)	InteractiveInd.6	-0.1805 (-1.4117)
InteractiveInd.5	-0.16216 (-0.60459)	InteractiveInd. 9	0.23828 (1.43093)
InteractiveInd.6	-0.17944 (-1.39506)	Leverage	-0.49186*** (-5.53954)
InteractiveInd. 9	0.23772 (1.41911)	Observations	612
Leverage	-0.53681*** (-6.21313)	Adj. R-Squared	0.636089
Observations	654		
Adj. R-Squared	0.642298		

TABLE VIII: 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'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. Working Capital 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. (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** (-2.39729)	-1.81278 (-1.2954)	-0.14448 (-0.08447)	-3.69334*** (-3.35919)	-0.90692* (-1.93522)
LogLagPay	0.37866** (2.57807)	0.44692*** (2.68264)	0.44806** (2.23053)	0.34251** (2.36281)	0.09265 (0.76992)
LogSize	-0.45106 (-0.57468)	1.58624** (2.36827)	-0.69408 (-0.83074)	1.96849*** (3.1628)	0.45734 (1.24217)
LogTobin'sQ	0.324644 (1.36531)	0.24532 (1.11377)	0.33052 (1.33696)	0.43806 (1.529)	0.24853 (0.97319)
IndustrySector1	-0.23903 (-1.0995)	-0.47895 (-3.01821)	-0.23887 (-1.3174)	-0.09676 (-0.73074)	0.05666 (0.47149)
IndustrySector2	0.45717** (1.8466)	0.15487 (0.61776)	-0.02815 (-0.14864)	0.20084 (0.53158)	0.18578 (0.86005)
IndustrySector4	0.20203 (0.65774)	0.34327 (1.58102)	-0.09668 (-0.46778)	-0.14914 (-1.08547)	0.05009 (0.53612)
IndustrySector5	-0.15208 (-0.7734)	0.10835 (0.61937)	-0.00945 (-0.05757)	-0.05022 (-0.32976)	-0.26414* (-1.76415)
Ind.Sector6(tech)	0.21297** (2.20087)	0.16799 (1.51895)	0.10452 (0.98695)	0.10458 (1.04869)	0.07738 (0.93615)
IndustrySector9	-0.1524 (-1.0083)	-0.37338** (-2.423)	-0.23204 (-1.5859)	-0.27439** (-2.28009)	-0.03939 (-0.29954)
CEOAge>Med	0.05356 (0.63038)	0.01347 (0.15768)	-0.04145 (-0.51446)	0.09273 (1.31391)	0.02971 (0.50987)
ROA	0.90354** (1.6881)	-0.02769 (-0.04099)	0.08865 (0.14957)	-0.48115 (-0.62261)	0.20374 (0.29648)
Leverage	-0.56773** (-1.98084)	-0.61495** (-2.22336)	0.22324 (1.16397)	-0.33882* (-1.71233)	-0.17635 (-1.05124)
LogSales	-0.39713 (-1.62913)	-0.21307 (-1.03149)	0.14602 (0.80954)	-0.06039 (-0.33909)	0.17635 (1.23481)
Acquisitions/Size	-0.82711 (-1.18978)	-0.45153 (-0.7425)	-0.69629 (-1.05272)	-1.0655* (-1.85236)	0.87718 (1.23481)
LogLagSize	1.05108 (1.44184)	-1.18597 (-1.86563)	0.35318 (0.54412)	-0.88943* (-1.7077)	-0.00147 (-0.00411)
LogWorkingCap	0.67596*** (3.27266)	0.71071*** (4.898)	0.5444*** (3.91446)	0.43007*** (4.51034)	0.28893*** (3.66403)
Observations	116	116	116	115	116
Adj. R-Squared	0.400423	0.490351	0.313581	0.438042	0.58485

TABLE IX: 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. 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. Working Capital 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. Working Capital 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. (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*** (-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 X: 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'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. Working Capital 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.
(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*** (-7.84516)	Intercept	-1.31191*** (-7.74694)	Intercept	-0.52774*** (-3.20856)	Intercept	-1.31083*** (-7.14359)
LogLagPay	0.13625*** (2.89423)	LogLagPay	0.21949*** (3.66803)	LogLagPay	0.04176 (0.86298)	LogLagPay	0.21029*** (2.97788)
LogSize	0.76008*** (3.36172)	LogSize	0.66681*** (7.21875)	LogSize	0.39657 (1.64284)	LogSize	0.71961*** (6.22664)
LogTobin'sQ	0.47846*** (3.88559)	LogTobin'sQ	0.46394*** (3.79076)	LogTobin'sQ	0.15145 (0.86635)	LogTobin'sQ	0.55787*** (3.60351)
IndustrySector1	-0.07017 (-0.83789)	IndustrySector1	-0.07933 (-0.95057)	CEOAge>Med	-0.0678 (-1.19901)	IndustrySector1	-0.07512 (-0.83028)
IndustrySector2	0.02077 (0.17631)	IndustrySector2	0.03349 (0.28522)	ROA	-0.50728 (-1.30986)	IndustrySector2	0.03609 (0.28392)
IndustrySector4	-0.04099 (-0.33927)	IndustrySector4	-0.05325 (-0.44222)	Leverage	-0.14775 (-1.55711)	IndustrySector4	-0.05118 (-0.39358)
IndustrySector5	-0.22841** (-2.4493)	IndustrySector5	-0.22864** (-2.4642)	LogSales	0.03089 (0.26466)	IndustrySector5	-0.23028** (-2.29863)
Ind.Sector6(tech)	0.248114*** (4.65679)	Ind.Sector6(tech)	0.8508*** (3.14664)	Acquisitions/Size	-0.39736 (-0.89256)	IndustrySector9	0.01781 (0.24653)
IndustrySector9	-0.00156 (-0.0242)	IndustrySector9	0.00226 (0.03519)	LogLagSize	0.03522 (0.163)	CEOAge>Med	0.02177 (0.44952)
CEOAge>Med	0.00212 (0.05411)	CEOAge>Med	0.00172 (0.04414)	LogWorkingCap	0.4929*** (4.59264)	ROA	0.04559 (0.14935)
ROA	-0.11704 (-0.4319)	ROA	-0.05935 (-0.24423)			Leverage	-0.01021 (-0.62102)
Leverage	-0.01079 (-0.7068)	Leverage	-0.01162 (-0.76686)			LogSales	-0.22005** (-2.04895)
LogSales	-0.15196* (-1.80189)	LogSales	-0.17516** (-2.10858)			Acquisitions/Size	-1.06249** (-2.35199)
Acquisitions/Size	-0.94014*** (-2.62271)	Acquisitions/Size	-0.91814*** (-2.65062)			LogWorkingCap	0.33922*** (6.31426)
LogLagSize	-0.0987 (-0.43936)	InteractiveInd.6	-0.17729** (-2.27241)				
LogWorkingCap	0.35232*** (7.51672)	LogWorkingCap	0.35625*** (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 XI: 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'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. Working Capital 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

CHART I: Residuals v. Predicted Values (calculated using the 2010 sample). 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'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. *Working Capital* 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.

