THREE ESSAYS IN CORPORATE GOVERNANCE

THREE ESSAYS IN CORPORATE GOVERNANCE

By

ANDREW GLEN CARROTHERS
B.Sc.E.E., M.B.A.

A Thesis
Submitted to the School of Graduate Studies
in Partial Fulfillment of the Requirements
for the Degree of
DOCTOR OF PHILOSOPHY

McMaster University

DOCTOR OF PHILOSOPHY
(Business Administration — Finance)

McMaster University
Hamilton, Ontario

Title:	Three Essays in Corporate Governance
Author:	Andrew Glen Carrothers M.B.A. (McMaster University)
Supervisors:	Professor Jiaping Qiu Professor Sudipto Sarkar Associate Professor Anna Danielova Associate Professor Seungijn Han
Number of Pages:	x, 202

Abstract

This thesis examines three important topics in corporate governance: the relationship between activist hedge funds and other institutional investors, the role of perks in the market for CEO talent, and public scrutiny and the changing nature of perks.

First, I provide an in depth study of the interaction between activist hedge funds and other institutional investors. Hedge funds are more likely to target firms with high levels of institutional ownership, and demonstrate a preference for short term focused institutional investors. Hedge fund activism generates short run and long run abnormal returns without increasing stock return volatility. Regardless of investment horizon, volatility is inversely related to prior period institutional ownership. The trading behavior of institutional owners with different investment horizons is consistent with hedge fund activism creating value. These findings hold regardless of whether investment horizon is based on portfolio churn rate or type of institution. Overall, the results suggest a mutually beneficial relationship between activist hedge funds and other institutional investors.

Second, in a coauthored paper with Drs. Seungijn Han and Jiaping Qiu, I provide the first comprehensive analysis on how CEOs' wage and perks are jointly determined in a competitive CEO market. The underlying theory shows that in equilibrium, firm size, wage, perks and talent are all positively related. Perks are more sensitive than wage to changes in firm size. The more perks

enhance the CEO's productivity, the faster perks increase in firm size. Closed form solutions allow the recovery of the cost function of providing perks. I examine the determinants of CEO perquisite compensation using hand-collected information for S&P 500 companies and find consistent empirical evidence.

Third, I examine the impact of public scrutiny on CEO compensation using the unique opportunity provided by the 2008 financial crisis, government support, and legislated compensation restrictions. I introduce novel data on executive perks at S&P 500 firms from 2006 to 2012. Overall, my results are consistent with increased public scrutiny having lasting impact on perks and temporary impact on wage, and with legislated compensation restrictions having temporary impact on wage. Changes in specific perks items provide evidence on which perks firms perceive as excessive and which provide common value.

Acknowledgements

Foremost, I acknowledge and thank my thesis supervisor, Dr. Jiaping Qiu, for his guidance, patience, and support since I began the Ph.D. program in 2009. His wisdom, creativity, and commitment to excellence were instrumental in helping me to develop skills as a researcher.

I owe a great debt to the other members of my supervisory committee which includes Dr. Anna Danielova and Dr. Sudipto Sarkar from the DeGroote School of Business at McMaster University and Dr. Seungijn Han, from the Department of Economics at McMaster University. Their collaboration, flexibility, and helpfulness in supporting me through the each step of my doctoral studies were influential in making the experience rewarding and successful. My development would have been incomplete without their willingness to challenge ideas and offer advice. In addition, I extend special thanks to Drs. Qiu, Danielova, and Sarkar for their assistance and encouragement during the application processes for scholarship funding and career placement in academia.

I appreciate the warmth and sense of community fostered by the finance area and departmental faculty and staff at the DeGroote School of Business. I wish my fellow Ph.D. candidates every success and thank them for their support. This has been a wonderful place to pursue knowledge at the highest level.

Contents

List of Tables

List of Figures

List of Appendices

Chapter One: Introduction

This thesis examines three important topics in corporate governance with a particular focus on executive perk compensation and hedge fund activism. These topics are of interest to academics, financial professionals, and policy makers. The lucrative fee structure of hedge funds, the dramatic growth of CEO compensation in the past three decades, and the government bailout of financial institutions during the 2008 crisis have encouraged a generally negative public perception of the corporate elite — there has been a clear groundswell of populist sentiment against perceived excesses (e.g., Murphy, 2012 and Kahan and Rock, 2007). My research has policy and regulatory implications about the need for restrictions on executive compensation and hedge fund activities. Motivation for increased regulation should not be punitive — it is essential to ensure that any regulatory changes have the beneficial effect of protecting taxpayers and shareholders, reducing inappropriate risk-taking, and avoiding harmful unintended consequences.

The first essay, *Friends or Foes? Hedge Fund Activism and Other Institutional Investors*, examines the corporate governance implications of the interaction between hedge funds and other institutional investors. This topic matters because hedge funds have displaced other institutional investors as the most frequent shareholder activists (Gillan and Starks, 2007), yet we know little about how interaction between the two impacts governance and value creation.

Since activist hedge funds typically acquire minority ownership positions, they rely on support from other institutional investors (e.g., Brav, Jiang, Partnoy, and Thomas, 2008). However, the nature of activism by hedge funds is different from that of other institutional investors such as banks, insurance companies, mutual funds, pension funds, and endowment funds, which are all subject to regulatory and political restrictions, conflicts of interest, and liquidity constraints (e.g., Armour and Cheffins, 2009). I focus on the following questions: Do hedge funds target firms with high levels of institutional ownership, and, if so, do they prefer targets with short or long term focused institutional investors? What are the trading behaviors of institutional owners in response to hedge fund activism? What is the impact of investment time horizon on institutional trading? Are hedge funds compatible with other institutional investors?

The next two essays shift the governance focus from shareholder activism to executive compensation. The second essay, *The Market for CEO Talent and Perquisites: Theory and Evidence*[1], is a coauthored paper with Dr. Jiaping Qiu from DeGroote School of Business, McMaster University, Hamilton, Ontario, L8S 4M4 Canada and Dr. Seungjin Han from the Department of Economics, McMaster University, Hamilton, Ontario, L8S 4M4 Canada. I collected the detailed information on executive perks from SEC filed proxy statements and performed the empirical work. I made major contributions in the writing of

[1]Carrothers, A., S. Han, and J. Qiu, The market for CEO talent and perquisites: Theory and evidence (May 18, 2012). Available at SSRN: http://ssrn.com/abstract=2062592

sections 3.1, 3.3, and 3.4. This essay examines the determinants of executive perks. While both monetary and perk compensation have been subject to increased regulatory and media scrutiny, the literature has focused primarily on monetary compensation because of the limited availability of data on executive perks. Taking advantage of stricter disclosure requirements for executive perks, I manually collected information on CEO perks from public disclosures contained in the proxy statements that S&P 500 companies filed with the SEC between January 1, 2007 and December 31, 2010. The competing theoretical arguments about the prevalence of CEO perks are agency theory (e.g., Jensen and Meckling, 1976, and Bebchuk and Fried, 2004) and optimal contracting (e.g., Fama, 1980, and Henderson and Spindler, 2005). That is, either weak corporate governance allows CEOs to divert corporate resources for personal gain, or perks are a cost effective way to enhance executive productivity and should be part of optimal executive compensation packages. I focus on the following questions: Are perks purely excess or a part of optimal compensation contract? What is the relationship between wage and perk contracts and how do firm characteristics affect such a relationship? I provide empirical evidence supporting a new equilibrium theory on how CEO wages and perks are endogenously determined in a competitive CEO market with heterogeneous firms and CEOs.

The third essay, *Public Scrutiny and the Changing Nature of CEO Perks: Evidence from the Financial Crisis*, examines the impact of public scrutiny on

CEO compensation. The financial crisis and TARP (Troubled Asset Relief Program) legislation provide an interesting opportunity to evaluate the impact of public scrutiny on executive compensation. I investigate the extent to which increased public scrutiny associated with financial crisis and governance intervention changed corporate compensation practices by examining time trends in compensation, by differentiating firms with respect to public scrutiny, and by including both monetary and nonmonetary compensation. There is widespread blame for the crisis on excessive risk-taking by executives at financial institutions, with accusations that the structure of compensation plans incented these executives to embrace risks (Kirkpatrick, 2009). Executive compensation became an increasingly important corporate governance issue as public scrutiny intensified in step with reformist rhetoric. From a governance perspective, public scrutiny is the examination and monitoring of firms by broad segments of the population with the aim of improving firm performance. Dyck and Zingales (2002) show that public scrutiny, specifically media attention, influences corporate governance to affect shareholder value and corporate social responsibility. Gan (2006) finds that public scrutiny can impact firms through legal or economic costs of dealing with special interest groups, compliance costs of government regulations, and implicit costs of negative media coverage of firm misbehavior. Public scrutiny could be an important form of external governance that causes firms to change behavior in response to explicit and implicit scrutiny

costs. Compensation practices at firms that received government support (*TARP firms*) were markedly different from those at firms that did not (*nonTARP firms*) in the years surrounding the financial crisis, and CEO wage and perks behaved differently in response to heightened public scrutiny. The financial crisis had a much greater impact on CEO compensation at TARP firms, and the effects lingered. The magnitude and persistence of perk reductions at TARP firms suggest that this change has a degree of permanence. Using changes in individual perk items, I provide evidence that previous levels of perks such as personal use of corporate aircraft, personal security, and company paid club memberships may have been excessive, while perks such as charitable gift matching, medical/health benefits, cost of living allowances, and car and driver services may provide common benefits that outweigh any negatives related to public perception. Overall, my results are consistent with increased public scrutiny having lasting impact on perks and temporary impact on wage, and with legislated compensation restrictions having temporary impact on wage.

My dissertation research makes the following primary contributions. The results in the first essay show that hedge fund activism creates value at target firms and, as such, has policy implications with respect to the regulation of hedge funds. Moreover, I show that by explicitly or implicitly supporting activist hedge fund agendas, other institutional investors play an important role in improving governance, performance and shareholder value at target firms. Overall, the

results of this paper suggest that activist hedge funds and other institutional investors are compatible — they are friends, not foes. The economic implication is that this new style of shareholder activism creates value through cooperation between hedge funds and other institutional investors to improve performance and corporate governance at target firms. The second essay contributes to the executive compensation literature by investigating the determinants of executive perks in S&P 500 firms using manually collected panel data to empirically test a new equilibrium theory of how CEO wages and perks are endogenously determined in a competitive CEO market with heterogeneous firms and CEOs. The third essay extends the literature on executive compensation by investigating the impact of public scrutiny on CEO wage and perks using the unique opportunity provided by the 2008 financial crisis. Furthermore, I contribute to the discussion of perks as excess by studying how firms choose to alter levels of specific perk items in response to increased public scrutiny and legislated compensation restrictions using a novel data set of perk compensation at S&P 500 firms. One constraint in studying perk compensation is the availability of data. Execucomp does not provide detailed perk information. Existing literature on perks relies on limited data. For example, Grinstein, Weinbaum, and Yehuda (2010), compile a perk database based on 2007 and 2008 SEC filings for a random sample of small, medium, and large firms that includes 130 large market-capitalization firms while Rajan and Wulf (2006) use perk data for approximately

300 companies between 1986 and 1999 collected from responses to surveying by a well-known U.S. based compensation consultant. I manually collected information on executive perks from public disclosures contained in the proxy statements that S&P 500 companies filed with the SEC between January 1, 2007 and December 31, 2013. To the best of my knowledge, this data provides the most comprehensive executive perks information to date at S&P 500 companies.

Overall, my dissertation results are consistent with the argument that calls for increased regulation of executive compensation and shareholder activism by hedge funds are largely unwarranted. Despite specific examples of individual excess and self-serving behavior, market forces generally get things right. The compatibility between hedge funds and other institutional investors results in activism that creates value through improved governance and target firm performance. Firms compete in a competitive market for CEOs in which optimal compensation packages include perks. In the aftermath of the 2008 financial crisis, it was public scrutiny, not legislated compensation reforms, which led to lasting changes in perk practices.

The rest of the thesis proceeds as follows. Chapter 2 studies the corporate governance implications of the interaction at target firms between hedge funds and other institutional investors. Chapter 3 examines the determinants of executive perks in the context of an equilibrium theory of how CEO wages and perks are endogenously determined in a competitive CEO market with

heterogeneous firms and CEOs. Chapter 4 focuses on the impact of public scrutiny on the changing nature of executive perks in response to financial crisis, government support, and legislated compensation reform. Chapter 5 summarizes and concludes.

References

Armour, J. and B. Cheffins, 2009, The rise and fall of shareholder activism by hedge funds, 2009, ECGI – Law Working Paper No. 136/2009.

Bebchuk, L., and J. Fried, 2004, Pay Without Performance: The Unfulfilled Promise of Executive Compensation, (Harvard University Press, Cambridge, MA).

Brav, A., W. Jiang, F. Partnoy, and R. Thomas, 2008, Hedge fund activism, corporate governance, and firm performance. Journal of Finance 63(4), 1729–1775.

Dyck, A. and L. Zingales, 2002, The corporate governance role of the media, CRSP Working Paper No. 543. Available at SSRN: http://ssrn.com/abstract=335602

Fama, E., 1980. Agency problems and the theory of the firm. Journal of Political Economy 88, 288–307.

Gabaix, X. and A. Landier, 2008, Why has CEO pay increased so much? The Quarterly Journal of Economics 123(1), 49-100.

Gan, A., 2006, The impact of public scrutiny on corporate philanthropy, Journal of Business Ethics 69, 217–236.

Gillan, S., and L. Starks, 2007, The evolution of shareholder activism in the United States, Journal of Applied Corporate Finance 19, 55–73.

Grinstein, Y., D. Weinbaum, and N. Yehuda, 2010, The economic consequences of perk disclosure, Johnson School Research Paper Series No. 04-09; AFA 2011 Denver Meetings Paper. Available at SSRN: http://ssrn.com/abstract=1108707

Henderson, T., and J. Spindler, 2005, Corporate heroin: A defense of perks, executive loans, and conspicuous consumption. Georgetown Law Journal 93, 1835-1884.

Kahan, M. and E. Rock, 2007, Hedge funds in corporate governance and corporate control, University of Pennsylvania Law Review 155(1), 1021-1056.

Jensen, M. C., and W. Meckling, 1976, Theory of the firm: managerial behavior, agency costs, and ownership structure, Journal of Financial Economics 3, 360–395.

Kirkpatrick, G., 2009, The corporate governance lessons from the financial crisis, OECD Journal: Financial Market Trends 2009(1), 61-87.

Murphy, K. and J. Zabojnik, 2004, CEO pay and appointments: A market-based explanation for recent trends, The American Economic Review 94(2), 192-196.

Rajan, R. G., and J. Wulf, 2006, Are perks purely managerial excess? Journal of Financial Economics 79(1), 1-33.

Chapter Two: *Friends or Foes?* *Activist Hedge Funds and Other Institutional Investors*

2.1 Introduction

In the mid 1980s, traditional institutional investors, particularly public and union pension funds, emerged as the most frequent shareholder activists. In the past decade, however, hedge funds have overtaken all others as the most prevalent in the investor activism space (Gillan and Starks, 2007). The nature of activism by hedge funds is different from that of other institutional investors such as banks, insurance companies, mutual funds, pension funds, and endowment funds, which are all subject to regulatory and political restrictions, conflicts of interest, and liquidity constraints (e.g., Armour and Cheffins, 2009, Klein and Zur, 2006, and Thompson, 2006). While hedge funds and other institutional investors both use tactics such as discussions with directors and executives, formal shareholder proposals, and media campaigns, hedge funds use them as part of escalating agendas that can also include proxy contests, lawsuits, and takeover bids (e.g., Gantchev, 2012 and Gillan and Starks, 2007). In general, activism by other institutional investors focuses on changing corporate governance *rules* whereas hedge funds address specific governance issues as part of larger plans to improve target firm performance (Kahan and Rock, 2007). There is an extensive literature

on institutional investors and corporate governance[2] and, more recently, there has been increasing interest in hedge fund activism[3]. Yet we know little about how activist hedge funds interact with other institutional investors.

Since hedge funds typically acquire minority ownership positions in target firms (e.g., Katelouzou, 2012, and Brav, and Jiang, and Kim, 2009), they rely on support from other shareholders to successfully implement activist agendas. Given that institutional ownership at publically traded firms exceeded 60% in 2005 (Gillan and Starks, 2007), it is clear that institutional investors collectively control sufficient power to affect the effectiveness of hedge funds. On one hand, if hedge fund activism is based on self-serving financial manipulation, hedge funds would avoid targets with high levels of institutional ownership because other institutional investors would act to protect their own interests. Hedge funds would be harmed if other institutional investors decide to support incumbent management and impede agenda implementation or choose to liquidate holdings in response to activism and drive share price down. On the other hand, if hedge fund activism creates value that other institutional investors cannot because they face structural and regulatory constraints (Admati and Pfleiderer, 2013), then

[2] Since the seminal paper by Shleifer and Vishny (1986) identified the impact of large shareholders on corporate governance, the literature has extensively examined shareholder proposals and voting, proxy contests, and the influence and wealth effects of institutional investor activism, (e.g., Smith , 1996, Del Guerio and Hawkins, 1998, Gillan and Starks, 1998 & 2000, Prevost and Rao, 2000, Romano, 2001, Karpoff, 2001, and Parrino, Sias, and Starks, 2003).

[3] See, for example, Kahan and Rock, 2007, Brav, Jiang, Partnoy, and Thomas, 2008, Klein and Zur, 2009a&b, Greenwood and Schor, 2009, Gantchev, 2012, Gantchev and Jotikasthira, 2012, and Bebchuk, Brav, and Jiang, 2013.

hedge funds should expect support for their agendas and prefer high levels of institutional ownership at target firms.

Turning to the preferences of other institutional investors, their trading behavior should reflect their perception of hedge fund activism. Non declining post activism levels of institutional ownership would be a clear indication that institutional owners view activism as beneficial, with institutional investors holding their positions to profit as share price increases in response to improved performance. However, even if overall levels decline, the trading behavior of different types of institutional investors could still indicate that hedge fund activism creates value. Institutional investors differ in their investment objectives, trading styles, regulatory environment, clientele, investment time horizon, and portfolio choices (e.g., Verado, 2010, and Gillan and Starks, 2007). The literature investigates investment time horizon as an important dimension of institutional investor heterogeneity (e.g., Gaspar, Massa, and Matos, 2005, and Yan and Zhang, 2009). Stable long term focused ownership levels indicate that long term focused investors anticipate value creation (Chen, Harford, and Li, 2007) while decreasing short term ownership levels could simply reflect profit-taking to take advantage of abnormal returns at target firms.

In this paper, I provide a comprehensive analysis of the interaction between activist hedge funds and other institutional investors at target firms. In particular, I focus on the following questions: Do hedge funds target firms with

high levels of institutional ownership, and, if so, do they prefer targets with short or long term focused institutional investors? What are the trading behaviors of institutional owners in response to hedge fund activism? What is the impact of investment time horizon on institutional trading? Are hedge funds compatible with other institutional investors?

First, I find that the level of institutional ownership has a meaningful large and statistically significant impact on the likelihood of a firm becoming a hedge fund target. In my sample of hedge funds matched with their five nearest neighbors, the probability of being targeted increases by 4.0% for a one standard deviation increase in the level of institutional ownership. The preference that hedge funds have for high levels of institutional ownership may be the result of hedge funds benefiting from the influence of institutional investors over target firm executives and boards (e.g., institutional investor implicit or explicit support for the activist agenda), from lower activism costs (e.g., reduced communication costs to get large shareholders to support activism), or from explicit voting support in hostile proxy contests (Armour and Cheffins, 2009).

Having established that hedge funds prefer high levels of institutional ownership, I move to the question of the impact of institutional investor heterogeneity. Hedge funds may prefer targets with high levels of short term investors simply because they want to match to others with similar investment time horizons. For example, the investment time horizon of hedge funds in my

sample matches very closely with institutional investors with shorter (i.e., below median) investment time horizons; the mean (median) investment time horizon of activist hedge funds is 1.8 (2.1) years compared to 1.6 (2.1) years for short term focused institutional investors. Or hedge funds may have other reasons for preferring investors with short term investment horizons. Gantchev and Jotikasthira (2012) find that block selling by specific institutional investors to satisfy liquidity requirements acts as a trigger for hedge funds to acquire initial ownership positions. Institutional investors with shorter term investment time horizons such as mutual funds and independent investment advisors are more likely to have unanticipated liquidity needs than longer term institutional investors with predictable cash requirements such as pension funds (Gaspar, Massa, and Matos, 2005). It follows that firms with high levels of short term focused institutional ownership are more likely to be hedge fund targets. Moreover, hedge funds typically increase their holdings after establishing initial positions (Brav, Jiang, Partnoy, and Thomas, 2008), and may find it easier to do so because of liquidity created by short term focused institutional investors selling to lock in gains from short term abnormal returns. Hedge funds may also benefit because new investors on the opposite side of these trades are likely to be supportive because the activist agendas are public information at the time of the purchase decisions. As well, hedge funds may expect those short term focused institutional investors who do not exit immediately after the initiation of activism to be either

informed[4] or intuitive enough to recognize the value of supporting activism to profit from ultimately higher share prices that reflect the full value of successful activism.

Alternatively, hedge funds may prefer targets with high levels of long term focused ownership since institutions with long investment time horizons are more likely to monitor firms in an effort to improve governance and firm performance (e.g., Chen, Harford, and Li, 2007, and Bhagat, Black, and Blair, 2004). Hedge funds may expect support from long term focused institutional investors because they are better able to evaluate the potential of the activism to enhance value. To test the impact of institutional investment time horizon on hedge fund targeting, I classify other institutional investors as short and long term based on portfolio churn rate and type of institution. For churn rates, I define institutions as short term (long term) if their portfolio churn rates are greater than (less than) the median institutional investor churn rate. For institutional type, I define institutions as short term (long term) if they tend to have active trading (buy-and-hold) investing styles. In general, banks, insurance companies, pension funds, and endowment funds tend to adopt buy-and-hold investing styles while independent investment advisors and mutual funds tend to adopt more aggressive trading styles and/or engage in liquidity motivated trading (Edelen, 1999).

[4] Yan and Zhang (2009) find that short term focused institutional investors are better informed and trade to exploit their informational advantage.

I show that, for both definitions of investment time horizon, higher levels of short term focused institutional ownership have large and statistically significant impact on the probability that firms will become targets of hedge funds. Using the churn rate (institution type) approach, the likelihood of being targeted increases by 3.5% (4.7%) for a one standard deviation increase in the level of short term focused institutional ownership. In contrast, long term focused institutional ownership does not affect the likelihood of being targeted by hedge funds — although hedge funds may benefit from the support of long term focused institutional investors, their presence at target firms is not a significant factor in the decision to proceed with activism.

The results so far suggest that hedge funds expect to benefit from the support of other institutional investors. If the relationship is mutually beneficial, the behaviors of other institutional investors should reflect the belief that hedge fund activism creates value. Parrino, Sias, and Starks (2003) document the trading effectiveness of institutional investors who are dissatisfied with management at portfolio firms — a reasonable extension of their main result is to expect institutional investors to "vote with their feet" if they perceive hedge fund activism to be value destructing. Bebchuk, Brav and Jiang (2013) find that hedge fund activism is associated with long term improvement in target firm operating performance and that short term abnormal returns correctly predict the long term consequences of the activism. There is general consensus that stock markets view

hedge fund activism favorably[5]. I confirm that hedge fund activism generates significant short term and long term abnormal returns and also show that there is no increase in stock return volatility. The actual trading behavior of other institutional investors reveals that they benefit from activism regardless of their investment time horizon. Compared to the year prior, the level of long term focused institutional ownership does not change in the two years following the initiation of activism. A decrease in overall institutional ownership in the year after the hedge fund activism event is entirely driven by selling by institutions with short term investment horizons. The levels of overall and short term focused institutional ownership return to pre-event levels within two years. The behavior of institutional investors suggests that they view hedge fund activism favorably — long term investors hold their positions to profit from long term abnormal return; short term investors take profits but, in aggregate, return seeking more.

The primary contributions of this paper are twofold. Taken together my results show that hedge fund activism creates value at target firms — by contributing to the discussion on the value of hedge fund activism, this study has policy implications with respect to the regulation of hedge funds. Support for hedge fund activism is not universal. Proponents argue that activist hedge funds

[5] Examples of studies that document the short and long term returns to hedge fund activism include Brav, Jiang, Partnoy, and Thomas (2008), Clifford (2008), Kahan and Rock (2007), Boyson and Mooradian (2007), and Klein and Zur (2009b).

are beneficial[6] — they create value because they are better able than traditional institutional investors to reduce traditional agency problems at target firms. Critics hold that the benefits of activism do not accrue to stakeholders equally[7] and deny that activism creates long term value — any shareholder benefit is short term in nature and based on financial manipulation[8] rather than true value creation. My study contributes to this important discussion by showing that hedge funds do not avoid targets with high levels of institutional ownership and that the trading behavior of institutional investors with different investment time horizons is consistent with hedge fund activism creating value.

The second contribution is to the broad literature on the monitoring and governance roles of institutional investors. Institutional ownership should matter (Bhagat, Black, and Blair, 2004) in that shareholder wealth creation should follow directly from improved company performance driven by institutional owners monitoring and agitating for change at firms in their portfolios. However, it is unclear whether activism by institutional investors is effective at creating value.

[6] Many papers find that hedge fund activism creates value by driving changes that improve governance and/or long term operating performance (e.g., Armour and Cheffins, 2009, Clifford, 2008, Katelouzou, 2012, Klein and Zur, 2009a, Brav, Jiang, and Kim, 2011, and Bebchuk, Brav and Jiang, 2013).

[7] Klein and Zur (2009a) find that hedge fund activism transfers wealth from bondholders to shareholders. Greenwood and Schor (2009) argue that the abnormal returns associated with hedge fund activism are limited to activism campaigns that result in a takeover of the target firm.

[8] For example**,** in The New York Times "Claiming Stock Manipulation, Biovail Sues Hedge Fund" on February 23, 2006, J. Anderson covers a lawsuit alleging price manipulation. "This action arises from a massive, illegal and continuing stock market manipulation scheme, which has targeted and severely harmed Biovail, among other companies, and which has resulted in immense ill-gotten profits for SAC Capital and other extremely powerful hedge funds," the lawsuit says.

While the literature confirms that institutional owners have an impact on corporate governance by exerting influence at firms in their portfolios (e.g., Parino, Sias, and Starks, 2003, and Allen, 2001) and by championing changes to governance rules through the shareholder proposal process (Gillan and Starks, 2000), it is not clear that traditional institutional investors are effective in using access and influence to increase shareholder value[9]. In contrast, hedge funds are agents of change with specific goals that depend on unique situations prevalent at target firms — actions to improve target firm governance (e.g., board representation or CEO replacement) are part of larger agendas to improve the performance of the target company (Kahan and Rock, 2007). When hedge funds take the lead, the constraints that limit the ability of other institutional investors to engage in effective activism are no longer binding. By explicitly or implicitly supporting activist hedge fund agendas, other institutional investors play an important role in improving governance, performance and shareholder value at target firms — hedge funds have a track record of delivering increased shareholder value and hedge funds rely on institutional investors to implement their agendas.

Overall, the results of this paper suggest that activist hedge funds and other institutional investors are compatible — they are friends, not foes. The

[9] For examples that find no evidence that activism by traditional institutional investors has a meaningful impact on long term operating performance or stock returns at target firms see Song and Saewzal (2003), Romano (2001), Del Guercio and Hawkins (1998), and Wahal (1996).

economic implication is that this new style of shareholder activism creates value through cooperation between hedge funds and other institutional investors to improve performance and corporate governance at target firms. The next section describes the data and presents the results. The final section summarizes and concludes.

2.2 Data and Empirical Results

2.2.1 Data

The 1934 Securities Exchange Act, Section 13(d), requires investors who acquire beneficial ownership of more than 5% of the shares of a publically traded company and who plan to exert influence over the control of that company to disclose their ownership position and their intent within ten days of taking the position. The SEC defines the term beneficial ownership to include any person who directly *or indirectly* has the power to vote or sell the shares, so that, for example, the beneficial ownership report (Schedule 13D) would include the personal holdings of hedge fund managing partners in addition to the holdings of the fund itself. The SEC requires firms to identify the reason(s) for acquiring the shares. The original data for hedge fund activism events is 1220 Schedule 13D filings[10] between July 17, 1995 and December 26, 2007. There were a total of 223

[10] The 13D filing date is a good proxy for the date at which the hedge fund's intentions become public information — the schedule is filed with the SEC and is provided to the company that issued the securities and to each exchange where the security is traded. Any material changes in the facts contained in the schedule require a prompt amendment.

unique hedge fund companies making Schedule 13D filings concerning a total of 1007 unique target firms[11].

I supplement the activist hedge fund information from the Schedule 13D filings with target firm financial, operating, and share price information from the CRSP-COMPUSTAT merged database and institutional ownership information from Thompson Reuters. Since the subsequent analysis uses the combination of firm and year as the unique identifier, the number of usable observations decreases. First, of the 1220 events, 73 target companies have two or more Schedule 13D filings in a given year. Second, not all of the targets firms have stock price information in CRSP, company performance information in COMPUSTAT, and institutional ownership information in Thompson Reuters Institutional (13f) Holdings. Of the 1007 companies in the initial hedge database, I base my subsequent analysis on 613 event-year matches (from June 20, 1997 to December 26, 2007) corresponding to 540 unique target companies and 198 hedge fund companies. I winsorize all variables at the top and bottom one percent. See Appendix 2.A for detailed definitions of variables used in this study. For this sample, the average ownership position declared in the original Schedule 13D filings was 7.5%. The average maximum ownership position of the hedge funds was 11.4% (based on required amendment filings).

[11] Refer to Brav, Jiang, and Kim (2009)

2.2.2 Discussion of Results

(Insert Table 2.1 about here)

Table 2.1 provides a summary of activist hedge fund events (i.e., 13D filings) by disclosed objectives and tactics. The Schedule 13D filing consists of seven sections[12]. Item 4 identifies the *purpose of the transaction* which, along with supplemental news and internet searches, is the source data for the objectives and tactics; Item 5 describes the *interest in securities of the issuer* which provides specific information regarding beneficial ownership level. Hedge funds may identify multiple objectives and may use multiple tactics so total percentages in Table 2.1 exceed one hundred. Hedge fund objectives include *general undervaluation* (48.0%), *governance* (28.1%), *sale of target company* (20.6%), *business strategy* (20.3%), and *capital structure* (19.2%). *General undervaluation* decribes events in which the hedge fund plans to solve the undervaluation issues using tactics that are no more aggressive than communication with the target firm's executive officers and board of directors. This objective is mutually exclusive of the remaining objectives. *Governance* indicates that the hedge fund is focused on any of the following: executive compensation, takeover defenses, CEO or chairman replacement, board independence or fair representation, information disclosure, or fraud. *Sale of target company* indicates that the hedge

[12] 1) Security and Issuer, 2) Identity and Background, 3) Source or Amount of Funds or Other Consideration, 4) Purpose of Transaction, 5) Interest in Securities of the Issuer, 6) Contracts, Arrangements, Understandings or Relationships with Respect to Securities of the Issuer, and 7) Material to Be Filed as Exhibits

fund activism is focused on the following: sale of the company or its main assets to a third party, taking majority control of the company, or taking the company private. *Business strategy* targets the following: business focus, excess diversification, business restructuring, growth strategy, or blocking or renegotiating a pending merger and acquisition (M&A) deal. *Capital structure* indicates that the hedge fund is focused on any of the following at the target firm: excess cash, leverage, debt structure, recapitalization, share repurchase, dividend payment, or equity issuance. Panel B summarizes tactics used by hedge funds to achieve stated objectives. Hedge fund activism often proceeds through a sequence of escalating steps (Gantchev, 2012). Table 2.1 presents the tactics in the order of escalating activism — tactics can be non hostile or hostile. The non hostile tactics are: change through communication with the board of directors and senior management (49.3%); and change through seeking representation on board of directors without a proxy contest or management confrontation (12.7%). Change through formal shareholder proposals or public letters (36.7%) can be either hostile or non hostile. Hostile tactics are: change through threat of lawsuit or proxy fight (7.5%); change through proxy contests to replace the board of directors (15.0%); change through proceeding with lawsuit against target (5.5%); and change through takeover bid (3.4%).

(Insert Table 2.2 about here)

Table 2.2 presents summary statistics of firm characteristics based on observations from 1997 to 2007. All data are fiscal year end of the year prior to the 13D filing. Panel A presents data for firms subject to targeting by hedge funds. Panel B presents data for matched firms, specifically the five nearest neighbors based on industry (3 digit SIC code), market to book ratio, and market value of equity from the COMPUSTAT universe during the subject years. These three criteria are the basis for generating matched sample results elsewhere in the paper. Table 2.2 summarizes prior year data because hedge funds evaluate target firms based on information available at the time of the analysis. Compared to matched firms, targets have: a) similar return on assets and worse yields from equity markets (combined stock return and dividend and share repurchase yield); b) lower q and lower percentage sales growth c) similar levels of leverage and d) better cash flows. The target and matched firms are similar in size since market value of equity was one of the matching criteria. When compared to the entire universe of COMPUSTAT firms during the subject years, target firms are smaller (details not included in the table).

(Insert Table 2.3 about here)

Table 2.3 presents summary statistics of institutional ownership measures at target firms. The source of information for institutional holdings is Thompson Reuters Institutional (13f) Holdings. The SEC requires institutional investment managers (including banks, insurance companies, investment advisors, pension

funds, endowment funds, and hedge funds) with at least $100 million in equity assets to file quarterly reports of their equity holdings. A minor limitation of this data is that institutional investors may choose not to report holdings of individual securities when the number of shares is less than 10,000 *and* the market value is less than $200,000. Since I am interested in the relationships between hedge funds and "other" institutional investors, I exclude hedge funds when calculating all measures of institutional ownership. All values in Table 2.3 are year end prior to the hedge fund activism event. Institutional ownership (IO) is the percent of the target firm's outstanding shares owned by institutional investors. Target firms in the sample have mean (median) institutional ownership of 55.9% (58.8%). The mean (median) institutional ownership of the five nearest neighbor firms is 39.7% (33.8%). The mean (median) difference of 16.2% (25.0%) is statistically significant at the 1% level — firms targeted by hedge funds have higher levels of institutional ownership than their peers.

To further explore why hedge funds prefer targets with high levels of institutional ownership, I examine institutional investor heterogeneity in the context of investment time horizon based on portfolio churn rate and type of institution. For churn rates, I classify institutional investors as short term and long term focused based on the methodology in Yan and Zhang (2009). Using each institutional investor's aggregate share purchases and sales, I calculate an average quarterly churn rate, $\overline{CRq}$, (i.e., the mean of the four quarterly churn rates in each

year) for each institutional investor, based on the minimum of aggregate purchases and sales. Yan and Zhang indicate that the advantage of their approach is that it minimizes the impact of investor cash flow on portfolio turnover and is philosophically similar to the CRSP approach to calculating mutual fund turnover. Note that it is common practice with financial industry professionals to use the minimum of aggregate purchases and sales to calculate portfolio turnover. Sorting by $\overline{CRq}$ and year, I define institutional investors as short term focused if their $\overline{CRq}$ is greater than or equal to the median $\overline{CRq}$ for that year. Institutional investors are long term focused if their $\overline{CRq}$ is below median. I define short term focused institutional ownership ($SIO_{churn\ rate}$) for each target-company-year observation in the data set as the number of shares held by short term institutional investors divided by the total number of shares outstanding and long term institutional ownership ($LIO_{churn\ rate}$) as the number of shares held by long term institutional investors divided by the total number of shares outstanding. By construction, IO equals the sum of $SIO_{churn\ rate}$ and $LIO_{churn\ rate}$. See Appendix 2.B for details. Table 2.4 provides a summary of the mean and median $\overline{CRq}$ and inferred investment time horizon for each year between 1997 and 2007, and the overall values for all year — Panels A and B present the results for short and long term focused institutional investors, respectively. Overall mean (median) $\overline{CRq}$ and investment time horizon for short term focused investors were 15.2% (12.1%)

and 1.6 (2.1) years, respectively. In comparison, overall mean (median) $\overline{CRq}$ and investment time horizon for long term focused investors were 5.0% (5.1%) and 5.0 (4.9) years, respectively. Panel C presents the results for hedge funds that made 13D filings between 1997 and 2007 — hedge funds in the sample match closely with short term focused institutional investors. Overall mean (median) $\overline{CRq}$ and investment time horizon were 14.0% (11.8%) and 1.8 (2.1) years.

(Insert Table 2.4 about here)

The Thomson Reuters data includes a variable, TYPECODE, to denote the type of institution (i.e., banks, insurance companies, investment companies and their managers, independent investment advisors, and all others including pension, endowment, and sovereign wealth funds). The ability to effectively use this code (without adjustment) as a measure of investor heterogeneity is limited because of inconsistent code use over time, and high use of the "all other" category[13]. To ensure that improper coding does not distort ownership summary statistics and regression results, I manually correct for the errors in mapping. For

[13] The acknowledged problem with this coding follows: "The TYPECODE variable was designed to distinguish among different types of institutional managers. It has the problem of sudden change from a non-five value to five in December 1998, March 1999, and June 1999. TYPECODE in the S34 set have serious classification errors in recent years, such that the Other group is unrealistically large. Many Banks (TYPECODE=1) and Independent Investment Advisors (TYPECODE=4) are improperly classified in the Others (TYPE=5) group in 1998 and beyond. For example, in the first quarter of 1999, the number of independent investment advisors drops from over 1200 to about 200, while the Other group jumps from roughly 100 to over 1300 . Thompson Financial Network explain that a mapping error occurred when integrating data from another source, regret that the problem occurred, but they have no plans to fix the problem." Page 16 of User's Guide to Thomson Reuters Mutual Fund and Investment Company Common Stock Holdings Databases on WRDS available at http://wrds-web.wharton.upenn.edu/wrds/ds/tfn

institutional type, I define institutional investors as short term focused if they are TYPECODE 3 or 4 (investment companies and independent investment advisors) and long term focused if they are TYPECODE 1, 2, or 5 (banks, insurance companies, and others including pension, endowment and sovereign wealth funds). In general, banks, insurance companies, pension funds, and endowment funds tend to adopt buy-and-hold investing styles while independent investment advisors and mutual funds tend to adopt more aggressive trading styles and/or engage in liquidity motivated trading (Edelen, 1999). $SIO_{\text{institution type}}$ ($LIO_{\text{institution type}}$) equals the number of shares held by short term (long term) focused institutional investors divided by the total number of shares outstanding.

The balance of Table 2.3 shows that compared to matched firms, firms targeted by hedge funds have significantly higher levels (at the 1% level) of both short term and long term institutional ownership. The results using churn rate and institutional type are very similar. By churn rate, target firms have mean (median) short term focused institutional ownership of 38.1% (38.1%) compared to matched firm mean (median) levels of 27.7% (22.2%) — the mean (median) difference is 10.5% (15.9%). Target firms have mean (median) long term focused institutional ownership of 17.6% (16.9%) while the mean (median) level for matched firms is 11.9% (8.7%) — the mean (median) difference is 5.8% (8.2%). Note that short term focused institutional ownership is much higher than long term focused institutional ownership at both target and matched firms. By type of

institution, target firms have mean (median) short term focused institutional ownership of 38.4% (39.4%) compared to matched firm mean (median) levels of 27.5% (23.1%) — the mean (median) difference is 10.9% (16.2%). Target firms have mean (median) long term focused institutional ownership of 17.4% (16.4%) while the mean (median) level for matched firms is 12.0% (8.6%) — the mean (median) difference is 5.4% (7.8%).

Compared to matched firms, the targets of hedge funds have higher levels of institutional investors regardless of investment time horizon. However, given the relatively higher ownership positions of short term focused institutional investors at target firms, investment time horizon may be a particularly important factor for hedge funds when engaging in activism. For example, when a hedge fund is soliciting support for its activist agenda, institutional owner investment time horizon may be a meaningful differentiator in that short term focused owners control more votes implying that they can exert more influence over target firm directors and executives.

(Insert Table 2.5 about here)

Subsequent regression analysis provides a more rigorous examination of the relationships among hedge fund activism, and target firm institutional ownership levels and investment time horizon, while controlling for other target firm characteristics such as operating performance, capital structure and growth opportunities. First, I determine what factors influence the probability of a firm

being targeted by hedge funds. Table 2.5 presents the marginal results of three probit regression specifications indicated by (1), (2) and (3). This table reports the impact of the previously defined measures of institutional ownership (which exclude hedge funds) on the probability of the firm being the targeted by hedge funds. All independent variables are lagged by one year. The dependent variable, Y_i, is equal to 1 if the firm *i* is a hedge fund target during the year. In regression (1), the explanatory variable is institutional ownership (IO). The regression controls for year fixed effects, q, sales growth, return on assets, leverage, research and development, and dividend and share repurchase yield (see Appendix 2.A for definitions). The main effect probit model is $\Phi^{-1}(p_i) = \mathrm{x}_i'\beta = \sum_i x_i\beta_i$, where $\Phi^{-1}(\ )$ is the inverse of the cumulative normal distribution function. Marginal effects are defined as the derivative of p_i[14] with respect to each independent variable so the value of marginal effects depends on the values of all of the independent variables. The marginal effect of the j^{th} element in x_i' in the probit model is equal to $\phi(\mathrm{x}_i'\beta)\cdot b_j$ where $\phi(\mathrm{x}_i'\beta)$ is the density function of the standard normal distribution evaluated at $\mathrm{x}_i'\beta$, and b_j is the estimated regression coefficient for j^{th} element in x_i'. Marginal effects represent the change in probability of being a target for a very small change in one independent variable, holding all others fixed. In regression (1) the coefficients

[14] $p_i = \mathrm{Prob}(\mathrm{Y}_i = 1) = \Phi(\mathrm{x}_i'\beta)$

for q, sales growth, and institutional ownership are significant at the 1% level and the coefficient for dividend and share repurchase yield is significant at the 10% level. Based on the regression results, a firm has a 2.7% lower chance of being a target for a one standard deviation higher level of q (i.e., 4.22 vs. 2.09), a 2.7% lower chance of being a target for a one standard deviation higher level of sales growth (i.e., 65.3% vs. 17.5%), a 0.9% higher chance of being a target for a one standard deviation higher level of dividend and share repurchase yield (i.e., 6.6% vs. 2.2%), and an 4.0% greater chance of being a target for a one standard deviation higher level of institutional ownership (i.e., 74.6% vs. 42.5%). Unexploited growth opportunities, sales growth, dividend yield and institutional ownership all have statistically significant effects on the probability of the firm being a target of activist hedge funds — hedge funds are more likely to target low growth, undervalued firms with high levels of institutional ownership. The results of the first specification are consistent with those in Brav, Jiang, Partnoy, and Thomas (2008) who interpret the impact of q on the probability of being a hedge fund target as an indication that activist hedge funds are value investors seeking to profit from long term target firm share price appreciation resulting from changes at the target firm to exploit growth opportunities. The results for q, sales growth, and dividend and share repurchase yield are similar in the remaining probit regression specifications in Table 2.5 and require no further discussion.

Regression (2) examines the impact of investment time horizon of institutional owners (based on churn rate) on the probability that a firm will be targeted by an activist hedge fund. The level of short term focused institutional ownership has a meaningfully large and a statistically significant (at the 1% level) impact on the likelihood of being targeted. The likelihood of being a target increases by 3.4% for a one standard deviation higher level of short term focused institutional ownership (i.e., increase from 29.4% to 53.1%). Long term focused institutional ownership does not impact the likelihood that a firm with be targeted by hedge funds. Regression (3) examines the impact of investment time horizon of institutional owners (based on institutional type) on the probability that a firm will be targeted by an activist hedge fund. Once again, the level of short term focused institutional ownership has a meaningfully large and a statistically significant (at the 1% level) impact on the likelihood of being targeted. The likelihood of being a target increases by 2.7% for a one standard deviation higher level of short term focused institutional ownership (i.e., increase from 29.4% to 52.3%). Long term focused institutional ownership does not impact the likelihood that a firm with be targeted by hedge funds.

To summarize, the univariate results in Table 2.3 show that the levels of all types of institutional owners at target firms are significantly higher than at matched firms. The levels of short term exceed those of long term at both target and matched firms. Table 2.4 shows that the investment time horizons of activist

hedge funds closely match with those of short term focused institutional investors. The multivariate results in Table 2.5 confirm that institutional ownership has a statistically significant and meaningfully large impact on the likelihood of hedge fund targeting. Moreover, hedge funds demonstrate a particular preference for institutional investors with a short term time horizon. The results are robust across different classifications of investment time horizon.

To determine whether hedge fund activism is beneficial for other institutional investors, I investigate abnormal returns at hedge fund targets. Expected returns should motivate the trading behavior of institutional investors and behavior should reflect institutional investors' attitudes toward hedge funds. Using event study methodology based on total returns (i.e., price changes plus distributions), I find economically and statistically significant target firm abnormal returns in both the short and long run. Figure 2.1 shows the average cumulative abnormal return (CAR) and trading volumes for target firm shares over the 41-day event window (+/- 20 days) surrounding the date of the Schedule 13D filing. To calculate abnormal return, I use the market model based on the value weighted NYSE/AMEX/NASDAQ index from CRSP. The estimation window for the market model parameters and normal trading volume is the interval from 100 to 40 days prior to the date of Schedule 13D filing. On average, there is a share price increase of three percent from ten days and one day prior to the event. On the event day and day after, there is an additional increase of two

percent. The total cumulative abnormal return by 20 days after the event is 7.1%. The results show abnormally high trading volumes in the period from ten days prior to two days after the Schedule 13D filing date. Overall, 61.4% of the activism events have a positive cumulative abnormal return in the minus 20 to plus 20 day window. By percentile, the CARs for the +/- 20 day window are -34.6% (5^{th}), -6.0% (25^{th}), 5.0% (50^{th}), 18.9% (75^{th}), and 48.4% (95^{th}). The abnormal return results are similar for alternative specifications for the event window. For example, the average CAR increases to 8.1% by 40 days after the Schedule 13D filing.

(Insert Figure 2.1 about here)

Buy and hold abnormal return (BHAR) is preferable to CAR when evaluating long term stock price performance (Barber and Lyon, 1997). For the long range study, I define abnormal return as the difference between the target firm stock return and the return on the NYSE/AMEX/NASDAQ index from CRSP based on monthly total returns. Figure 2.2 plots the average buy and hold abnormal return for target firms from twelve months prior to the Schedule 13D filing to 24 months after. The results demonstrate negative abnormal returns in the interval between six months and one month prior to the 13D filing ($BHAR_{-5mth\ to\ -1\ mth}$ = -5%). This negative abnormal return sharply reverses during the month prior to the activism event. The average buy and hold abnormal return continues to increase until approximately 20 months after the Schedule 13D filing

($BHAR_{-1mth\ to\ 20\ mth}$ = 23%), after which the returns are consistent with the overall market index .

(Insert Figure 2.2 about here)

The abnormal return results show that, regardless of investment time horizon, other institutional investors can benefit from returns to hedge fund activism — target firm institutional investors have a valid reason to like the arrival of hedge funds at target firms.

To evaluate whether abnormal returns associated with hedge fund activism are the result of improved performance at target firms being reflected in the market price of the target firm shares, I examine the volatility of stock returns at target firms. It is possible that activism increases the risk of target firms, and that higher returns could be coincident with higher volatility. In the literature, for example, Klein and Zur (2009a) document the shift of wealth from bondholders to equity holders as a result of activism and suggest that increases in leverage, dividends and share repurchases increase the risk of target firms. Stock return volatility may provide insight into the returns associated with hedge fund activism. Post event increases in volatility could signal that the higher returns are simply coincident with higher risk associated with holding an ownership position in the target firm. In contrast, stable or decreasing post activism volatility strengthens the argument that the long term returns to activism are driven by performance improvements at target firms. Consider Figures 2.3 and 2.4 which

depict the short run and long run stock return volatility at firms targeted by hedge funds. Figure 2.3 shows the average daily variance of returns[15] in the +/- 20 day window surrounding the 13D filing. While there are indications of increases in variance in the days immediately before and after the 13D filing, there is no apparent trend of increasing volatility after the activism event.

(Insert Figure 2.3 about here)

Figure 2.4 examines a longer time frame, showing the average monthly variance at target firms in the +/- 24 months surrounding the 13D filing. The dashed line represents the average for all observations in the sample, and suggests an increase in volatility after hedge fund activism. However, the database includes activism events up to December 26, 2007, so the plus 24 month observations are influenced by the impact of the 2008/09 financial crisis on firm volatility. Based on the dates of activism events in the sample, the post activism average volatility is influenced by the financial crisis while the pre activism volatility is not. The solid line adjusts for the financial crisis by removing observations after August 31, 2008 (1,494 from a total of 30,178 monthly observations). The 2008/09 financial crisis was arguably one of the most significant financial events since the Great Depression, and increased the stock return volatility of all publically traded firms, not just those firms that were targets of hedge fund activism.

(Insert Figure 2.4 about here)

[15] All volatility data presented are based on a GARCH (1, 1) model for estimating variance of target firm returns. See Appendix 2.C for details.

While a graphical depiction of average results is intuitively interesting, I use regression analysis to robustly test for changes in target firm stock return volatility before and after hedge fund activism and to confirm the relationships between abnormal returns and volatility and between the measures of institutional ownership and volatility. To avoid the distorting effect of the financial crisis, I exclude post August 31, 2008 observations from the analysis. All the variables in Table 2.6 are quarterly, and observations occur during the +/- eight quarters surrounding hedge fund activism events. The dependent variable in both regressions is the quarterly standard deviation of stock returns[16]. Both regressions control for prior quarter return on assets, q, dividend and share repurchase yield, leverage, and cash flow — prior period return on assets and dividend and share repurchase yield are inversely related to stock return volatility (1% significance level). In regression (1), the explanatory variable of interest is a dummy that equals 1 if the observation occurs after the SEC 13 filing. The regression coefficient is not significantly different from zero, indicating that the standard deviation of stock returns is the same before and after hedge activism. Regression (2) includes quarterly abnormal return as an explanatory variable in addition to the dummy variable from the first regression. There is a significant (1% level) inverse relationship between abnormal return and stock return

[16] The dependent variable equals the square root of the estimate of quarterly variance based on a GARCH(1, 1) model. I derived similar results using realized variance (not tabulated) to those presented in Tables 4.6 and 4.7. See Appendix 2.C for further details.

volatility. A 1% increase in quarterly abnormal return is associated with a 0.56% *decrease* in the standard deviation of quarterly returns. Confirming this inverse relationship, the Spearman rank correlation between quarterly abnormal returns and stock return standard deviation is -0.12. Firms that are targeted by hedge funds generate long term abnormal returns and these returns are not associated with higher levels of volatility. Moreover, firms with higher abnormal returns experience lower stock return volatility. I interpret these results to indicate that the higher returns at target firms after hedge fund activism are not simply reflective of an increased risk premium to compensate for increased risk created by the activism. Overall the results are consistent with hedge fund activism creating wealth through performance improvement at the target firm.

Given that target firm ownership by other institutional investors is important to hedge funds and that, all else equal, hedge funds should prefer target firms to have lower stock return volatility, I investigate whether ownership levels and trading behavior of other institutional investors are related to target firm volatility. Table 2.7 reports the relationships between the levels of and changes in institutional ownership and stock return volatility at firms subject to hedge fund activism. The dependent variable in all regressions is the quarterly standard deviation of stock returns in the 24 months following the 13D filing. All regressions control for prior quarter return on assets, q, dividend and share repurchase yield, leverage, and cash flow — prior period return on assets

(leverage) is inversely (directly) related to stock return volatility. The results from the first regression confirm significant (1% level) inverse relationships between the level of and change in institutional ownership at target firms and the stock return volatility in the subsequent quarter — at target firms, on average, a 0.01 higher level of (increase in) institutional ownership precedes a 0.13% (0.11%) lower standard deviation of returns. The regression (2) results show that these relationships hold (at the 1% significance level) for both short term focused and long term focused institutional investors. At target firms, on average, a 0.01 higher *level* of short (long) term institutional ownership precedes a 0.10% (0.21%) lower standard deviation of returns. Target firm return volatility is more sensitive to prior period levels of long term focused institutional ownership — a one-sided t-test confirms that the LIO regression coefficient is significantly more negative (1% level) than the SIO regression coefficient (t-score = -2.71, p-value = 0.0030). A 0.01 *increase* in short (long) term institutional ownership during the prior quarter precedes a 0.10% (0.13%) lower level of volatility. However the impact of the change in short term focused ownership is not significantly different from that of long term focused ownership. An F-test confirms that the regression coefficients for ΔSIO and ΔLIO are not significantly different (F = 1.48, Prob > F = 0.224). The results show that the ownership levels and trading behavior of institutional investors is inversely related to subsequent levels of target firm stock return standard deviation, and may provide additional insight

into why hedge funds choose to target firms with higher levels of institutional ownership. Assuming a preference for lower target firm volatility, hedge funds could benefit from the lower volatility at target firms associated with high institutional ownership. Moreover, hedge funds may recognize these other institutional investors as sophisticated and optimize the implementation of the activist agenda to minimize the impact on return volatility associated with institutional investors selling their positions in target firms.

Having established that hedge fund activism generates both short and long term abnormal returns without increasing volatility, I return to the question of whether other institutional investors' trading behavior reflects a positive view of hedge funds. If target firm institutional owners have an unfavorable view of hedge funds, they would simply liquidate their positions in target firms after the arrival of hedge funds. If overall levels decline, it is important to evaluate the impact of investment time horizon on the trading behavior of institutional owners. Stable long term focused ownership levels would indicate that long term focused investors like activism because it creates value at target firms. Decreasing short term focused ownership levels may be consistent with profit-taking by short term investors driven by short term abnormal returns at target firms. Table 2.8 provides insight into levels of and changes in institutional ownership at target firms in the years before and after hedge fund activism. The regression specification is:

$$y_{i,t} = \sum_{j=-2}^{+2} \alpha_j + \sum_{j=-2}^{+2} \beta_j \mathrm{D}_{i,j} + \mathrm{FE}_{\mathrm{3digitSIC}} + \mathrm{FE}_{\mathrm{year}} + \varepsilon_{i,t}$$

where $y_{i,t}$ is the measure of institutional ownership (IO, $\mathrm{SIO}_{\text{churn rate}}$, $\mathrm{LIO}_{\text{churn rate}}$, $\mathrm{SIO}_{\text{institutional type}}$, and $\mathrm{LIO}_{\text{institutional type}}$) for firm *i* in year *t*, $\mathrm{D}_{i,j}$ is a dummy variable equal to 1 if firm *i* will be (was) subject to a hedge fund SEC 13D filing -*j* years relative to the current year, $\mathrm{FE}_{\mathrm{3digitSIC}}$ and $\mathrm{FE}_{\mathrm{year}}$ control for industry (based on 3 digit SIC code) and year fixed effects, and $\varepsilon_{i,t}$ is an error term. The β_j coefficients represent the abnormal level of the institutional ownership measure at target firms compared to normal levels at matched firms in the relative year indicated by *j*. For example, if $j = -2$ and $y_{i,t} = \mathrm{IO}_{i,t}$, β_{-2} represents the abnormal level of institutional ownership at firm *i* (which will be the subject of a hedge fund 13D filing in two years) compared to the average level of institutional ownership at the five nearest neighbor firms that match with firms that will be the target of hedge fund activism in two years.

In the five year window (+/- two years) surrounding the 13D filing, the coefficients for all dummies for all regressions are positive and statistically significant at the 1% level (except β_1 in the $\mathrm{SIO}_{\text{churn rate}}$ regression at 5% significance). These results are consistent with the findings in Table 2.3. Compared to their matched peers, firms that are targets of hedge funds have higher levels of institutional ownership, regardless of investment time horizon or

institution type. For example, the results in column 3 are for long term focused institutional ownership based on churn rate, $LIO_{churn\ rate}$. In the year prior to an event, LIO at targets is a full 3.0% higher than at matched firms. In the two years following the event, LIO is 3.3% and 2.7% higher than at matched firms for the respective years.

Table 2.8 also shows the *change* in the measures of institutional ownership in the years surrounding the hedge fund 13D filing. Using the year prior to the filing as a reference, the Table 2.8 regression results indicate that both overall and short term focused target firm institutional ownership levels (based on churn rate) decrease significantly (1% level) in the year after the filing but return to pre event levels within two years.[17] In contrast, long term focused institutional ownership remains at pre event levels in the two years following the 13D filing regardless of whether churn rate or institutional type is the basis for defining investment time horizon.

Institutional investors are heterogeneous in their trading behavior in response to hedge fund activism, and this response casts light on the attitudes of institutional investors toward hedge funds. Institutional owners with a long term investing horizon would simply liquidate their positions immediately if they perceived hedge fund activism to be focused on short term manipulation of share price to the detriment of other shareholders. The tendency of long term focused

[17] Untabulated results confirm that SIO based on institutional type returns to pre event levels within three years.

institutional investors to hold their target firm ownership positions long after the 13D filing suggests that they believe that hedge funds seek to profit from their activism through increased target firm share price driven by long term improvement of target firm performance. The trading behavior of short term focused institutional investors suggests that they, too, hold a favorable view of hedge funds. Short term focused institutional investors reduce their holdings in target firms after the 13D filing to lock-in the short run abnormal returns associated with activism. The fact that short term focused institutional investment at target firms increases between one and two years after the event suggests that these investors anticipate continued benefits from the activism[18]. Short term focused institutional investors do not sell their position because they dislike activism — they sell to capture profits and return seeking more. Long term focused institutional investors maintain their holdings in target firms after the 13D filing because they want to benefit from long term compounded returns that are better than those generated by the market — long term focused institutional investors view hedge fund activism favorably.

2.3 Conclusions

There is a mutually beneficial relationship between activist hedge funds and the other institutional owners at target firms — in general, they are friends, not foes.

[18] Table 2.8 shows that levels of short term focused institutional owners, based on churn rate, return to pre-event levels within two years. When institutional type is the basis for defining investment time horizon, although the levels two years after the activism have not fully rebounded, they increase significantly between years one and two.

Hedge funds demonstrate a preference for high levels of target firm institutional ownership suggesting that they seek the support of other institutional investors in implementing activist agendas. Institutional heterogeneity is a meaningful differentiator for hedge funds and investment time horizon is an important measure of heterogeneity. Activist hedge fund investment time horizon matches with that of short term focused institutional investors and hedge funds demonstrate a preference for short term focused institutional investors. Liquidity trading by short term investors may allow hedge funds to favorably acquire initial positions in target firms, and profit-taking by short term owners may provide a favorable environment for hedge funds to increase their holdings and attract new owners who are activism supporters. Institutional investors, regardless of investment time horizon, benefit from target firm ownership because hedge fund activism generates large short term and long term abnormal returns without increasing volatility. Hedge funds may benefit from lower target firm stock return volatility associated with high levels of institutional ownership, particularly long term focused ownership. The findings in this chapter are consistent with the hedge fund activism creating value at target firms — short term abnormal returns do not reverse over time, target firm return volatility does not increase after activism, and the trading behavior of both short and long term focused institutional owners reflect value creation at target firms. Regardless of the efficacy of traditional institutional investors as activists, their presence at firms targeted by hedge funds

is an indirect path through which other institutional investors improve governance, performance and shareholder value at target firms — hedge funds have a track record of activism that delivers increased shareholder value and hedge funds rely on the implicit or explicit support of institutional investors to implement their agendas.

References

Admati, A. and P. Pfleiderer, 2013, The 'Wall Street walk' and shareholder activism: Exit as a form of voice. Review of Financial Studies, Forthcoming.

Allen, F., 2001, Do financial institutions matter?, Journal of Finance 61(4), 1165–1175.

Armour, J. and B. Cheffins, 2009, The rise and fall of shareholder activism by hedge funds, 2009, ECGI – Law Working Paper No. 136/2009.

Barber, B. and J. Lyon, 1997, Detecting long-run abnormal stock returns: The empirical power and specification of test statistics, Journal of Financial Economics 43, 341-372.

Bebchuk, L., A. Brav, and W. Jiang, 2013, The long-term effects of hedge fund activism. Available at SSRN: http://ssrn.com/abstract=2291577

Bhagat, S., B. Black, and M. Blair, 2004, Relational investing and firm performance, Journal of Financial Research 27, 1-30.

Bollerslev, T., 1986, Generalized autoregressive conditional heteroscedasticity, Journal of Econometrics 31(3), 307–327.

Boyson, N. and R. Mooradian, 2007, Hedge funds as shareholder activists from 1994-2005, Working Paper, Northeastern University.

Brav, A., W. Jiang, and H. Kim, 2009, Hedge fund activism: A review, Foundations and Trends in Finance 4(3), 186-243.

Brav, A., W. Jiang, and H. Kim, 2011, The real effects of hedge fund activism: Productivity, risk, and product market competition. Available at SSRN: http://ssrn.com/abstract=2022904

Brav, A., W. Jiang, F. Partnoy, and R. Thomas, 2008, Hedge fund activism, corporate governance, and firm performance. Journal of Finance 63(4), 1729–1775.

Chen, X., J. Harford, and K. Li, 2007, Monitoring: Which institutions matter?, Journal of Financial Economics 86(2), 279-305.

Clifford, C., 2008. Value creation or destruction? Hedge funds as shareholder activists. Journal of Corporate Finance 14, 323–336.

Del Guerio, D., and J. Hawkins, 1998, The motivation and impact of pension fund activism, Journal of Financial Economics 52, 293-340.

Edelen, R., 1999, Aggregate price effects of institutional trading: A study of mutual fund flow and market returns, Journal of Financial Economics 53(3), 439-466.

Gantchev, N. and P. Jotikasthira, 2012, Hedge fund activists: Do they take cues from institutional exit? Available at SSRN: http://ssrn.com/abstract=2139482.

Gantchev, N., 2012, The costs of shareholder activism: Evidence from a sequential decision model, Journal of Financial Economics, Available online 27 September 2012.

Gaspar, J., M. Massa, and P. Matos, 2005, Shareholder investment horizons and the market for corporate control, Journal of Financial Economics 76(1), 135-165.

Gillan, S. and L. Starks, 1998, A survey of shareholder activism: Motivation and empirical evidence. Available at SSRN: http://ssrn.com/abstract=663523

Gillan, S. and L. Starks, 2000, Corporate governance proposals and shareholder activism: the role of institutional investors, Journal of Financial Economics 57(1), 275-305.

Gillan, S., and L. Starks, 2007, The evolution of shareholder activism in the United States, Journal of Applied Corporate Finance 19, 55–73.

Gompers, P., and A. Metrick, 2001, Institutional investors and equity shares, Quarterly Journal of Economics, 229-259.

Greenwood, R., and M. Schor, 2009. Investor activism and takeovers. Journal of Financial Economics 92, 362–375.

Kahan, M. and E. Rock, 2007, Hedge funds in corporate governance and corporate control, University of Pennsylvania Law Review 155(1), 1021-1056. Available at SSRN:http://ssrn.com/abstract=919881

Karpoff, J., 2001, The impact of shareholder activism on target companies: A survey of empirical findings. Available at SSRN: http://ssrn.com/abstract=885365

Katelouzou, D., 2012, Myths and realities of hedge fund activism: Some empirical evidence, Forthcoming in Virginia Law & Business Review. Available at SSRN: http://ssrn.com/abstract=2152351

Klein, A., and E. Zur, 2006, Hedge fund activism, Working paper, New York University.

Klein, A., and E. Zur, 2009a, The impact of hedge fund activism on the target firm's existing bondholders, Review of Financial Studies 24(5), 1735-1771.

Klein, A., and E. Zur, 2009b. Entrepreneurial shareholder activism: Hedge funds and other private investors. Journal of Finance 63,187–229.

Parrino, R., R. Sias, and L. Starks, 2003, Voting with their feet: Institutional ownership changes around forced CEO turnover, Journal of Financial Economics 68(1), 3-46.

Prevost, A., and R. Rao, 2000, Of what value are shareholder proposals sponsored by public pension funds? Journal of Business 73, 177-204.

Romano, R., 2001, Less is more: Making institutional investor activism a valuable mechanism of corporate governance, Yale Journal on Regulation 18(1), 174-251.

Shleifer, A. and R. Vishny, 1986, Large shareholders and corporate control, Journal of Political Economy 94(3), 461-488.

Smith, M., 1996. Shareholder activism by institutional investors: Evidence from CalPERS, Journal of Finance 51, 227–252.

Song, W. and S. Szewczyk, 2003, Does coordinated institutional investor activism reverse the fortunes of underperforming firms?, Journal of Financial and Quantitative Analysis 38, 317-336.

Thompson, R., 2006, The limits of hedge fund activism, Law and Economics Workshop, Berkeley Program in Law and Economics, UC Berkeley.

Verado, M., 2010, Heterogeneity among institutional investors: Portfolio choices, trading behavior, and stock returns, Working paper.

Wahal, S., 1996, Pension fund activism and firm performance, Journal of Financial and Quantitative Analysis 31, 1-23.

Yan, X. and Z. Zhang, 2009. Institutional investors and equity returns: Are short-term institutions better informed?, Review of Financial Studies 22(2), 893-924.

Figure 2.1

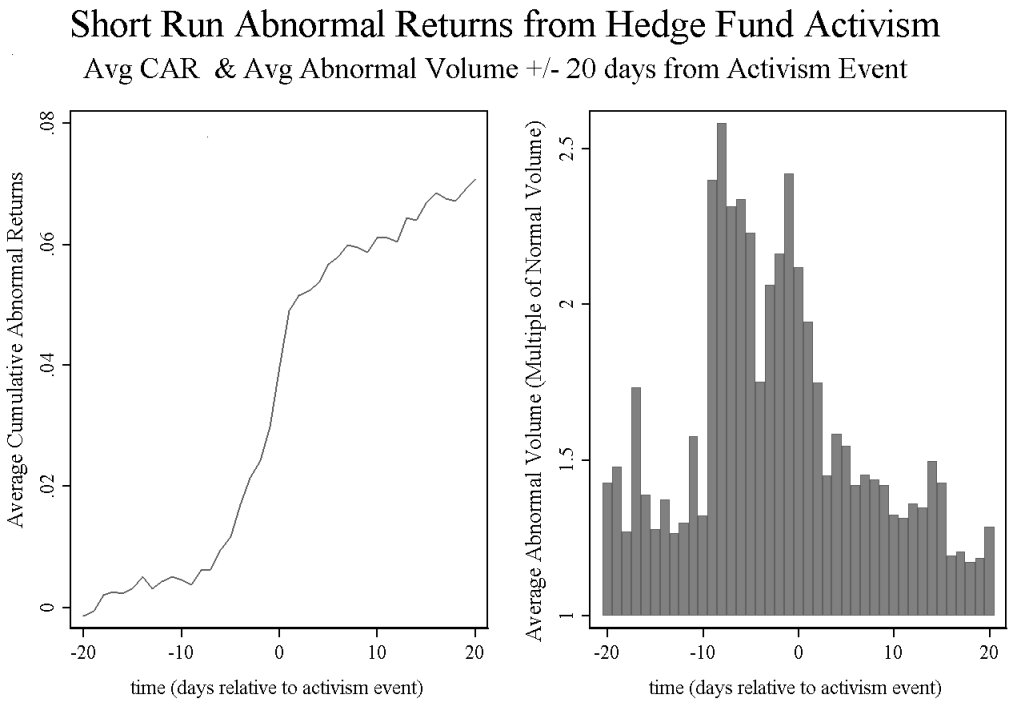
Short Run Abnormal Returns from Hedge Fund Activism
Avg CAR & Avg Abnormal Volume +/- 20 days from Activism Event
Average Cumulative Abnormal Returns
0
.02
.04
.06
.08
-20
-10
0
10
20
time (days relative to activism event)
Average Abnormal Volume (Multiple of Normal Volume)
1
1.5
2
2.5
-20
-10
0
10
20
time (days relative to activism event)

Figure 2.2

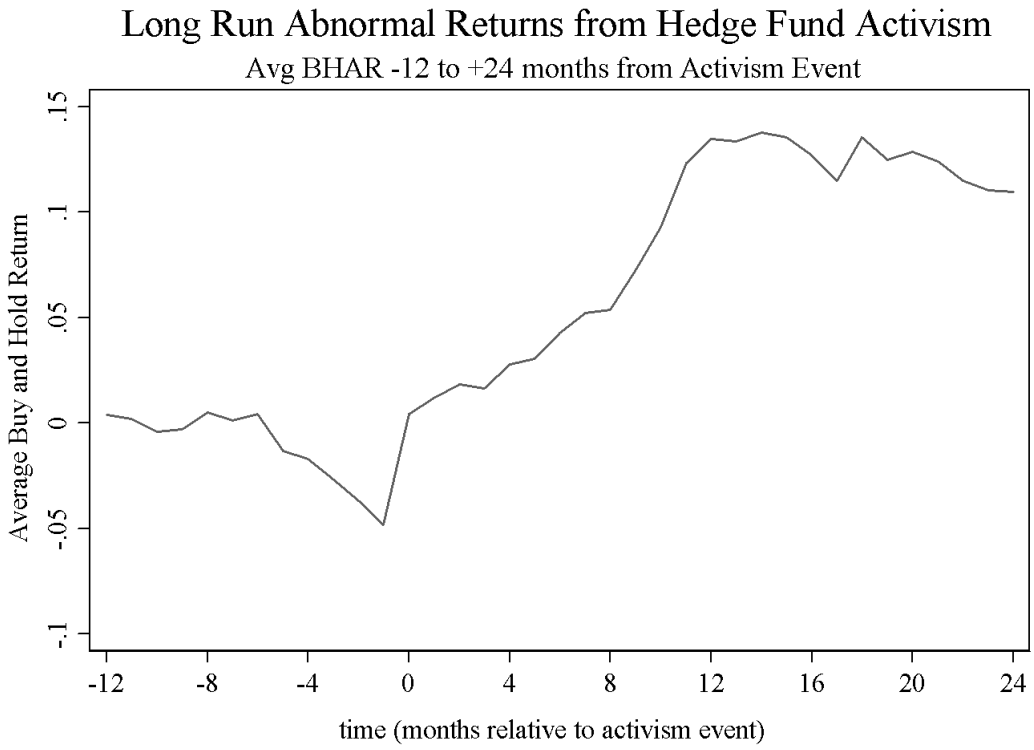
Long Run Abnormal Returns from Hedge Fund Activism
Avg BHAR -12 to +24 months from Activism Event
Average Buy and Hold Return
-.1
-.05
0
.05
.1
.15
-12
-8
-4
0
4
8
12
16
20
24
time (months relative to activism event)

Figure 2.3

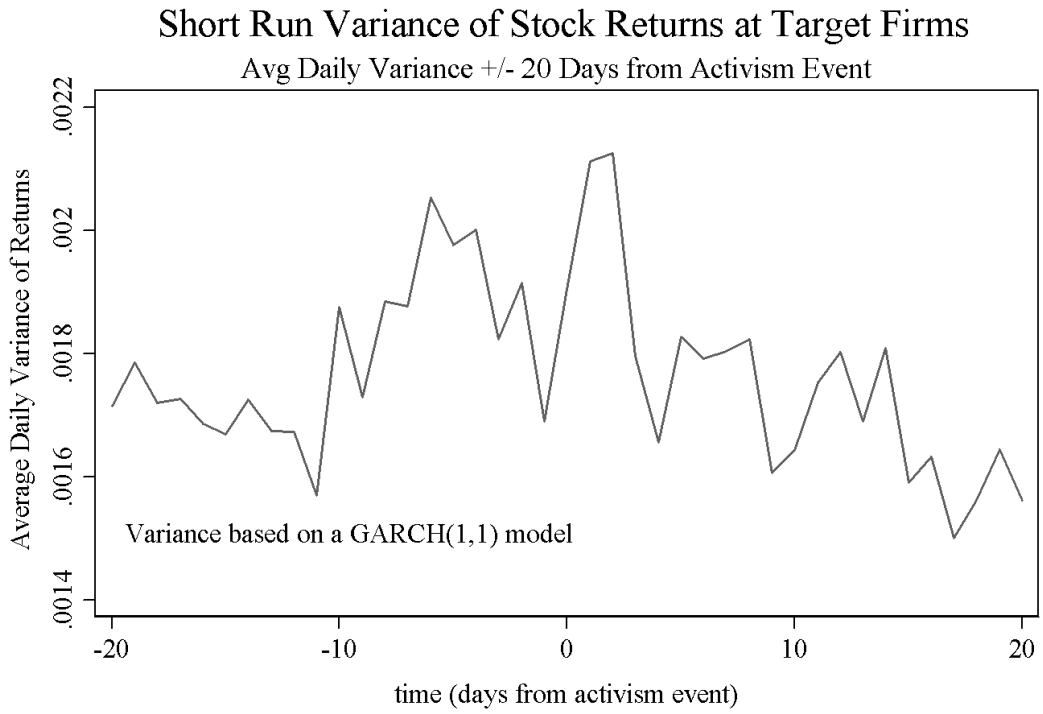
Short Run Variance of Stock Returns at Target Firms
Avg Daily Variance +/- 20 Days from Activism Event
Average Daily Variance of Returns
.0014
.0016
.0018
.002
.0022
Variance based on a GARCH(1,1) model
-20
-10
0
10
20
time (days from activism event)

Figure 2.4

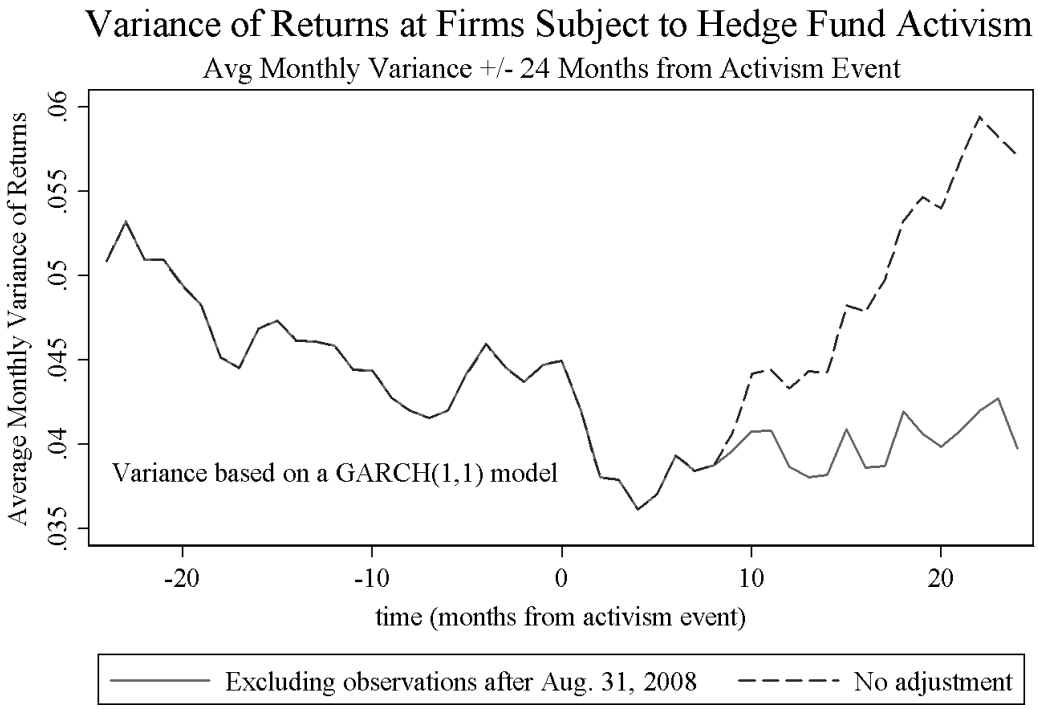
Variance of Returns at Firms Subject to Hedge Fund Activism
Avg Monthly Variance +/- 24 Months from Activism Event
Average Monthly Variance of Returns
.035
.04
.045
.05
.055
.06
Variance based on a GARCH(1,1) model
-20
-10
0
10
20
time (months from activism event)
Excluding observations after Aug. 31, 2008
No adjustment

Table 2.1

Summary of activist hedge fund events by stated objectives and tactics

The sample includes 613 events (SEC Schedule 13D filings) from 1997 to 2007 for which target firm institutional ownership and other control variable information is available. Panel A presents a summary of the objectives of the hedge fund as declared in the 13D filing. "General undervaluation" indicates that the intent of the hedge fund was non-specific, such as improving the company or improving shareholder value. (This information was usually in Item 4 of the Schedule 13D filing, sometimes confirmed from news articles. This objective is mutually exclusive of the remaining objective categories). "Governance" includes: takeover defenses; CEO/chairman replacement; board independence or fair representation; information disclosure; fraud; and executive compensation. "Business strategy" includes: lack of business focus; excess diversification; business restructuring including spinning off of business segments; blocking a pending M&A deal involving the company or changing the terms of the deal; and growth strategy. "Sale of target company" includes: sale of the company or its main assets to a third party; majority control of the company; buy-out of the company; and privatization of the company. "Capital structure" includes: excess cash; under-leverage; restructuring of debt; recapitalization; share repurchase; dividend payment; and equity issuance. Panel B summarizes tactics employed by the hedge fund to achieve the stated objectives.

Panel A

Hedge Fund Objective	# of events	% of total events
General undervaluation	294	48.0%
Governance	172	28.1%
Sale of target company	126	20.6%
Business strategy	124	20.3%
Capital structure	118	19.2%

Panel B

Tactic	# of events	% of total events
Change through communication with the board of directors and senior management	302	49.3%
Change through seeking representation on board of directors without a proxy contest or management confrontation	78	12.7%
Change through formal shareholder proposals or public letters	225	36.7%
Change through threat of lawsuit or proxy fight	46	7.5%
Change through proxy contests to replace the board of directors	92	15.0%
Change through proceeding with lawsuit against target	34	5.5%
Change through takeover bid	21	3.4%

Table 2.2

Summary statistics of firm characteristics

The table shows summary statistics of sample firm characteristics based on observations from 1997 to 2007. See Appendix 2.A for definitions of all variables. All values are lagged by one year. "Obs" is the number of observations. Panel A presents data for firms subject to hedge fund SEC 13D filings between the years 1997 and 2007; Panel B presents data for matched firms (5 nearest neighbors from the Compustat universe during the subject years) based on 3 digit SIC code, market to book ratio, and market value of equity. Data in the full sample is winsorized at the top and bottom 1%.

Panel A – Firms subject to hedge fund SEC 13D filings between 1997 and 2007

Variable	Obs	Mean	Std Dev	Min	Max	p25	p50	p75
Total Market Value of Equity ($millions)	613	1150.8	3844.1	4.2	41295.9	66.6	215.6	801.4
Return on Assets	613	0.088	0.156	-0.977	0.581	0.029	0.099	0.162
Stock Return	613	0.115	0.631	-0.857	4.190	-0.222	0.030	0.300
Dividend and Share Repurchase Yield	613	0.027	0.051	0.000	0.269	0.000	0.001	0.034
Sales Growth	613	0.096	0.312	-0.797	3.247	-0.025	0.063	0.166
Market to Book Ratio	613	2.149	3.499	-10.765	30.738	1.034	1.691	2.744
Q	613	1.875	1.443	0.371	17.932	1.069	1.481	2.262
Leverage	613	0.325	0.314	0.000	1.446	0.016	0.278	0.520
Free Cash Flow Ratio	613	0.015	0.165	-1.195	0.440	-0.023	0.018	0.076
Research & Development/Total Assets	613	0.040	0.083	0.000	0.830	0.000	0.000	0.044

Panel B – Matched Firms (5 Nearest Neighbors)

Variable	Obs	Mean	Std Dev	Min	Max	p25	p50	p75
Total Market Value of Equity ($millions)	2907	1219.4	3981.7	1.4	41295.9	51.4	201.5	778.5
Return on Assets	2907	0.086	0.185	-0.977	0.581	0.025	0.098	0.171
Stock Return	2907	0.159	0.720	-0.857	4.190	-0.241	0.033	0.360
Dividend and Share Repurchase Yield	2907	0.021	0.041	0.000	0.269	0.000	0.000	0.027
Sales Growth	2907	0.192	0.505	-0.797	4.208	-0.004	0.101	0.251
Market to Book Ratio	2907	2.445	3.885	-10.765	30.738	1.095	1.754	2.760
Q	2907	2.138	2.240	0.371	17.932	1.074	1.466	2.246
Leverage	2907	0.337	0.297	0.000	1.446	0.046	0.308	0.543
Free Cash Flow Ratio	2907	-0.013	0.186	-1.195	0.440	-0.029	0.012	0.060
Research & Development/Total Assets	2907	0.042	0.096	0.000	0.830	0.000	0.000	0.039

Table 2.3

Summary statistics of firm institutional ownership

The table shows summary statistics of firm characteristics regarding institutional ownership (excluding ownership by hedge funds) based on observations from 1997 to 2007. All values are based on year end prior to the hedge fund SEC 13D filing. Institutional Ownership (IO) is the fraction of the firm's outstanding shares owned by institutional investors. Institutional ownership is further classified as short term (SIO) and long term (LIO) based on the fraction of the firm's outstanding shares that are owned by institutional investors with a short term and long term focus, respectively, based on portfolio churn ratio (see Appendix 2.B) and institutional type (investment companies and independent investment advisors are short term, and banks, insurance companies, and others including pension, endowment funds and sovereign wealth funds are long term). "Obs" is the number of observations. Panel A presents data for firms targeted by hedge funds; Panel B presents data for matched firms (5 nearest neighbors) based on 3 digit SIC code, market to book ratio, and market value of equity from the Compustat universe during the subject years; Panel C presents results for tests of significance regarding the differences between Panels A and B. ***, **, * indicate significance level at 1%, 5% and 10% level respectively.

Panel A – Firms Targeted by Hedge Funds

Variable	Obs	Mean	SD	Min	Max	p25	p50	p75
Institutional Ownership (IO)	613	0.5590	0.3214	0.0001	1.0000	0.2804	0.5883	0.8576
Short Term Focused IO ($SIO_{\text{churn rate}}$)	613	0.3811	0.2304	0.0000	0.8355	0.1838	0.3808	0.5636
Long Term Focused IO ($LIO_{\text{churn rate}}$)	613	0.1763	0.1282	0.0000	0.4566	0.0651	0.1685	0.2621
Short Term Focused IO ($SIO_{\text{institutional type}}$)	613	0.3841	0.2222	0.0000	0.7794	0.1971	0.3938	0.5828
Long Term Focused IO ($LIO_{\text{institutional type}}$)	613	0.1740	0.1238	0.0000	0.4411	0.0621	0.1642	0.2760

Panel B – Matched Firms – Five Nearest Neighbors

Variable	Obs	Mean	SD	Min	Max	p25	p50	p75
Institutional Ownership (IO)	2907	0.3970	0.3131	0.0001	1.0000	0.1115	0.3380	0.6544
Short Term Focused IO ($SIO_{\text{churn rate}}$)	2907	0.2765	0.2341	0.0000	0.8355	0.0678	0.2217	0.4496
Long Term Focused IO ($LIO_{\text{churn rate}}$)	2907	0.1185	0.1122	0.0000	0.4566	0.0247	0.0865	0.1814
Short Term Focused IO ($SIO_{\text{institutional type}}$)	2907	0.2750	0.2262	0.0000	0.7794	0.0722	0.2314	0.4496
Long Term Focused IO ($LIO_{\text{institutional type}}$)	2907	0.1201	0.1118	0.0000	0.4411	0.0220	0.0864	0.1983

Panel C – Test of Mean and Median Differences[†]: Target Firms vs. Matched Firms

Variable	Mean	SD	t-score	Median	χ^2-score[‡]
Difference - Institutional Ownership (IO)	0.1620	0.0140	11.59***	0.2502	83.82***
Difference - Short Term Focused IO ($SIO_{\text{churn rate}}$)	0.1046	0.0104	10.08***	0.1591	82.20***
Difference - Long Term Focused IO ($LIO_{\text{churn rate}}$)	0.0578	0.0051	11.30***	0.0820	65.43***
Difference -Short Term Focused IO ($SIO_{\text{institutional type}}$)	0.1092	0.0100	10.89***	0.1624	95.61***
Difference -Long Term Focused IO ($LIO_{\text{institutional type}}$)	0.0539	0.0051	10.65***	0.0778	75.88***

[†] H0: Difference=0, Ha: Difference>0

[‡] Continuity corrected Pearson χ^2 score

Table 2.4

Summary statistics of institutional investor portfolio churn rate and investment time horizon

The table provides a summary of the average quarterly churn rate, $\overline{CRq}$, and investment time horizon (ITH) for institutional investors for each year between 1997 and 2007 and overall for all years based on the methodology described in Appendix 2.B. Panel A presents the results for short term focused institutional investors; Panel B presents the results for long term focused institutional investors; and Panel C presents the results for hedge funds. "Obs" is the number of observations.

Panel A - Short Term Focused Institutional Investors

Year	Obs	Mean $\overline{CRq}$ (/qtr)	SD	Min	Max	Median $\overline{CRq}$ (/qtr)	Mean ITH[1] (years)	Median ITH[2] (years)
1997	648	0.152	0.152	0.074	1.786	0.109	1.6	2.3
1998	755	0.136	0.093	0.081	1.181	0.113	1.8	2.2
1999	822	0.146	0.090	0.083	1.406	0.124	1.7	2.0
2000	906	0.200	0.165	0.098	1.979	0.154	1.3	1.6
2001	885	0.171	0.119	0.086	1.370	0.136	1.5	1.8
2002	904	0.156	0.128	0.077	1.640	0.118	1.6	2.1
2003	972	0.147	0.104	0.072	1.225	0.115	1.7	2.2
2004	928	0.150	0.111	0.075	1.682	0.121	1.7	2.1
2005	1088	0.137	0.102	0.066	1.516	0.111	1.8	2.3
2006	1221	0.143	0.104	0.068	1.332	0.113	1.7	2.2
2007	1167	0.145	0.111	0.073	1.983	0.114	1.7	2.2
Overall	10296	0.152	0.118	0.066	1.983	0.121	1.6	2.1

Panel B - Long Term Focused Institutional Investors

Year	Obs	Mean $\overline{CRq}$ (/qtr)	SD	Min	Max	Median $\overline{CRq}$ (/qtr)	Mean ITH[1] (years)	Median ITH[2] (years)
1997	647	0.049	0.016	0.002	0.074	0.051	5.1	4.9
1998	755	0.055	0.017	0.002	0.081	0.058	4.5	4.3
1999	822	0.054	0.019	0.000	0.083	0.058	4.6	4.3
2000	905	0.064	0.021	0.000	0.098	0.065	3.9	3.8
2001	885	0.058	0.018	0.000	0.086	0.061	4.3	4.1
2002	903	0.051	0.016	0.000	0.077	0.053	4.9	4.7
2003	971	0.048	0.015	0.003	0.071	0.050	5.2	5.0
2004	927	0.047	0.017	0.000	0.075	0.049	5.3	5.1
2005	1088	0.042	0.015	0.000	0.066	0.043	6.0	5.8
2006	1221	0.041	0.015	0.000	0.068	0.042	6.0	6.0
2007	1167	0.045	0.016	0.002	0.073	0.045	5.6	5.6
Overall	10291	0.050	0.018	0.000	0.098	0.051	5.0	4.9

Panel C – Hedge Funds

Year	Obs	Mean $\overline{CRq}$ (/qtr)	SD	Min	Max	Median $\overline{CRq}$ (/qtr)	Mean ITH[1] (years)	Median ITH[2] (years)
1997	29	0.176	0.214	0.043	1.113	0.116	1.4	2.2
1998	38	0.138	0.087	0.044	0.570	0.117	1.8	2.1
1999	44	0.130	0.071	0.039	0.390	0.109	1.9	2.3
2000	47	0.148	0.097	0.032	0.561	0.127	1.7	2.0
2001	59	0.168	0.156	0.034	1.158	0.133	1.5	1.9
2002	69	0.155	0.099	0.021	0.523	0.128	1.6	2.0
2003	77	0.147	0.086	0.035	0.468	0.118	1.7	2.1
2004	88	0.138	0.070	0.038	0.363	0.119	1.8	2.1
2005	108	0.122	0.067	0.014	0.351	0.113	2.1	2.2
2006	121	0.139	0.155	0.000	1.606	0.119	1.8	2.1
2007	131	0.124	0.069	0.002	0.327	0.111	2.0	2.2
Overall	811	0.140	0.108	0.000	1.606	0.118	1.8	2.1

[1] inferred from mean churn rate [2] inferred from median churn rate

Table 2.5

Probit analysis of the effect of institutional ownership on hedge funds' targeting

This table reports the impact of institutional ownership on the probability of a firm being the target of hedge funds. Sample years are 1997 to 2007 inclusive. All independent variables are lagged by one year. The dependent variable is equal to 1 if the firm is a hedge fund target during the year. Institutional Ownership (IO) is the fraction of the firm's outstanding shares owned by institutional investors. Institutional ownership is further classified as short term (SIO) and long term (LIO) based on the fraction of the firm's outstanding shares that are owned by institutional investors with a short term and long term focus, respectively, based on portfolio churn ratio (see Appendix 2.B) and institutional type (investment companies and independent investment advisors are short term, and banks, insurance companies, and others including pension, endowment funds and sovereign wealth funds are long term). All regressions control for q, sales growth (Growth), return on assets (ROA), leverage, research and development (R&D), and dividend and share repurchase (DSR) yield and year fixed effects (See Appendix 2.A for definitions). Observations are from a matched sample (5 nearest neighbor firms) based on 3 digit SIC code, market to book ratio, and firm size based on market value of equity. Cluster-robust cluster standard errors are in parentheses with clustering at firm level. ***, **, * indicate significance level at 1%, 5% and 10% level respectively.

	(1)	(2)	(3)
	Marginal Effects	Marginal Effects	Marginal Effects
Q	-0.0141***	-0.0143***	-0.0140***
	(0.0044)	(0.0044)	(0.0043)
Growth	-0.0610***	-0.0622***	-0.0619***
	(0.0176)	(0.0177)	(0.0176)
ROA	0.0233	0.0223	0.0204
	(0.0415)	(0.0416)	(0.0412)
Leverage	0.0120	0.0133	0.0174
	(0.0211)	(0.0210)	(0.0211)
R&D	0.1073	0.0992	0.1044
	(0.0806)	(0.0812)	(0.0802)
DSR Yield	0.2076*	0.2195*	0.2173*
	(0.1244)	(0.1244)	(0.1229)
IO	0.1129***		
	(0.0183)		
$SIO_{churn\ rate}$		0.1334***	
		(0.0277)	
$LIO_{churn\ rate}$		0.0732	
		(0.0555)	
$SIO_{institutional\ type}$			0.1811***
			(0.0325)
$LIO_{institutional\ type}$			-0.0368
			(0.0625)
Year Fixed Effects	Y	Y	Y
Observations	3,520	3,520	3,520
Pseudo R^2	0.1722	0.1729	0.1747

Table 2.6

Volatility of stock returns of firms targeted by hedge fund

This table examines quarterly stock return volatility in the +/- eight quarters surrounding hedge fund SEC 13D filings between 1997 and 2007. The dependent variable in all regressions is the quarterly standard deviation of stock returns based on a GARCH(1,1) model. In regression (1), the explanatory variable of interest is a dummy that equals 1 if the observation occurs after the 13D filing. Regression (2) includes the dummy variable from the first regression and adds quarterly abnormal return as an explanatory variable. All regressions control for industry (3 digit SIC) and year fixed effects. All explanatory/control variables are based on quarterly data. The regressions control for return on assets, q, dividend and share repurchase yield, leverage, cash flow ratio (See Appendix 2.A for definitions). Cluster-robust cluster standard errors are in parentheses with clustering at firm level. ***, **, * indicate significance level at 1%, 5% and 10% level respectively

Variable	(1)	(2)
Dummy=1 if observation is after activism event	0.0014	0.0042
	(0.0050)	(0.0047)
Quarterly Holding Period Abnormal Return		-0.0561***
		(0.0081)
Return on Assets$_{\text{prior quarter}}$	-0.6392***	-0.6266***
	(0.0585)	(0.0592)
q$_{\text{prior quarter}}$	0.0016	0.0022
	(0.0017)	(0.0017)
Dividend and Share Repurchase Yield$_{\text{prior quarter}}$	-1.0560***	-0.9367***
	(0.2203)	(0.2085)
Leverage$_{\text{prior quarter}}$	0.0074	0.0020
	(0.0144)	(0.0158)
Free Cash Flow Ratio$_{\text{prior quarter}}$	0.0166	0.0100
	(0.0194)	(0.0194)
Constant	0.7849***	0.5348***
	(0.0830)	(0.0479)
Year Fixed Effect	Y	Y
Industry Fixed Effects (3 digit SIC code)	Y	Y
Observations	8,937	8,267
R-squared	0.378	0.398

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2.7

Impact of institutional ownership on the volatility of stock returns of firms targeted by hedge funds

This table reports the relationships between the levels of and changes in institutional ownership stock return volatility at firms targeted by hedge funds between 1997 and 2007. The dependent variable in all regressions is the quarterly standard deviation of stock returns based on a GARCH(1,1) model in the 24 months following the activism event. All regressions control for industry (3 digit SIC) and year fixed effects. All explanatory/control variables are based on quarterly data. Institutional Ownership (IO) is the fraction of the firm's outstanding shares owned by institutional investors. Institutional ownership is further classified as short term (SIO) and long term (LIO) based on the fraction of the firm's outstanding shares that are owned by institutional investors with a short term and long term focus, respectively, based on portfolio churn ratio using the methodology in Appendix 2.B. The regressions control for return on assets, q, dividend and share repurchase yield, leverage, and cash flow ratio (See Appendix 2.A for definitions). Cluster-robust cluster standard errors are in parentheses with clustering at firm level. ***, **, * indicate significance level at 1%, 5% and 10% level respectively

Variable	(1)	(2)
Institutional Ownership (IO)$_{\text{prior quarter}}$	-0.1343***	
	(0.0182)	
Short Term Focused Institutional Ownership (SIO)$_{\text{prior quarter}}$		-0.0984***
		(0.0227)
Long Term Focused Institutional Ownership (LIO)$_{\text{prior quarter}}$		-0.2118***
		(0.0332)
Δ Institutional Ownership (IO)$_{\text{prior quarter}}$	-0.1056***	
	(0.0212)	
Δ Short Term Focused Institutional Ownership (SIO)$_{\text{prior quarter}}$		-0.0971***
		(0.0234)
Δ Long Term Focused Institutional Ownership (LIO)$_{\text{prior quarter}}$		-0.1285***
		(0.0275)
Return on Assets$_{\text{prior quarter}}$	-0.5058***	-0.5095***
	(0.0708)	(0.0709)
q$_{\text{prior quarter}}$	0.0017	0.0012
	(0.0021)	(0.0021)
Dividend and Share Repurchase Yield$_{\text{prior quarter}}$	-0.3565	-0.3120
	(0.2299)	(0.2287)
Leverage$_{\text{prior quarter}}$	0.0328*	0.0343**
	(0.0170)	(0.0171)
Free Cash Flow Ratio$_{\text{prior quarter}}$	0.0043	0.0075
	(0.0260)	(0.0261)
Constant	0.4414***	0.4293***
	(0.0280)	(0.0282)
Year Fixed Effect	Y	Y
Industry Fixed Effects (3 digit SIC code)	Y	Y
Observations	3,402	3,402
R-squared	0.440	0.443

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2.8

Institutional ownership in target firms before and after hedge fund hedge fund targeting

This table presents changes in measures of target firm institutional ownership in the years before and after being targeted by hedge funds. The regression specification is $y_{i,t} = \sum_{j=-2}^{+2} \alpha_j + \sum_{j=-2}^{+2} \beta_j D_{i,j} + FE_{3digitSIC} + FE_{year} + \varepsilon_{i,t}$ where $y_{i,t}$ is the measure of institutional ownership (defined below) for firm *i* in year *t*, $D_{i,j}$ is a dummy variable equal to 1 if firm *i* will be (was) subject to a hedge fund SEC 13D filing *-j* years relative to the current year, $FE_{3digitSIC}$ and FE_{year} control for industry (based on 3 digit SIC code) and year fixed effects, and $\varepsilon_{i,j}$ is an error term. The dependent variables in the separate regressions are measures of institutional ownership at target firms: Institutional Ownership (IO) is the fraction of the firm's outstanding shares owned by institutional investors. Institutional ownership is further classified as short term (SIO) and long term (LIO) based on the fraction of the firm's outstanding shares that are owned by institutional investors with a short term and long term focus, respectively, based on portfolio churn ratio (see Appendix 2.B) and institutional type (investment companies and independent investment advisors are short term, and banks, insurance companies, and others including pension, endowment funds and sovereign wealth funds are long term). Observations are from a matched sample (5 nearest neighbor firms) based on 3 digit SIC code, market to book ratio, and firm size based on market value of equity. Cluster-robust cluster standard errors are in parentheses with clustering at firm level. ***, **, * indicate significance level at 1%, 5% and 10% level respectively.

Variable	IO	$SIO_{churn\ rate}$	$LIO_{churn\ rate}$	$SIO_{institutional\ type}$	$LIO_{institutional\ type}$
$D_{i,-2}$	0.0905***	0.0654***	0.0261***	0.0706***	0.0214***
	(0.0139)	(0.0104)	(0.0053)	(0.0102)	(0.0049)
$D_{i,-1}$	0.0973***	0.0681***	0.0297***	0.0722***	0.0260***
	(0.0132)	(0.0096)	(0.0052)	(0.0094)	(0.0049)
$D_{i,0}$	0.0503***	0.0335***	0.0170***	0.0322***	0.0192***
	(0.0128)	(0.0095)	(0.0051)	(0.0090)	(0.0049)
$D_{i,1}$	0.0540***	0.0210**	0.0325***	0.0296***	0.0238***
	(0.0140)	(0.0102)	(0.0057)	(0.0099)	(0.0055)
$D_{i,2}$	0.0819***	0.0557***	0.0273***	0.0456***	0.0359***
	(0.0160)	(0.0117)	(0.0064)	(0.0111)	(0.0066)
α_i	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y
Ind. fixed effects (3 digit SIC code)	Y	Y	Y	Y	Y
Observations	14,629	14,629	14,629	14,629	14,629
R-squared	0.706	0.677	0.628	0.681	0.657
Tests of significant changes in levels of institutional ownership[1]					
Coefficients $\beta_1 - \beta_{-1}$	-0.0433***	-0.0471***	0.0028	-0.0426***	-0.0022
F- Score	12.34	22.72	0.29	21.14	0.20
Coefficients $\beta_2 - \beta_{-1}$	-0.0154	-0.0124	-0.0024	-0.0266**	0.0099
F- Score	1.07	1.13	0.14	6.05	2.35

[1] Test of H0: βx-βy=0

*** p<0.01, ** p<0.05, * p<0.1

Appendix 2.A
Definition of Variables

Variable Name	Variable Definition
Dividend and Share Repurchase Yield	total dividend payment and total expenditures on share repurchases all divided by market value of equity
Free Cash Flow	net income plus depreciation & amortization plus interest after tax minus the increase in net working capital minus capital expenditures
Free Cash Flow Ratio	free cash flow divided by total assets
Institutional Ownership (IO)	fraction of the target firm's outstanding shares owned by institutional investors
Leverage	book value of debt divided by sum of book value of debt and book value of equity
Long term focused institutional ownership (LIO)	fraction of the target firm's outstanding shares owned by institutional investors with a long term focus
Market to Book Ratio	fiscal year end share price times common shares outstanding divided by book value of equity
Market Value of Equity	share price at fiscal year end times the total number of shares outstanding
Q	sum of book value of debt and market value of equity all divided by the sum of book value of debt and book value of equity
Research and Development (R&D)	research and development expense divided by prior year total assets
Return on Assets (ROA)	earnings before interest, taxes, depreciation, and amortization (EBITDA) divided by prior year total assets

Variable Name	Variable Definition
Sales Growth	increase in sales over prior year divided by prior year sales
Short term focused institutional ownership (SIO)	fraction of the target firm's outstanding shares owned by institutional investors with a short term focus
Stock Return	fiscal year end price plus all per share dividend payments during the fiscal year all divided by prior fiscal year end share price

Appendix 2.B

Determining portfolio churn rate and investment time horizon of institutional investors

Since I am interested in the relationships between activist hedge funds and other institutional investors, I exclude activist hedge funds from the sample when calculating churn rate and investment time horizon.

Step 1

Using information from Schedule 13F quarterly filings of equity holdings:

$\#_{k,i,t}$ is the number of firm *i* shares held by institutional investor *k* at the end of quarter *t*

$\text{Price}_{i,t}$ is the share price for firm *i* at the end of quarter *t*

N_k is the number of different firms in which institutional investor *k* has equity holdings

$$\text{Aggregate Purchases}_{\text{k,t}} = \sum_{i=1}^{N_k}\left(\#_{k,i,t}\,\text{Price}_{i,t} - \#_{k,i,t-1}\,\text{Price}_{i,t-1} - \#_{k,i,t}\,\Delta\text{Price}_{i,t}\right) \text{ for } \#_{k,i,t} > \#_{k,i,t-1}$$

$$\text{Aggregate Sales}_{k,t} = \sum_{i=1}^{N_k}\left|\#_{k,i,t}\,\text{Price}_{i,t} - \#_{k,i,t-1}\,\text{Price}_{i,t-1} - \#_{k,i,t}\,\Delta\text{Price}_{i,t}\right| \text{ for } \#_{k,i,t} \le \#_{k,i,t-1}$$

Step 2

Find the quarterly churn rate for each institutional investor

$$\text{Quarterly Churn Rate}_{k,t} = CRq_{k,t} = \frac{\min\left(\text{Aggregate Purchases}_{\text{k,t}}, \text{Aggregate Sales}_{\text{k,t}}\right)}{\sum_{i=1}^{N_k}\frac{\left(\#_{k,i,t}\,\text{Price}_{i,t} - \#_{k,i,t-1}\,\text{Price}_{i,t-1}\right)}{2}}$$

Step 3

Find the average quarterly churn rate for each institutional investor

$$\text{Average Quarterly Churn Rate}_{k,year} = \overline{CRq}_{k,year} = \frac{1}{4}\sum_{qtr=1}^{4} CRq_{k,qtr} \text{ for } qtr \in year$$

Step 4

Based on $\overline{CRq}$, sort all institutional investors into two portfolios. An institutional investor is short term focused if its churn rate is greater than or equal to the median of $\overline{CRq}$ for each year and long term focused if its churn rate is below median.

Step 5

For each firm, SIO is the number of shares held by short term focused institutional investors divided by the total number of shares outstanding. LIO is the number of shares held by long term focused institutional investors divided by the total number of shares outstanding.

Note that Tables 2.6 and 2.7 are based on quarterly data. To calculate quarterly SIO and LIO, I use the quarterly churn rate, CRq, from step 2 to sort the institutional investors into short term and long term focused.

Appendix 2.C

Estimating Stock Return Volatility

GARCH (1, 1) Model

Some of the results in this paper are based on estimates of target firm stock return variance. A common approach in the empirical literature is to use a first-order generalized autoregressive conditional heteroscedasticity model — GARCH (1, 1) — Bollerslev (1986). I collected daily share price information for all target firms for the time period December 31, 1992 to December 31, 2009 from CRSP. The continuously compounded return is $r_t = \ln\left(\frac{p_t}{p_{t-1}}\right)$, where p_t and p_{t-1} are the closing share price on day *t* and *t-1* respectively. I assume that $r_t = \bar{r} + \sigma_t \varepsilon_t$ where $\bar{r}$ is the mean continuously compounded daily return (which may vary over time), σ_t^2 is the variance of daily returns, and ε_t is a sequence of $N(0,1)$ i.i.d. random variables. The $a_t = \sigma_t \varepsilon_t = r_t - \bar{r}$ terms are the residuals. In the GARCH(1, 1) specification, the current period estimate of the variance depends on the prior period estimate of the variance and the prior period squared residuals, $\sigma_t^2 = \alpha_0 + \alpha_1 a_{t-1}^2 + \beta_1 \sigma_{t-1}^2$. STATA uses maximum likelihood methodology to estimate the α and β parameters based on a sample of returns. Using post estimation commands I generated the GARCH estimates of daily stock return variance. Monthly stock return variance equals the sum of the daily variances over the month. Quarterly stock return variance equals the sum of the monthly variances over the quarter. Standard deviation equals the square root of variance.

Realized Variance

Realized variance equals sum of squared returns.

$$\mathrm{RV}_{monthly} = \sum_{i=1}^{n} r_i, \text{ where } n \text{ is the number of daily returns in the month}$$

$$\mathrm{RV}_{quarterly} = \sum_{i=1}^{3} \mathrm{RV}_{monthly}$$

Chapter Three: *The Market for CEO Talent and Perquisites: Theory and Evidence*

This is a coauthored paper with Dr. Jiaping Qiu from the DeGroote School of Business, McMaster University, Hamilton, Ontario, L8S 4M4 Canada and Dr. Seungjin Han is from the Department of Economics, McMaster University, Hamilton, Ontario, L8S 4M4 Canada. I collected the detailed information on executive perks from SEC filed proxy statements and conducted the empirical tests. I made major contributions in the writing of sections 3.1, 3.3, and 3.4.

3.1 Introduction

Compensation for corporate chief executive officers (CEOs) has risen dramatically beyond the rising wage level of average workers over the past decades (e.g., Hall and Murphy, 2003 and Murphy and Zabojnik, 2004). Public controversy about such pay disparity has resulted in increased scrutiny of all aspects of CEO compensation, both monetary and nonmonetary. CEO monetary compensation, or simply wage, normally includes cash salary, bonus, equity and options. Nonmonetary compensation, often referred to as perquisites or perks, is benefits offered to CEOs but not to employees at large. CEO perks have various forms such as company car, club memberships, corporate aircraft, legal fees, financial services, security, and relocation benefits. The exclusivity and luxury of CEO perks make them even more controversial than monetary compensation and

tend to be perceived by the public as negative.[19] Despite being controversial, executive perks remain widespread. For example, according to 2010/2011 executive compensation survey results from compensation consultant Compdata Surveys, in the midst of the recent financial crisis, 77.6 percent of organizations offer perks to their CEOs in 2010.[20]

The extant literature offers two arguments on the prevalence of CEO perks. One holds that perks are the result of weak corporate governance that allows CEOs to divert corporate resources for personal gain (e.g., Jensen and Meckling, 1976, and Bebchuk and Fried, 2004). The optimal contracting argument, however, states that perks could be a cost effective way to enhance executive productivity and should be part of optimal executive compensation packages (e.g., Fama, 1980, Rosen, 1986, and Henderson and Spindler, 2005). However, despite the guidance from these two schools of thought on the existence of CEO perks, not much is known about how executive wage and perks are jointly determined in a competitive CEO market where CEOs differ in their talent and perks may affect a CEO's utility and productivity. The empirical evidence on CEO perks is limited and mixed. Yermack (2006) finds that the disclosure of executives' personal use of corporate jets leads to lower equity returns. Grinstein,

[19] For example, in *The New York Times* "Scrutiny of bankers' perks will grow, too" on February 5, 2009, E. Dash calls "for greater corporate review of excessive or luxury items for executives" and gives examples of large dollar perks provided by firms that accepted government bail-out money during the financial crisis.

[20] The Wall Street Journal/Hay Group CEO Compensation Study found that 63% of companies offered personal use of the corporate aircraft in 2010.

Weinbaum, and Yehuda (2010) confirm the punitive market reaction to first-time disclosure of perks. In contrast, Rajan and Wulf (2006) find that firms are more likely to offer perks in situations in which perks enhance CEO productivity, suggesting that perks might not be purely managerial excess. One of the difficulties in investigating CEO perks is data availability. Executive perks information is not offered in standard research data available to researchers. Existing studies rely on the information of one particular type of perk or small random samples or survey data.

This paper makes two main contributions. First, it provides an equilibrium theory on how CEO wage and perks are endogenously determined in a competitive CEO market with heterogeneous firms and CEOs. Second, it investigates the determinants of executive perks in S&P (Standard and Poors) 500 firms using new manually collected panel data. Recent studies (e.g., Murphy and Zabojnik, 2007, Tervio, 2008, Gabaix and Landier, 2008, and Edmans, Gabaix and Landier, 2008) consider CEOs with different levels of managerial talent matching with firms in a competitive matching model. CEOs are compensated by wage (without perks) in their models. Our theory considers the joint determinants of CEO wage and perks in a sufficiently general matching environment in which (i) there is heterogeneity in both CEO talent and firm size and (ii) firms and CEOs competitively bargain multidimensional compensation packages (i.e., wage and perks), fully aware of their outside options in the competitive market. Moreover,

we address three key features of perks. First, the cost of providing perks could differ from that of providing wage. On one hand, perks are more cost effective for firms if there are economies of scale in providing perks. For instance, a car service or financial consultant can be shared by multiple executives. On the other hand, perks could be costly if they magnify agency costs inside the firm or create negative perception among investors. For example, a golf club membership could divert a CEO from working and the negative reaction of investors to the disclosure of personal use of company aircraft, as documented in Yermack (2006), suggests that negative perception of perks by investors could result in significantly higher costs of equity. Second, perks and other consumption goods (purchased with wage) could be complements in a CEO's utility function. As argued in Hirsch (1976) and Rajan and Wulf (2006), perks could be a form of status conveying the relative position of an executive in a firm. Being a positional good, higher perk consumption could increase the marginal utility derived from consuming more other goods. In other words, perks and other consumption goods are complementary (inseparable) in a CEO's utility function. Third, perks could be productivity-related or non productivity-related depending on their ability to enhance CEO productivity. Productivity-related perks provide common value to both the firm and the CEO because they increase both the CEO's utility and productivity. Non productivity-related perks provide only private benefit to the CEO because they increase utility without increasing the CEO's productivity.

Our theory shows how firms compensate CEO talents with both wage and perks in a competitive CEO market, considering the cost of providing perks, the CEO's preferences over wage and perks, and the productivity-related nature of perks. We derive closed-form solutions for the equilibrium levels of wage and perks that depend on the CEO's preferences, the cost of providing perks and the production function of the firm. Our results lead to three main predictions regarding wage, perks, and firm size. First, both perks and wage are increasing in firm size. Second, if there are economies of scale in the cost of providing perks, perks are more sensitive than wage to changes in firm size; i.e., firms increase perks faster than wage in their compensation packages as firm size increases. Third, the sensitivity of perks to changes in firm size depends on how much they enhance the CEO's productivity: The more perks enhance the CEO's productivity, the faster they increase in firm size.

To evaluate the predictions of our model, we assemble a new panel database on CEO perks in S&P 500 companies. On January 27, 2006 the SEC (Security and Exchange Commission) released proposed amendments to the rules governing disclosure; they issued the revised and final version of the release on August 29, 2006. The SEC required adherence to the new rules for all filings after December 15, 2006. Under the old 1992 rules, if the aggregate value of perks given to an executive did not exceed $50,000, firms did not have to disclose perks at all. The old rules required firms to itemize the costs of any individual perks if

they exceeded 25% of the overall total perk value, given the reporting threshold was reached. The new 2006 rules lowered the $50,000 threshold to $10,000 and required that every individual perk item be identified. In addition to the requirement to identify perks, any perks valued at greater than $25,000 or 10% of the aggregate perk value must be separately quantified (SEC Release No. 33-8732A). The timing of this regulation change ensures that all proxy statements for fiscal years 2006 and beyond provide meaningful and consistent data that enables the analysis of relationships between wage, perks, and firm size. We manually collected information on CEO perks from public disclosures contained in the proxy statements that S&P 500 companies filed with the SEC between January 1, 2007 and December 31, 2010. To the best of our knowledge, our data provides the most comprehensive CEO perks information to date at S&P 500 companies.

We test the model predictions regarding the sensitivity of perk compensation to changes in firm size, the relative sensitivity of perks and wage to changes in firm size, and the relative sensitivity of more productivity-related and less productivity-related perks to changes in firm size. We demonstrate that both perks and wage are increasing in firm size, while perks are more sensitive than wage to changes in firm size. Based on closed form solution equations, the estimated coefficients for firm size from the wage and perks equations further permit us to recover the exponent parameter in the cost function of providing perks. Our

results indicate that this cost function is concave, suggesting, on average, there are economies of scale for our sample firms in providing perks to CEOs. Recognizing the potential controversy in defining specific perk items as productivity enhancing, we then classify perks as more or less productivity-related based on three different criteria; their ability to remove distractions from the CEO, their ability to improve CEO well-being, and their ability to save time for the CEO. Depending on the productivity classification, we find that more productivity-related perks are between forty and seventy percent more sensitive than less productivity-related perks to changes in firm size. The results are consistent with the prediction of the theory that, if perks provide common value and increase the CEO's productivity, firms are willing to offer more perks in their compensation packages. Overall, the empirical evidence on the determinants of CEO wage and perks provide strong support to the predictions of our theory.

The rest of the paper proceeds as follows. Section 2 presents the theoretical model. Section 3 provides empirical evidence. Section 4 summarizes and concludes.

3.2 Theory

There is a continuum of firms differing in their sizes and a continuum of CEOs differing in their talents. Let s denote the size of a firm. Firm s can negotiate with its potential CEO on perks and wage. Let p denote the level of perks and w the wage. CEOs differ in their talent. Let t denote the talent level of a CEO. The

total measure of CEOs is normalized to one. Let G characterize the measure of CEOs so that $G(t)$ denotes the measure of CEOs whose talents are no greater than t. The market for CEOs is competitive so that there are more firms than CEOs in the market. Let S be the total measure of firms and it is therefore assumed to be no less than one $(S \geq 1)$. The measure of the firms is characterized by F. Let $F(s)$ be the measure of firms whose sizes are no greater than s.

The utility function $u(c, p)$ represents the CEO's preferences on the consumption good c that she purchases with wage and the perks p that she gets. Let the CEO's exogenous non-earned income be normalized to zero. Then, if the CEO's wage is w , she purchases w units of the consumption good $(c = w)$. Given this formulation, we denote the utility function by $u(w, p)$ from now on. Assume that the CEO's preferences are monotone, so the marginal utilities $u_w(w, p)$ and $u_p(w, p)$ of wage and the perks are both positive at all $(w, p) \in \mathrm{R}^2_+$.

Let $f(p,t,s)$ be the firm's production function. We normalize the price of output to one. When firm s hires a CEO with talent t at wage w and perks p, its profit is

$$\pi(w, p, t, s) = f(p,t,s) - w - c(p),$$

where $c(p)$ is the cost that the firm incurs in providing perks p. We assume that $f_t(p,t,s) > 0$ and $f_s(p,t,s) > 0$ so that the firm's output is increasing in the

CEO's talent and its size. We assume that $f_p(p,t,s) \geq 0$. If $f_p(p,t,s) > 0$ at each (p,t,s), perks have the common value because they increase both the CEO's utility and the firm's output. If $f_p(p,t,s) = 0$ at each (p,t,s), perks have only the private value because they increase only the CEO's utility.

3.2.1 Equilibrium

We construct a competitive equilibrium with the notion of stable matching where there are no alternative pairs of firms and CEOs who, by matching each other with any compensation package (w, p), can make themselves strictly better off. The stable matching equilibrium defined below endogenizes the firm's supply decision of perks together with the wage offered to a CEO. A stable matching equilibrium in the competitive CEO market is characterized by (i) the market wage function $w(s)$, (ii) the market perks function $p(s)$ and (iii) the market matching function $m(s)$. The market wage and perks functions $\{w(s), p(s)\}$ characterize the wage and perks that firm s gives its CEO in equilibrium. The market matching function $m(s)$ characterizes the talent of the CEO who works for a firm as a function of the firm's size. We use the notation $\varnothing$ so that $m(s) = \varnothing$ means that firm s does not hire a CEO in the market.

First consider the problem for CEO t, that is, the CEO with talent t. If she wants to work for firm s, firm s will agree to any compensation package (w, p) as long as it gives the firm profit at least as high as the one that the firm would

have by hiring the CEO with talent $m(s)$ with the compensation package $\{w(s), p(s)\}$. Hence if CEO t wants to work for firm s, she will find a compensation package (w, p) that maximizes her utility subject to $f(p,t,s) - w - c(p) \geq f(p(s), m(s), s) - w(s) - c(p(s))$. Because the CEO will also choose which firm to work for, CEO t therefore solves the following problem:

$$\max_{(w,p,s)} u(w, p)$$

$$\text{subject to } f(p,t,s) - w - c(p) \geq f(p(s), m(s), s) - w(s) - c(p(s)).$$

Let $\{\tilde{w}(t), \tilde{p}(t), \tilde{s}(t)\}$ be a solution to the problem of the CEO with talent t.

Consider firm s's problem. If it wants to hire CEO t, it must offer a compensation package to her that generates a utility level at least as high as $u(\tilde{w}(t), \tilde{p}(t))$. Since the firm needs to choose which CEO to hire for profit maximization, firm s therefore solves the following problem:

$$\max_{(w,p,t)} f(p,t,s) - w - c(p)$$

$$\text{subject to } u(w, p) \geq u(\tilde{w}(t), \tilde{p}(t)).$$

Let $\{w(s), p(s), t(s)\}$ be a solution to the problem of firm s.

CEO t works for firm s and she is compensated with (w, p) when (w, p, s) solves CEO t's problem and (w, p, t) solves firm s's problem. In stable matching equilibrium, the compensation package offered by firm s is equal to what market

wage and perks functions specify; $(w, p) = (w(s), p(s))$. Furthermore, the talent of the CEO that firm s hires is exactly the same as what market matching function specifies; $t = m(s)$. Therefore, the market participants' expectations on $\{w(s), p(s), t(s)\}$ are realized in stable matching equilibrium.

Definition 1 *A tuple* $\{w(\cdot), p(\cdot), m(\cdot)\}$ *is a stable matching equilibrium in which, for all* t, *CEO* t *works for firm* s *and the compensation package is* $(w(s), p(s))$ *if (i)* $(w(s), p(s), s)$ *is a solution to CEO t's problem; (ii)* $(w(s), p(s), t)$ *is a solution to firm s's problem; and (iii)* $t = m(s)$.

The tuple $\{w(\cdot), p(\cdot), m(\cdot)\}$ that satisfies conditions (i)-(iii) in Definition 1 leads to stable job matching because it induces no pairs of firms and CEOs who, by matching each other with any compensation package (w, p), can make themselves strictly better off.

Let $\underline{s}$ be the smallest size of the firm from among firms that hire CEOs in equilibrium. Because the production function is increasing in firm size, any firm that hires a CEO in equilibrium has a larger firm size than any firm that does not hire a CEO. This implies that $\underline{s}$ is determined by $S - F(\underline{s}) = 1$. Then firm $\underline{s}$ is indifferent between hiring a CEO in the market or staying out of the market because its profit in equilibrium is zero,

$$f(p(\underline{s}), m(\underline{s}), \underline{s}) - w(\underline{s}) - c(p(\underline{s})) = 0. \quad (1)$$

Equation (1) can be shown easily. Because there are potentially more firms than CEOs in the market, the competition among firms drives up the equilibrium wage for the CEO hired by firm $\underline{s}$ to $w(\underline{s}) = f(p(\underline{s}), m(\underline{s}), \underline{s}) - c(p(\underline{s}))$. If not, firm $\underline{s}$ enjoys positive profit in equilibrium. In this case, the CEO with $m(\underline{s})$ and a firm that does not hire a CEO with a very similar firm size to $\underline{s}$ can agree on a compensation package that makes both better off. The fact that there are potentially more firms than CEOs determines the equilibrium profit for firm $\underline{s}$.

If the i^{th} best firm hires the i^{th} best CEO in stable matching equilibrium, matching is called (positively) assortative. When matching is assortative, the market matching function is uniquely determined by $S - F(s) = 1 - G(m(s))$ for all $s \geq \underline{s}$. Proposition 1 below characterizes the stable matching equilibrium.

Proposition 1. Suppose that the firm's profit function and the CEO's utility function satisfy conditions 1 and 2 stated in the next subsection 2.2, the stable matching equilibrium is assortative and it is characterized by the tuple of market functions $\{w(\cdot), p(\cdot), m(\cdot)\}$ that satisfies

(a) for all $s \geq \underline{s}$, $S - F(s) = 1 - G(m(s))$ and

(b) for all $s \geq \underline{s}$,

$$w'(s) + \frac{u_p(w(s), p(s))}{u_w(w(s), p(s))} p'(s) = f_t(p(s), t(s), s) m'(s) \qquad (2)$$

$$\frac{u_p(w(s), p(s))}{u_w(w(s), p(s))} + f_p(p(s), t(s), s) = c'(p(s)) \tag{3}$$

with the initial condition $(w(\underline{s}), p(\underline{s}))$, which is a solution to the system of the following equations,

$$w'(\underline{s}) + \frac{u_p(w(\underline{s}), p(\underline{s}))}{u_w(w(\underline{s}), p(\underline{s}))} p'(\underline{s}) = f_t(p(\underline{s}), t(\underline{s}), \underline{s}) m'(\underline{s})$$

$$f(p(\underline{s}), t(\underline{s}), \underline{s}) - w(\underline{s}) - c(p(\underline{s})) = 0.$$

Part (a) characterizes the market matching function for assortative matching. In the next subsection, we present conditions 1 and 2 under which assortative matching is a unique stable matching pattern. Equations (2) and (3) of part (b) are the first-order conditions for the problems for both CEOs and firms that are matched. Given the assortative matching function satisfying part (a), these equations are in fact the first-order differential equations for the market perks function and the market wage function with the initial condition. We can solve these differential equations for the market perks function and the market wage function, given the assortative matching function.

Equation (2) shows that in equilibrium, the marginal change in the total value of wage and perks for a CEO is equal to the marginal change of output associated with the change in the talent of the CEO who matches with a larger firm. The right hand side of Equation (2) shows that, as the firm size *s* increases at the margin, it is accompanied by the change in the CEO's talent $m'(s)$, which

changes the total output by $f_t(p(s),t(s),s)m'(s)$. Therefore, the right hand side of Equation (2) is the marginal change of output due to the change in the talent of the CEO who matches with a larger firm. In a competitive CEO market, this change in the total output is fully passed to the CEO through changes in wage and perks, which are captured by the left hand side of Equation (2) where the first term is the marginal change of wage while the second term is the marginal change in the CEO's utility due to the change in perks normalized by the marginal utility of wage, i.e., the dollar value of the marginal utility of perks.

Equation (3) shows that in equilibrium, the marginal benefit of providing perks equals its marginal cost for a given firm with size *s*. This condition, jointly with equation (2), determines wage and perks in the compensation package for the CEO $m(s)$. The right hand side of equation (3) is the marginal cost of providing perks. The left hand side of equation (3) is the marginal benefit of providing perks which comes from two sources: the increases of the CEO's utility normalized by the marginal utility of wage (i.e., the dollar value of the increase of the utility) and the increase of output.

3.2.2 Assortative Matching Pattern

In this section we provide sufficient conditions for assortative matching to be the unique stable matching pattern. Readers who are less interested in technical details can skip this section and move directly to subsection 3.2.3 on closed-form solutions for the determinants of wage and perks in stable matching equilibrium.

In assortative matching, the i^{th} best CEO works for the i^{th} largest firm. In our model of continuous firms and CEOs, this relationship between CEO talent and firm size implies that the matching function $t = m(s)$ is assortative if $S - F(s) = 1 - G(m(s))$ for all $s \geq \underline{s}$. It implies that the slope of the market matching function is positive, i.e., $m'(s) > 0$ at all $s \geq \underline{s}$.

The supermodular property of payoff functions is closely related to assortative matching. Let us briefly explain the supermodular property.[21] For any x, x' in X, let $x \vee x'$ denote the least upper bound (join) of x and x' in X and let $x \wedge x'$ denote the greatest lower bound (meet). Suppose that $X \subseteq \mathrm{R}^n$. Then, the join of x and x' is simply the component-wise maximum and the meet is simply the component-wise minimum. The set X is a lattice if, for any x and x' in X, their join and meet exist and they belong to X. Consider a lattice $X \subseteq \mathrm{R}^n$ with the ordering relation $\geq$ such that $x = (x_1, \ldots, x_n) \geq x' = (x'_1, \ldots, x'_n)$ if $x_i \geq x'_i$ for all $i = 1, \ldots, n$. Any real-valued function $e : X \to \mathrm{R}$ with a lattice $X \subseteq \mathrm{R}^n$ is supermodular (equivalently x_i and x_j are complementary for all i and j such that $i \neq j$) if

$$e(x) + e(x') \leq e(x \vee x') + e(x \wedge x') \tag{4}$$

[21] See Topkis (1998) for more details on the supermodular functions and matching/assignment problems.

for all x and x'. The function e is strictly supermodular (equivalently x_i and x_j are strictly complementary for all i and j such that $i \neq j$) if, for all unordered x and x', (4) holds with strict inequality. When the function e is twice differentiable, supermodularity is equivalent to complementarity between all x_i and x_j (i.e., $e_{ij} = \partial^2 e / \partial x_i \partial x_j \geq 0$ for all i and j such that $i \neq j$) and strict supermodularity is equivalent to strict complementarity between all x_i and x_j (i.e., $e_{ij} > 0$ for all i and j such that $i \neq j$). For example, the production function specified in our model is supermodular if it exhibits complementarity between any pair of input factors which means that the marginal productivity of one input factor is nondecreasing in another. Suppose that a firm considers hiring a CEO. The CEO's marginal productivity is nondecreasing in firm size given the complementarity between CEO productivity and firm size. Because perks are complementary to firm size and CEO talent, a larger firm has an added incentive to provide a higher level of perks even when it hires the same CEO. Supermodularity is quite natural in many cases. Separable functions are supermodular but not strictly supermodular. Supermodularity is also sufficiently general to allow for non productivity-related perks.

We now turn to the sufficient conditions for assortative matching as the unique stable matching pattern in our model with continuous firms and CEOs. These conditions are as follows:

Condition 1

(a) The firm's profit function, $f(p,t,s)-w-c(p)$, is concave in p and the CEO's utility function, $u(w,p)$, is concave in (w,p).

(b) Either (i) the CEO's utility function is strictly concave or (ii) the firm's profit function is strictly concave in p and the CEO's utility function is strictly concave in w.

Condition 1 states the concavity properties required by the firm's profit function and the CEO's utility function for assortative matching: The firm's profit function must be concave in perks and the CEO's utility function must be concave in both wage and perks and at least some of them must be strictly concave. If the firm's profit function is not strictly concave in perks, then the CEO's utility function must be strictly concave in both wage and perks. If the CEO's utility function is not strictly concave in both wage and perks, then the firm's profit function must be strictly concave in perks and the CEO's utility function must be strictly concave in wage.

The firm's profit function is concave in perks when the production function is concave in perks and the cost function is convex (i.e., $-c(p)$ is concave) in perks. However, the profit function can be concave in perks even with a concave cost function if the degree of its concavity is not too high. The concavity of the cost function of perks may capture the idea that the marginal cost can decrease due to the economies of scale in providing perks. After all, the shape of the cost

function of perks depends on the nature and scope of perks and it should be empirically addressed with the data on perks.

Condition 2 shows another property of supermodularity that is required for assortative matching. This condition is required on the firm's production function only.

Condition 2

(a) The firm's production function is supermodular.

(b) Either (i) t and s are strictly complementary in the firm's production function or (ii) p is strictly complementary to both t and s in the firm's production function and the CEO's utility function is strictly concave in w.

Condition 2 requires that the firm's production function be supermodular. This property is equivalent to the complementarity between any pair of input factors. It also requires that some of them be strictly complementary: If the production function does not exhibit strict complementarities between perks and CEO talent and between perks and firm size, then it must exhibit strictly complementarity between CEO talent and firm size. If the production function does not exhibit strict complementarity between CEO talent and firm size, then it must exhibit strict complementarities between perks and CEO talent and between perks and firm size. In this case, the strict concavity of the CEO's utility function in wage is further required. This point will be clear in the proof of Theorem 1.

Theorem 1 below shows that conditions 1 and 2 are sufficient to ensure that assortative matching is the unique stable matching pattern. For technical simplicity, we assume that functions are twice differentiable.

Theorem 1 Suppose that the firm's profit function and the CEO's utility function satisfy conditions 1 and 2. Then, the stable matching is (positively) assortative.

Proof First, let $v(t) \equiv u(\tilde{w}(t), \tilde{p}(t))$ be the equilibrium utility level that the CEO with talent t receives. If firm s wants to hire the CEO with talent t, it must provide the utility level $v(t)$. Therefore, the firm's problem for the choice of (w, p) can be captured in the following Largrangian function:

$$L = f(p,t,s) - w - c(p) + \lambda[v(t) - u(w,p)]$$

Let $p^*(t,s)$ and $w^*(t,s)$ be the optimal compensation package that firm s would offer to the CEO with talent t if it wanted to hire her.[22] The first-order conditions with respect to p and w are respectively

$$f_p(p,t,s) - c'(p) - \lambda u_p(w,p) = 0$$
$$-1 - \lambda u_w(w,p) = 0$$

at $(p,w) = (p^*(t,s), w^*(t,s))$. Note that the optimal levels of perks and wage $p^*(t,s)$ and $w^*(t,s)$ depend on the talent of the CEO that the firm wants to hire.

[22] Note that $p^*(t,s)$ and $w^*(t,s)$ are specified for all possible t. The observed equilibrium compensation package is $p(s) = p^*(m(s),s)$ and $w(s) = w^*(m(s),s)$ with $t = m(s)$.

Let us denote by p_t^* and w_t^* the partial derivatives of $p^*(t,s)$ and $w^*(t,s)$. Taking the partial derivatives of the first-order conditions then yields

$$f_{pt} + f_{pp}p_t^* - c''(p)p_t^* - \lambda u_{pw}w_t^* - \lambda u_{pp}p_t^* = 0, \tag{5}$$

$$-\lambda u_{ww}w_t^* - \lambda u_{wp}p_t^* = 0. \tag{6}$$

One can solve the systems of equations (5) and (6) for p_t^* and w_t^*. The solution for p_t^* is

$$p_t^* = \frac{-f_{pt}\lambda u_{ww}}{(f_{pp} - c'')\lambda u_{ww} + \lambda^2(u_{pw}^2 - u_{pp}u_{ww})}.$$

The Largrangian multipler λ is negative because the higher utility level for the CEO decreases the firm's profit. Given this negative multiplier, (a) and (b) in condition 1 ensure that p_t^* is non-negative so that $p^*(t,s)$ is non-decreasing in the CEO's talent t.

Now let us consider the maximum profit function for firm s when it hires the CEO with talent t:

$$\Pi(t,s) \equiv f(p^*(t,s),t,s) - w^*(t,s) - c(p^*(t,s)) + \lambda[v(t) - u(w^*(t,s), p^*(t,s))].$$

Applying the envelop theorem, the cross partial derivative of $\Pi(t,s)$ is

$$\Pi_{ts}(t,s) = f_{ts} + f_{ps}p_t^*.$$

Conditions 1 and 2 ensure that both terms are non-negative and at least one of them is positive so that $\Pi_{ts}(t,s) > 0$: The firm's maximum profit function is

strictly supermodular in (t,s). Therefore, for any t_H, t_L with $t_H > t_L$ and any s_H, s_L with $s_H > s_L$

$$\Pi(t_H, s_H) - \Pi(t_L, s_H) > \Pi(t_H, s_L) - \Pi(t_L, s_L) \tag{7}$$

Equation (7) directly implies that the stable matching must be (positively) assortative. Suppose not, i.e., firm s_L hires the CEO with talent t_H and firm s_H hires the CEO with talent t_L in stable matching equilibrium. Firm s_L hires the CEO with talent t_H only when

$$\Pi(t_H, s_L) \geq \Pi(t_L, s_L) \tag{8}$$

From equations (7) and (8), we can deduce

$$\Pi(t_H, s_H) > \Pi(t_L, s_H),$$

which shows that firm s_H can make a strictly higher profit by hiring the CEO with talent t_H. This contradicts that firm s_H hires the CEO with talent t_L in stable matching equilibrium. Therefore, the stable matching must be (positively) assortative. **QED**

It is now well known how to characterize the stable matching pattern when utility is one-to-one transferable between partners in a match: If the total suplus function in a match satisfies the increasing differences in the partners' inherent attributes, then the stable matching is assortative in terms of partners' attributes. Less known is how to characterize the stable matching pattern when utility is not

one-to-one transferable. Our model does not belong to the case of one-to-one transferable utility because the CEO's utility and the firm's profit are not one-to-one transferable when wage is not separable from perks in the CEO's utility function. For the non-transferable utility case, Legros and Newman (2007) identify the condition called "generalized increasing differences" for stable matching to be assortative.

However, we cannot apply their result directly because their model is based on a finite number of agents on each side but our model is based on a continuum of agents. This is why we identify our own sufficient conditions for stable matching to be assortative in the continuous model. Our sufficient conditions also have added advantages compared to the one in Legros and Newman (2007). The condition of "generalized increasing differences" in Legros and Newman (2007) is not directly defined over an agent's primitive utility function, which specifies the agent's utility as a function of her inherent attributes and characteristics that she endogenously chooses. Rather it is the properties of the indirect utility function that specify the agent's maximum utility as a function of her attributes, the partner's attributes, and the utility level for the partner that the agent has to concede. However, our sufficient conditions are characterized in terms of the properties that are required for the primitive utility functions when the agent bargains a two dimensional compensation package of wage and perks together

with her partner. Hence, it is easy to verify whether our sufficient condition is satisfied.

3.2.3 Closed-Form Analysis

We provide the closed-form solutions for equilibrium wage and perks under a widely used class of function forms that satisfy conditions 1 and 2. The market matching function is derived according to (a) in Proposition 1. For simplicity, assume that distributions of CEOs and firms, G and F, are both probability distributions. Then, because $S = 1$, (a) in Proposition 1 becomes, for all all $s \geq \underline{s}$,

$$1 - F(s) = 1 - G(m(s)).$$

We need to solve this equation for $m(s)$ in order to get the market matching function. Given the market matching function $m(s)$, we can solve the first-order differential equations in (b) in Proposition 1 for the market perks function $p(s)$ and the market wage function $w(s)$. For this purpose, we derive the closed-form solution given the following functional form:

$$m(s) = ks^q, \tag{9}$$

where $k > 0$ and $q > 0$. k is the "shift" parameter and q is the "relative spacing" parameter. Given k, the relative spacing parameter q shows the relative heterogeneity of the CEO's talent to the firm size. This functional form can be derived under several reasonable distributions for firm size and CEO talent. For example, assume that the distributions of firm size and CEO talent follow a class

of Weibull distributions. Then we have $1-F(s)=\exp[-(s/\lambda_1)^{k_1}]$ and $1-G(t)=\exp[-(t/\lambda_2)^{k_2}]$. In this case, the parameters in equation (9) become $q=k_1/k_2$ and $k=\lambda_2/\lambda_1^{k_1/k_2}$. If $k_2=1$, it is the exponential distribution. If $k_2=3,4$, it is close to the normal distribution. Suppose that the distribution of firm size follows a class of Pareto distributions, so does the distribution of CEO talent. Then, we have $1-F(s)=(s/s_m)^{-k_1}$ and $1-G(t)=(t/t_m)^{-k_2}$, where s_m is the mode of the firm size, t_m is the mode of the CEO's talent, and k_1 and k_2 are positive numbers. The parameters in equation (9) become $q=k_1/k_2$ and $k=t_m/s_m^{k_1/k_2}$.[23]

For the firm's profit function, we take the widely-used class of Cobb-Douglas functions for its production function. These functional forms are quite general for the parameters to have various economic interpretations in the empirical/theoretical analysis. Let $f(p,t,s)=\delta p^{\alpha}t^{\beta}s^{\gamma}$ denote the production function, where $\delta>0$, $\alpha\geq 0$, $\beta>0$, and $\gamma>0$. The parameters, α, β, and γ, determine the marginal rates of technical substitution of between perks, the CEO's talent and firm size. The parameter δ represents technology level. If $\alpha>0$,

[23] The Pareto distributions have been very helpful in approximating the distributions of many economic variables such as individual income levels, city sizes, insurance claims, and standardized price returns on individual stocks among many others. It quite nicely approximates firm size and also possibly the CEO's talent in the matching market for CEOs (Gabaix and Landier, 2008). The functional form in equation (9) is also derived when the distributions of firm size and CEO talent follow a class of Fréchet distributions or a class of Gumbel distributions.

perks are productivity-related and are strictly complementary to both CEO talent and firm size; perks have common value for both the firm and the CEO. If $\alpha = 0$ in the production function, perks have only private value in the sense that they affect the CEO's utility only. The signs of the parameters in the production function ensure its supermodular properties in condition 2. The firm's cost function for providing perks is given by $c(p) = \lambda p^{\phi}$ with $\lambda > 0$ and $\phi > 0$. Therefore, the profit function for firm z is $\Pi = \delta p^{\alpha} t^{\beta} s^{\gamma} - w - \lambda p^{\phi}$.

The CEO's utility function is $u(w, p) = a w^{d} p^{b}$. Assume that $a > 0$, $0 < d \leq 1$, and $0 < b \leq 1$. The parameters, d and b, determine the CEO's marginal rate of substitution of perks for wage. The CEO's utility function is concave and wage and perks are strictly complementary. Because the marginal utility of wage is increasing in perks and the marginal utility of perks is increasing in wage, it is cost saving for the firm to increase both wage and perks slightly in order to raise a utility level instead of increasing only one component of the compensation package.

Given the profit function, the utility function and the market matching function, the first-order conditions in (b) in Proposition 1 become, for all $s \geq \underline{s}$,

$$w'(s) + \frac{bw(s)}{dp(s)} p'(s) = \delta\beta p(s)^{\alpha} m(s)^{\beta-1} s^{\gamma} m'(s), \tag{10}$$

$$\frac{bw(s)}{dp(s)} + \alpha\delta p(s)^{\alpha-1} m(s)^{\beta} s^{\gamma} = \phi\lambda p(s)^{\phi-1}, \tag{11}$$

with the initial condition $(w(\underline{s}), p(\underline{s}))$.

We normalize the smallest firm size among those firms that hire in equilibrium into zero: $\underline{s} = 0$. This normalization makes the compensation package offered by firm $\underline{s}$ equal to $(w(\underline{s}), p(\underline{s})) = (0,0)$. Given this initial condition and the matching function given in equation (9), we then solve equations (10) and (11) for the equilibrium compensation package $(w(s), p(s))$ yielding

$$w(s) = A \times s^{\frac{\phi(\beta q+\gamma)}{\phi-\alpha}},$$

$$p(s) = B \times s^{\frac{\beta q+\gamma}{\phi-\alpha}},$$

where A and B are constants,

$$B = \left[\frac{\delta k^{\beta}}{\lambda\phi}\left(\frac{b\beta q}{d\left(\frac{\beta q+\gamma}{\phi-\alpha}\right)\left(\phi+\frac{b}{d}\right)}+\alpha\right)\right]^{\frac{1}{\phi-\alpha}} \text{ and } A = \frac{B^{\alpha}\delta\beta q k^{\beta}}{\left(\frac{\beta q+\gamma}{\phi-\alpha}\right)\left(\phi+\frac{b}{d}\right)}.$$

The details on how to derive $w(s)$ and $p(s)$ are provided in Appendix 3.A. By taking the log transformation of $w(s)$ and $p(s)$, the equilibrium wage and perks equations become

$$\ln w(s) = \ln A + \frac{\phi(\beta q+\gamma)}{\phi-\alpha}\ln s. \tag{12}$$

$$\ln p(s) = \ln B + \frac{\beta q+\gamma}{\phi-\alpha}\ln s, \tag{13}$$

Previous studies have shown that CEO wage is positively related to firm size (e.g., Gabaix and Landier, 2008, and Graham, Li and Qiu, 2012), suggesting that $\phi - \alpha > 0$. Equations (12) and (13) show that the sensitivities of wage and perks to the change of firm size increase with a higher α because the coefficients of the logarithmic firm size in the two equations increase in α. Recall the firm's production function is $f(p,x,z) = \delta p^{\alpha} t^{\beta} s^{\gamma}$. A higher α indicates the perks are more productivity-related, i.e., the impact of increases in perks on the firm's output is higher.

On the other hand, perks have private value only in the extreme opposite case of $\alpha = 0$ because, in this case, changes in perks have no impact on output but affect the CEO's utility only. In this private-value case, the equilibrium wage and perks equations become

$$\ln w(s) = \ln \tilde{A} + (\beta q + \gamma) \ln s. \tag{14}$$

$$\ln p(s) = \ln \tilde{B} + \frac{\beta q + \gamma}{\phi} \ln s, \tag{15}$$

where $\tilde{A}$ and $\tilde{B}$ are constants that correspond to A and B with $\alpha = 0$.

3.2.4 Implications

Because wage and perks are complementary in CEO utility, the firm can raise the CEO's utility a lot more by increasing both wage and perks at the same time instead of increasing only one. Therefore, from the firm's point of view, it is cost-

saving to increase both perks and wage when the firm has to raise the CEO's utility as her talent increases. Because a larger firm hires a more productive CEO in assortative matching, it implies that equilibrium wage and perks are both increasing in the firm size.

The relative slopes of the equilibrium wage equation and the equilibrium perks equation depend on the convexity/concavity of the cost function of perks. If the coefficient of logarithmic firm size in the equilibrium perks function is greater than the corresponding coefficient in the equilibrium wage function, then the cost function of perks is (strictly) concave (i.e., $\phi < 1$). On the other hand, if the coefficient of logarithmic firm size in the equilibrium perks function is smaller, the cost of perks is (strictly) convex (i.e., $\phi > 1$). Therefore, we can empirically determine the concavity/convexity of the cost function of perks by examining whether or not the estimated coefficient of logarithimic firm size in the perks equation is smaller than the estimated corresponding coefficient in the wage equation. This implication is quite natural to expect. For example, suppose that the cost function of perks is concave. Then, the marginal cost of perks is decreasing in the level of perks but, since wage is linear in money, the marginal cost of the wage is always constant. This implies that larger firms will increase perks more than wage due to the economies of scale in providig perks. As a result, equilibrium perks increase faster in firm size than the equilibrium wage if the cost

function for perks is concave. The opposite holds when the cost function of perks is convex.

Equations (13) shows that the equilibrium equation for perks is steeper when they are more productivity-related, i.e., have a higher value of α. This implication is economically straightforward. More productivity-related perks increase the firm's output more than less productivity-related perks do. Therefore, the firm has an added incentive to provide more productivity-related perks as the firm size increases. In the extreme opposite case where perks are non productivity-related, the firm has no added incentive to provide perks because non productivity-related perks increase the CEO's utility only and changes in non productivity-related perks do not affect the firm's output. This is why the equilibrium perks equation for productivity-related perks is steeper than the equilibrium perks equation for non productivity-related perks.

In sum, the above analysis leads to the following testable predications.

1. In equilibrium, logarithmic wages and logarithmic perks are positively linearly related to logarithmic firm size.
2. If the slope of the logarithmic wage equation exceeds that of the logarithmic perks equation, then the cost function of perks is convex. On the other hand, if the slope of the logarithmic perks equation exceeds that of the logarithmic wage equation, then the cost function of perks is concave. In particular, the exponent in the cost function of perks,

parameter ϕ, equals the ratio of the coefficient of logarithmic firm size in the wage equation to that in the perks equation.

3. In the equilibrium equations for more productivity-related and less productivity-related perks, the firm-size coefficient for more productivity-related perks exceeds that for less productivity-related perks. In general, the more productivity-related perks are, the more sensitive they are to the change in firm size.

In the next section, we present empirical analysis based on the closed-form solutions derived in this section. We are particularly interested in whether the implications from the closed-form solutions are confirmed from the empirical analysis.

3.3 Empirical Evidence

3.3.1 Data

Our source of data on perks originates with public disclosures contained in proxy statements that S&P 500 companies filed with the SEC between January 1, 2007 and December 31, 2010 available from the SEC Edgar database. These proxy statements were all subject to the SEC disclosure rules that came into effect on December 15, 2006. Depending on a company's chosen month for fiscal year end, sample firms' fiscal years are from 2006 to 2010. The SEC defines named officers as CEO, CFO (chief financial officer), and the other top three highest paid officers of the company, and requires publicly traded companies to disclose

compensation for named officers in annual proxy statements. Sometimes firms choose to also include compensation for other executives, such as those recently retired or terminated. Appendix 3.B is a sample of the summary compensation table prescribed by current SEC regulations. The SEC specifies the elements of executive compensation that companies must report in separate columns (designated by lower case letters) in the summary compensation table of the proxy statement: (c) *salary*, (d) *bonus*, (e) *stock awards*, (f) *option awards*, (g) *non-equity incentive plan compensation*, (h) *change in pension value and nonqualified deferred compensation earnings*, (i) *all other compensation*, and (j) *total*. The SEC defines *all other compensation* as executive compensation not otherwise included in columns (c) though (h), and specifies two categories of *all other compensation*: *perquisites and other personal benefits* and *additional all other compensation*.

For the first category, *perquisites and other personal benefits*, the SEC does not specifically define perquisites and personal benefits but provides guidance.[24] *Perquisites and other personal benefits* include, but are not limited to, club memberships, financial or tax advice, personal travel, personal use of company

[24] In Release No. 33-8732A the SEC expresses concern "that sole reliance on a bright line definition in our rules might provide an incentive to characterize perquisites or personal benefits in ways that would attempt to circumvent the bright lines…. An item is not a perquisite or personal benefit if it is integrally and directly related to the performance of the executive's duties. Otherwise, an item is a perquisite or personal benefit if it confers a direct or indirect benefit that has a personal aspect, without regard to whether it may be provided for some business reason or for the convenience of the company, unless it is generally available on a non-discriminatory basis to all employees."

property, housing, relocation and other living expenses, security, and discounts on company products or services (SEC Release No. 33-8732A, p.77).

The second category, *additional all other compensation*, includes severance or any payment related to a change of control, company contributions to vested or unvested pension plans, the value of any company paid insurance premiums, amounts reimbursed during the fiscal year for the payment of taxes (gross-ups), the value of discount on acquired company shares, the value of any dividends or other earnings paid on stock or option awards when the dividends or earnings were not factored into the grant date fair value, director or other fees, commissions, any other miscellaneous cash payment (SEC Release No. 33-8732A, p.79).

There is no standard approach to reporting the details (e.g., items and values) of *all other compensation*. Depending on the company, the detailed information is either in the footnotes to the summary compensation table or summarized in a separate table. We manually collected compensation information in the summary compensation table and detailed information for *all other compensation* for executives at S&P 500 companies. We supplement the hand collected compensation data with company financial statement information from Compustat. The final merged dataset has 2,031 observations on 719 CEOs from 559 firms. The number of firms exceeds 500 because of changes to the composition of the S&P 500 over time. We winsorize all variables at the top and

bottom one percent. See Appendix 3.C for detailed definitions of variables used in this study.

(Insert Table 3.1 about here)

Table 3.1 provides summary statistics of firm characteristics for our sample firms. Given that the sample pool is the S&P 500, the firms in our data set are large (average annual sales of $16.2 billion, average total assets of $44.7 billion and average number of employees of 44,960) and profitable (average return on equity of 12.4% and average return on assets of 4.8%). The average market-to-book ratio is 3.1. The average stock return is 5.3%. Our sample firms span fifty-seven sectors defined by two-digit SIC (standard industry classification) code.

3.3.2 Perks Provisions in S&P 500 Firms

Since the SEC does not uniformly define perk items, firms choose their own descriptions of perks when disclosing compensation under the category *perquisites and other personal benefits*. For example, firms describe car service alternatively as car and driver, chauffeur, limousine, and ground transportation. As such it is necessary to exercise some discretion in grouping perks with different descriptions but with common meaning. We consolidate more than 50 perk descriptions into the twenty specific perk items shown in Table 3.2. For example we group five separate items (travel assistance, moving expenses, temporary accommodation, cash lump sum in lieu of incidentals, and realtor,

legal, and other closing costs) into "relocation expenses" because all five items are associated with reimbursement for a job-related move. Companies often disclose miscellaneous or other perks; we consolidate these items with other not-easily-classifiable descriptions as "other perks". The literature provides examples of similar approaches to consolidating perks. Grinstein, Weinbaum, and Yehuda (2010) compile a perk database based on 2007 and 2008 SEC filings for a random sample of small, medium, and large firms that includes 130 large market-capitalization firms. They document 30 descriptions of perks consolidated into ten main perk items, including tax gross-ups. Rajan and Wulf (2006) use a database of 15 perk items based on the responses of approximately 300 companies between 1986 and 1999 to a survey conducted by a well known U.S. based compensation consultant. The perk items on the survey were chosen by the consultant. We believe ours to be the most comprehensive perk database in existence for large market capitalization firms based on consistent, stringent compensation disclosure rules.

(Insert Table 3.2 about here)

Table 3.2 provides a summary of *all other compensation* for CEOs in fiscal years 2006 to 2010. For comparison purposes, we also include information for other executives. Almost all executives receive some form of all other compensation (99.0% of CEOs and 98.0% of other named executives, at average values of $320,395 and $210,981, respectively). The percentage of CEOs (other

executives) receiving *additional all other compensation* is 91.6% (89.8%). On average, CEOs (other executives) receive *additional all other compensation* worth $203,137 ($162,385).

CEOs receive *perquisites and other personal benefits* more frequently and at higher levels, on average, than do other executives (75.1% compared to 63.2% and $148,775 compared to $60,961 respectively). The most common perks for CEOs disclosed under the category *perquisites and other personal benefits* are personal use of aircraft (36.3%), other perks (26.3%), financial services (24.0%), personal use of automobile (19.5%), and security (10.7%). The most valuable perks for CEOs are security ($162,480), personal use of aircraft ($143,299), relocation expenses ($134,320), cost of living allowances ($113,258), and car service ($55,088). The most common perks for executives other than CEO are other perks (23.9%), financial services (21.6%), personal use of automobile (17.1%), personal use of aircraft (10.3%), and medical/health (8.8%). The most valuable perks for executives other than CEO are relocation expenses ($168,169), cost of living allowances ($141,761), personal use of aircraft ($65,735), car service ($52,960), and legal fees ($40,704).

Personal use of aircraft is a good example of a truly exclusive perk in that CEOs receive it far more frequently than other named executives, and at a higher dollar value. Chauffeur services are also exclusive, even among executives; CEOs are more than twice as likely as the other named executives to benefit from the

services of a car and driver. Note that for CEOs, security is the fifth most common perk but the most expensive on average and with a maximum annual value of $1.7 million. Overall, the results indicate that, despite the fact that the use of perks as a form of executive compensation is widespread across S&P 500 companies, there is large variation in value and scope of perks offered to executives of different rank.

We measure wage as the sum of *salary*, *bonus*, *stock awards*, *option awards*, *non-equity incentive plan compensation*, and *change in pension value and nonqualified deferred compensation earnings* (i.e., all elements in the summary compensation table excluding *all other compensation*). We measure perks as the amount reported as *perquisites and other personal benefits*. This amount equals the sum of the 20 perk items described in Table 3.2.[25]

The Spearman's rank correlation coefficients between wage and perks are 0.3655 and 0.2472 for CEOs and other executives respectively, both significant at the 1% level. The results indicate that higher wages are positively associated with higher perks. The correlation coefficient between CEO wage and firm size is 0.5148 while the correlation coefficient between CEO perks and firm size is

[25] The SEC specifically classifies tax gross-ups as an item in *additional all other compensation* instead of an item in *perquisite and other personal benefit*. As such, our definition of total perks does not include tax gross-up. Grinstein, Weinbaum, and Yehuda (2010) include tax gross-ups as one of their perk items. We define an alternative definition of total perks that includes tax gross-ups. We repeat all of our empirical analyses using this alternative definition and find no change to the interpretation of our results. The conclusions are actually strengthened because tax gross-ups are large and frequent (31.4% of CEOs and 26.8% of other executives receive tax gross-ups, at average values of $42,392 and $49,662, respectively).

0.2707, both are significant at 1% level. The positive correlations between wage, perks and firm size are consistent with our theory that large firms tend to offer both higher wage and higher perks yielding a positive correlation between wages and perks.

3.3.3 The Determinants of Perks in S&P 500 Firms

We now conduct formal analyses regarding the relationship between firm size, CEO wage and perks. The equilibrium perk and equilibrium wage equations (i.e., equations (12) through (15)) predict the linear relationships between logarithmic perks and logarithmic firm size and between logarithmic wage and logarithmic firm size. Therefore, we estimate the following regression models:

$$Ln(Wage_{it}) = \alpha_W + \beta_W Ln(Size_{it-1}) + \mathbf{X}'_{it-1}\boldsymbol{\gamma}_W + u_j^w + v_t^w + \varepsilon_{it}^w \quad (16)$$

$$Ln(Perks_{it}) = \alpha_P + \beta_P Ln(Size_{it-1}) + \mathbf{X}'_{it-1}\boldsymbol{\gamma}_P + u_j^p + v_t^p + \varepsilon_{it}^p \quad (17)$$

where $Ln(Wage_{it})$ and $Ln(Perks_{it})$ are the natural logarithm of CEO *i*'s wage and perks compensation in year *t*, respectively. $Ln(Size_{i,t-1})$ is the logarithm of firm *i*'s market value in year *t-1*. Alternative measures for firm size have been used in the literature, including number of employees, total assets, sales, and market capitalization. Gabaix and Landier (2008) argue that market value is a better measure of firm size when the effect of CEO talent on future earnings is permanent. Empirically, they show that, compared to other measures of firm size, the market value of a firm (i.e., sum of book value of debt and market value of

equity) offers the highest predictive power in a regression with total compensation as the dependent variable and firm size as the single explanatory variable. In recognition of the benefits of this measure of firm size, we use market value as the proxy for firm size. To check the robustness of our results, we also use total assets, total sales or number of employees as alternative proxies for firm size and find these alternatives have no impact on the conclusions of our results.

X is a vector including control variables for firm and managerial characteristics. Extant literature has investigated how firm characteristics (such as profitability and stock price) and managerial characteristics (such as job tenure and gender) affect executive compensation (e.g., Rose and Shepard, 1997, Lazear, 2003, Murphy and Zabojnik, 2007, and Core, Guay, and Larcker, 2008). We use this literature as a guide in choosing explanatory variables for our regression analyses. Specifically, we control for growth opportunities of the firm, market performance, accounting performance, cash flow, growth, tenure and gender. u_j is industry *j*'s fixed effect. v_t is year *t*'s fixed effect. β_W and β_P measure the sensitivities of wage and perks to firm size. We also estimate equation (17) separately for more productivity-related and less productivity-related perks and obtain their sensitivities to firm size $\beta_P^{\text{More productivity-related}}$ and $\beta_P^{\text{Less productivity-related}}$. Hence, the predictions of our theory can be translated into the following testable hypotheses:

Hypothesis 1: Wage and perks are positively associated with firm size, i.e., $\beta_W > 0, \beta_P > 0$.

Hypothesis 2: The ratio of β_W / β_P is equal to the parameter ϕ in the cost function of perks. If the cost function of perks is concave, $\phi < 1$, perks are more sensitive to firm size than wage, i.e., $\beta_P > \beta_W$.

Hypothesis 3: More productivity related perks are more sensitive to firm size than less productivity-related perks,

i.e., $\beta_P^{\text{More productivity-related}} > \beta_P^{\text{Less productivity-related}}$

(Insert Tables 3.3 and 3.4 about here)

Tables 3.3 and 3.4 test Hypothesis 1 and report regression results for the impact of firm size on the equilibrium wage and perks equations, respectively. The five columns in each table report results for alternative specifications using different combinations of explanatory variables. Column (1) reports regression results that include only $Ln(Size_{i,t-1})$ as the explanatory variable. Column (2) includes $Ln(Size_{i,t-1})$, industry dummy and year dummy as explanatory variables. Column (3) includes $Ln(Size_{i,t-1})$ and other firm and managerial characteristics as explanatory variables. Column (4) includes $Ln(Size_{i,t-1})$, other firm and managerial characteristics, industry dummy and year dummy as explanatory variables. Column (5) adds the E (Entrenchment) Governance Index (Bebchuk, Cohen et al, 2009) as an additional explanatory variable to control for the effect of

corporate governance on compensation. Because the index is available for only 1639 observations in our database of approximately 2000 observations, we treat the column (4) regression as the main specification.

For the equilibrium wage equation in Table 3.3, the coefficients for $Ln(Size_{i,t-1})$ range from 0.277 to 0.297 over the five regressions and are all significant at the 1% level; for the complete specification in the fourth column of Table 3.3, the coefficient is 0.297, implying that a 1% increase in market value is associated with a 0.297% increase in the CEO's wage. For the estimated equilibrium perks equation in Table 3.4, the coefficients for $Ln(Size_{i,t-1})$ range from 0.662 to 0.917 over the five regressions and are all significant at the 1% level. The result from the specification in the fourth column of Table 3.4 shows that the coefficient for firm size β_P is 0.894, implying that a 1% increase in the market value of the firm is associated with a 0.894% increase in the CEO's total perks. Columns 5 in Tables 3.3 and 3.4 show that adding the E Index as an additional control has very little impact on the coefficients for $Ln(Size_{i,t-1})$. The results provide strong support for Hypothesis 1 that both wage and perks increase with the firm size.

(Insert Table 3.5 about here)

To test Hypothesis 2 and evaluate the cost function of perks, Table 3.5 summarizes the ratios of β_W / β_P using the estimated coefficients from Tables 3.3 and 3.4. The model predicts that the exponent ϕ in the perquisite cost function, $c(p) = \lambda p^{\phi}$, is equal to β_W / β_P. Hence, if the slope of the perk equation exceeds that of the equilibrium wage equation, $\beta_W / \beta_P < 1$, then $\phi < 1$ and the cost function of perks is concave. Table 3.5 show that β_W / β_P ranges from 0.310 to 0.418. Based on the complete specification in the fourth columns of Tables 3.3 and 3.4, β_W / β_P is equal to 0.332. The Chi^2 tests for the hypothesis that $\beta_W / \beta_P = 1$ have p-values less than 1% across all five specifications, rejecting the hypothesis that the firm-size coefficients for logarithmic wage and logarithmic perks are equal. The results indicate that the exponent in the perquisite cost function is less than one $(\phi < 1)$ and the perk cost function is concave. Note that the estimated concavity is conditional on the range of perks that have been offered by S&P companies. The result does not imply that the perk cost function will be neccesarily concave for perks outside of the range in our sample. It is possible that the cost function becomes convex if companies provide perks outside of the observed range in our sample. In other words, while our theory is flexible with the perk cost function being concave or convex, the estimated concavity reflects the function form over the range of the actual perks offered by firms.

Now turn to Hypothesis 3 on the implication of more versus less productivity-related perks. Ragan and Wulf (2008) are one of the few examples in the literature to discuss the empirical implications of the assumption that perks improve productivity. There is no generally accepted method to evaluate the productivity enhancing attributes of perks. Depending on the chosen criteria, any perk item has the potential to influence CEO productivity; as such, we refer to perks as more or less productivity-related rather than as productive or nonproductive. We recognize that any classification of a given perk item as more productivity-related may be debatable. To mitigate controversy, we test our third hypothesis using three different approaches to defining perks as more or less productivity-related. The first classification defines the productivity of perks in the context of their ability to remove distractions from the CEO, and is based on the argument that such perks will enable the CEO to better focus on important job-related duties. Under this classification, we define more productivity-related perks as relocation expenses, personal use of automobile, security, financial services, personal services, car service, personal meals, legal fees, parking, cost of living allowance, and medical/health; less productivity-related perks include club memberships, tickets and entertainment, personal travel, professional association dues, and perk cash allowance. The rationale for this classification follows. For more productivity-related perks, relocation expenses and cost of living allowances relieve the CEO from the burden of worrying about the details of a company

required change of work location. Company provided automobile and parking simplifies commuting; a car service is even better in that it removes the distraction of driving, allowing the executive to accomplish productive work while in transit. When a firm provides financial, legal, security and other personal services, the CEO can focus on work issues while other professionals manage important non-work activities on her behalf. Personal meals (for example, at the corporate cafeteria) eliminate lost transit and dining time associated with restaurant meals. Company provided health benefits and medical screening remove the distraction of unresolved health issues. For the less productivity-related perks, club memberships (e.g., golf and country club) and tickets and entertainment may have business networking benefits, but overall are distractions for the CEO. Company provided personal travel benefits do not remove CEO distractions as this perk is usually related to the travel expenses of the executive's family and guests. There is no elimination of CEO distraction associated with the firm paying the cost of professional association dues on behalf of the executive and perk cash allowances are really the equivalent to cash compensation.

In classification 2, we select more productivity-related perks specifically related to the CEO's physical, medical, financial, or legal well-being based on the argument that these perks are productivity enhancing because there is common benefit for both the firm and the CEO when the CEO can better focus on work duties when unencumbered by personal well-being issues. Under this

classification, the more productivity-related perks include security, financial services, legal fees, and medical/health; less productivity-related perks are unrelated to this specific definition of CEO well-being and include club memberships, tickets and entertainment, personal travel, and perk cash allowance.

In the first two classifications, we have purposely omitted certain controversial perk items such as the personal use of aircraft perk. However, because the aircraft perk is the most common and second most valuable perk for CEOs in our sample, we would be remiss in not including this perk in our analysis. Our third classification thus uses all of the perk items in Table 3.2 except other perks. This classification follows Ragan and Wulf (2008) by defining perk productivity in terms of the ability of the perk to save time for the CEO. More productivity-related perks are personal use of aircraft, personal use of automobile, financial services, reimbursement for unused vacation, car service, legal fees, parking, and medical/health; less productivity-related perks are relocation expenses, security, club memberships, tickets and entertainment, personal meals, personal travel, professional association dues, perk cash allowance, cost of living allowance, and charitable gift matching.

First we elaborate on the inclusion of specific perk items as more productivity-related. The use of corporate aircraft for business purposes saves time and improves the productivity of executives. Personal use of company aircraft could also be linked to time saving in two ways - it is often hard to

differentiate between personal and business use of aircraft and even for pure personal use of aircraft, companies normally argue that it is good for the productivity of CEOs.[26] Companies provide automobiles to CEOs for business purposes; having personal access to this transportation asset saves time for the CEO by simplifying vehicle selection and maintenance. Providing legal and financial services, including tax and estate planning, frees the CEO from time-consuming, personally-important matters and helps the CEO focus on business issues. When the company provides cash in lieu of unused vacation, the CEO spends more time on the job. A car service permits the CEO to work effectively while in transit (Ragan and Wulf, 2008). Assigned parking reduces transit time. Annual physicals promote wellness; the results of diagnostic tests either reduce worry by confirming good health or allow for better prognosis through early detection. We argue that healthy CEOs are more time efficient and that early detection of medical problems saves time in the long run.

Next we consider the defined less productivity-related perks in the context of ability to save time. Relocation and cost of living allowances are reimbursements for personal costs associated with changing the location of employment and are not related to saving time for the executive. Generally, security covers the cost for

[26]*The Wall Street Journal* "Corporate jet set: Leisure vs. business" on June 9, 2011, reports "it is hard to distinguish a CEO's work time from his leisure time" and that "Corporate jets are vital business tools that can efficiently carry busy executives to far-flung meetings, sometimes to multiple cities in a day. Allowing occasional personal use of the company plane can form an important part of a compensation package for a top executive."

installation and ongoing maintenance of home security systems. Infrequently this perk includes more extensive security services required because of safety concerns due to the public profile or country of employment of the executive. Although this second, less common type of security may have a time saving connotation, on the whole we categorize security as less productivity-related. While club memberships, tickets and entertainment may have residual benefits for the firm, they are, from a time saving point of view, distractions for the executive. Overall, personal travel and meal related to expenses for the executive, family members or guests have little direct time saving element for the CEO. There is no beneficial time saving impact for the CEO when the company pays for professional association dues, matches the dollar contributions of CEO charitable giving, or provides a cash lump sum in lieu of specific perks.

(Insert Table 3.6 about here)

Table 3.6 reports the impact of firm size on more versus less productivity-related perks for the three classifications defined above. The table shows that the perk equation is steeper for more productivity-related perks than for less productivity-related perks in all cases. For specification 1, the slope coefficient in the more productivity perk equation is 0.403 at a significance level of 1% while that in the less productivity perk equation is 0.233 at a significance level of 5%. For specification 2, the slope coefficient in the more productivity-related perk equation is 0.407 at a significance level of 1% while that in the less productivity-

related perk equation is 0.235 at a significance level of 5%. For classification 3, the slope coefficient in the more productivity-related perk equation is 0.428 at a significance level of 1% while that in the less productivity-related perk equation is 0.299 at a significance level of 1%. Overall, our empirical results show that more productivity-related perks are more sensitive than less productivity-related perks to changes in firm size which is consistent with Hypothesis 3.

A caveat with the above findings is that we base the empirical tests of our hypotheses on reported dollar values of perks as required by the SEC. As such, our tests are subject to a relatively narrow perk definition that focuses on personal benefit. According to the SEC, an item is not a perquisite or personal benefit "if it is integrally and directly related to the performance of the executive's duties" (SEC Regulation 33-8732A, page72). Therefore, if a perk item meets this criterion, the company does not need to report its cost as perk compensation. A broader perk definition would include business related perks (e.g., large, well-appointed offices, corporate jets for business travel, and personal communication devices such as smart phones and tablet computers), yet the cost of all of these will not appear as perk compensation in proxy statements if the company classifies them as integral to the job. For example, if an executive chooses to fly business class instead of economy class and is able to accomplish more work during the flight and arrives more rested and better prepared for subsequent meetings, this broader perk would be productivity-related, but the cost

differential in airfares is not a perk by SEC standards. Contrast this with a company policy that requires an executive to use the corporate jet for all travel (both business and personal) for security reasons, for which the SEC regulations require that the company reports the incremental cost of the personal travel as perk compensation. To the extent that business-integral perks are more productivity-related, empirical analysis that is conditional on personal perks makes it is more difficult to detect the difference between more and less productivity-related perks.

3.4 Conclusions

This paper analyzes the joint determinants of CEO wage and perks in a competitive CEO market. Firms differ in their size and CEOs possess heterogeneous talents. They competitively bargain multidimensional compensation packages (i.e., wage and perks). We show that, in equilibrium, firm size, wage, perks and talent are all positively related. Moreover, productivity-related perks that provide common value by increasing both firm profitability and executive utility increase faster with firm size compared to non productivity-related perks that provide private value by increasing executive utility only. We test the predictions of the model using manually collected data on CEO perks in S&P 500 companies. The empirical results are consistent with the theoretical predictions. Our theory shows how perks are determined as a part of competitive compensation packages. If perks are complementary to wage in the CEO's utility

function, including perks in compensation packages is cost effective for firms and utility improving for CEOs as well. The benefit of including perks in compensation packages will be enhanced if perks are more productivity-related and provide common value to firms and CEOs.

The unique nature of different perk items, the difficulty in collecting perk information and the complexity in modeling perks together with wage have largely limited the research on perks, both theoretically and empirically. This paper makes a first attempt to understand how wage and perks are jointly determined in a competitive CEO market. Our analysis considers the impact of two major heterogeneities, CEO talent and firm size, on wage and perks compensation. An interesting future research question is to understand, from the CEO's perspective, the difference between perks and wage, which will help us to have further insight on the cross-sectional variation in CEO compensation packages.

References

Bebchuk, L., A. Cohen and A. Ferrell, 2009, What matters in corporate governance? Review of Financial Studies 22(2), 783-827.

Bebchuk, L, and J. Fried, 2004, Pay Without Performance: The Unfulfilled Promise of Executive Compensation, (Harvard University Press, Cambridge, MA).

Burrough, B., Helyar, J., 2003, Barbarians at the Gate, (Harper Business, New York).

Core, J., W. Guay, and D. Larcker, 2008, The power of the pen and executive compensation, Journal of Financial Economics 88, 1-25.

Edgerton, J., 2012, Agency problems in public firms: Evidence from corporate jets in leveraged buyouts, Journal of Finance 67(6), 2187-2213.

Edmans, A., X. Gabaix and A. Landier, 2009, A multiplicative model of optimal CEO incentives in market equilibrium, Review of Financial Studies 22(12), 4881-4917.

Fama, E., 1980. Agency problems and the theory of the firm. Journal of Political Economy 88, 288–307.

Gabaix, X. and A. Landier, 2008, Why has CEO pay increased so much? The Quarterly Journal of Economics 123(1), 49-100.

Graham, J., S. Li, and J. Qiu, 2012, Managerial attributes and executive compensation, Review of Financial Studies 25(1), 144-186.

Grinstein, Y., D. Weinbaum, and N. Yehuda, 2010, The economic consequences of perk disclosure, Johnson School Research Paper Series No. 04-09; AFA 2011 Denver Meetings Paper. Available at SSRN: http://ssrn.com/abstract=1108707

Hall, B., and K. Murphy, 2003, The trouble with stock options, Journal of Economic Perspectives 17(3), pp. 47-70.

Henderson, T., and J. Spindler, 2005, Corporate heroin: A defense of perks, executive loans, and conspicuous consumption. Georgetown Law Journal 93, 1835-1884.

Hirsch, F., 1976, Social Limits to Growth, (Harvard University Press, Cambridge, MA).

Jensen, M., and W. Meckling, 1976, Theory of the firm: managerial behavior, agency costs, and ownership structure, Journal of Financial Economics 3, 360–395.

Lazear, E., 2003, Firm-specific human capital: A skill-weights approach, IZA Discussion Paper No. 813. Available at SSRN: http://ssrn.com/abstract=422562

Legros, P., and A. Newman, 2007, Beauty is a beast, frog is a prince: Assortative matching with nontransferabilities, Econometrica 75(4), 1073-1102.

Murphy, K. and J. Zabojnik, 2004, CEO pay and appointments: A market-based explanation for recent trends, The American Economic Review 94(2), 192-196.

Murphy, K., and Zabojnik, J., Managerial capital and the market for CEOs (April 2007), working paper. Available at SSRN: http://ssrn.com/abstract=984376

Rajan, R. G., and J. Wulf, 2006, Are perks purely managerial excess? Journal of Financial Economics 79(1), 1-33.

Rose, N., and A. Shepard, 1997, Firm diversification and CEO compensation: Managerial ability or executive entrenchment? Rand Journal of Economics 28(3), 489-514.

Rosen, S., 1986, The theory of equalizing differences, in Ashenfelter, O. and R. Layrad, eds.: Handbook of Labor Economics, (Elsevier Science B.V., Amsterdam, The Netherlands).

Tervio, Marko. 2008. The difference that CEOs make: An assignment model approach. American Economic Review, 98(3): 642–68.

Topkis, D. M., 1998, Supermodularity and Complementarity, (Princeton University Press, Princeton, NJ).

Yermack D., 2006, Flights of fancy: Corporate jets, CEO perquisites, and inferior shareholder returns, Journal of Financial Economics 80(1), 211-242.

Yermack, D., 2012, Tailspotting: How disclosure, stock prices and volatility change when CEOs fly to their vacation homes. Available at SSRN: http://ssrn.com/abstract=2022822

Table 3.1

Summary statistics of firm characteristics

The table provides summary statistics of firm characteristics in the sample. The sample includes S&P 500 firms between January 1, 2006 and December 31, 2010. *Market Value* is book value of debt plus market value of equity. *Return on Assets* is net income divided by total assets. *Return on Equity* is net income divided by total equity. *Sales Growth* is the percentage change in sales between the current fiscal year and the previous fiscal year. *Stock Return* is fiscal year end share price plus all per share dividend payments during the fiscal year all divided by prior fiscal year end share price. *Market to Book Ratio* is fiscal year end share price times common shares outstanding divided by book value of equity. *Free Cash Flow* is net income plus depreciation & amortization plus interest after tax minus the increase in working capital minus capital expenditures.

	Mean	Std	Min	Max	P25	Median	P75
Employees	44,960	98,312	110	2,100,000	7,000	18,700	45,000
Net Sales ($millions)	16,173	25,405	598	157,333	3,327	7,426	15,403
Total Assets ($millions)	44,685	125,175	1,115	884,547	4,780	11,417	29,552
Market Value ($millions)	30,103	53,609	1,325	343,632	6,657	12,776	26,952
Return on Assets	4.8%	8.5%	-34.7%	27.2%	1.6%	5.0%	9.1%
Return on Equity	12.4%	37.2%	-164.8%	174.3%	6.7%	14.2%	22.0%
Sales Growth	5.1%	20.6%	-52.7%	88.3%	-4.5%	5.2%	13.0%
Stock Return	5.3%	49.4%	-81.8%	236.8%	-25.7%	2.9%	26.0%
Market to Book Ratio	3.1	3.7	-11.5	23.8	1.5	2.3	3.7
Free Cash Flow ($millions)	1,415	3,865	-3,725	25,491	68	467	1,265

Table 3.2

Summary statistics of perks provided in S&P 500 firms

The table presents summary statistics for perk benefits provided by S&P 500 firms as detailed in SEC filed proxy statements between January 1, 2006 and December 31, 2010. The SEC classifies "*all other compensation*" into two main categories "*perquisites and other personal benefits*" and "*additional all other compensation*". We further classify perks reported under "*perquisites and other personal benefits"* into 20 main perk items. For each item, the amounts are in $ thousands and Freq is the percentage of firms disclosing a dollar value for the item.

	CEOs only					**Top Executives (excluding CEOs)**				
	Freq	Mean	Std	Min	Max	Freq	Mean	Std	Min	Max
Total *All Other Compensation*	99.0%	320.4	532.2	0.0	3715.3	98.0%	211.0	557.5	0.0	4137.8
Main Categories										
Perquisites & Other Personal Benefits	75.1%	148.8	209.2	1.0	1700.0	63.2%	61.0	113.4	0.2	1817.6
Additional All Other Compensation	91.6%	203.1	498.4	1.5	3745.4	89.8%	162.4	509.0	0.6	3856.8
Main Perquisite Items Under Perquisites & Other Personal Benefits										
Personal Use Of Aircraft	36.3%	143.3	146.4	0.8	733.6	10.3%	65.7	104.1	0.3	595.0
Relocation Expenses	3.9%	134.3	217.1	0.4	1309.5	6.3%	169.2	271.7	0.5	1817.6
Personal Use Of Automobile	19.5%	22.3	23.2	0.5	153.0	17.1%	15.8	11.0	0.2	61.7
Security	10.7%	162.5	336.9	0.2	1700.0	3.2%	26.5	75.9	0.1	496.6
Financial Services	24.0%	22.1	47.6	1.1	403.3	21.6%	10.1	8.3	0.6	52.6
Club Memberships	7.8%	16.0	27.3	0.1	150.0	6.0%	7.8	12.0	0.2	84.1
Reimbursement for Unused Vacation	1.9%	44.8	61.1	0.1	254.9	2.2%	35.4	44.2	0.1	231.4
Personal Services/Use Of Assets	2.2%	49.9	119.4	0.0	776.0	1.1%	19.9	35.7	0.0	164.8
Car Service (Car And Driver)	7.3%	55.1	61.8	0.5	234.2	2.9%	53.0	67.6	0.1	298.8
Tickets And Entertainment	0.4%	53.5	60.1	0.9	135.5	0.3%	9.0	11.2	0.1	34.4
Personal Meal	0.4%	11.2	13.2	1.1	33.8	0.3%	9.4	16.1	0.0	75.0
Personal Travel	3.5%	27.3	55.2	0.0	311.4	2.7%	12.1	17.0	0.1	77.3
Professional Association Dues	0.2%	49.7	56.3	2.2	139.7	0.3%	20.9	26.6	0.3	125.0
Perquisite Cash Allowance	6.1%	41.5	29.0	2.6	125.0	5.7%	27.4	17.0	1.8	100.0
Legal Fees	2.2%	32.2	32.7	0.0	125.0	0.5%	40.7	100.3	0.0	554.0
Parking	1.5%	3.1	1.7	0.9	6.8	1.8%	3.1	1.7	0.4	10.3
Cost Of Living Allowance	2.2%	113.3	140.5	7.0	866.2	3.0%	141.8	202.9	1.5	1212.9
Charitable Gift Matching	5.3%	40.2	75.5	0.2	506.0	4.0%	17.7	31.2	0.1	216.8
Medical/Health	10.4%	6.1	9.8	0.2	64.1	8.8%	5.3	8.3	0.1	46.9
Other Perquisites	26.3%	34.8	63.1	0.1	463.4	23.9%	22.5	41.0	0.1	303.3

Table 3.3

Wage and firm size

This table reports the determinants of CEO wage estimated from the following equation:

$$Ln(Wage_{it}) = \alpha_W + \beta_W Ln(Size_{it-1}) + \mathbf{X}'_{it-1}\boldsymbol{\gamma}_W + u_j^w + v_t^w + \varepsilon_{it}^w$$

where $Ln(Wage_{it})$ is the natural logarithm of CEO i's wage in year t. Wage is the sum of salary, bonus, stock awards, option awards, non-equity incentive plan compensaton, change in pension value and nonqualified deferred compensation. $Ln(Size_{i,t-1})$ is the natural logarithm of firm i's market value (book value of debt pus market value of equity) in year t-1. u_j is industry j's fixed effect. v_t is year t's fixed effect. $\mathbf{X}_{it-1}$ are control variables including Market to Book Ratio$_{t-1}$, Stock Return$_t$, Stock Return$_{t-1}$, Return on Assets$_t$, Return on Assets$_{t-1}$, Free Cash Flow Ratio$_{t-1}$, Sales Growth$_{t-1}$, Ln(Tenure$_t$), Female and E Governance Index. The subscripts $_t$ and $_{t-1}$ indicate current and prior fiscal year respectively. The detail definition of these variables are provided in Appendix 3.C. Cluster-robust standard errors are in parentheses with clustering at firm level. ***, **, * indicate significance level at 1%, 5% and 10% level respectively.

	(1)	(2)	(3)	(4)	(5)
Ln (Size$_{t-1}$)	0.277***	0.281***	0.290***	0.297***	0.284***
	(0.033)	(0.043)	(0.035)	(0.045)	(0.050)
Market to Book Ratio$_{t-1}$			-0.026**	-0.027**	-0.018*
			(0.013)	(0.012)	(0.011)
Stock Return$_t$			0.153**	0.084	0.090
			(0.067)	(0.076)	(0.086)
Stock Return$_{t-1}$			0.182***	0.149**	0.198**
			(0.063)	(0.071)	(0.077)
Return on Assets$_t$			0.591**	0.316	0.093
			(0.298)	(0.279)	(0.277)
Return on Assets$_{t-1}$			-0.233	-0.619**	-0.651**
			(0.294)	(0.277)	(0.270)
Free Cash Flow$_{t-1}$			0.678*	0.945**	0.800**
			(0.358)	(0.388)	(0.349)
Sales Growth$_{t-1}$			-0.146	-0.123	-0.018
			(0.173)	(0.183)	(0.187)
Ln(Tenure$_t$)			-0.017	-0.029	-0.011
			(0.031)	(0.037)	(0.040)
Female			0.148	0.019	0.130
			(0.104)	(0.118)	(0.117)
E (Entrenchment) Governance Index					0.044**
					(0.021)
Constant	13.136***	13.096***	13.093***	13.201***	13.165***
	(0.309)	(0.480)	(0.336)	(0.515)	(0.549)
Year Fixed Effects	N	Y	N	Y	Y
Industry Fixed Effects	N	Y	N	Y	Y
Observations	2,019	2,019	1,990	1,990	1,639
R-squared	0.122	0.211	0.151	0.237	0.233

Table 3.4

Perks and firm size

This table reports the determinants of CEO perks estimated from the following equation:

$$Ln(Perks_{it}) = \alpha_P + \beta_P Ln(Size_{it-1}) + \mathbf{X}'_{it-1}\boldsymbol{\gamma}_P + u_j^p + v_t^p + \varepsilon_{it}^p$$

where $Ln(Perks_{it})$ is the natural logarithm of CEO *i*'s perks compensation in year *t*, respectively. *Perks* is the amount reported in the category - *perquisites and other personal benefits*. $Ln(Size_{i,t-1})$ is the natural logarithm of firm *i*'s market value (book value of debt plus market value of equity) in year t-1. u_j is industry *j*'s fixed effect. v_t is year t's fixed effect. $\mathbf{X}_{it-1}$ are control variables including Market to Book Ratio$_{t-1}$, Stock Return$_t$, Stock Return$_{t-1}$, Return on Assets$_t$, Return on Assets$_{t-1}$, Free Cash Flow Ratio$_{t-1}$, Sales Growth$_{t-1}$, Ln(Tenure$_t$), Female and E Governance Index. The subscripts $_t$ and $_{t-1}$ indicate current and prior fiscal year respectively. The detail definition of these variables are provided in Appendix 3.C. Cluster-robust standard errors are in parentheses with clustering at firm level. ***, **, * indicate significance level at 1%, 5% and 10% level respectively.

	(1)	(2)	(3)	(4)	(5)
Ln (Size$_{t-1}$)	0.662***	0.719***	0.824***	0.894***	0.917***
	(0.142)	(0.167)	(0.147)	(0.171)	(0.184)
Market to Book Ratio$_{t-1}$			-0.083*	-0.106**	-0.101**
			(0.047)	(0.043)	(0.046)
Stock Return$_t$			0.585**	0.165	-0.177
			(0.260)	(0.307)	(0.334)
Stock Return$_{t-1}$			-0.004	0.414	0.078
			(0.359)	(0.387)	(0.443)
Return on Assets$_t$			-2.454	-3.734**	-3.834**
			(1.647)	(1.603)	(1.816)
Return on Assets$_{t-1}$			-0.908	-3.281*	-3.219
			(1.840)	(1.805)	(2.075)
Free Cash Flow$_{t-1}$			-0.111	1.063	1.110
			(1.588)	(1.552)	(1.649)
Sales Growth$_{t-1}$			-1.876**	-0.765	-0.397
			(0.823)	(0.835)	(0.913)
Ln(Tenure$_t$)			-0.301	-0.233	-0.045
			(0.210)	(0.222)	(0.239)
Female			1.260*	0.316	0.542
			(0.728)	(0.723)	(0.673)
E (Entrenchment) Governance Index					0.009
					(0.132)
Constant	1.983	3.310*	1.746	3.582*	2.520
	(1.393)	(1.936)	(1.479)	(1.994)	(2.132)
Year Fixed Effects	N	Y	N	Y	Y
Industry Fixed Effects	N	Y	N	Y	Y
Observations	2,019	2,019	1,990	1,990	1,639
R-squared	0.022	0.124	0.045	0.143	0.154

Table 3.5

Estimation of parameter ϕ in perk cost function

This table summarizes the estimate of parameter ϕ which equals the ratio of the coefficients for $Ln(Size_{i,t-1})$ from the regressions for $Ln(Wage_{it})$ and $Ln(Perks_{it})$ in Table 3.3 and Table 3.4, respectively. Parameter ϕ is the exponent in the perk cost function, $c(p) = \lambda p^{\phi}$.

	(1)	(2)	(3)	(4)	(5)
β_W: Coefficient for $Ln(Size_{i,t-1})$ from $Ln(Wage_{it})$ regression (Table 3.3)	0.277	0.281	0.290	0.297	0.284
β_P: Coefficient for $Ln(Size_{i,t-1})$ from $Ln(Perks_{it})$ regression (Table 3.4)	0.662	0.719	0.824	0.894	0.917
β_W / β_P**:** Estimates of Parameter ϕ	0.418	0.391	0.352	0.332	0.310
Control Variables (except Entrenchment Governance Index)	N	N	Y	Y	Y
E (Entrenchment) Governance Index	N	N	N	N	Y
Year Fixed Effects	N	Y	N	Y	Y
Industry Fixed Effects	N	Y	N	Y	Y

Table 3.6

The impact of firm size on the provision of more versus less productivity-related perks

This table reports the difference in the sensitivity of more vs. less productivity-related perks to changes in firm size (book value of debt plus market value of equity). The independent variables are logarithmic more productivity-related or less productivity-related perks. Each regression controls for year and industry fixed effects and for the following specified control variables: Market to Book Ratio$_{t-1}$, Stock Return$_t$, Stock Return$_{t-1}$, Return on Assets$_t$, Return on Assets$_{t-1}$, Cash Flow Ratio$_{t-1}$, Sales Growth$_{t-1}$, Ln(Tenure$_t$) and Gender. The subscripts $_t$ and $_{t-1}$ indicate current and prior fiscal year respectively. We adopt three classifications for more productivity-related and less productivity-related perks. In classification 1 more productivity-related perks remove distractions from the CEO and include "relocation expenses", "personal use of automobile", "security", "financial services", "personal services/use of assets", "car service (car and driver)", "personal meals", "legal fees", "parking", "cost of living allowance", and "medical/health"; less productivity perks include "club memberships", "tickets and entertainment", "personal travel", "professional association dues", and "perk cash allowance". In classification 2 more productivity-related perks contribute to the CEOs physical, medical, financial, or legal well-being and include "security", "financial services", "legal fees", and "medical/health"; less productivity-related perks include "club memberships", "tickets and entertainment", "personal travel", and "perk cash allowance". In classification 3 more productivity-related perks save time for the CEO and include "personal use of aircraft", "personal use of automobile", "financial services", "reimbursement for unused vacation", "car service", "legal fees", "parking", and "medical/health"; less productivity perks include "relocation expenses", "security", "club memberships", "tickets and entertainment", "personal meals", "personal travel", "professional association dues", "perk cash allowance", "cost of living allowance", and "charitable matching contribution". Cluster-robust standard errors are in parentheses with clustering at firm level. ***, **, * indicate significance level at 1%, 5% and 10% level respectively.

	Classification 1		Classification 2		Classification 3	
	More productivity-related perks	Less productivity-related perks	More productivity-related perks	Less productivity-related perks	More productivity-related perks	Less productivity-related perks
Ln (Size$_{t-1}$)	0.403***	0.233**	0.405***	0.235**	0.428***	0.299***
	(0.011)	(0.108)	(0.073)	(0.107)	(0.053)	(0.094)
Market to Book Ratio$_{t-1}$	0.022	-0.014	0.043	-0.027	-0.029*	0.015
	(0.025)	(0.022)	(0.035)	(0.020)	(0.015)	(0.025)
Stock Return$_t$	0.098	0.262	0.205	0.207	-0.035	0.264*
	(0.109)	(0.165)	(0.136)	(0.166)	(0.123)	(0.157)
Stock Return$_{t-1}$	-0.068	-0.363	-0.060	-0.383	0.016	-0.129
	(0.142)	(0.249)	(0.178)	(0.295)	(0.153)	(0.241)
Return on Assets$_t$	-0.949	2.354*	-0.264	2.615*	-0.797	0.505
	(0.639)	(1.345)	(0.748)	(1.519)	(0.584)	(1.135)
Return on Assets$_{t-1}$	-0.846	-0.880	-0.076	-1.349	-0.573	-1.498
	(0.773)	(1.208)	(0.790)	(1.457)	(0.660)	(1.271)
Free Cash Flow$_{t-1}$	0.096	-0.260	-0.922	-0.789	0.047	-0.761
	(0.577)	(0.839)	(0.735)	(0.891)	(0.570)	(1.089)
Sales Growth$_{t-1}$	0.050	-0.549	-0.293	-0.696	-0.108	-0.195
	(0.297)	(0.503)	(0.339)	(0.542)	(0.329)	(0.474)
Ln(Tenure$_t$)	-0.019	0.104	0.305***	-0.161	-0.137	0.170
	(0.082)	(0.140)	(0.106)	(0.134)	(0.087)	(0.142)
Female	0.063	0.902***	-0.257	1.100***	0.038	1.196**
	(0.304)	(0.330)	(0.542)	(0.320)	(0.266)	(0.508)
Constant	5.607***	9.082***	2.202**	10.148***	0.411	8.630***
	(0.834)	(1.065)	(0.982)	(1.180)	(0.506)	(0.793)
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Industry Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	992	399	701	316	1223	632
R-squared	0.236	0.341	0.323	0.431	0.242	0.221

Appendix 3.A
Closed-form Solutions

We first conjecture that the solutions for $w(s)$ and $p(s)$ take the following forms:

$$w(s) = As^C \text{ and } p(s) = Bs^D$$

First of all, the conjectured forms of $w(s)$ and $p(s)$ yield $(w(\underline{s}), p(\underline{s})) = (0,0)$ because $\underline{s} = 0$. Therefore, they satisfy the initial condition. We will derive the exact values of $A, B, C,$ and D by using the first order conditions, i.e., equations (10) and (11), in (b) in Proposition 1.

Given the conjectured forms of the solutions and the market matching function, $m(s) = ks^q$, equation (11) becomes

$$\frac{bA}{dB} s^{C-D} + \alpha\delta B^{\alpha-1} k^{\beta} s^{\alpha D - D + \beta q + \gamma} = \phi\lambda B^{\phi-1} s^{\phi D - D} \tag{A1}$$

Equation (A1) is satisfied when the powers of s in the equation satisfies

$$C - D = \alpha D - D + \beta q + \gamma \tag{A2}$$

$$\alpha D - D + \beta q + \gamma = \phi D - D \tag{A3}$$

Solving equation (A3) for D yields

$$D = \frac{\beta q + \gamma}{\phi - \alpha} \tag{A4}$$

Plugging equation (A4) into equation (A2), we can solve equation (A2) for C:

$$C = \frac{\phi(\beta q + \gamma)}{\phi - \alpha} \text{B} \tag{A5}$$

Because the powers of s on each side of equation (A1) are the same as in equations (A2) and (A3), the coefficients on both sides of equation (A1) must be the same as well:

$$\frac{b}{d}A+\alpha\delta B^{\alpha}k^{\beta}=\phi\lambda B^{\phi} \tag{A6}$$

From equation (A1), we derive the values of C and D in equations (A4) and (A5) and the relationship between A and B.

Given the conjectured forms of $w(s)$ and $p(s)$, the market matching function, $m(s)=ks^{q}$, and the values of C and D in equations (A4) and (A5), equation (10) becomes

$$A\left(\phi+\frac{b}{d}\right)\left(\frac{\beta q+\gamma}{\phi-\alpha}\right)s^{\frac{\phi(\beta q+\gamma)}{\phi-\alpha}-1}=B^{\alpha}\beta\delta k^{\beta}qs^{\frac{\phi(\beta q+\gamma)}{\phi-\alpha}-1} \tag{A7}$$

The powers of s on both sides of equation (A7) are the same. Therefore, if the coefficients on both sides are the same, then equation (A7) is satisfied:

$$A\left(\phi+\frac{b}{d}\right)\left(\frac{\beta q+\gamma}{\phi-\alpha}\right)=B^{\alpha}\beta\delta k^{\beta}q \tag{A8}$$

Solving equation (A8) for A yields

$$A=\frac{B^{\alpha}\beta\delta k^{\beta}}{\left(\phi+\frac{b}{d}\right)\left(\frac{\beta q+\gamma}{\phi-\alpha}\right)} \tag{A9}$$

Plugging equation (A9) into equation (A6) and solving equation (A6) for B yields

$$B = \left[\frac{\delta k^{\beta}}{\lambda \phi} \left(\frac{b \beta q}{d\left(\frac{\beta q + \gamma}{\phi - \alpha} \right)\left(\phi + \frac{b}{d} \right)} + \alpha \right) \right]^{\frac{1}{\phi - \alpha}} \tag{A10}$$

By plugging equation (A10) into equation (A9), we can derive the exact value of A. Therefore, equations (A2), (A3), (A9), and (A10) completely determine the values of $A, B, C,$ and D.

Appendix 3.B

Sample Summary Compensation Table[27]

Name and Principal Position (a)	Year (b)	Salary ($) (c)	Bonus ($) (d)	Stock Awards ($) (e)	Option Awards ($) (f)	Non-Equity Incentive Plan Compensation ($) (g)	Change in Pension Value and Nonqualified Deferred Compensation Earnings ($) (h)	All Other Compensation ($) (i)	Total ($) (j)
PEO[1]									
PFO[2]									
A									
B									
C									

[1] Refers to principal executive officer
[2] Refers to principal financial officer

[27] See: http://www.sec.gov/news/press/2006/2006-123_table.pdf

Appendix 3.C
Definition of Variables

Variable Name	**Variable Definition**
Firm Level Variables	
Ln(Size)	natural logarithm of firm size – the proxy for firm size is market value defined as book value of debt plus market value of equity
Market to Book Ratio	fiscal year end share price times common shares outstanding divided by book value of equity
Stock Return	fiscal year end price plus all per share dividend payments during the fiscal year all divided by prior fiscal year end share price
Return on Assets (ROA)	net income divided by total assets
Free Cash Flow	net income plus depreciation & amortization plus interest after tax minus the increase in net working capital minus capital expenditures
Free Cash Flow Ratio	free cash flow divided by total assets
Sales Growth	increase in sales over prior fiscal year divided by prior fiscal year sales
E (Entrenchment) Index	a measure of corporate governance as defined in (Bebchuk, Cohen et al, 2009) in which lower values correspond to higher levels of corporate governance

Manager Level Variables	
Ln(Wage)	natural logarithm of the sum of salary, bonus, stock awards, option awards, non-equity incentive plan compensation, and change in pension value and nonqualified deferred compensation earnings
Ln(Perks)	natural logarithm of the sum of personal use of aircraft, relocation expenses, personal use of automobile, security, financial services, club memberships, reimbursement for unused vacation, personal services/use of assets, car service (car and driver), tickets and entertainment, personal meals, personal travel, professional association dues, perk cash allowance, legal fees, parking, cost of living allowance, charitable gift matching, medical/health, and other perks
Ln(Tenure)	natural logarithm of the length of service (in years) of the executive
Female	indicator variable that equals one if the manager is a female and zero if male

Chapter Four: *Public Scrutiny and the Changing Nature of CEO Perks: Evidence from the Financial Crisis*

4.1 Introduction

The financial crisis of 2008 is arguably the largest global macroeconomic shock since the Great Depression. There is widespread blame for the crisis on excessive risk-taking by executives at financial institutions, with accusations that the structure of compensation plans incented these executives to embrace risks (Kirkpatrick, 2009). Over past decades, compensation committees of company boards of directors adjusted the structure of pay packages with the express purpose of minimizing agency conflict by aligning interests of top executives and shareholders (Faulkender and Yang, 2010). Yet, it is these very compensation plans that became the subject of heated criticism. Calls for reform of executive compensation are widespread in academic, political, and public circles, and are coincident with a dramatic increase in executive compensation since the 1980s (e.g., Murphy, 1999, and Hall and Murphy, 2003). Compensation reformists became increasingly vocal as scrutiny of executive pay intensified in the wake of the financial crisis (e.g., Bebchuk, Cohen, and Spamman, 2010). Effective October 3, 2008, the Emergency Economic Stabilization Act (EESA) established the Troubled Assets Relief Program (TARP) in response to the deterioration of the US stock market. TARP is an umbrella program with initiatives that fall into

six different categories. Under the *Executive Compensation Program*[28], TARP recipients became subject to executive compensation restrictions while they had outstanding TARP obligations. Government support acted as a trigger to expand the debate on CEO pay because the legislation made support contingent on compensation restrictions.

Three primary arguments for the levels and increases in CEO pay are managerial rent extraction (e.g., Bebchuk and Fried, 2004 and Kuhnen and Zweibel, 2007), optimal contracting in competitive labor markets (e.g., Rosen, 1992, Diamond and Verrechia, 1982, Tervio, 2008, and Edmans and Gabaix, 2009), and reward for accepting compensation contracts with proportionately higher levels of at-risk incentive pay (e.g., Hall and Murphy, 2002, and Murphy, 2002). There is extensive literature examining the impact of firm size (e.g., Gabaix and Landier, 2008), firm performance (e.g., Jensen and Murphy, 1990), human capital (e.g., Lazear, 2003 and Murphy and Zabojnik, 2004), and unobservable firm and managerial attributes (e.g., Graham, Li, and Qiu, 2010) on CEO compensation. Regardless of the reason for high pay packages, executive compensation became an increasingly important corporate governance issue as public scrutiny intensified in step with reformist rhetoric. From a governance perspective, public scrutiny is the examination and monitoring of firms by broad segments of the population with the aim of

[28] The TARP legislation included compensation restrictions because of political and public concern about using taxpayer money to bail out firms that had excessive compensation schemes.

improving firm performance. While the media, politicians, and regulators often take the lead in using scrutiny to pursue particular agendas at firms, they may well be doing so in response to public demands. Public scrutiny could be essential in ensuring that firms remain accountable and effective. Wiersema and Zhang (2013) find that scrutiny by media and government of stock option backdating, rather than the backdating itself, causes firms to take corrective action to demonstrate to stakeholders a commitment to resolving problems. Dyck and Zingales (2002) show that public scrutiny, specifically media attention, influences corporate governance to affect shareholder value and corporate social responsibility. Gan (2006) finds that public scrutiny can impact firms through legal or economic costs of dealing with special interest groups, compliance costs of government regulations, and implicit costs of negative media coverage of firm misbehavior. Public scrutiny could be an important form of external governance that causes firms to change behavior in response to explicit and implicit scrutiny costs. However, little is known about the influence of public scrutiny on executive pay. In one of the few related studies, Core, Guay, and Larker (2007) find a strong relationship between negative media coverage and both excess CEO pay and high levels of exercised options, but find little evidence that the negative media coverage (i.e., heightened scrutiny) leads to decreases in compensation.

The financial crisis and TARP legislation provide an interesting opportunity to re-examine whether the costs of public scrutiny are high enough to cause

changes in executive compensation practices. First, I use the years surrounding the crisis to examine time trends in compensation in response to changing levels of public scrutiny. The financial crisis likely increased public scrutiny at all S&P 500 firms. For example, the crisis caused widespread, large declines in equity values, unfavorably impacting investments and savings of wide cross sections of the population. In addition, liquidity evaporated during the crisis and actions by firms to preserve cash affected job security and wages. As the impact of crisis had tangible effect on individuals, the media and the public at large subjected firms to increased scrutiny. In particular, perceived excess in compensation practices at recipients of government bailout funds acted as a lightning rod in attracting scrutiny as the media, politicians, and public demanded accountability to ensure protection of and integrity in the use of taxpayer resources[29]. Second, I differentiate firms with respect to scrutiny. Thirty-four S&P 500 firms received government assistance through TARP — twelve of those firms, $TARP_{nonrestricted}$ *firms,* avoided legislated compensation restrictions by repaying their TARP obligations before the end of 2009. $TARP_{restricted}$ *firms,* the remaining twenty-two, were subject to legislated compensation restrictions in at least one year due to outstanding TARP obligations. The balance of S&P 500 firms, *nonTARP firms,*

[29] For example, in *The New York Times* "U.S. Plans $500,000 Cap on Executive Pay in Bailouts" on February 3, 2009, E. Andrews and V. Bajaj quote President Obama, "For top executives to award themselves these kinds of compensation packages in the midst of this economic crisis is not only in bad taste – it's a bad strategy – and I will not tolerate it as President. We're going to be demanding some restraint in exchange for federal aid – so that when firms seek new federal dollars, we won't find them up to the same old tricks."

did not receive funding through TARP. Assuming that all firms experienced increased scrutiny as a result of the financial crisis, nonTARP firms provide a benchmark for how firms changed compensation practices in response to heightened scrutiny. Compared to nonTARP firms, TARP firms came under more intense political and regulatory scrutiny, and the media responded by demonstrating unfavorable coverage toward TARP firms. For example, the majority of Wall Street Journal articles about TARP recipients had a negative tone during program initiation (Ng, Vasvari, and Wittenberg-Moerman, 2011). It reasonably follows that public sentiment echoed media coverage.[30] I use $TARP_{nonrestricted}$ firms to examine the impact of intense public scrutiny on CEO compensation and $TARP_{restricted}$ firms to study the impact of both intense scrutiny and legislated compensation restrictions on CEO pay.

Third, I distinguish between monetary (wage) and nonmonetary (perk) compensation, and show that behavior of wage and perks is very different in response to heightened scrutiny. Executive perks play an important role in the analysis because the exclusivity and luxury of perks make them even more controversial (i.e., subject to even higher scrutiny) than wage.[31] Since perks attract

[30] For example, in its 2009 Trust Barometer, Edelman, a public relations firm, found that trust in U.S. business (at 38% compared to 58% in 2008) was the lowest since tracking began, even lower than in the aftermath of the scandals that led to the Sarbanes Oxley legislation in 2002. Firms in industries that received government support during the financial crises experienced the largest decreases in public trust.

[31] Perks tend to be perceived by the public as excessive and negative See, for example, *The Economist* "Restraints on executive pay: Attacking the corporate gravy train", May 28, 2009.

more attention than wage, the examination of perks is interesting in testing the impact of public scrutiny on pay because the effects may be more pronounced or lasting. The literature shows that the media acts to satisfy both the demand for information and the demand for entertainment (e.g., Core, Guay, and Larker, 2008, and Miller, 2006). For instance, the media may take a particular interest in perk excess[32] because such stories sell better than traditional coverage of wages (i.e., sensationalism). The cycle may feed itself as the ensuing increased public scrutiny encourages further coverage of perks as the public seeks to better evaluate the excessive nature of perks (i.e., investigative reporting). Dyck and Zingales (2002) find that the costs of media scrutiny are related to the impact on reputation. They identify three ways that media affects the reputations of executives: a) attention to weak governance prompts regulators to enact legislation; b) negative attention causes public to question the decision making abilities of executives, thereby decreasing the value of executives in the labor market; and c) negative attention damages the reputation of executives and thereby imposes social costs. The magnitude of the costs depends on the effect of media coverage on public sentiment. Regardless of whether the media is engaged in sensationalism or investigative reporting, there is a point at which firms will take action in response to the costs of increased scrutiny. Because perks are so

[32] For example, in *The New York Times* "Scrutiny of bankers' perks will grow, too" on February 5, 2009, E. Dash calls "for greater corporate review of excessive or luxury items for executives" and gives examples of large dollar perks provided by firms that accepted government bail-out money during the financial crisis.

controversial, they may be a very good way to test the impact of public scrutiny on executive compensation. The public can perceive perks items as excessive (e.g., Yermack, 2006, Edgerton, 2012, and Grinstein, Weinbaum, and Yehuda, 2010) or productivity enhancing (e.g., Rajan and Wulf, 2006). Decisions by firms to increase or decrease levels of overall and specific perks in an environment of increased public scrutiny may cast light on whether perks are excessive or value enhancing.

Turning to my results, I control for firm size, firm performance, governance, managerial attributes, and industry fixed effects in the multivariate regression analysis, so the coefficients on year dummies capture the compensation year-effect that is not attributable to these controls. For example, the control variable coefficients, rather than the year dummy coefficients, pick up the compensation effects of changes in firm size and share price related to the crisis. The year dummy coefficients capture the impact of public scrutiny and legislated compensation restrictions — two important "non control" explanatory factors closely associated with the financial crisis.

The summary wage data are consistent with scrutiny being higher at TARP firms than at nonTARP during the crisis, and with wage scrutiny lessening as the recession receded. For example, nonTARP firm CEO wage decreased by a modest 1.8% between 2006 and 2009 and increased by 12.5% overall between 2006 and 2012. In contrast, the wage impact at both nonrestricted and restricted TARP

firms was more pronounced. Wages began to decrease as crisis set in, bottoming in 2008 and 2009, before rebounding to levels lower than before the crisis. For example, CEO wage at $TARP_{nonrestricted}$ ($TARP_{restricted}$) firms decreased from $23.9 million ($10.8 million) in 2006 to $8.1 million ($4.7 million) in 2009 (2008), drops of 66% and 57% respectively, before increasing to $16.1 million ($8.3 million) in 2012, ending 33% (23%) lower than 2006 levels. The regression analysis confirms the significant impact of financial crisis on wage at firms that received government support, and suggests that both public scrutiny and legislated compensation restrictions have a temporary impact on wage (i.e., wages rebound once scrutiny and restrictions ease). The restriction/wage result is straightforward. Firms with outstanding TARP obligations reduced wages significantly in accordance with the law, but increased wages once restrictions no longer applied. The relationship between CEO wage and scrutiny is more subtle. Wage levels are the outcome of firms' evaluation of costs and benefits. The increased cost of heightened public scrutiny during the financial crisis became one of the factors influencing CEO wage. My results suggest that the perceived scrutiny costs were not sufficient to cause benchmark nonTARP firms to reduce CEO wages. However, bail out recipients responded to the resulting intense scrutiny with large cuts to CEO wages (i.e., beyond what changes in the other controls would predict) that moderated as the crisis (and scrutiny) receded. The results suggest that firms subject to more scrutiny tend to respond with larger wage decreases.

The summary perk data are consistent with scrutiny having a larger and more lasting impact on perks than on wages — nonTARP firm CEO perks decreased slowly between 2006 and 2012 while TARP firm CEOs experienced abrupt, large decreases in perks during the crisis that persisted through 2012. CEO perks at nonTARP firms decreased by 5.7% (i.e., from $89,886 to $84,756) between 2006 and 2012. CEO perks at $TARP_{nonrestricted}$ ($TARP_{restricted}$) firms went from $207,880 ($119,683) in 2006 to $133,564 ($36,795) in 2009 and then to $137,474 ($41,416) by 2012, ending 34% (65%) lower than 2006 levels. The regression analysis confirms the significance and persistence of the decreases, and suggests that public scrutiny has a lasting impact on CEO perks. In the wake of the financial crisis, firms appear to have (permanently) shifted their attitudes toward the scrutiny costs of providing perks. One possibility is that crisis may cause executives and compensation committees to reconsider the role of perks in pay contracts[33]. Given the emotional public response to perk disclosure and the small value of perks compared to overall pay, TARP firm compensation committees may have decided that the negative impact of the public perception of perks as excessive more than offset the potential benefit of perks as part of executive pay.

Next, I provide further evidence that public scrutiny matters by showing that some perk items are more sensitive to scrutiny. While total CEO perks at

[33] In equilibrium, perks may form part of optimal compensation packages in competitive markets for executive talent (e.g., Fama, 1980, Rajan and Wulf, 2006, and Carrothers, Han, and Qiu, 2012).

benchmark nonTARP firms decreased modestly between 2006 and 2012, these firms chose to change the structure of perk compensation by increasing some specific perk items and decreasing others. For example, nonTARP firms made significant and meaningfully large reductions in company paid club memberships and payouts for unused vacation, suggesting that they recognized that previous levels of these two perks as excessive. Firms may change the payout of certain perk items seeking to reap the benefit of lower public scrutiny by reducing excess. In contrast, nonTARP firms chose to increase charitable gift matching and medical/health perks, which have the potential to provide common benefit by addressing corporate social responsibility and by enhancing executive well-being and productivity. Common-value perks may attract less attention than excessive perks or firms may perceive that the benefit of common-value perks exceeds the costs (including scrutiny costs). The changing levels of specific perk items at $TARP_{nonrestricted}$ and $TARP_{restricted}$ firms suggest that, as scrutiny increases, firms respond by making larger cuts to perceived excess. Both nonrestricted and restricted TARP firm made significant and meaningfully large cuts to personal use of corporate aircraft and personal security (i.e., two of the highest profile and most expensive perks), and $TARP_{restricted}$ firms eliminated spending on club memberships by 2010. Furthermore, $TARP_{restricted}$ firms also targeted the use of the "other perks" category which consolidates miscellaneous perks, suggesting that their response to intense scrutiny was to enhance transparency and to more

carefully monitor perceived luxury spending. Despite implementing large overall reductions in perks, $TARP_{nonrestricted}$ ($TARP_{restricted}$) firms chose to increase levels of car and driver services and medical/health perks (cost of living allowances). Given that these firms were fully aware of high levels of scrutiny, their actions are consistent with certain perk items providing common benefit that outweighs all costs. For example, since most of the $TARP_{nonrestricted}$ firms are located in New York City, the productivity and well-being benefits of car and driver services may be particularly valuable to both executives and firms. Even under intense scrutiny, firms remain committed to certain perks such as cost of living allowances.[34]

This paper makes the following contributions. First, I extend the literature on executive compensation by investigating the impact of public scrutiny on CEO wage and perks using the unique opportunity provided by the 2008 financial crisis. While there is a large literature investigating the determinants of executive compensation and the rapid and large increase in CEO pay over past decades (e.g., Gabaix and Landier, 2008, Murphy and Zabojnik, 2007, Lazear, 2003, and Hall and Murphy, 2003), there has been little inquiry into the impact of public scrutiny on compensation. Public scrutiny could be an important source of external governance if firms change behavior in response to explicit and implicit scrutiny costs. Second, I contribute to the discussion of perks as excess by

[34] For example, *The Towers Watson/Worldwide ERC 2012 Global Talent Mobility Study* found that as part of developing executive talent, "45% of global multinationals expect traditional expatriate assignments to increase through 2014, while only 18% expect them to decrease", despite the high expense of cost of living allowances.

introducing a novel data set of perk compensation at S&P 500 firms, and by studying how firms choose to alter levels of specific perk items in response to increased public scrutiny and legislated compensation restrictions. There are two arguments regarding the prevalence of executive perks. One holds that perks are the result of weak corporate governance that allows CEOs to divert corporate resources for personal gain (e.g., Jensen and Meckling, 1976, and Bebchuk and Fried, 2004). In contrast, optimal contracting argues that perks could be a cost effective way to enhance executive productivity and should be part of optimal executive compensation packages (e.g., Fama, 1980, Rosen, 1986, Henderson and Spindler, 2005). Using changes in perks at S&P 500 firms, I provide evidence that traditional practices with respect to perks such as personal use of corporate aircraft, personal security, and company paid club memberships may have been excessive, while perks such as medical/health benefits, cost of living allowances, and car and driver services may provide common benefits that outweigh any negatives related to public perception. One constraint in studying perk compensation is the availability of data. Execucomp does not provide detailed perk information. Existing literature on perks relies on limited data. For example, Grinstein, Weinbaum, and Yehuda (2010), compile a perk database based on 2007 and 2008 SEC filings for a random sample of small, medium, and large firms that includes 130 large market-capitalization firms while Rajan and Wulf (2006) use perk data for approximately 300 companies between 1986 and 1999 collected

from responses to surveying by a well known U.S. based compensation consultant. I manually collected information on executive perks from public disclosures contained in the proxy statements that S&P 500 companies filed with the SEC between January 1, 2007 and December 31, 2013. To the best of my knowledge, this data provides the most comprehensive executive perks information to date at S&P 500 companies.

The rest of the paper proceeds as follows. Section 4.2 provides background. Section 4.3 presents the empirical results. Section 4.4 summarizes and concludes.

4.2 Background

4.2.1 The Origins of the Financial Crisis

DeYoung, Peng and Yan (2010) summarize key changes in the banking sector during the two decades preceding the financial crisis. During the 1990s, there was a structural change in the financial sector with banks shifting away from the traditional "originate-and-hold" lending model in which they derived profit from loan interest and repeat business. The emerging "originate-and-securitize" model effectively removed loans from bank balance sheets, allowing banks to derive income mostly from fees. There was coincident increasing reliance on mortgage loans. Moreover, in an environment of decreased regulation and increased competition, many financial firms and institutional investors became overexposed to collateralized debt obligations (CDOs) and mortgage backed securities (MBSs). Banks became particularly vulnerable when the collapse of the US housing bubble

simultaneously reduced fee income for new mortgages and devalued illiquid investment grade MBSs that they held in their investment portfolios. Management at both commercial and investment banks made many fundamental risk management mistakes (Kashyap and Zingales, 2010). For example, executives at financial institutions underestimated the covariance of house prices across geographical regions and allowed their firms to become overexposed to MBSs. When the default rates on the underlying mortgages increased as housing prices collapsed, these institutions were left holding illiquid, severely distressed financial assets.

Defaults in the subprime mortgage market began to increase in 2006 as a result of the slowing in the growth of US house prices and the resetting of teaser interest rates. Beginning in 2007, major financial governing bodies such as the Organisation for Economic Co-operation and Development (OECD), the Financial Services Authority (FSA), and the Bank of England issued warnings about liquidity risk. By June 2007, credit spreads started to increase in some of the major global financial markets (DeYoung, Peng and Yan, 2010). The primary cause was fear about the US subprime residential mortgage market and the risk exposure of institutional investors to losses from investments in securitized or structured financial products such as CDOs and MBSs. While there were clear warning signs as early as 2006, it is common to date the financial crisis to 2008 because the collapse of Lehman Brothers in September 2008 was the largest

bankruptcy filing in US history (e.g., Kirkpatrick, 2009, and Bebchuk, Cohen, and Spamman, 2010). Two weeks later, the imminent implosion of American International Group threatened to destabilize the global financial system — the US government faced enormous pressure to act quickly and aggressively.

4.2.2 Legislation[35]

Effective October 3, 2008, the Emergency Economic Stabilization Act (EESA) established the Troubled Assets Relief Program (TARP) in response to the deterioration of the US stock market. TARP is an umbrella program with initiatives that fall into six different categories: *Bank Investment Programs, Investment in AIG, Auto Industry, Executive Compensation, Credit Market Programs, and Housing.* The purpose of *Bank Investment Programs* was to stabilize the US banking system during the financial crisis. It included the Capital Purchase Program (CPP) which provided capital to viable institutions (generally through preferred stock and warrants). The CPP was, by far, the largest of the TARP initiatives in terms of public funding. The Treasury Department created a distinct initiative, *Investment in AIG*, because of the enormous risk to the financial system posed by credit default swap positions[36] held by American International Group. *Auto Industry* involved major equity investments in General Motors and

[35]The U.S. Treasury Department website http://www.treasury.gov/initiatives/financial-stability/TARP-Programs is the primary source for details in this section. See also Murphy (2012) for a summary of legislation enacted to restore confidence in the financial system.

[36] As part of the securitization process for mortgage portfolios, financial institutions had been using credit default swaps to justify high credit ratings for MBSs. AIG was, by far, the largest counterparty.

Chrysler because of the risk to the overall economy and the potential harm to a wide cross section of citizens that would result from the collapse of domestic automobile manufacturing. Appendix 4.C provides a summary of S&P 500 firms that received government support under TARP. In total, thirty-four S&P 500 firms (mostly finance and insurance companies) received TARP funding. While more than half are commercial banks, the group is not homogenous and also includes federal and federally-sponsored credit agencies, personal credit institutions, finance lessors, finance services, security brokers and dealers, investment advisors, life insurers, fire, marine, and casualty insurers, and automobile manufacturers.

Under the *Executive Compensation Program*, all TARP recipients became subject to restrictions on executive compensation while they had outstanding obligations under TARP. In the initial 2008 legislation, EESA specified executive compensation standards for certain TARP participants that prohibited new golden parachute agreements in the event of involuntary termination and limited golden parachutes to 300% of average taxable compensation of past five years, reduced the IRS tax deductibility limit from $1,000,000 to $500,000, placed "limits on compensation that exclude incentives for senior executive officers of a financial institution to take unnecessary and excessive risks that threaten the value of the

financial institution"[37], and established "a provision for the recovery by the financial institution of any bonus or incentive compensation paid to a senior executive officer based on statements of earnings, gains, or other criteria that are later proven to be materially inaccurate"[38] which significantly expanded clawbacks introduced in the Sarbanes-Oxley legislation of 2002.

However, from an implementation viewpoint, the interim final rule was not updated until 2009, so none of the 2008 TARP recipients had meaningful restriction on 2008 compensation. Furthermore, in the wake of public outrage of 2009 bonus payments[39], the American Recovery and Reinvestment Act of 2009 strengthened the restrictions on executive compensation at firms that had outstanding TARP obligations. The legislation particularly targeted compensation contracts that included:

a) significant cash bonuses with pay-off based on performance, since these payouts were rarely clawed back when performance subsequently fell

[37] EESA Section 111(b)(2)(A)
[38] EESA Section 111(b)(2)(B)
[39] There was a clear groundswell of populist sentiment against perceived excessive pay at financial institutions. For example, in March 2009, firms seeking capital under TARP had to agree with limits on executive compensation and the US Treasury Department took action to prevent bonuses owed to executives and other financial professionals at AIG. Both legislative and administrative branches of the US government exerted continued pressure for regulation of executive compensation such as increasing shareholder power over and board responsibility for compensation contracts, strengthening bank supervisors' ability to monitor and restrict executive pay, or imposing bans on pay practices thought to encourage short-run risk-taking at the expense of long-run firm value (Murphy, 2012).

b) provisions for annual sale of stocks and options, since large net cash withdrawals in the years preceding the crash were consistent with an incentive for short-term performance manipulation to maximize the amount withdrawn
c) option grants since the asymmetrical payoff of options encourage risk-taking behavior.

Compensation restrictions associated with TARP included: bonuses limited to 33% of total compensation (payable restricted stock only) subject to clawback provisions; prohibition of severance and change in control payments for named executive officers; enhanced disclosure of perks in the context of a requirement for firms to adopt a luxury expenditure policy; prohibition of tax gross-ups; annual non-binding "say on pay" shareholder vote; and independent compensation committees (Core and Guay, 2010). It is interesting that twelve S&P 500 TARP recipients (i.e., JPMorgan Chase, Bank of New York Mellon, Goldman Sachs Group, Morgan Stanley, State Street, BB&T, Capital One Financial, Northern Trust, US Bancorp, American Express, Bank of America, and Wells Fargo) repaid their TARP obligations before the end of 2009 and, as such, effectively avoided legislated restrictions on executive compensation. In 2009, these twelve firms made TARP principal repayments totaling $138.3 billion plus an additional $12.9 billion profit to the Treasury Department (see Appendix 4.C).

4.2.3 Examples of the changing attitudes toward executive perks

To illustrate the changing attitudes towards perks in an environment of increased public scrutiny, I summarize how perk programs evolved at two sample firms — General Motors and Wells Fargo. The details come directly from the compensation discussion and analysis and notes to the summary compensation table included in SEC filed proxy statements.

4.2.3.1 Perks at General Motors

Regarding perks and other personal benefits, the 2006 General Motors proxy statement states:

> "A limited number of additional benefits are provided for executives as part of the total compensation package because we believe that it is customary to provide these benefits or otherwise in our interest to do so. The compensation associated with these programs is included in *All Other Compensation*."[40]

The attitude toward perks is that they are an expected element of overall compensation, but have the potential to provide value to the firm as well as to the executive. Although described as limited, GM had the following (generous) perk policies:

> "Corporate Aircraft — With the approval of the Chairman and CEO, the Corporation's aircraft may be used by members of the Senior Leadership Group for business purposes. This provides for a more efficient use of their time given the greater possibility of direct flights and improved flight times than are available commercially. It also provides a more secure traveling environment where sensitive GM business issues may be discussed and enhances personal safety. A spouse may accompany the

[40] General Motors Corporation SEC Schedule 14A, Definitive Proxy Statement for 2006, page 27.

> executive on the aircraft when the executive is traveling for business purposes and imputed income is assessed to the executive with taxes thereon reimbursed by the Corporation if the spouse's participation is required for business purposes. The Executive Compensation Committee annually reviews all corporate aircraft usage by the Named Executive Officers. As part of a comprehensive security study, certain Named Executive Officers are encouraged to use the corporate aircraft for personal travel….
>
> Security Systems and Services — As part of the Corporation's comprehensive security study, residential security systems and services have been implemented for Messrs. Wagoner, Henderson, Lutz, Gottschalk, and Devine.
>
> Executive Company Vehicle Program — The Corporation maintains a program that provides all executives, including the Named Executive Officers, with a GM vehicle of their choice. This program is not mandatory. Executives electing to participate in the program are asked to evaluate the vehicles they drive, thus providing feedback about our products. Participants are required to pay a monthly administration fee of $150 and are charged with imputed income based on the value of the vehicle they choose to drive. Executives are reimbursed for taxes on this income, subject to a maximum vehicle value. Beyond this maximum amount, taxes assessed on imputed income are the responsibility of the executive. In addition, participants are also required to purchase or lease at least one GM vehicle every four years….
>
> Executive Health Evaluation — The Corporation provides a routine medical exam for all U.S. executives which we believe is in the best interests of the organization in that executives are able to contribute to their maximum potential, and unanticipated medical concerns are minimized by early detection and prevention.
>
> Financial Counseling — The Corporation provides a taxable allowance to all senior U.S. executives for financial counseling and estate planning services. This program does not include tax preparation services.
>
> GM Matching Contributions Program — All active GM employees in the U.S. may participate in a matching contributions program to accredited four-year colleges, universities, and community colleges in which all

> eligible contributions are matched on a dollar-for-dollar basis up to $5,000 annually."[41]

By 2010, the treatment of and attitude toward executive perks at General Motors was very different.

> "The Special Master[42] determined that no more than $25,000 in total "other" compensation and perquisites may be provided to NEOs, absent exceptional circumstances for good cause shown. Payments related to expatriate assignments are not included in this total…. The Special Master and TARP regulations require additional limitations which cause our programs to exclude what market-based surveys indicate are competitive practices….
>
> Luxury Expense Policy
> As required by TARP regulations, we have adopted a luxury expense policy and posted it on our website www.gm.com/investors, under "Corporate Governance" and then "General Motors Expense Policy". The policy's governing principles establish expectations for every business expense, embodying the integrity and values that promote the best interests of the enterprise. Luxury or excessive expenditures are not reimbursable by GM under the policy. Such expenditures may include, but are not limited to expenditures on entertainment or events, office and facility renovations, aviation, transportation services, or other activities or events that are not reasonable expenditures for staff development, performance incentives, or other similar measures conducted in the ordinary course of business operations….We do not maintain any private passenger aircraft or any interest in such aircraft, or private passenger aircraft leases."[43]

I also note that the 2011 policies with respect to perquisites and other personal benefits were almost identical to those in 2010. In response to the directives of the

[41] Ibid, pages 28 and 29.
[42] The Secretary of the Treasury established the Office of the Special Master to monitor and regulate executive compensation at firms receiving exceptional assistance under TARP.
[43] General Motors Corporation SEC Schedule 14A, Definitive Proxy Statement for 2010, pages 33, 34, and 38.

Special Master, GM cut perks to what it considered to be below-competitive levels. Not only did GM stop personal use of corporate aircraft, they eliminated the jets altogether.[44]

The shift in attitudes toward perks had a large impact on perk consumption at GM. In 2006, CEO G.R. (Rick) Wagoner Jr. received perks valued at $361,058 consisting of personal use of company aircraft ($51,941), security ($284,523)[45], and other ($24,594), including company vehicle program, executive health evaluations, financial counseling and estate planning services. In 2010 (2011), CEO Daniel F. Akerson received $17,264 ($23,809) in perks, consisting of $6,740 ($276) for security and $10,524 ($23,533) under the executive company vehicle program and for car and driver services. Between 2006 and 2010 (2011), CEO perks decreased by 95% (93%).

4.2.3.2 Perks at Wells Fargo

As a second example, I highlight the changes in perk paying practices at Wells Fargo. From the 2006 proxy filing, regarding perks and other compensation,

> "Perquisites are intentionally limited and may include a car allowance, paid parking, financial planning, social club dues, home security systems, and benefits under a Relocation Program for team members who relocate at our request. In lieu of a car allowance, under our security policy for our Chairman and CEO, we provide a car and driver to Mr. Kovacevich that

[44] Auto industry executives encountered severe public and political backlash for using corporate jets to travel to Congressional hearings on November 19, 2008 seeking government bailout funds to prevent collapse in the US auto sector. See, for example, The New York Times, "Contrite Over Misstep, Auto Chiefs Take to Road" by John Schwartz published December 2, 2008.

[45] The costs include installation and monitoring of security systems and staffing expenses for personal protection (including chauffeured vehicles for business-related functions).

> he uses primarily for business and occasionally for commuting from his home to his office or to outside events. Providing this service allows Mr. Kovacevich while in transit to work safely and have confidential telephone conversations undisturbed, and thus provides a benefit to the Company that more than offsets the relatively modest incremental cost for his non-business use of a car and driver over the past year."[46]

In 2006, the attitude projected toward perks is that they are limited (although nontrivial) and reflect a cost of doing business (e.g., relocation at company request), or provide common value (e.g., the firm benefits from increased CEO productivity and safety related to car and driver services). The 2010 proxy statement indicates that the level of restraint at Wells Fargo had increased — the firm had eliminated most perks. Note, however, that even under intense public scrutiny, the company continued to provide car and driver services because of the perceived benefit.

> "The HRC[47] has intentionally limited perquisites to executive officers and in 2010 continued to reduce or eliminate almost all executive perquisite programs. We have eliminated executive perquisites providing for relocation-related home purchase expenses and reimbursements for financial planning services, automobile allowance, club dues, parking, and home security systems. For security or business convenience, we provide a car and driver to Mr. Stumpf,… primarily for business travel and occasionally for commuting."[48]

In 2006, CEO Richard M. Kovacevich (COO John G. Stumpf) received total perks of $64,969 ($104,499) consisting of $47,506 ($47,776) for security systems at their primary and second homes, $0 ($27,000) for relocation expenses, and

[46] Wells Fargo and Company SEC Schedule 14A, Definitive Proxy Statement for 2006, page 50.
[47] Human Resources Committee
[48] Wells Fargo and Company SEC Schedule 14A, Definitive Proxy Statement for 2010, page 71.

$17,463 ($29,723) for other perks, including financial planning, car allowance, parking, social club dues, and car and driver services. In 2010, CEO John G. Stumpf received $13,831 in perks, consisting of financial planning, home security, and car and driver services. Stumpf's 2010 perks were 79% less than 2006 CEO perks, and 87% less than his own 2006 perks. From a 2006 self-described attitude of restraint, Wells Fargo became much more frugal by 2010. Moreover, the company committed to further reductions in perks beyond 2010 — "the Company terminated the executive financial planning program and reimbursement of home security expenses."[49]

4.3. Data and Results

4.3.1 Data

The source of data on executive compensation originates with public disclosures contained in proxy statements that S&P 500 companies filed with the Securities and Exchange Commission (SEC) between January 1, 2007 and December 31, 2013 available from the SEC Edgar database. These proxy statements were all subject to the SEC disclosure rules that came into effect on December 15, 2006. Depending on a company's chosen month for fiscal year end, sample firms' fiscal years are from 2006 to 2013, although the number of fiscal year 2013 observations is comparatively small. The SEC defines named executive officers (NEOs) as CEO (chief executive officer), CFO (chief financial officer), and the

[49] Ibid, page 77.

other top three highest paid officers of the company, and requires publicly traded companies to disclose compensation for named executive officers in annual proxy statements. Sometimes firms choose to also include compensation for other executives, such as those recently retired or terminated. Appendix 4.A is a sample of the summary compensation table prescribed by current SEC regulations. The SEC specifies the elements of executive compensation that companies must report in separate columns (designated by lower case letters) in the summary compensation table of the proxy statement: (c) *salary*, (d) *bonus*, (e) *stock awards*, (f) *option awards*, (g) *non-equity incentive plan compensation*, (h) *change in pension value and nonqualified deferred compensation earnings*, (i) *all other compensation*, and (j) *total*. The SEC defines *all other compensation* as executive compensation not otherwise included in columns (c) though (h), and specifies two categories of *all other compensation*: *perquisites and other personal benefits* and *additional all other compensation*.

The first category, *perquisites and other personal benefits*, includes, but is not limited to, club memberships, financial or tax advice, personal travel, personal use of company property, housing, relocation and other living expenses, security, and discounts on company products or services (SEC Release No. 33-8732A, p.77). This category represents nonmonetary compensation.

The second category, *additional all other compensation*, includes severance or any payment related to a change of control, company contributions to vested or

unvested pension plans, the value of any company paid insurance premiums, amounts reimbursed during the fiscal year for the payment of taxes (gross-ups), the value of discount on acquired company shares, the value of any dividends or other earnings paid on stock or option awards when the dividends or earnings were not factored into the grant date fair value, director or other fees, commissions, any other miscellaneous cash payment (SEC Release No. 33-8732A, p.79). This category represents monetary compensation that is of a different nature than the monetary compensation disclosed in columns c) through h) of the summary compensation (e.g., one-time, related to other effort, or irregular).

I manually collected compensation information in the summary compensation table and detailed information for *all other compensation* for executives at S&P 500 companies, and then supplemented this hand collected data with company financial statement information from Compustat. The final merged dataset has 19,249 (3,529) observations on 5,884 (964) executives (CEOs) from 624 firms. The number of firms exceeds 500 because of changes to the composition of the S&P 500 over time. I winsorize all variables at the top and bottom one percent. See Appendix 4.B for detailed definitions of variables used in this study.

Since I am interested in the differences in firm behavior with respect to monetary and nonmonetary compensation, I define the following. *Wage* is the

sum of salary, bonus, stock awards, option awards, non-equity incentive plan compensation, and change in pension value and nonqualified deferred compensation earnings reported in SEC proxy filings. This is my benchmark measure of total monetary compensation. I specifically exclude *perquisites and other personal benefits* (the nonmonetary part of total compensation) and *additional all other compensation* (to avoid clouding the results with one time payments such as severance or retirement lump sums). *Perks* is the amount reported as perquisites and other personal benefits. This is the measure of nonmonetary compensation.

4.3.2 Results

I define $TARP_{nonrestricted}$ *firms* as the twelve sample firms that received TARP funding at any time during the sample period but avoided compensation restrictions by repaying TARP obligations before the end of 2009, $TARP_{restricted}$ *firms* as the twenty-two sample firms that were subject to compensation restrictions for at least one year in the sample period because of outstanding TARP obligations, and *nonTARP firms* as S&P 500 firms that did not receive government support through TARP.

(Insert Table 4.1 about here)

Table 4.1 presents summary statistics of firm characteristics for $TARP_{nonrestricted}$, $TARP_{restricted}$, and nonTARP firms as indicated. Given that the sample pool is the S&P 500, the firms in the data set are large and profitable.

Compared to nonTARP firms, $TARP_{nonrestricted}$ ($TARP_{restricted}$) firms are larger [i.e., sales of $43.2 ($25.4) billion vs. $15.1 billion, total assets of $449.2 ($201.7) billion vs. $28.7 billion, and number of employees of 91,438 (40,556) vs. 39,765], with higher free cash flows, $7.6 ($3.1) billion vs. $1.2 billion, and better governance, E index of 1.9 (2.7) vs. 2.7. However, $TARP_{nonrestricted}$ ($TARP_{restricted}$) firms are less profitable, with return on equity of 11.0% (13.8%) vs. 14.0% and return on assets of 1.0% (0.7%) vs. 5.8%, and lower growth, with sales growth of 6.1% (2.9%) vs. 6.9% and market-to-book ratio of 1.6 (1.0) vs. 3.2. Although all of the firm characteristics are right skewed, the respective lower median values demonstrate the same patterns as the means.

(Insert Table 4.2 about here)

(Insert Figure 4.1 about here)

Table 4.2 and Figure 4.1 summarize wage information for CEOs at $TARP_{nonrestricted}$, $TARP_{restricted}$ and nonTARP firms in the years surrounding the financial crisis. I base the analysis on calendar year to avoid the distorting effect of sample firms with fiscal year ends such that fiscal year compensation is effectively prior calendar year compensation. Compared to nonTARP firms, CEO wages are higher at $TARP_{nonrestricted}$ firms prior to the financial crisis. $TARP_{nonrestricted}$ firm CEO wages demonstrate a pronounced V-shape during the years surrounding the financial crisis. For example, mean (median) wage decreases from $23.9 million ($28.0 million) in 2006 to $8.1 million

($6.9 million) in 2009 — 33.9% (24.6%) of 2006 levels — before rebounding to $16.1 million ($14.5 million) in 2012 — 67.2% (51.8%) of 2006 levels. Prior to the crisis, CEO wage levels are similar at nonTARP and $TARP_{restricted}$ firms, but CEO wages at $TARP_{restricted}$ firms demonstrate the same pronounced V-shape as at $TARP_{nonrestricted}$ firms. For example, mean (median) CEO wage decreases from $10.7 million ($9.4 million) in 2006 to $4.7 million ($4.5 million) in 2008 — 43.1% (47.5%) of 2006 levels — before rebounding to $8.3 million ($8.8 million) in 2012 — 77.2% (93.5%) of 2006 levels. In contrast, nonTARP firm CEO wage decreases modestly during the crises before reaching new highs. For example, mean (median) CEO wage goes from $9.4 million ($7.7 million) in 2006 to $9.2 million ($7.6 million) in 2008 — 98.2% (98.0%) of pre crisis levels — then to $10.6 million ($9.1 million) in 2012 — 113% (119%) of pre crisis levels. In short, from 2006 to 2012, the wage gap between CEOs at $TARP_{nonrestricted}$ ($TARP_{restricted}$) and nonTARP firms narrows (reverses).

(Insert Table 4.3 about here)

(Insert Figure 4.2 about here)

Table 4.3 and Figure 4.2 summarize CEO perks at $TARP_{nonrestricted}$, $TARP_{restricted}$ and nonTARP firms. Perks are higher at $TARP_{nonrestricted}$ firms than at $TARP_{restricted}$ firms for all years from 2006 to 2012. Compared to nonTARP firms, perks are higher at both nonrestricted and restricted TARP firms prior to the financial crisis. Overall, TARP firm perks decrease substantially over the entire

period. For example, mean (median) CEO perks at $TARP_{nonrestricted}$ firms decrease from $207,880 ($161,097) in 2006 to $137,474 ($71,252) in 2012 — 66.1% (44.2%) of 2006 levels. The percent reduction of mean CEO perks at $TARP_{restricted}$ firms is even larger than at $TARP_{nonrestricted}$ firms. CEO mean (median) perks decrease from $119,683 ($46,797) in 2006 to $41,416 ($23,160) in 2012 — 34.6% (49.5%) of 2006 levels. At nonTARP firms, CEO perks decrease (modestly) over the sample period; mean (median) perks are $89,886 ($32,760) in 2006 and $84,756 ($29,585) in 2012.

To summarize the univariate results, $TARP_{nonrestricted}$ ($TARP_{restricted}$) firm wage and perks exceed those of nonTARP firms prior to the financial crisis, but the compensation gap narrows (reverses) during the years surrounding the crisis. CEO wages and perks behave differently between 2006 and 2012. At nonTARP firms, wages increase while perks decrease (modestly). At both nonrestricted and restricted TARP firms, CEOs experience large wage decreases in response to crisis followed by partial rebound after the crisis; in contrast, perk consumption declines through the entire sample period. Despite being a small proportion of executive compensation (typically less than 1% of wage), perks may foster behaviors that make them psychologically important to executives (e.g., Hirsch, 1976, and Rajan and Wulf, 2006) or to shareholders, politicians, and

the public in general.[50] I am expressly interested why the behavior of this small, but unique, form of compensation is different from wage.

I now turn to multivariate regression analysis and use financial crisis and government intervention to isolate the impact of public scrutiny and legislated compensation restrictions on executive pay. In the regressions, since I want to use a "pure" year effect to study the impact of scrutiny on compensation, I control for other determinants of compensation to remove their effect from the year dummy coefficients. For example, if share prices decrease in 2008 and 2009 because of the crisis and are also important determinants of executive compensation, including share price as a separate control variable removes the impact of crisis-related share price changes from the year dummy coefficients. Extant literature investigates how firm characteristics (such as size, profitability and stock price) and managerial characteristics (such as job tenure and gender) affect executive compensation (e.g., Lazear, 2003, Core, Guay and Larcker, 2008, and Rose and Shepard, 1997). I use this literature to choose regression explanatory variables, specifically controlling for firm size, growth opportunities, market performance, accounting performance, growth, tenure, gender, governance, and firm fixed effects.

[50] For example, in *The New York Times* "Scrutiny of bankers' perks will grow, too" on February 5, 2009, E. Dash calls "for greater corporate review of excessive or luxury items for executives" and gives examples of large dollar perks provided by firms that accepted government bail-out money during the financial crisis.

(Table 4.4 about here)

Table 4.4 presents regression results for CEO compensation based on the following equation: $Ln(Compensation_{it}) = \alpha_c + \mathbf{W}'\boldsymbol{\beta}_C + \mathbf{X}'\boldsymbol{\gamma}_C + \mathbf{Y}'\boldsymbol{\chi}_C + \mathbf{Z}'_{it-1}\boldsymbol{\varphi}_C + u_j^c + \varepsilon_{it}^c$, where the dependent variable, $Ln(Compensation_{it})$, is the natural logarithm of CEO *i*'s compensation in year *t* and *compensation* is either *wage* (columns 1 and 2) or *perks*[51] (columns 3 and 4). u_j is industry *j*'s fixed effect based on 3 digit SIC code. $\mathbf{Z}_{it-1}$ is a vector of control variables including ln(Market Value$_{t-1}$), Market to Book Ratio$_{t-1}$, Stock Return$_t$, Stock Return$_{t-1}$, Return on Assets$_t$, Return on Assets$_{t-1}$, Free Cash Flow Ratio$_{t-1}$, Sales Growth$_{t-1}$, ln(Tenure$_t$), and Female. Columns (2) and (4) include E Index[52] as a control for governance. I have separate regressions controlling for governance because of limited availabilty of data from Risk Metrics to calculate E Index for all firm-years[53]. See Appendix 4.B for complete definitions of all variables. $\mathbf{W}$ is a vector of year dummy variables for 2007 to 2012. $\mathbf{X(Y)}$ is a vector of dummy variables for TARP$_{\text{nonrestricted}}$ (TARP$_{\text{restricted}}$) firms in each year from 2006 to 2012. The design of the regression specification simplifies the interpretation of the regression coefficients of the dummy variables. β_1 to β_6 represent the differences in compensation at nonTARP

[51] *Perks* = Total Perks+1 so that I do not exclude observations for which total perks equal zero.
[52] Bebchuk and Cohen and Ferrel (2009) base the E (entrenchment) Index on six governance provisions: staggered boards, limits to shareholder bylaw amendments, poison pills, golden parachutes, and supermajority requirements for mergers and charter amendments.
[53] In Table 3, the number of *CEO-year* observations drops from 3530 to 3092 in regressions using E Index as a control.

firms in 2007 to 2012, respectively, compared to nonTARP firms in 2006. γ_1 to γ_7 represent the differences in compensation at $TARP_{nonrestricted}$ firms in 2006 to 2012, respectively, compared to compensation at nonTARP firms in the year defined by the dummy. Similarly, χ_1 to χ_7 represent the differences in compensation at $TARP_{restricted}$ firms in 2006 to 2012, respectively, compared to compensation at nonTARP firms in the year defined by the dummy. By controlling for industry fixed effects plus the generally accepted determinants of CEO compensation, the regression specification isolates pure year effects for my three categories of firms. That is, the compensation changes associated with the dummy variables are not the result of changing firm size, firm performance, industry factors, or managerial traits. The key exogenous event that occurred during the sample period was the financial crisis, which led to heightened public scrutiny of compensation practices at *all* sample firms. However, the level of scrutiny was more intense at firms that received government support during the crisis. NonTARP firms provide a benchmark for the impact of changes in public scrutiny on CEO compensation in the years 2006 to 2012. $TARP_{nonrestricted}$ firms allow me to examine the impact of intense public scrutiny on CEO compensation; $TARP_{restricted}$ firms permit the study of the impact of both intense scrutiny and legislated compensation restrictions on CEO pay. $TARP_{nonrestricted}$ firms had the heightened attention associated with receiving government bailout funds, but clearly had better financial viability than other TARP recipients (i.e., they were

able to more quickly raise the capital required to repay TARP obligations and avoid compensation restrictions). In contrast, $TARP_{restricted}$ firms had not only the scrutiny of receiving TARP funding, but also had to adhere to legislated wage restrictions and had to assess and publicly disclose their approach to luxury spending. Compensation changes at $TARP_{nonrestricted}$ firms (reflected in the γ regression coefficients) indicate the impact of an intense scrutiny while compensation changes at $TARP_{restricted}$ firms (reflected in the χ regression coefficients) indicate the impact of (even more) intense scrutiny plus the impact of legislated compensation restrictions while TARP obligations were outstanding.

In the wage regression of column (1), the significant positive and increasing β coeffcients for the 2008 to 2012 dummies confirm overall increasing wage at nonTARP firms. Given that the sample average nonTARP CEO 2006 wage was $9.78 million, the 2008 (2012) dummy coefficient of 0.102 (0.236) suggest that 2008 (2012) nonTARP average CEO wage increased to $10.82 million ($12.38 million) — a 10.7% (26.6%) increase over 2006 levels. The column (2) wage regression includes E index as an explanatory variable, and shows the same increasing CEO wage pattern. The main difference is that the year dummy variables are not significant until 2010, but the overall interpretation is the same. The positive, significant E index regression coefficient indicates that CEO wage at S&P 500 firms was higher at firms in which the shareholders cede more rights to management. I interpret these benchmark results to indicate that perceived cost

of increased scrutiny at nonTARP firms was not sufficient to cause these firms to decrease CEO wage.

With a value of 0.583, the significant, large, positive coefficient for γ_1 means that 2006 CEO wage at $TARP_{nonrestricted}$ firms was much higher than at nonTARP firms (i.e., $17.52 million or 79.1% higher). The coefficients γ_3 and γ_4 are significant, negative and large, indicating significant CEO wage reductions at $TARP_{nonrestricted}$ firms in 2008 and 2009. Given that the average 2008 (2009) nonTARP firm CEO wage was $9.25 ($9.27) million, γ_3 = -0.527 (γ_4 = -1.019) implies that 2008 (2009) $TARP_{nonrestricted}$ firm CEO wage was $5.46 ($3.35) million, 59.0% and 36.1% of 2008 and 2009 nonTARP CEO wage, respectively. The wage pattern for CEOs at $TARP_{nonrestricted}$ firms indicated by the regression (2)[54] results are nearly identical. The γ_5 to γ_7 coefficients are negative but not significant, indicating that the impact of scrutiny on CEO wage at $TARP_{nonrestricted}$ firms eased in 2009 to 2012. This result is consistent with wage scrutiny declining as the crisis receded.

The regression (1) and (2) χ_1 coefficients are not significantly different from zero, indicating 2006 CEO wages were approximately the same at $TARP_{restricted}$ and nonTARP firms. The regression (1) and (2) χ_2 to χ_7 coefficients are all significant, large, and negative, indicating that from 2007 to 2012 CEO wages at

[54] Includes E Index as a control for governance.

$TARP_{restricted}$ firms were significantly lower than at nonTARP firms. The results show that the wage gap was greatest in 2009 and narrowed by 2011 and 2012. For example, in regression (1), χ_3 = -1.187 (χ_7 = -0.413) implies that 2009 (2012) $TARP_{restricted}$ firm CEO wage was \$2.83 (\$7.01) million, 30.5% and 66.2% of 2008 and 2012 nonTARP CEO wage, respectively. The results suggest that increased public scrutiny began to impact $TARP_{restricted}$ firm CEO wage in 2007, with legislated wage restrictions causing further wage reductions while TARP obligations were outstanding. The magnitude of the coefficients decreases in 2010 to 2012 as firms repaid TARP obligations. However, the fact that CEO wages at $TARP_{restricted}$ firm remained significantly lower than at nonTARP firms through 2012 is consistent with the scrutiny of wages being more intense and lasting longer at $TARP_{restricted}$ firms than $TARP_{nonrestricted}$ firms.

With respect to perks, E index is not a significant explanatory factor for CEO perks. In the perk regressions of columns (3) and (4), the β coefficients are not significant except for β_3, indicating that CEO perks at nonTARP firms did not change significantly from 2006 to 2012[55]. These benchmark results suggest that increased scrutiny at nonTARP firms did not impact overall perk practices. In the column (3) regressions, the large, significant, and positive coefficients for γ_1 to γ_3 indicate that from 2006 to 2008, CEO perks at $TARP_{nonrestricted}$ firms were much

[55] Except 2009 when they are significantly higher.

higher than at nonTARP firms. Although γ_4 to γ_7 are all positive, they are not statistically significant, indicating that $TARP_{nonrestricted}$ reduced CEO perks by 2009 and kept them lower through 2012. CEO perks at $TARP_{restricted}$ firms demonstrate a similar pattern, but the results suggest that the cuts occurred earlier and were deeper. In the column (3) regression, χ_1 and χ_2 are large, significant and positive, indicating that 2006 and 2007 CEO perks at $TARP_{restricted}$ firms were significantly higher than the respective levels at nonTARP firms. χ_3 to χ_7 are mostly negative and not significant. The results suggest that intense scrutiny has a more lasting impact on perks than on wages. The benchmark nonTARP firms made little change to perks as they came under increased scrutiny during the crisis. The high perk paying $TARP_{nonrestricted}$ firms responded to increased scrutiny by making large cuts to perks as the crisis unfolded and maintained the cuts through 2012. Recall that the compensation restrictions under TARP did not specifically limit perks. The results for $TARP_{restricted}$ firms suggest that they experienced the most intense scrutiny, reducing perks earlier and keeping them lower than nonTARP firms. The differing impact of scrutiny on CEO wages and perks may be related to perks attracting more attention and being perceived as more excessive than wage causing firms to rethink the (implicit) scrutiny costs of

perks and more permanently shifting attitudes towards perks as part of executive compensation packages[56].

(Insert Table 4.5 about here)

I further investigate the idea that excessive perks attract more public scrutiny by examining changes in specific perk items. Although CEO perks at benchmark nonTARP firms remained relatively static from 2006 to 2012, there was significant movement in individual perks items. In Table 4.5, columns 1 to 3 (4 and 5) present results for specific perk items that experienced significant decreases (increases) at nonTARP firms during the sample period. The regression specification is the same as in Table 4.4 but with specific perks items as the dependent variables instead of wage or total perks. To simplify the presentation, I do not tabulate the γ coefficients for the $TARP_{nonrestricted}$·year dummies or the χ coefficients for the $TARP_{restricted}$·year dummies because I am interested in the changing perk practices at nonTARP firms. The dependent variables in columns (1) to (5) are the natural logarithms of CEO company-paid club memberships, payout for unused vacation, professional association dues, charitable gift matching, and medical/health perks, respectively. Since the dependent variables are logarithmic, the coefficients on the year dummy variables represent (approximately) the percentage change in that perk item compared to 2006 levels.

[56] The regression (4) results have the same interpretation, but the reductions in CEO perks at both restricted and nonrestricted TARP firms start one year later at the sample firms for which E index data is available.

In columns (1) to (3), the β coefficients for the year dummies are all negative[57] and statistically significant particularly in the later years of the sample period[58], indicating sustained reductions in these specific perk items. Overall, compared to 2006 levels, nonTARP firm CEO consumption of club memberships, vacation payouts, and professional association dues remained significantly lower in 2012. The decision to reduce perks may reflect a firm's assessment that previous levels of these perks were excessive or inappropriate.

In columns (4) and (5), all of the year dummy coefficients are positive and most are significant, indicating that CEO charitable gift matching and medical/health perks increased from 2006 levels and remained higher. The results are consistent with nonTARP firms recognizing the benefits of corporate social responsibility and executive well-being. As benchmark firms, I interpret changes in perk paying practices at nonTARP firms as a reflection of their evaluation of the costs and benefits of providing specific perk items in an environment of heightened overall scrutiny caused by the financial crisis. Under scrutiny, firms may choose to reduce perks that are excessive, and increase those perks that provide common value.

(Insert Table 4.6 about here)

[57] Except for 2007 in the club membership regression.
[58] 2011 and 2012 for club memberships; 2008, 2009, 2011, and 2012 for vacation payouts; and 2007, 2011, and 2012 for professional association dues.

I next examine what happened at firms that received TARP funding. Table 4.6 shows changes in specific perks items consumed by CEOs at $TARP_{nonrestricted}$ firms from 2006 to 2012. Columns 1 to 3 (4 and 5) presents results for specific perk items that experienced significant decreases (increases). The dependent variables in columns (1) to (5) are logarithmic personal use of company aircraft, security, financial services, car and driver services, and medical/health perks, respectively. Similar to Table 4.5, to simplify the presentation, I do not tabulate the β coefficients for the year dummies or the χ coefficients for the $TARP_{restricted}$·year dummies because I am interested in the changing perk practices at $TARP_{nonrestricted}$ firms. The set up for the regressions means that the γ coefficients of the $TARP_{nonrestricted}$·year dummies indicate the difference in the level of the specific perk item at $TARP_{nonrestricted}$ firms compared to nonTARP firms in the year defined by the dummy.

The regression (1) results show that $TARP_{nonrestricted}$ firms make very large cuts to the personal use of corporate aircraft perk. γ_4 = -2.847, γ_6 = -2.557, and $\gamma_7 = -3.079$ are all statistically significant and indicate that $TARP_{nonrestricted}$ firms all but eliminated aircraft perks starting in 2009. The γ_1 coefficients in regressions (2), (3), and (4) are large, positive, and statistically significant, indicating that, in 2006, $TARP_{nonrestricted}$ firm CEOs had much higher levels of security, financial, and car and driver services than nonTARP firm CEOs. The

security regression in column (2) shows that the gap between $TARP_{nonrestricted}$ and nonTARP firms became progressively smaller from 2007 to 2010. By 2011 and 2012, spending on CEO security was not statistically different between $TARP_{nonrestricted}$ and nonTARP firms. Similarly, $TARP_{nonrestricted}$ firms reduced spending on financial services, although the results are less compelling[59]. The regression (1), (2), and (3) results are consistent with $TARP_{nonrestricted}$ firms acting to reduce excessive consumption of aircraft, security, and financial services perks (i.e., three of the highest dollar value and/or most frequent perks[60]). While $TARP_{nonrestricted}$ firms responded to the financial crisis by making perk reductions overall, they chose to significantly increase spending on car and driver services and medical/health perks. Given that these firms were aware of the negative impact of public scrutiny, their decision to increase these perks suggest that firms perceived them as beneficial and not excessive. The column (4) regression shows that the gap between $TARP_{nonrestricted}$ firms and nonTARP firms widens — the γ_2 *to* γ_7 (2007 to 2012) coefficients are all larger than γ_1 and significant at the 1% level. Executives at $TARP_{nonrestricted}$ firms became significantly higher users of car and driver services. Given that $TARP_{nonrestricted}$ firms are predominantly New York

[59] γ_3, γ_5, and γ_7 are not significant, indicating that CEO financial services perks at $TARP_{nonrestricted}$ firms are not significantly different from those at nonTARP firms in 2008, 2010, and 2012.

[60] In the overall sample, the number of CEOs and average value of these three perks are 1334 ($139,706), 436 ($155,119), and 879 ($17,342) for aircraft, security, and financial services, respectively.

City banks and investment brokers, this behavior is consistent with recognizing the productively benefit of letting executives continue to focus on business while someone else deals with vagaries and stress of city traffic. Since a car service is particularly beneficial in New York City, it is reasonable that $TARP_{nonrestricted}$ firms would find this perk more beneficial than would nonTARP firms. The medical/health regression in column (5) shows that in 2006, CEO spending on medical/health was not significantly different at $TARP_{nonrestricted}$ and nonTARP firms, but the the γ_2 to γ_7 coefficients are all large, postive, and significant, indicating that, compared to nonTARP firms, $TARP_{nonrestricted}$ firms spent more on medical/health perks in 2007 to 2012. Note that the behavior of $TARP_{nonrestricted}$ firms with respect to medical/health perks is incremental to increasing levels of this perk at nonTARP firms between 2007 and 2012, indicating that $TARP_{nonrestricted}$ firms placed a very high value on the benefits of executive well-being.

(Insert Table 4.7 about here)

To complete the analysis, I examine the perk choices made by $TARP_{restricted}$ firms. Although there were no specific restrictions on perks, TARP regulations required these firms to formalize policies with respect to luxury spending. Table 4.7 shows changes in specific perks items consumed by CEOs at $TARP_{restricted}$ firms from 2006 to 2012. The results in columns (1) to (3) show that $TARP_{restricted}$ firms decreased spending on CEO personal use of company aircraft,

security, and other perks and the column (4) results indicate that they increased spending on cost of living allowances. Similar to Table 4.5, to simplify the presentation, I do not tabulate the β coefficients for the year dummies or the γ coefficients for the $TARP_{nonrestricted}$·year dummies because I am interested in the changing perk practices at $TARP_{restricted}$ firms. The χ coefficients of the $TARP_{restricted}$·year dummies indicate the difference in the level of the specific perk item at $TARP_{restricted}$ firms compared to nonTARP firms in the year defined by the dummy.

The regression (1) results show that $TARP_{restricted}$ firms make very large cuts to the personal use of corporate aircraft perk. $\chi_4 = -3.582$, $\chi_5 = -1.976$, and $\chi_6 = -1.982$ are all statistically significant and indicate that $TARP_{restricted}$ spending on CEO personal use of aircraft was much less than at nonTARP firms from 2009 to 2011. The coefficient for 2012 is also large and negative, but is not statistically significant. The regression (2) results show that $TARP_{restricted}$ firms reduced spending on security as well — $\chi_3 = -1.371$, $\chi_4 = -1.930$, and $\chi_5 = -1.652$ are all statistically significant and indicate that spending on CEO security was much lower at $TARP_{restricted}$ firms than at nonTARP firms in 2008, 2009, and 2010. In regression (3), $\chi_1 = 3.753$, $\chi_2 = 3.908$, and $\chi_3 = 3.724$ are all at the 1% significance level, indicating that $TARP_{restricted}$ firms had much, much higher levels of "other" perks than nonTARP firms in 2006, 2007, and 2008. This

changed abruptly in 2009. χ_4 to χ_7 are all much smaller and not statistically significant — the gap in spending on "other" perks disappeared from 2009 to 2012. The behavior of $TARP_{restricted}$ firms with respect to other perk consumption suggests that these firms became more careful in monitoring (luxury) perk spending. Consolidation of relatively large perk provision under the banner "miscellaneous" tends to project an image of of nontransparency and lack of control; $TARP_{restricted}$ firms made efforts to address this public image problem.

However, even in an environment of intense scrutiny and widespread cuts in perks, $TARP_{restricted}$ firms chose to maintain and even increase some perks. For example, the regression results show higher levels of cost of living allowances in 2009 and 2011 at $TARP_{restricted}$ firms compared to nonTARP firms. A deeper investigation of $TARP_{retricted}$ spending on cost of living allowances for all named executives[61] shows that $TARP_{retricted}$ firms maintained much higher levels than nonTARP firms through the entire sample period. This behavior is consistent with recognizing the value of developing executives through international assignments international assignments[62].

4.4 Conclusions

The financial crisis and TARP legislation provide an interesting opportunity to evaluate the impact of public scrutiny on executive compensation. I investigate

[61] Results for all named executives are not tabulated but are available on request.
[62] Multinational firms, in particular, use international assignments as part of career advancement for top executives - cost of living allowances are an important decision factor for executives (Baruch, 2004).

the extent to which increased public scrutiny associated with financial crisis and governance intervention changed corporate compensation practices by examining time trends in compensation, by differentiating firms with respect to public scrutiny, and by including both monetary and nonmonetary compensation. Compensation practices at $TARP_{nonrestricted}$, $TARP_{restricted}$ and nonTARP firms were markedly different in the years surrounding the financial crisis, and CEO wage and perks behaved differently in response to heightened public scrutiny.

The financial crisis had a much greater impact on CEO compensation at both nonrestricted and restricted TARP firms, and the effects lingered. By the end of the crisis, the wage and perk gap between $TARP_{nonrestricted}$ ($TARP_{restricted}$) firms and nonTARP firms narrowed (reversed). TARP firm compensation committees may have decided that the negative impact of public perception of perks as excessive more than offset the potential benefit of perks as part of executive pay. The magnitude and persistence of perk reductions at TARP firms suggest that this change has a degree of permanence. Using changes in individual perk items, I provide evidence that previous levels of perks such as personal use of corporate aircraft, personal security, and company paid club memberships may have been excessive, while perks such as charitable gift matching, medical/health benefits, cost of living allowances, and car and driver services may provide common benefits that outweigh any negatives related to public perception.

Overall, my results are consistent with compensation restrictions having a temporary impact on wage and public scrutiny having a temporary impact on wage and a lasting impact on perks. Increased scrutiny related to the crisis did not cause benchmark nonTARP firms to reduce CEO wages or perks. However, bail out recipients responded to the resulting intense scrutiny with large cuts to CEO wages that moderated as the crisis and scrutiny receded. In contrast, in the wake of the financial crisis, these firms experienced more permanent shifts in their attitudes toward the scrutiny costs of providing perks. NonTARP firms (i.e., firms experiencing more moderate changes in scrutiny) maintained overall levels of CEO perks but reduced perks perceived as excessive and focused on ones that have the potential to provide common value. TARP firms (i.e., firms facing more intense scrutiny) made large overall perk reductions through focused cuts to expensive and excessive perks, yet maintained or increased perks that provide common value.

References:

Baruch, Y., 2004, Managing Careers: Theory and Practice, (FT-Prentice-Hall, Harlow).

Bebchuk, L., A. Cohen, and H. Spamman, 2010, The wages of failure: Executive compensation at Bear Stearns and Lehman 2000-2008, Yale Journal on Regulation 27, 257-282.

Bebchuk, L., A. Cohen, and A. Ferrell, 2009, What matters in corporate governance?, Review of Financial Studies 22(2),783-827.

Bebchuk, L. , and J. Fried, 2004, Pay Without Performance: The Unfulfilled Promise of Executive Compensation, (Harvard University Press, Cambridge, MA).

Carrothers, A., S. Han, and J. Qiu, 2012, The market for CEO talent and perquisites: Theory and evidence. Available at SSRN: http://ssrn.com/abstract=2062592

Core, J., W. Guay, and D. Larcker, 2008, The power of the pen and executive compensation, Journal of Financial Economics 88, 1-25.

Core, J., and W. Guay, 2010, Is there a case for regulating executive pay in the financial services industry? Available at SSRN: http://ssrn.com/abstract=1544104

DeYoung, R., E. Peng, and M. Yan, 2010, Executive compensation and business policy choices at U.S. commercial banks, RWP 10-02, Research Division, Federal Reserve Bank of Kansas City.

Diamond D., and R. Verrecchia, 1982, Optimal managerial contracts and equilibrium security prices. Journal of Finance 37(2), 275-287.

Dyck, A. and L. Zingales, 2002, The corporate governance role of the media, CRSP Working Paper No. 543. Available at SSRN: http://ssrn.com/abstract=335602

Edgerton, J., 2012, Agency problems in public firms: Evidence from corporate jets in leveraged buyouts, Journal of Finance 67(6), 2187-2213.

Edmans A, Gabaix X, and Landier A., 2009, A multiplicative model of optimal CEO incentives in market equilibrium, Review of Financial Studies 22(12), 4881-4917.

Edmans, A., and X. Gabaix, 2009, Is CEO pay really inefficient? A survey of new optimal contracting theories, European Financial Management 15(3), 486-496.

Fama, E., 1980, Agency problems and the theory of the firm, Journal of Political Economy 88, 288–307.

Faulkender, M., and J. Yang, 2010, Inside the black box: The role and composition of compensation peer groups, Journal of Financial Economics 96(2), 257-270.

Gabaix, X. and A. Landier, 2008, Why has CEO pay increased so much? The Quarterly Journal of Economics 123(1), 49-100.

Gan, A., 2006, The impact of public scrutiny on corporate philanthropy, Journal of Business Ethics 69, 217–236.

Graham, J. R., S. Li, and J. Qiu, 2012, Managerial attributes and executive compensation, Review of Financial Studies 25(1), 144-186.

Grinstein, Y., D. Weinbaum, and N. Yehuda, 2010, The economic consequences of perk disclosure, Johnson School Research Paper Series No. 04-09; AFA 2011 Denver Meetings Paper. Available at SSRN: http://ssrn.com/abstract=1108707

Hall, B., and K. Murphy, 2002, Stock options for undiversified executives, Journal of Accounting and Economics 33(2), 3-42.

Hall, B., and K. Murphy, 2003. The trouble with stock options, Journal of Accounting Economics 17(3), 49-70.

Henderson, T., and J. Spindler, 2005, Corporate heroin: A defense of perks, executive loans, and conspicuous consumption. Georgetown Law Journal 93, 1835-1884.

Hirsch, F., 1976, Social Limits to Growth, (Harvard University Press, Cambridge, MA).

Jensen, M., and W. Meckling, 1976, Theory of the firm: managerial behavior, agency costs, and ownership structure, Journal of Financial Economics 3, 360–395.

Jensen, M., and K. Murphy, 1990. Performance pay and top-management incentives, Journal of Political Economy 98, 225 – 264.

Kashyap, A. and L. Zingales, 2010, The 2007–8 financial crisis: Lessons from corporate finance, Journal of Financial Economics 97(3), 303-305.

Kirkpatrick, G., 2009, The corporate governance lessons from the financial crisis, OECD Journal: Financial Market Trends 2009(1), 61-87.

Kuhnen, C., and J. Zwiebel, 2008, Executive pay, hidden compensation and managerial entrenchment, Rock Center for Corporate Governance Working Paper No. 16.

Lazear, E., 2003, Firm-specific human capital: A skill-weights approach, IZA Discussion Paper No. 813. Available at SSRN: http://ssrn.com/abstract=422562

Miller, G., 2006, The press as a watchdog for accounting fraud, Journal of Accounting Research 44, 1001-1033.

Murphy, K., 1999, Executive compensation, in Ashenfelter, O. and D. Card, eds.: Handbook of Labor Economics, (Elsevier Science B.V., Amsterdam, The Netherlands).

Murphy, K., 2002, Explaining executive compensation: Managerial power versus the perceived cost of stock options, University of Chicago Law Review 69(3), 847-869.

Murphy, K., 2012, Pay, politics, and the financial crisis, in Blinder, A., A. Lo and R. Solow, eds.: Economic Lessons from the Financial Crisis. (Russell Sage Foundation)

Murphy, K., and J. Zabojnik, 2004, CEO pay and appointments: A market-based explanation for recent trends, The American Economic Review 94(2), 192-196.

Murphy, K., and Zabojnik, J., Managerial capital and the market for CEOs (April 2007), working paper. Available at SSRN: http://ssrn.com/abstract=984376

Ng, J., F. Vasvari, and R. Wittenberg-Moerman, 2011, The Impact of TARP's Capital Purchase Program on stock market valuation of participating banks, Working paper. Available at http://ssrn.com/abstract=1566284

Rajan, R., and J. Wulf, 2006, Are perks purely managerial excess? Journal of Financial Economics 79(1), 1-33.

Rose, N., and A. Shepard, 1997, Firm diversification and CEO compensation: Managerial ability or executive entrenchment? Rand Journal of Economics 28(3), 489-514.

Rosen, S., 1986, The theory of equalizing differences, in Ashenfelter, O. and R. Layrad, eds.: Handbook of Labor Economics, (Elsevier Science B.V., Amsterdam, The Netherlands).

Rosen S., 1992, Contracts and the market for executives, in Wein, L. and H. Wijkander, eds.: Contract Economics, (Cambridge: Blackwell).

Tervio, M., 2008. The difference that CEOs make: An assignment model approach, American Economic Review 98(3), 642–668.

Wiersema, M. and Y. Zhang, 2013, Executive turnover in the stock option backdating wave: The impact of social context. Strategic Management Journal 34, 590-609.

Yermack D., 2006, Flights of fancy: Corporate jets, CEO perquisites, and inferior shareholder returns, Journal of Financial Economics 80(1), 211-242.

Figure 4.1

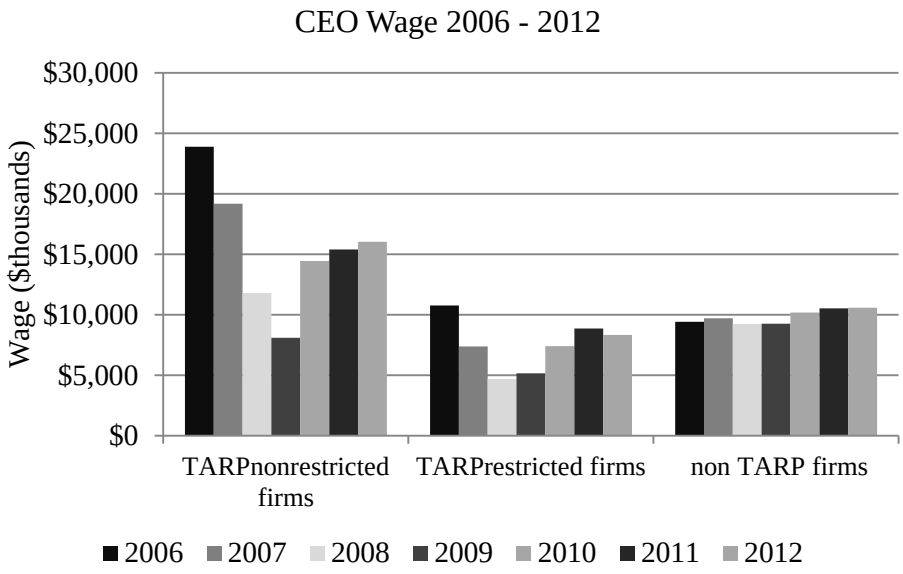
CEO Wage 2006 - 2012
$30,000
$25,000
$20,000
$15,000
$10,000
$5,000
$0
Wage ($thousands)
TARPnonrestricted firms
TARPrestricted firms
non TARP firms
2006
2007
2008
2009
2010
2011
2012

Figure 4.2

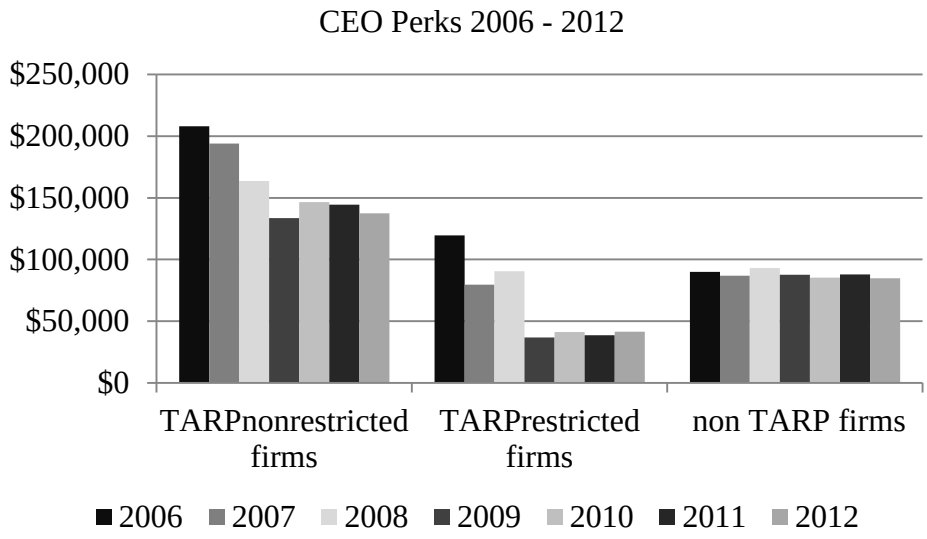
CEO Perks 2006 - 2012
$250,000
$200,000
$150,000
$100,000
$50,000
$0
TARPnonrestricted firms
TARPrestricted firms
non TARP firms
2006
2007
2008
2009
2010
2011
2012

Table 4.1

Summary statistics of firm characteristics

This table summarizes sample firm characteristic statistics. The sample includes S&P 500 firms between January 1, 2006 and December 31, 2013. Columns present data for CEOs at $TARP_{nonrestricted}$ (firms that repaid TARP obligations before December 31, 2009), $TARP_{restricted}$ (firms that did not repay TARP obligations before December 31, 2009) and nonTARP (firms that did not receive government support through TARP) firms as indicated. *Market Value* is book value of debt plus market value of equity. *Return on Assets* is net income divided by total assets. *Return on Equity* is net income divided by total equity. *Stock Return* is year end share price plus all per share dividend payments during the year all divided by prior year end share price. *Market to Book Ratio* is market value of equity divided by book value of equity. *Free Cash Flow* is net income plus depreciation & amortization plus interest after tax minus the increase in working capital minus capital expenditures. *E Index* is the entrencement index (governance) defined in Bebchuk, Cohen, and Ferrel (2009).

	$TARP_{nonrestricted}$			$TARP_{restricted}$			nonTARP		
	Obs	Mean (Median)	Std	Obs	Mean (Median)	Std	Obs	Mean (Median)	Std
Employees	95	91,438 (49,500)	91,716	170	40,556 (12,599)	72,804	4326	39,765 (16,800)	61,557
Net Sales ($millions)	95	43,167 (24,176)	39,678	170	25,351 (6,849)	43,988	4326	15,081 (6,674)	23,623
Total Assets ($millions)	95	449,224 (297,048)	323,794	170	201,652 (93,111)	254,464	4326	28,703 (10,164)	74,122
Market Value ($millions)	95	260,735 (117,900)	244,654	170	88,064 (22,426)	174,853	4326	29,342 (12,605)	59,246
Return on Assets	95	1.0% (1.0%)	0.8%	170	0.7% (0.8%)	7.1%	4326	5.8% (5.5%)	7.5%
Return on Equity	95	11.0% (9.9%)	8.0%	170	13.8% (8.2%)	50.5%	4326	14.0% (14.3%)	38.2%
Sales Growth	95	6.1% (3.8%)	21.3%	170	2.9% (-1.9%)	24.0%	4326	6.9% (5.7%)	18.3%
Stock Return	95	8.7% (8.6%)	37.6%	170	7.0% (12.3%)	49.6%	4326	11.0% (9.7%)	40.0%
Market to Book Ratio	95	1.6 (1.3)	1.1	170	1.0 (1.0)	0.7	4326	3.2 (2.4)	3.9
Free Cash Flow ($millions)	95	7,618 (4,176)	7,754	170	3,070 (907)	6,843	4326	1,183 (430)	3,106
E Index	82	1.9 (2)	1.4	123	2.7 (3)	1.4	3239	2.7 (3)	1.5

Table 4.2

Summary wage information for S&P 500 CEOs

This table presents summary statistics for CEO wage ($000s) at S&P 500 companies as disclosed in SEC filings between January 1, 2006 and December 31, 2013. Columns presents data for CEOs at $TARP_{nonrestricted}$ (firms that repaid TARP obligations before December 31, 2009), $TARP_{restricted}$ (firms that did not repay TARP obligations before December 31, 2009) and nonTARP (firms that did not receive government support through TARP) firms as indicated.

	$TARP_{nonrestricted}$		$TARP_{restricted}$		nonTARP	
Year	Mean (Median)	Std Dev	Mean (Median)	Std Dev	Mean (Median)	Std Dev
2006	23,910 (28,004)	7,679	10,783 (9,422)	7,009	9,417 (7,719)	6,832
2007	19,189 (23,468)	9,945	7,398 (6,085)	6,098	9,724 (7,918)	6,871
2008	11,800 (9,719)	8,925	4,690 (4,477)	3,527	9,248 (7,563)	6,318
2009	8,106 (6,931)	6,554	5,154 (4,791)	4,327	9,274 (7,991)	6,092
2010	14,460 (14,985)	5,077	7,407 (6,837)	5,418	10,192 (8,884)	6,417
2011	15,395 (15,705)	5,096	8,872 (7,885)	5,149	10,521 (9,129)	6,601
2012	16,051 (14,502)	5,962	8,328 (8,807)	4,197	10,596 (9,149)	6,407

Table 4.3

Summary perk information for S&P 500 CEOs

This table presents summary statistics for CEO perks at S&P 500 companies as disclosed in SEC filings between January 1, 2006 and December 31, 2013. Columns present data for CEOs at $TARP_{nonrestricted}$ (firms that repaid TARP obligations before December 31, 2009), $TARP_{restricted}$ (firms that did not repay TARP obligations before December 31, 2009) and nonTARP (firms that did not receive government support through TARP) firms as indicated.

	$TARP_{nonrestricted}$		$TARP_{restricted}$		nonTARP	
Year	Mean (Median)	Std Dev	Mean (Median)	Std Dev	Mean (Median)	Std Dev
2006	207,880	176,018	119,683	144,844	89,886	127,633
	(161,097)		(46,797)		(32,760)	
2007	193,921	179,825	79,697	112,384	87,004	128,461
	(134,656)		(40,741)		(30,369)	
2008	163,742	162,048	90,582	96,546	93,066	131,712
	(116,575)		(43,725)		(34,742)	
2009	133,564	141,497	36,795	52,699	87,791	117,470
	(92,759)		(17,337)		(37,870)	
2010	146,657	172,014	41,348	79,226	85,257	120,497
	(63,461)		(15,337)		(32,791)	
2011	144,565	175,395	38,648	52,519	87,811	125,292
	(84,635)		(22,318)		(33,528)	
2012	137,474	160,004	41,416	59,662	84,756	124,506
	(71,252)		(23,160)		(29,585)	

Table 4.4

Changes in CEO compensation at S&P 500 firms in the years surrounding the financial crisis

This table reports the changes in CEO wage and perk compensation over time. The dependent variable in columns 1&2 (3&4) is CEO logarithmic wage (perks). The coefficients for the year dummy variables indicate the level of CEO wage or perks in that year relative to 2006.The coefficients on the repective $TARP_{nonrestricted}$·Year ($TARP_{restricted}$·Year) dummies indicate the level of CEO wage or perks at nonrestricted (restricted) TARP firms compared to nonTARP firms in the given year. All regressions control for industry fixed effects and $\ln(\text{Market Value}_{t-1})$, Market to Book Ratio_{t-1}, Stock Return_t, Stock Return_{t-1}, Return on Assets_t, Return on Assets_{t-1}, Free Cash Flow Ratio_{t-1}, Sales Growth_{t-1}, $\ln(\text{Tenure}_t)$, and Female. Regressions contol for governance (E Index) as indicated. The subscripts $_t$ and $_{t-1}$ indicate current and prior year respectively. See Appendix 4.B for definitions of all variables. Cluster-robust standard errors are in parentheses with clustering at firm level. ***, **, * indicate significance level at 1%, 5% and 10% level respectively.

	1 $\ln(\text{Wage}_t)$	2 $\ln(\text{Wage}_t)$	3 $\ln(\text{Perks}_t)$	4 $\ln(\text{Perks}_t)$
β_1 (2007 dummy)	0.057	-0.010	-0.158	-0.451
	(0.049)	(0.054)	(0.284)	(0.328)
β_2 (2008 dummy)	0.102**	0.026	-0.025	-0.253
	(0.051)	(0.055)	(0.297)	(0.335)
β_3 (2009 dummy)	0.126**	0.089	0.656**	0.567*
	(0.053)	(0.055)	(0.307)	(0.336)
β_4 (2010 dummy)	0.142***	0.147***	0.451	0.353
	(0.052)	(0.054)	(0.304)	(0.330)
β_5 (2011 dummy)	0.173***	0.179***	0.221	0.120
	(0.049)	(0.051)	(0.284)	(0.312)
β_6 (2012 dummy)	0.236***	0.254***	0.393	0.347
	(0.052)	(0.054)	(0.299)	(0.329)
γ_1 ($TARP_{nonrestricted}$·2006 dummy)	0.583**	0.533**	3.340**	3.942**
	(0.255)	(0.261)	(1.476)	(1.595)
γ_2 ($TARP_{nonrestricted}$·2007 dummy)	0.101	0.336	3.285**	4.161***
	(0.247)	(0.252)	(1.429)	(1.542)
γ_3 ($TARP_{nonrestricted}$·2008 dummy)	-0.527**	-0.512**	2.860**	3.599**
	(0.247)	(0.243)	(1.431)	(1.483)
γ_4 ($TARP_{nonrestricted}$·2009 dummy)	-1.019***	-1.008***	1.919	2.726*
	(0.248)	(0.243)	(1.435)	(1.484)
γ_5 ($TARP_{nonrestricted}$·2010 dummy)	-0.197	-0.189	0.914	1.715
	(0.247)	(0.243)	(1.432)	(1.483)
γ_6 ($TARP_{nonrestricted}$·2011 dummy)	-0.002	0.003	0.266	0.949
	(0.247)	(0.242)	(1.431)	(1.481)
γ_7 ($TARP_{nonrestricted}$·2012 dummy)	-0.057	-0.041	1.251	2.009
	(0.248)	(0.243)	(1.434)	(1.483)
χ_1 ($TARP_{restricted}$·2006 dummy)	-0.092	-0.163	2.873**	3.648***
	(0.200)	(0.206)	(1.159)	(1.261)
χ_2 ($TARP_{restricted}$·2007 dummy)	-0.934***	-0.758***	2.202*	3.161**
	(0.195)	(0.206)	(1.128)	(1.262)
χ_3 ($TARP_{restricted}$·2008 dummy)	-1.024***	-0.810***	1.796	3.122**
	(0.200)	(0.206)	(1.158)	(1.259)
χ_4 ($TARP_{restricted}$·2009 dummy)	-1.187***	-0.880***	-0.809	0.410
	(0.203)	(0.206)	(1.174)	(1.257)
χ_5 ($TARP_{restricted}$·2010 dummy)	-0.748***	-0.450**	-1.281	0.001
	(0.190)	(0.209)	(1.100)	(1.279)
χ_6 ($TARP_{restricted}$·2011 dummy)	-0.398**	-0.392**	-1.119	-0.300
	(0.190)	(0.199)	(1.099)	(1.214)
χ_7 ($TARP_{restricted}$·2012 dummy)	-0.413**	-0.347*	-0.951	-0.044
	(0.190)	(0.199)	(1.102)	(1.217)
E Index		0.029**		-0.012
		(0.013)		(0.081)
Constant	14.137***	14.465***	2.503	-5.517
	(0.774)	(0.721)	(4.483)	(4.407)
Observations	3,530	3,092	3,530	3,092
R-squared	0.320	0.356	0.231	0.238

Table 4.5

Changes in specific perk items at nonTARP firms from 2006 to 2012

This table shows changes in specific perks items consumed by CEOs at nonTARP S&P 500 firms (firms that did not receive government support through TARP) from 2006 to 2012. Columns (1) to (3) summarize data for perk items that decreased during the period. Columns (4) and (5) summarize data for perk items that increased during the period. The dependent variables in columns (1) to (5) are logarithmic club memberships, payout for unused vacation, professional association dues, charitable gift matching, and medical/health perks, respectively. All regressions control for industry (3 digit SIC) fixed effects and ln(Market Value$_{t-1}$), Market to Book Ratio$_{t-1}$, Stock Return$_t$, Stock Return$_{t-1}$, Return on Assets$_t$, Return on Assets$_{t-1}$, Free Cash Flow Ratio$_{t-1}$, Sales Growth$_{t-1}$, Ln(Tenure$_t$), and Female. The subscripts $_t$ and $_{t-1}$ indicate current and prior year respectively. See Appendix 4.B for definitions of all variables. Cluster-robust standard errors are in parentheses with clustering at firm level. ***, **, * indicate significance level at 1%, 5% and 10% level respectively.

	(1)	(2)	(3)	(4)	(5)
	ln(Club Fees$_t$)	ln(Vacation$_t$)	ln(Pro Fees$_t$)	ln(Charity$_t$)	ln(Medical$_t$)
β_1 (2007 dummy)	0.035	-0.129	-0.065**	0.180	0.152
	(0.139)	(0.088)	(0.026)	(0.137)	(0.163)
β_2 (2008 dummy)	-0.077	-0.204**	-0.043	0.206	0.213
	(0.145)	(0.092)	(0.027)	(0.143)	(0.170)
β_3 (2009 dummy)	-0.222	-0.227**	-0.040	0.292**	0.057
	(0.150)	(0.095)	(0.028)	(0.148)	(0.176)
β_4 (2010 dummy)	-0.119	-0.141	-0.046*	0.278*	0.380**
	(0.149)	(0.094)	(0.027)	(0.146)	(0.174)
β_5 (2011 dummy)	-0.237*	-0.167*	-0.064**	0.382***	0.346**
	(0.139)	(0.088)	(0.026)	(0.137)	(0.163)
β_6 (2012 dummy)	-0.308**	-0.210**	-0.065**	0.419***	0.646***
	(0.146)	(0.093)	(0.027)	(0.144)	(0.171)
Constant	1.233	-0.048	-0.131	-1.609	1.141
	(2.197)	(1.388)	(0.404)	(2.161)	(2.570)
γ dummies	Y	Y	Y	Y	Y
χ dummies	Y	Y	Y	Y	Y
Control Variables	Y	Y	Y	Y	Y
Industry Fixed Effects	Y	Y	Y	Y	Y
Observations	3,530	3,530	3,530	3,530	3,530
R-squared	0.193	0.063	0.091	0.230	0.168

Table 4.6

Changes in specific perk items at $TARP_{nonrestricted}$ firms from 2006 to 2012

This table shows changes in specific perks items consumed by CEOs at $TARP_{nonrestricted}$ S&P 500 firms (firms that repaid TARP obligations by December 31, 2009) from 2006 to 2012. Columns (1) to (3) summarize data for perk items that decreased during the period. Columns (4) and (5) summarize data for perk items that increased during the period. The dependent variables in columns (1) to (5) are logarithmic personal use of company aircraft, security, financial services, car and driver services, and medical/health perks, respectively. All regressions control for industry (3 digit SIC) fixed effects and ln(Market $Value_{t-1}$), Market to Book $Ratio_{t-1}$, Stock $Return_t$, Stock $Return_{t-1}$, Return on $Assets_t$, Return on $Assets_{t-1}$, Free Cash Flow $Ratio_{t-1}$, Sales $Growth_{t-1}$, Ln($Tenure_t$), and Female. The subscripts $_t$ and $_{t-1}$ indicate current and prior year respectively. See Appendix 4.B for definitions of all variables. Cluster-robust standard errors are in parentheses with clustering at firm level. ***, **, * indicate significance level at 1%, 5% and 10% level respectively.

	(1) ln ($Aircraft_t$)	(2) ln ($Security_t$)	(3) ln ($Financial_t$)	(4) ln ($Car\ Service_t$)	(5) ln ($Medical_t$)
γ_1 $TARP_{nonrestricted}$·2006 dummy	-0.118	3.671***	3.855***	1.989**	-0.107
	(1.537)	(1.002)	(1.266)	(0.877)	(0.350)
γ_2 $TARP_{nonrestricted}$·2007 dummy	-0.502	3.321***	2.406**	3.017***	1.285***
	(1.488)	(0.970)	(1.225)	(0.849)	(0.339)
γ_3 $TARP_{nonrestricted}$·2008 dummy	-0.734	2.574***	1.544	2.680***	0.587*
	(1.490)	(0.971)	(1.227)	(0.850)	(0.339)
γ_4 $TARP_{nonrestricted}$·2009 dummy	-2.847*	1.699*	2.163*	3.535***	0.560*
	(1.494)	(0.974)	(1.230)	(0.852)	(0.340)
γ_5 $TARP_{nonrestricted}$·2010 dummy	-2.425	1.606*	1.532	3.613***	1.136***
	(1.491)	(0.972)	(1.228)	(0.851)	(0.339)
γ_6 $TARP_{nonrestricted}$·2011 dummy	-2.557*	1.273	2.339*	3.398***	0.548
	(1.490)	(0.971)	(1.227)	(0.850)	(0.339)
γ_7 $TARP_{nonrestricted}$·2012 dummy	-3.079**	0.735	1.578	2.328***	1.201***
	(1.493)	(0.973)	(1.230)	(0.852)	(0.340)
Constant	-17.217***	-10.489***	-3.112	-2.888	0.035
	(4.667)	(3.042)	(3.843)	(2.663)	(1.062)
β Year dummies	Y	Y	Y	Y	Y
χ $TARP_{restricted}$·Year dummies	Y	Y	Y	Y	Y
Control Variables	Y	Y	Y	Y	Y
Industry Fixed Effects	Y	Y	Y	Y	Y
Observations	3,530	3,530	3,530	3,530	3,530
R-squared	0.359	0.275	0.213	0.217	0.157

Table 4.7

Changes in specific perk items at $TARP_{restricted}$ firms from 2006 to 2012

This table shows changes in specific perks items consumed by CEOs at $TARP_{restricted}$ S&P 500 firms (firms that did not repay TARP obligations by December 31, 2009) from 2006 to 2012. Columns (1) to (3) summarize data for perk items that decreased during the period. Column (4) summarizes data for perk items that increased during the period. The dependent variables in columns (1) to (4) are logarithmic personal use of company aircraft, security, other, and cost of living allowances, respectively. All regressions control for industry (3 digit SIC) fixed effects and ln(Market $Value_{t-1}$), Market to Book $Ratio_{t-1}$, Stock $Return_t$, Stock $Return_{t-1}$, Return on $Assets_t$, Return on $Assets_{t-1}$, Free Cash Flow $Ratio_{t-1}$, Sales $Growth_{t-1}$, Ln($Tenure_t$), and Female. The subscripts $_t$ and $_{t-1}$ indicate current and prior year respectively. See Appendix 4.B for definitions of all variables. Cluster-robust standard errors are in parentheses with clustering at firm level. ***, **, * indicate significance level at 1%, 5% and 10% level respectively.

	(1) ln ($Aircraft_t$)	(2) ln ($Security_t$)	(3) ln ($Other_t$)	(4) ln ($COLA_t$)
χ_1 ($TARP_{restricted}$·2006 dummy)	0.346	-0.954	3.753***	0.674
	(1.207)	(0.787)	(1.044)	(0.427)
χ_2 ($TARP_{restricted}$·2007 dummy)	-0.312	-0.917	3.908***	0.680
	(1.174)	(0.765)	(1.015)	(0.415)
χ_3 ($TARP_{restricted}$·2008 dummy)	-0.060	-1.371*	3.724***	0.657
	(1.206)	(0.786)	(1.043)	(0.427)
χ_4 ($TARP_{restricted}$·2009 dummy)	-3.582***	-1.930**	1.029	0.772*
	(1.223)	(0.797)	(1.057)	(0.433)
χ_5 ($TARP_{restricted}$·2010 dummy)	-1.976*	-1.652**	0.460	0.324
	(1.145)	(0.747)	(0.991)	(0.405)
χ_6 ($TARP_{restricted}$·2011 dummy)	-1.982*	-0.956	0.115	0.892**
	(1.144)	(0.746)	(0.989)	(0.405)
χ_7 ($TARP_{restricted}$·2012 dummy)	-1.285	-1.034	0.038	0.414
	(1.147)	(0.748)	(0.992)	(0.406)
Constant	-17.217***	-10.489***	9.567**	0.883
	(4.667)	(3.042)	(4.036)	(1.651)
β Year dummies	Y	Y	Y	Y
γ $TARP_{nonrestricted}$·Year dummies	Y	Y	Y	Y
Control Variables	Y	Y	Y	Y
Industry Fixed Effects	Y	Y	Y	Y
Observations	3,530	3,530	3,530	3,530
R-squared	0.359	0.275	0.168	0.217

Appendix 4.A

Sample Summary Compensation Table[63]

Name and Principal Position (a)	Year (b)	Salary ($) (c)	Bonus ($) (d)	Stock Awards ($) (e)	Option Awards ($) (f)	Non-Equity Incentive Plan Compensation ($) (g)	Change in Pension Value and Nonqualified Deferred Compensation Earnings ($) (h)	All Other Compensation ($) (i)	Total ($) (j)
PEO[1]									
PFO[2]									
A									
B									
C									

[1] Refers to principal executive officer
[2] Refers to principal financial officer

[63] See: http://www.sec.gov/news/press/2006/2006-123_table.pdf

Appendix 4.B
Definition of Variables

Variable Name	Variable Definition
Firm Level Variables	
E (Entrenchment) Index	Bebchuk and Cohen and Ferrel (2009) base the E (entrenchment) Index on six governance provisions: staggered boards, limits to shareholder bylaw amendments, poison pills, golden parachutes, and supermajority requirements for mergers and charter amendments.
Free Cash Flow	net income plus depreciation & amortization plus interest after tax minus the increase in net working capital minus capital expenditures
Free Cash Flow Ratio	free cash flow divided by total assets
Ln(Market Value)	natural logarithm of firm market value - market value is defined as book value of debt plus market value of equity and is the proxy for firm size
Market to Book Ratio	fiscal year end share price times common shares outstanding divided by book value of equity
Market Value of Equity	share price at fiscal year end times the total number of shares outstanding
nonTARP firm	S&P 500 firms that did not receive government support through TARP
Return on Assets (ROA)	net income divided by total assets
Return on Assets (ROE)	net income divided by total equity
Sales Growth	increase in sales over prior fiscal year divided by prior fiscal year sales

Stock Return	fiscal year end price plus all per share dividend payments during the fiscal year all divided by prior fiscal year end share price
TARP	Troubled Assets Relief Program — an umbrella program established under the Emergency Economic Stabilization Act (EESA) of 2009 to restore stability to financial markets
$TARP_{nonrestricted}$ firm	S&P 500 firms that largely avoided legislated compensation restrictions by repaying their TARP obligations before the end of 2009
$TARP_{restricted}$ firm	S&P 500 firms subject to legislated compensation restrictions in at least one year due to outstanding TARP obligations

Manager Level Variables	
Wage	sum of salary, bonus, stock awards, option awards, non-equity incentive plan compensation, and change in pension value and nonqualified deferred compensation earnings in SEC proxy filings. This benchmark measure of total monetary compensation specifically excludes p*erquisites and other personal benefits* (the nonmonetary part of total compensation--++n) and *additional all other compensation* (one time payments such as severance or retirement lump sums)
Perks	amount reported as perquisites and other personal benefits in SEC filed proxy statements
Ln(Tenure)	natural logarithm of the length of service (in years) of the executive
Female	indicator variable that equals one if the manager is a female and zero if male

Appendix 4.C

Sample Firms Receiving Government Support Under the Troubled Asset Relief Program (TARP)[64]

Company Name	SIC Code	SIC Description	TARP Program	Funding Received	Date Received	Payment Status	Date Repaid	Profit to US Government
American Express Co	6199	Finance Services	CPP	$3,389	9-Jan-09	Full	9-Jun-09	$414.4
American International Group	6331	Fire, Marine, and Casualty Insurance	AIG	$67,800	25-Nov-08	Full	14-Dec-12	$5,030.0
Bank of America Corp	6020	Commercial Banks	CPP/TIP/AGP	$45,000	28-Oct-08	Full	9-Dec-09	$4,570.0
Bank of New York Mellon Corp	6020	Commercial Banks	CPP	$3,000	28-Oct-08	Full	9-Jun-09	$231.4
BB&T Corp	6020	Commercial Banks	CPP	$3,134	14-Nov-08	Full	9-Jun-09	$159.7
Blackrock Inc	6282	Investment Advice	PPIF	$1,580	2-Oct-09	Full	18-Oct-12	$436.0
Capital One Financial Corp	6141	Personal Credit Institutions	CPP	$3,555	14-Nov-08	Full	9-Jun-09	$251.7
CIT Group Inc	6172	Finance Lessors	CPP	$2,330	31-Dec-08	None		$0.0
Citigroup Inc	6199	Finance Services	CPP/TIP/AGP	$45,000	28-Oct-08	Full	6-Dec-10	$13,400.0
Comerica Inc	6020	Commercial Banks	CPP	$2,250	14-Nov-08	Full	17-Mar-10	$322.0
Discover Financial Services Inc	6141	Personal Credit Institutions	CPP	$1,225	13-Mar-09	Full	21-Apr-10	$239.7
Fannie Mae	6111	Federal and Federally-Sponsored Credit Agencies	PSI	$116,100	31-Mar-09	Partial		$0.0
Fifth Third Bancorp	6020	Commercial Banks	CPP	$3,408	31-Dec-08	Full	2-Feb-11	$593.4
First Horizon National Corp	6020	Commercial Banks	CPP	$867	14-Nov-08	Full	22-Dec-10	$170.9
General Motors	3711	Motor Vehicles and Passenger Car Bodies	AIFP	$50,700	29-Dec-08	Partial		$0.0
Goldman Sachs Group Inc	6211	Security Brokers, Dealers, and Flotation Companies	CPP	$10,000	28-Oct-08	Full	9-Jun-09	$1,420.0
Hartford Financial Services	6331	Fire, Marine, and Casualty Insurance	CPP	$3,400	26-Jun-09	Full	31-Mar-10	$814.4
Huntington Bancshares	6020	Commercial Banks	CPP	$1,398	14-Nov-08	Full	22-Dec-10	$196.3
Invesco Ltd	6282	Investment Advice	PPIP	$16,000	30-Sep-09	Full	29-Mar-12	$576.8

[64] Compiled from data available at http://www.treasury.gov/initiatives/financial-stability/TARP-Programs

Company Name	SIC Code	SIC Description	TARP Program	Funding Received	Date Received	Payment Status	Date Repaid	Profit to US Government
JPMorgan Chase & Co	6020	Commercial Banks	CPP	$25,000	28-Oct-08	Full	6-Jun-09	$1,730.0
Keycorp	6020	Commercial Banks	CPP	$2,500	14-Nov-08	Full	30-Mar-11	$367.2
Lincoln National Corp	6311	Life Insurance	CPP	$950	10-Jul-09	Full	30-Jun-10	$259.9
M & T Bank Corp	6020	Commercial Banks	CPP	$600	23-Dec-08	Full	17-Aug-12	$100.5
Marshall & Ilsley Corp	6020	Commercial Banks	CPP	$1,715	14-Nov-08	Full	5-Jul-11	$229.8
Morgan Stanley	6211	Security Brokers, Dealers, and Flotation Companies	CPP	$10,000	28-Oct-08	Full	9-Jun-09	$1,270.0
Northern Trust Corp	6020	Commercial Banks	CPP	$1,576	14-Nov-08	Full	9-Jun-09	$133.6
PNC Financial Services Group Inc	6020	Commercial Banks	CPP	$7,579	31-Dec-08	Full	10-Feb-10	$741.3
Regions Financial Corp	6020	Commercial Banks	CPP	$3,500	14-Nov-08	Full	4-Apr-12	$638.1
State Street Corp	6020	Commercial Banks	CPP	$2,000	28-Oct-08	Full	9-Jun-09	$123.6
Suntrust Banks Inc	6020	Commercial Banks	CPP	$4,850	14-Nov-08	Full	30-Mar-11	$527.3
Synovus Financial Corp	6020	Commercial Banks	CPP	$968	19-Dec-08	Full	26-Jul-13	$223.0
U S Bancorp	6020	Commercial Banks	CPP	$6,599	14-Nov-08	Full	9-Jun-09	$334.2
Wells Fargo & Co	6020	Commercial Banks	CPP	$25,000	28-Oct-08	Full	23-Dec-09	$2,280.0
Zions Bancorporation	6020	Commercial Banks	CPP	$1,400	14-Nov-08	Full	26-Sep-12	$253.0

CPP - Capital Purchase Program
AIG – Investment in AIG
TIP - Target Investment Program
AGP - Asset Guarantee Program
PSI - Preferred Stock Investment

Chapter Five: Conclusions

This thesis examines three important topics in corporate governance with a particular focus on hedge fund activism and executive perk compensation. The lucrative fee structure of hedge funds, the dramatic growth of CEO compensation in the past three decades, and the government bailout of financial institutions during the 2008 crisis have encouraged a generally negative public perception of the corporate elite. My research has policy and regulatory implications about the need for restrictions on executive compensation and hedge fund activities. Motivation for increased regulation should not be punitive — it is essential to ensure that any regulatory changes have the beneficial effect of protecting taxpayers and shareholders, reducing inappropriate risk-taking, and avoiding harmful unintended consequences.

The first essay investigates the corporate governance implications of shareholder activism by hedge funds. I find a mutually beneficial relationship between activist hedge funds and the other institutional owners at target firms — in general, they are friends, not foes. Hedge funds demonstrate a preference for high levels of target firm institutional ownership suggesting that they seek the support of other institutional investors in implementing activist agendas. Institutional heterogeneity is a meaningful differentiator for hedge funds and investment time horizon is an important measure of heterogeneity. Activist hedge

fund investment time horizon matches with that of short term focused institutional investors and hedge funds demonstrate a preference for short term focused institutional investors. Liquidity trading by short term investors may allow hedge funds to favorably acquire initial positions in target firms, and profit-taking by short term owners may provide a favorable environment for hedge funds to increase their holdings and attract new owners who are activism supporters. Institutional investors, regardless of investment time horizon, benefit from target firm ownership because hedge fund activism generates large short term and long term abnormal returns without increasing volatility. Hedge funds may benefit from lower target firm stock return volatility associated with high levels of institutional ownership, particularly long term focused ownership. The findings in the first essay are consistent with the hedge fund activism creating value at target firms — short term abnormal returns do not reverse over time, target firm return volatility does not increase after activism, and the trading behavior of both short and long term focused institutional owners reflect value creation at target firms. Regardless of the efficacy of traditional institutional investors as activists, their presence at firms targeted by hedge funds is an indirect path through which other institutional investors improve governance, performance and shareholder value at target firms — hedge funds have a track record of activism that delivers increased shareholder value and hedge funds rely on the implicit or explicit support of institutional investors to implement their agendas.

In the second essay, I move to the topic of executive compensation and analyze the joint determinants of CEO wage and perks in a competitive CEO market. Firms differ in their size and CEOs possess heterogeneous talents. They competitively bargain multidimensional compensation packages (i.e., wage and perks). I show that, in equilibrium, firm size, wage, perks and talent are all positively related. Moreover, productivity-related perks that provide common value by increasing both firm profitability and executive utility increase faster with firm size compared to non productivity-related perks that provide private value by increasing executive utility only. I test the predictions of the model using manually collected data on CEO perks in S&P 500 companies. The empirical results are consistent with the theoretical predictions. The theory shows how perks are determined as a part of competitive compensation packages. If perks are complementary to wage in the CEO's utility function, including perks in compensation packages is cost effective for firms and utility improving for CEOs as well. If perks are more productivity-related (i.e., they provide common value to firms and CEOs), there is enhanced benefit in including perks in compensation packages.

The unique nature of different perk items, the difficulty in collecting perk information and the complexity in modeling perks together with wage have largely limited the research on perks, both theoretically and empirically. This essay makes a first attempt to understand how wage and perks are jointly

determined in a competitive CEO market. The analysis considers the impact of two major heterogeneities, CEO talent and firm size, on wage and perks compensation.

The financial crisis and TARP legislation provide an interesting opportunity to evaluate the impact of public scrutiny on executive compensation. In the third essay, I investigate the extent to which increased public scrutiny associated with financial crisis and governance intervention changed corporate compensation practices by examining time trends in compensation, by differentiating firms with respect to public scrutiny, and by including both monetary and nonmonetary compensation. Compensation practices at S&P 500 firms that received government support during the crisis (TARP firms) were markedly different in the years surrounding the financial crisis than at those that did not (nonTARP firms). The financial crisis had a much greater impact on CEO compensation at TARP firms, and that the effects lingered. Moreover, CEO wage and perks behaved differently in response to heightened public scrutiny. The magnitude and persistence of perk reductions at TARP firms suggest a lasting change. Using changes in individual perk items, I provide evidence that previous levels of perks such as personal use of corporate aircraft, personal security, and company paid club memberships may have been excessive, while perks such as charitable gift matching, medical/health benefits, cost of living allowances, and car and driver

services may provide common benefits that outweigh any negatives related to public perception.

Overall, my results are consistent with public scrutiny having a temporary impact on wage and a lasting impact on perks, and with compensation restrictions having a temporary impact on wage. Increased scrutiny related to the crisis alone did not cause benchmark nonTARP firms to reduce CEO wages or perks. However, bail out recipients responded to the resulting intense scrutiny with large cuts to CEO wages that moderated as the crisis (and perhaps scrutiny) receded. In contrast, in the wake of the financial crisis, these firms experienced more permanent shifts in their attitudes toward the scrutiny costs of providing perks. Firms experiencing benchmark changes in scrutiny maintain overall levels of CEO perks but reduce perks perceived as excessive and focus on ones that have the potential to provide common value. As firms face more intense scrutiny, they make large overall reductions through focused reductions of expensive and excessive perks, yet maintain or increase perks that provide common value.

In sum, my dissertation results suggest that calls for increased regulation of executive compensation and shareholder activism by hedge funds are largely unwarranted. Despite specific examples of individual excess and self-serving behavior, market forces generally get things right. The compatibility between hedge funds and other institutional investors results in activism that creates value through improved governance and target firm performance. Firms compete in a

competitive market for CEOs in which optimal compensation packages include perks. In the aftermath of the 2008 financial crisis, it was public scrutiny, not legislated compensation reforms, which led to lasting changes in perk practices.