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An Empirical Examination of Economic Determinants of Financial CEO Compensation: A Comparative Study on Pre and Post Financial Crisis Periods[1]

Abstract

Inadequate risk monitoring and the executive incentive system of US financial institutions are considered to be significant factors in exacerbating the 2008 financial crisis, and regulators attempted to reform the executive compensation system in the post-crisis period. In this study, we conduct a comparative analysis of the economic determinants of the compensation for chief executive officers (CEOs) between the pre- and post-financial crisis periods, using data from US financial service institutions, since this is the sector that has been most affected by the financial crisis. We find that the mean values of total compensation and its incentive components, including cash bonus and long-term compensations, decreased significantly in the post-crisis period. While the proportion of fixed salary to total compensation increased, the bonus decreased significantly during the pre- to post-crisis period. In the pre-crisis period, total compensation was determined by stock performance, accounting profit, long-term growth and business leverage, whereas in the post-crisis period stock returns and leverage are the major economic factors influencing total compensation. We also find that leverage is positively associated with total compensation and that a firm's leverage negatively influences the sensitivity of the pay for performance in both the pre- and post-crisis periods. But the influence of leverage on pay for performance is weaker in the post-crisis period compared to the pre-crisis period. The Dodd-Frank Act, enacted in 2011, empowered shareholder influence on CEO pay. This encourages CEOs to focus on short-term stock returns to satisfy the scrutiny of empowered shareholders. Disregarding other economic factors and narrowing the focus on stock returns for determining executive compensation in the post-crisis period might have unintended consequences, deterring firms to take wider forward-looking approaches for their long-term sustainability.

An Empirical Examination of Economic Determinants of Financial CEO Compensation:
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1. Introduction

In 2008 the US economy faced one of the worst financial crises since the Great Depression. Academics argue that inadequate market discipline for financial institutions and a short-term goal-oriented executive incentive system, among others contributed to excessive risk-taking by the executives , which resulted in the biggest economic downturn in the US and global economy since the 1930s (Bhagat and Bolton, 2014). If the poorly-aligned executive incentive is responsible for this economic turmoil, markets should have learned valuable lessons from the crisis. The incentive system should be redesigned, shifting its exposure away from the companies' short-term results to long-term sustainability. As the US economy started to trend downward, regulators and policymakers seized the initiative to reform the managerial incentive system. As a response to the 2008's crisis, in early 2011, the Dodd-Frank Act was enacted to regulate the executive incentive system. The Act gave power to shareholders over executive compensation decisions.[2]

In this paper, we investigate whether the aftermath of the financial crisis in 2008 brought any change to the executive incentive system in US financial institutions. The objective of our study is to examine the relationship between executive compensation and firm performance in the pre- and post-financial crisis period. While analyzing this relationship, we test if there is any significant difference in the determinants of executive compensation before and after the financial crisis. We narrow our focus to the firm-specific economic determinants of the compensation of chief executive officers. Using data from 477 financial institutions and 3,575 firm-year

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[2] The Dodd-Frank Wall Street Reform and Consumer Protection Act, commonly referred to as Dodd-Frank Act, was signed by President Barack Obama on July 21, 2010 and enacted in early 2011.
https://www.sec.gov/about/laws/wallstreetreform-cpa.pdf

observations, our results show that the CEO compensation composition and its economic determinants differ significantly between the pre- and post-financial crisis periods. While most of the studies exclude financial institutions because of their special characteristics, regulations and capital structure, we focus on financial institutions specifically (SIC codes from 6000 to 6799, including financial, insurance and real estate industries) because they are the industries most affected by and blamed for the financial crisis.

Research motivated by the 2008 financial crisis mostly examines whether the incentive system in the financial sector encouraged excessive risk-taking and led to one of the worst economic disasters in US history (Fahlenbrach and Stulz, 2011; DeYoung et al., 2013). These ex-ante analyses use data from and around the crisis period. Although the ex-post scenarios after the crisis are underexplored and still developing, our study complements this strand of literature by conducting a comparative analysis of the pre- and post-financial crisis periods using a wider range of data. Our data ranges from five years before to five years after the financial crisis, defined as 2003 to 2007 for the pre-crisis period, 2008 as the crisis, and 2009 to 2013 for post-crisis period.

We document that, total CEO payments, bonus, and long-term compensation shrank notably from pre- to post-financial crisis period. This finding stirs the debate about whether the reduction in CEO pay leads to optimal contracting or is simply window dressing. The reduced payments in the post-crisis period seem to support the "rent extraction theory" as opposed to the "labor market theory". According to the "rent extraction theory", powerful CEOs extract private benefits in excess of optimal compensation (Hermanson, 2006; Strier, 2010; Kuhnen and Zwiebel, 2009), whereas "labor market theory" suggests that a generous incentive package is due to CEO talent, skill and labor market demand (Murphy and Zabojnik, 2007; Frydman, 2007; Graham et al. 2009). Since the labor market demand for CEO talent to manage complex modern firms has not

changed significantly over the pre- and post-crisis periods, the reduction in compensation in the post-crisis period seems to imply that over-payments in the pre-crisis period amount to rent extraction.

In our study, we also find that, in the pre-crisis period, the total compensation is primarily determined by stock performance, accounting performance, growth and company leverage, whereas in the post-crisis period stock returns and leverage are the major factors influencing total compensation. Particularly, we find significant positive associations between total compensation and stock returns, accounting earnings, and leverage in the pre-crisis period. On the other hand, in the post-crisis period, the relationships between total compensation, and stock returns and leverage are significantly positive but there is no relationship between total compensation and accounting income. Our study also documents that the sensitivity of pay for performance is significantly mediated by the leverage structure of the firm. However, the role of leverage on mediating the pay for performance sensitivity is weaker in the post-crisis period than in the pre-crisis period. This finding warrants concerns over whether the debtholders' interest is well protected in the incentive system of the financial institutions in the post-crisis period.

Agency theory argues for the alignment of interests between owners and managers (Jensen and Murphy, 1990; Roberts, 2005; Holmstrom, 1979; Murphy, 1999). Tying executive compensation with firm performance is considered as an effective way to ensure a better alignment of principal (shareholders) and agent's (managers') interests. We find that in both pre- and post-financial crisis periods, total compensation and stock returns are significantly and positively associated. However, the pay for stock performance sensitivity is significantly stronger in the post-crisis period. The findings of stronger pay for performance sensitivity in the post-crisis period, indicates a better alignment between executive incentives and shareholder interest. The Dodd-

Frank Act has increased shareholder power and works as an incentive for firms to determine executive compensation by focusing on stock returns. As a result, in the post-crisis period, compensation seems to be determined for the most part by the satisfaction of the empowered shareholders. However, the findings of our study raise the question whether the Dodd-Frank Act places too much emphasis on stock performance and ignores many other economic factors for optimal CEO contracting. Strengthening CEO incentives with stock returns and giving shareholders more "Say on Pay"[3] resulted in higher pay for performance sensitivity. But this may encourage shareholders and executives to gamble with taking risky initiatives, leading in some cases to government intervention if the bets would not pay off.

Our research is significant in the context of the US economy, the regulatory reforms of financial institutions, and the perspectives of the executive compensations. First, although compensation literature is mature, only a few studies to our knowledge have focused on the post-crisis compensation data, and none has compared the relationship between compensation and firm performance over the pre- and post-crisis period. To address this gap, we analyzed the compensation structures for these periods, as well as the determinants of compensation and the changes in the influencing factors of total and various components of compensation. Second, by analyzing two competing theories, "rent extraction theory" and "labor market theory," we extend the compensation literature. We documented significant reductions in total and incentive components of compensation in the post-crisis period, which justifies the rent extractions of powerful managers in the pre-crisis period, and call for further research into whether rent extractions are partly responsible for excessive risk-taking and the economic crisis. Third, our

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[3] "Say on Pay", a provision in the Dodd-Frank Act, requires public companies to hold a non-binding shareholder vote on the compensation of their top executives at least once every three years. The "Say on Pay" provision also requires public companies to hold a non-binding vote at least once every six years to determine if the vote on compensation will take place every one, two or three years.

study adds new insights to the literature of financial industry, an industry usually excluded by researchers. Our study is an explicit attempt to develop a theoretical understanding of the compensation/performance relationship for the financial industry, which is mostly blamed for the financial crisis and is most affected by the Dodd-Frank regulation after the crisis. Finally, the study's findings will be of interest to regulators, board of directors, lenders, shareholders and managers.

2. Prior Literature

CEO incentive systems are complex and constantly debated in the literature. US CEO payments are the highest in the world (Hermanson, 2006; Strier, 2010), and some academics argue that generous pay packages for top executives amounts to a "rent extraction" from the firm by powerful employees (Bebchuk and Fried, 2004; Kuhnen and Zwiebel, 2009). The "rent extraction theory" posits that high compensation levels reflect the CEOs' ability to extract private benefits in excess of optimal compensation contract. Other researchers explain the large payments as the result of optimal contracting because of the competitiveness of the "labor market forces" (Murphy and Zabojnik, 2007; Frydman, 2007; Graham et al. 2009). The "labor market theory" justifies excessive pay as a demand for skilled labor and talent to operate complex modern companies, aligning CEO with shareholder interests.

Frydman and Jenter (2010) have divided the evolution of CEO compensation into two periods. From the end of the Second World War to the 1970s, CEO payments were relatively low, with moderate pay for performance sensitivities. From the late 1980s, CEO compensation levels started to increase, and in the 1990s skyrocketed as equity incentive and stock option grants were added as a large portion of the pay package to top executives (Hall and Liebma, 1998; Murphy, 1999; Core et al., 1999). Bebchuk and Grinstein (2005) find that average compensation for top

executives of the S&P 500 firms increased 200% from 1993 to 2003. None of the existing theories – rent extraction or labor market demand – seems to explain fully the changing landscape of the compensation pattern in last few decades.

Certainly, CEO payments became more controversial in the wake of the 2008 financial crisis. CEO compensation, especially in the financial services industry, attracted renewed media attention. In many cases, it is clear that top executives of large banks continued to receive generous pay packages while government rescued large firms that were about to collapse. All too often, compensation for top executives of large financial institutions did not aligned with company performance during and before the crisis. For example, the second largest Wall Street bonus of 2008, $39.4 million, was paid to Thomas Montag, head of sales at Merrill Lynch. However, in the fourth quarter of 2008, the company had a net loss of $15.31 billion. Similarly, Lehman Brothers' CEO, Richard Fuld, was paid $184 million from 2003 to 2007. During Fuld's time as CEO, Lehman turned into one of the riskiest players on Wall Street. Bear Stearns CEO James Cayne was paid $163 million from 2003 to 2007, earning a $33 million bonus in 2006. To meet a minimum threshold of ROE so that he could receive the bonus, Cayne made risky bets with company assets on subprime mortgages.[4] All of these firms failed spectacularly during the financial crisis, which led many to believe that the high compensation of CEOs encouraged them to take high risks for their firms. There are also concerns about whether CEOs use bailout funds to reward themselves and give favored employees bonuses.

Many researchers argue that the compensation contract in the pre-crisis period encouraged excessive risk-taking, which eventually threatened the global economy (DeYoung et al., 2013;

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[4] Corkery, Michael, Sept. 18, 2009, *The Wall Street Journal*, Executive Pay and the Financial Crisis: A Refresher Course

Rajan, 2008; Chesney et al., 2011; Gande and Kalpathy, 2011; Suntheim, 2011). However, other researchers do not support the argument that the economic downturn induced by excessive risk-taking resulted from higher incentive packages in the banking industry (Fahlenbrach and Stulz, 2011; Erel et al., 2011). Some studies find no evidence that banks with risk inducing remuneration policies performed worse during the financial crisis (Fahlenbrach and Stulz, 2011; Beltratti and Stulz, 2009). Fahlenbrach and Stulz (2011) claim that stock option incentives have no adverse impact on bank performance. Conyon et al. (2010) argue that the role of the compensation system on excessive risk-taking prior to the crisis was dwarfed by loose monetary policy, social policies, and financial innovation.

In the early 1990s, compensation for bank CEOs was much less than for non-bank CEOs (Smith and Watts, 1992; Houston and James, 1995). However, using data from 1994 to 2006, Gregg et al, (2012) documents that CEO pay in the financial service sector is much higher than that of other sectors, although the pay for performance sensitivity in the banking industry is not significantly higher than in other industries. Core and Guay (2010) state that payments to US bank CEOs are "neither too high nor too little" and they maintain that compensation to the financial firms' CEOs, in particular the big firms, has been increasingly in line with non-financial CEOs over past decades. The compensation package of the large banks reflects the executives' talents, complexity of their tasks, firm superior performance and labor market demands (Core et al., 2005, Kaplan, 2008).

3. Theoretical Development and Hypotheses

The principal-agent literature focused on the determination of the optimal contracting between the principal (shareholder) and the agent (manager). According to the agency theory that separates ownership from control, shareholders and managers have conflicting interests (Jensen

and Meckling, 1976; Ross, 1973). In a complex information environment, where the owner is unable to observe all managerial efforts, the optimal contract is to make the compensation contract on the basis of the outcome of the manager (Jensen and Murphy, 1990; Roberts, 2005). When the compensation contract between the firm and the CEO is based on stock returns, the CEO would more likely behave in the interests of the shareholders (Holmstrom, 1979; Murphy, 1999). However, the application of the agency theory in the real world is not straightforward.

The complexity of the CEO incentive contract has spurred considerable research on the variation of the determinants of the CEO compensation. Researchers identify several factors that influence CEO payments, which include the CEO's specific characteristics, the firm's economic characteristics, corporate governance mechanisms, ownership attributes, and social and political forces (Smith and Watts, 1992; Gaver and Gaver, 1995; Holthausen et al. 1995; Lambert et al. 1993; Graham et al., 2009; Frydman, 2007). These factors seem to affect the various components differently, such as fixed salaries, bonuses, long-term incentives and equity incentives (Chalmers et al., 2006). While other determinants include a wide range of elements from CEO ownership to gender, economic determinants are clearly identified in the literature. In this study, we focus on firm's economic performance, both accounting profit and stock returns, as the key determinants of CEO payments, in addition to firm-specific economic factors, such as growth, leverage and company size reflecting the demand for skilled and talented CEOs (Rosen, 1982; Smith and Watts, 1992; Banker and Datar, 1989; Milkovich and Rabin, 1991).

3.1. Firms' Stock Performance and Executive Compensation

In the US, compensation packages for CEOs include salary, bonus, stock grants, options and other long-term incentives. As its name suggests, the bonus plan is designed as an incentive to increase accounting profit, whereas equity shares and stock options are used to increase stock returns and

to align manager and shareholder interests. Even so, the evidence linking CEO payments and stock performance is mixed. While many studies find no relation between compensation and performance (Kerr and Bettis, 1987; Miller, 1995; Jeppson et al. 2009), Jensen and Murphy (1990) detect a weak association between CEO pay and company performance, and Hall and Liebman (1998) find a strong positive association between the two. Indeed, Nourayi and Daroca (2008) find that firm size and stock performance positively influence CEO compensation. Similarly, Boschen et al. (2003) find a positive and persistent relation between stock performance and CEO compensation. Murphy (1985) argues that stock returns are more appropriate than accounting profits for designing incentive plans. In line with previous literature, it is important to reexamine the impact of stock returns on executive compensation in the pre- and post-financial crisis periods, and to test whether there is any significant difference in this relationship during those periods.

Historical trends on compensation show that any rise or fall in the economy, or any regulatory reforms, significantly influences the executive incentive system. For example, Jarque (2008) documents that after the economic downturn in the early 2000s, executive compensations decreased and that the composition of payment moved from fixed salary towards incentive-based compensation. By using executive compensation data from 2000-2006, DeYoung et al. (2013) find that in the years leading up to the 2008 financial crisis banks included stronger risk-taking incentives in CEO compensation packages. Chen et al. (2015) document that the positive relationship between company stock-market performance and executive compensation has been stronger following the Sarbanes–Oxley Act (SOX). In line with the literature, we would expect a strong positive relationship between total compensation and company stock performance in the pre-financial crisis period.

Using post financial crisis data, Correa and Lel (2016) find that CEO pay declined after the 2008 crisis, and especially after Dodd–Frank in 2010. The Dodd–Frank Wall Street Reform and Consumer Protection Act, to give its full name, mandated several provisions for the executive compensation system and reinforced accountability for top executives. The act improves transparency of the incentive system by mandating: (1) "Say on Pay", shareholders input on compensation, (2) additional disclosures on the relation between compensation and the company's financial performance, and (3) checks and balances on pay by establishing new standards for compensation-committee independence and with a 'clawback' provision. Correa and Lel (2016) argue that the "Say on Pay" provision increases pay-performance sensitivity, the company's stock performance and compensation relationship). Thus, the act decentralizes power from the firm to shareholders, who now have better information and a controlling influence in determining CEO compensation packages. Therefore, we predict that in the post-financial crisis period, the relationship between executive compensation and stock returns would be significantly positive.

Kent, Kercher and Routledge (2016) also find a stronger pay for performance sensitivity in the post-crisis period. The authors argue that Dodd-Frank increased the independence of the compensation committee, which results in better oversight on company performance and incentive structure. Thus, in the post-crisis period, we would expect a stronger alignment between CEO compensation and stock returns. From this discussion, we developed the following hypotheses about the relation between compensation and stock returns in the pre- and post-crisis periods:

H1 (a): CEO total compensation is positively associated with stock returns in the pre-financial crisis period.

H1 (b): CEO total compensation is positively associated with stock returns in the post-financial crisis period.

H1 (c): The association between CEO total compensation and stock returns is stronger in the post-financial crisis period.

3.2. Firms' Accounting Performance and Executive Compensation

In the existing literature, several authors investigate the relationship between executive compensation and company accounting-based performance. Although accounting earnings are considered a crude measure of company performance, and easily distorted, Meredith (1990), and Sigler and Haley (1995) suggest that the best way to design an optimal compensation plan is to link both accounting and market-based performance. Most research in the compensation literature shows a strong positive relationship between executive compensation and accounting performance (Lambert and Larcker, 1987; Defeo et al., 1989; Dechow et al., 1994). In addition, Balsam (1998) finds that accounting performance is more exposed to bonus and salary pursuits by executives. Boschen et al. (2003) find that the association between accounting performance and CEO compensation is non-persistently positive.

Carter, Lynch and Zechman (2009) find that in the mid-2000s, following the Sarbanes-Oxley Act (SOX), firms placed greater emphasis on accounting income to determine bonuses. For the post-SOX period, Shim and Kim (2015) find that CEO compensation is strongly related to accounting-based performance. Since SOX intended to improve the corporate governance system and the reliability of financial reporting, firms and investors place significant weight on accounting information as a determinant for executive compensation during 2002-2008—that is, to the eve of the financial crisis. Therefore, we would expect a strong positive relationship between accounting performance and compensation in the pre-crisis period.

After the crisis in 2008, several companies restructured their compensation policies, but we would still expect the positive association to continue, and even to see a stronger relation

between accounting performance measures and compensation. The reasons for our positive prediction lie with the several legal provisions that ensure and improve the reliability and transparency of the accounting numbers after 2008. For example, Section 953 of the Dodd-Frank Act requires company disclosures on the relationship between compensation paid and the company's financial performance, and Section 954 requires a clawback policy in the event of any material financial misstatements. Thus, following the crisis, firms are expected to be more cautious about reporting financial numbers, and particularly about linking executive compensation to accounting performance. Therefore, we predict our second set of hypotheses as follows (in our empirical analysis, we use returns on equity (net income divided by stockholder equity) to measure company accounting-based performance):

H2 (a): CEO total compensation is positively associated with returns on equity in the pre-financial crisis period.

H2 (b): CEO total compensation is positively associated with returns on equity in the post-financial crisis period.

H2 (c): The association between CEO total compensation and returns on equity is stronger in the post-financial crisis period.

3.3. Firms' Leverage and Executive Compensation

Berkovitch et al. (2000) argue that there is a complex relationship between managerial compensation and capital structure. They suggest that in empirical cross-sectional studies on the economic determinants of executive compensation, debt structure should not be used simply as a control variable, and a few papers document a negative relation between leverage and compensation. Houston and James (1995), for example, document that CEOs with high leveraged

firms in the banking sector receive less cash compensation and a smaller percentage of options and equity compensation. Because high leverage sends a negative signal to markets, it might be interpreted as the CEO's inefficiency and result in lower compensation. Higher leverage is also interpreted as higher financial risk for a firm, and unwelcome from the stockholders' perspective. In line with the literature, we predict a negative relationship between compensation and leverage in the pre- and post-crisis periods.

After the financial crisis, firms should be more cautious about financial risks as excessive executive risk-taking is considered one reason for the crisis, and if executives take greater financial risks, which is measured by leverage, they should be penalized with lower compensation. Therefore, we would expect a stronger negative relation between leverage and compensation in the post-crisis period. From this discussion, we developed the following group of hypotheses on leverage and compensation relationship:

H3 (a): CEO total compensation is negatively associated with leverage in the pre-financial crisis period.

H3 (b): CEO total compensation is negatively associated with leverage in the post-financial crisis period.

H3 (c): The association between CEO total compensation and leverage is stronger in the post-financial crisis period.

3.4 Pay for Performance Sensitivity, Leverage and Compensation

According to agency theory, aligning CEO incentives with shareholder interests reduces the agency problem. However, this in a highly leveraged firm might exacerbate conflicts between shareholders and debtholders (John et al., 2010). Consequently, because of conflicting interests

among stakeholders, tying compensation to stock performance may not always provide an optimal solution. In fact, compensation tied to stock returns may create risk-shifting incentives for managers. Because CEOs may take excessive risks which debtholders bear, in a leveraged firm the debtholders can play a monitoring role and significantly influence the association between CEO payment and stock performance. Thus, a firm's leverage structure can influence the compensation and stock-return relationship (pay for performance sensitivity).

John et al. (2010) argue and find that pay for performance sensitivity decreases with the leverage ratio where debtholders work as a monitoring mechanism for the risk taking attitudes of CEOs. Gilson and Vetsuypens (1993) document that risk-related complexity and pay for performance sensitivity decreases significantly when a firm becomes financially distressed. Ortiz-Molina (2007) finds that pay–performance sensitivity decreases in straight-debt leverage, but it is higher in firms with convertible debt. He argues that, to mitigate shareholder-bondholder conflicts of interest, firms trade-off shareholder-manager incentive alignment. John and John (1993) also document a negative relationship between pay-performance sensitivity and leverage. Because of the previous evidence, we expect leverage to play a significant role on pay for performance sensitivity in both pre- and post-crisis periods. However, whether the magnitude of the influence of leverage on pay for performance sensitivity would be the same as it was in the pre- and post-crisis periods is for future investigation.

In the post-financial crisis period, distressed firms on the brink of collapse and financially struggling institutions, which had been rescued through regulatory intervention, should have a substantial portion of debt in their capital structure. It should, then, be a legitimate concern for bondholders in the aftermath of the 2008 crisis to be more active about monitoring the managers' risk-shifting incentives. This might result in a stronger role for leverage in mediating the sensitivity

of pay for performance. In fact, the intensity of the conflicts between bondholders and shareholders may create variations in the role of leverage on the sensitivity of pay for performance between the pre- and post-crisis periods. The above discussion leads to the following set of hypotheses:

H4 (a): The sensitivity of the pay for performance is mediated by the leverage in the pre-financial crisis period.

H4 (b): The sensitivity of the pay for performance is mediated by the leverage in the post-financial crisis period.

H4 (c): The mediating role of leverage on pay for performance is stronger in the post-financial crisis period.

4. Research Methodology

4.1. Sample and Data

We begin data collection using the COMPUSTAT database. All financial institutions are included in the sample; SIC codes ranging from 6000 to 6799. The initial sample consists of 5,965 financial institutions with 39,407 firm-year observations for the period 2002 to 2013. We then collect the stock returns data from the CRSP database. 22,742 first-year observations (3,456 firms) are excluded for the missing values of the required financial variables and stock price data. Collecting compensation information of the CEOs, we exclude 2,032 financial institutions and 13,089 firm-year observations for the unavailability of the compensation information, and merged the data with the Execucomp database.

The final sample consists of 477 institutions and 3,575 firm-year observations, all of which have the financial variables, stock returns and compensation related information. We define the pre-crisis period as the five years from 2003 to 2007, which represented 443 financial institutions and 1,460 firm-year observations. We exclude year 2008 in our analysis since this is the crisis

year, and by doing so we reduce the bias in the regression results in the pre- and post-crisis period. During the post-crisis period, from 2009 to 2013, the total number of firm-year observations was 1,750 of 380 institutions. Table 1, Panel A provides the sample selection procedure, and Panel B shows the final sample in the pre-crisis, crisis and post-crisis periods.

[Insert Table 1 Here]

4.2. Model Specification

To test the hypotheses, we employee the multivariate regressions and conduct separate tests using pre- and post-crisis data. We use lagged regressions for the explanatory variables since current executive pay is based upon prior year's performance. In the following model, the dependent variable, *CEO_Total_Compensation*, is the total annual compensations for CEOs, which includes salary, bonus and long-term compensations.

$$
\begin{aligned}
CEO\ Total\ Compensation_t \\
= \alpha + \beta_1\ Stock\_Return_{t-1} + \beta_2\ ROE_{t-1} + \beta_3\ Leverage_{t-1} + \beta_4\ Stock\_Ret\_Leverage_{t-1} \\
+ \beta_5\ Mkt\_to\_Book_{t-1} + \beta_6\ Size_{t-1} + \sum \gamma_j\ Year\_Dummy + \varepsilon_t
\end{aligned}
$$

In addition to test total compensations, we also examine the effects of firms' economic determinants on various components of the compensations, such as cash compensation (salary + bonus), long-term compensation (long-term incentive + stock grant + options), and incentive compensation (bonus + long-term compensation) in different analyses. The models for the additional tests are as follows:

$$
\begin{aligned}
CEO\ Cash\ Compensation_t \\
= \alpha + \beta_1\ Stock\_Return_{t-1} + \beta_2\ ROE_{t-1} + \beta_3\ Leverage_{t-1} + \beta_4\ Stock\_Ret\_Leverage_{t-1} \\
+ \beta_5\ Mkt\_to\_Book_{t-1} + \beta_6\ Size_{t-1} + \sum \gamma_j\ Year\_Dummy + \varepsilon_t
\end{aligned}
$$

$CEO\ Incentive\ Compensation_t$

$$= \alpha + \beta_1\ Stock\_Return_{t-1} + \beta_2\ ROE_{t-1} + \beta_3\ Leverage_{t-1} + \beta_4\ Stock\_Ret\_Leverage_{t-1}$$

$$+ \beta_5\ Mkt\_to\_Book_{t-1} + \beta_6\ Size_{t-1} + \sum \gamma_j Year\_Dummy + \varepsilon_t$$

$CEO\ Long - Term\ Compensation_t$

$$= \alpha + \beta_1\ Stock\_Return_{t-1} + \beta_2\ ROE_{t-1} + \beta_3\ Leverage_{t-1} + \beta_4\ Stock\_Ret\_Leverage_{t-1}$$

$$+ \beta_5\ Mkt\_to\_Book_{t-1} + \beta_6\ Size_{t-1} + \sum \gamma_j Year\_Dummy + \varepsilon_t$$

Our first explanatory variable is stock returns (*Stock_Return*). *Stock_Return $_{t-1}$* is the previous year's average stock return of the company that captures the stock performance of the firm. According to H1 (a) to H1 (c), we expect β_1 to be significantly positive, and the magnitude of the coefficient would be significantly higher in the post-crisis period.

Our second interest variable is *ROE. ROE$_{t-1}$* is the prior year's return on equity, calculated as net income divided by stockholder equity. *ROE* is employed as a proxy for accounting performance. According to the second sets of hypothesis, H2 (a) to H2 (c), we expect a significant positive sign on β_2 and the magnitude of the coefficient would be higher in the post-crisis period. *Leverage$_{t-1}$* is the debt ratio of the previous year. *Leverage$_{t-1}$* is calculated as the prior year's total long-term debt divided by total assets. According to the third group of hypotheses, we expect a negative coefficient for the *Leverage* variable both in pre- and post-crisis period, and the coefficient β_3 will be larger in post-crisis period. Other explanatory variables in the model are $Stock\_Ret\_Leverage_{t-1}$. $Stock\_Return\_Leverage$ is an interaction term between stock return and leverage. A significant positive coefficient on *the $Stock\_Return\_Leverage$* variable implies that debt capital intensifies the association between stock return and executive compensation. A negative significant coefficient implies that leverage reduces the pay for performance sensitivity,

supporting the notion that debtholders play a monitoring role in overseeing the executive to ensure fair risk-sharing. If the coefficient on $Stock\_Return\_Leverage$ is insignificant, we would not expect any role of debtholders on pay for performance sensitivity in CEO contracting. According to our predictions in H4, we expect a negative sign for the variable $Stock\_Return\_Leverage$ both in pre- and post-crisis period, and the negative relationship will be stronger in the post-crisis period.

In addition to the four key explanatory variables, ($Stock\_Return_{t-1}$, ROE_{t-1}, $Leverage_{t-1}$ and $Stock\_Ret\_Leverage_{t-1}$), we also control for the growth and size of the firms. The operational complexity of a high growth firm requires better skills, experience and talent, which demands a higher payment in the optimal compensation contract. Therefore, the compensation for CEOs would increase with the growth perspectives of the firm. Rosen (1981, 1982) argue that higher CEO talent is more valuable in larger high-growth companies, and larger firms should offer higher levels of payment and be matched by more capable CEOs in an efficient labor market. Gayle and Miller (2009) explain that the moral hazard problem is more severe for larger firms, resulting in higher incentives for CEOs as the companies grow. Therefore, we control for the growth and size of the firm in our regression, expecting a positive sign for both variables. Mkt_to_Book is used as a control variable for capturing the influence of growth prospects of the firm. Mkt_to_Book is estimated by the prior year's total market capitalization divided by the book value of the firm.

In order to control the effect of size on executive compensation, we include the variable $Size$, which is determined by the log value of the lag total assets. Year dummies are used for controlling any unobserved year-specific effects on compensation. To see if there is any significant difference among the coefficients of the interest variables between these two periods, we run the

same regression for both pre- and post-financial crisis periods. We expect differences among the coefficients between pre- and post-financial crisis periods. An *F*-test would confirm the statistical significance of the differences between the periods' regression coefficients.

5. Sample Statistics and Empirical Results

5.1. Sample Distribution

Table 2 reports the sample distributions based on a three-digit SIC codes. Panel A in Table 2 shows that, the depository institution sector is the largest with 173 firms or 34%, followed by holding and other investment firms with 112 firms or 23.65% and insurance carriers with 101 firms or 23.2% respectively . Real estate is the smallest sector with 6 firms and 39 firm-year observations for the years 2003 to 2013. Table 2, Panel A shows the average sales and net income distribution of different financial sectors in our sample. On average, all financial institutions in our sample show sales of $5.6 billion and net income of $460 million, respectively. Non-depository credit institutions show the highest sales with $22.5 billion and net income of 824.8 million, from 2003 to 2013. Insurance carrier is the second largest sector, showing average sales of $9.7 billion. Holding and other investment offices is the smallest sector, with average sales of $702 million.

Panel B in Table 2 shows the mean values of compensation amounts for each sector. As per total compensation, the highest paid sector is the non-depository credit institutions where the average yearly payment for CEOs is $12.96 million. The long-term equity incentive and bonus is also highest with $12 million in this sector. The second highest paid sector is security and commodity brokers / dealers, where the total compensation, long-term incentives and bonuses average $10.7 million, $8.4 million, and $1.5 million, respectively. However, the average long-term incentive is higher in the insurance broker, agent and service sector. Interestingly, depository institution is the lowest paid sector for both, total compensation and incentive compensation.

[Insert Table 2 Here]

Table 3 reports annual mean compensations, stock price, ROE and sales of the full sample for the years 2003 to 2013. Total compensation steadily increased in the earlier period of the sample from 2003 to 2006. In 2003, average total compensation is $6.7 million, which is increased to $8.8 million in 2006. Compensation somewhat decreases around the crisis period, and immediately following the crisis, in 2009, the total average compensation is decreased to $3.8 million. The high growth in total compensation is due to the sharp increase in incentive compensation. Long-term incentives increase rapidly from 2003 to 2006, decrease in 2008 and in 2009, and increase again in 2010 and 2011. The bonus compensation reduces substantially around 2008, the crisis year, and during the post-crisis period. In 2003, the average bonus is $1.5 million but falls to $0.28 million in 2008. The bonus amount remains low after the crisis.

[Insert Table 3 Here]

Figures 1 and 2 show the trends of compensation components and stock prices over the study period and the sharp decline after the financial crisis in 2008 and followed by the stock price crash. Figure 2 shows the comparative picture of the ROE, the total and different components of the compensation. ROE declines sharply in 2008, yielding negative returns, on average, for the financial sector. The compensation amounts also decrease significantly with poor firm performance. These two figures vividly depict that there is a distinct relationship between CEO compensation and firm accounting-based performance as well as stock market-based performance. The trend of salary is relatively stable and consistent over the research periods.

[Insert Figure 1 and 2 Here]

Table 4, Panel A shows the weight of the different compensation components with respect to total compensation over the periods studied. On average, salary accounts for 11.9% of total

compensation and bonuses for 10.2%, while long-term compensation is 77.9% of total CEO pay. Panel A shows that the percentage of salary in total compensation slightly increases over the period. The table also shows that the proportion of the bonus is 23.6% in 2003 and that it decreases significantly over the period, yielding only 4.35% of total compensation in 2012. Following the financial crisis, firms followed more rigid policies regarding bonus payment. In 2008-2009, the proportion of long-term compensation decreases immediately after the financial crisis but begins to increase again in 2010. Panel B shows that overall, the proportion of long-term compensation increased in the post-crisis period, although the change is not statistically significant for long-term compensation. An interesting finding is that the fraction of bonus payments in total compensation shrinks substantially in the post-crisis period, and a t-test confirms the statistical significance of the reduction in bonuses.

[Insert Table 4 Here]

5.2 Descriptive Statistics

Table 5, Panel A shows the descriptive statistics for all variables for the period 2003-2013. The mean salary for the financial service sector is $0.744 million. The mean bonus and long-term compensation is $0.64 million and $5.1 million, respectively. The mean cash compensation (salary + bonus) is $1.3 million whereas the mean incentive compensation (bonus + long-term incentive + stock grants) is $5.7 million. One interesting observation in Panel A is the highly skewed distribution for bonuses. The data distribution shows that the first quartile and median value of the bonus is 0, which means that the majority of firms did not pay bonuses. The mean value of the bonus, $0.639 million, is derived from the one-fourth sample of the top quartile firms that pay large bonuses to their CEOs. The skewed distribution is also observed for long-term compensation. The median value of the long-term compensation is $1.9 million whereas the mean value of it is

$5.1 million. The size of the firms in terms of total assets has a mean and median value of $5.6 billion and $874 million. The relatively high mean value of firm size is influenced by the presence of a few large firms in the sample. The mean, median and standard deviation of the ROE is 4%, 10% and 2.03, respectively. The average market to book ratio is 1.67. The mean value of leverage is 0.89 whereas the median is 0.53 and the third quartile value is 1.24. This distribution implies that some firms are highly leveraged, and at least one quarter of the sample has negative equity.

Table 5, Panel B shows the mean differences and their statistical significance of all tested variables between the pre- and post-financial crisis period. Except for the size of the firm, the mean values of all variables differ significantly for the same period. Except for salaries, all other compensation components including total compensation decreases significantly in the post crisis period. Stock price, ROE, market to book ratio and leverage ratio are lower in the post-crisis period than those of pre-crisis period, and the *t*-test confirms that these differences between pre- and post-crisis periods are statistically significant.

[Insert Table 5 Here]

5.3 Correlation Matrix and Results of Lagged Regression Analysis

Table 6 reports the Pearson correlation matrix for all variables. Panel A and B shows the correlation matrix for the pre- and post-financial periods. In both Panel A and B, Salary is positively correlated with cash compensation, long-term and total compensation. There is no relation between salary and ROE, market to book and leverage, in the pre-crisis period. However, salary is negatively correlated with ROE and market to book in the post-crisis periods. Bonuses are positively correlated with size, ROE and stock returns in both the pre- and post-crisis periods. The correlation between long-term compensation and stock return is positive in both the pre- and

post-crisis periods. However, there is no correlation between long-term compensation and ROE for the pre-crisis period.

In Panel A, leverage is positively correlated with total compensation. However, the correlation between leverage and total compensation is not significant in Panel B. Stock return is positively correlated with ROE for both the pre- and post-crisis periods. For the pre-crisis period, market to book ratio is correlated only with ROE. However, correlations between market to book, and salary and bonus are negative in the post-crisis period.

[Insert Table 6 Here]

Table 7 shows the multivariate lagged regression results. In Table 7, the dependent variable is the total compensation. In column one, the regression results for the pre-financial crisis period show that all the firm-specific economic factors included in the regression model considerably influence CEO compensation. The coefficients of stock return and ROE are significantly and positively associated with total compensation, which support H1 (a) and H2 (a). In the pre-crisis period, the values of the coefficients for *Stock_Return, ROE* and *Mkt_to_Book* are 0.373, 0.381 and 0.029 with *t*-stat values of 7.83, 3.1 and 2.97, respectively. In the pre-crisis period, leverage is positively associated with total compensation, which contradicts our prediction in H3 (a).

In Table 7 (pre-crisis column), the coefficient of *Stock_Ret_Leverage* is -0.158 with *t*-stat -3.05. The significant negative coefficient on *Stock_Ret_Leverage* variable provides strong support for H4 (a), i.e., that leverage negatively influences the pay for performance sensitivity. Total compensation is positively related to the size of the firm, which is consistent with previous literature. Overall, the first column shows that total compensation in the pre-crisis period is significantly determined by firm-specific economic factors, including company size, ROE , stock

performance and leverage. Unlike other studies, our study shows the adjusted R^2 for regression at 40.67%, which indicates a very high explanatory power of our model.

Table 7 also shows the regression results for the post-crisis period. The results indicate that during the post-crisis period, total compensation is determined primarily by stock-returns that supports H1 (b). The coefficient value is 0.416 and t-stat is 12.150, which implies that, if *Stock_Return* increases by one standard deviation, a CEO's total compensation will increase approximately 0.4 % percent (0.416 * 59.97/5,885.06 = 0.42%). In post-crisis period, there is no significant relationship between total compensation and ROE. Therefore, we fail to support H2 (b). However, we find that in the post-financial crisis period, leverage and total compensation are significantly and positively associated, which is contradictory with our prediction in H3(b). The correlation coefficient on *Stock_Ret_Leverage* is -0.012 (*t*-stat = 1.835) which implies that leverage reduces the pay for performance sensitivity. Overall, we present evidence that in the post-crisis period, total compensation is determined primarily by stock returns and leverage. Thus, we find support for H1 (b) and H4 (b) in the post crisis period. However, the relationship between leverage and total compensation is somewhat inconsistent with our prediction. We find a positive relationship between leverage and compensation. An alternative explanation of this positive relationship is that in a highly leveraged firm, managers face higher risk and greater operational complexity. As a result, CEOs may demand higher compensation as their tasks become more challenging with increased financial risk.

In accordance with our comparative hypothesis, we found that the role of firm economic factors in determining executive compensation is not the same in the pre- and post-crisis periods. For further analysis, we conduct *F*-tests for checking the statistical differences of the coefficients between the pre- and post-crisis periods and find that the pay for performance sensitivity is higher

in the latter. The coefficient value for *Leverage* and *Stock_Ret_Leverage* significantly decreases from the pre- to post-crisis period, supporting H 4 (c). The *p*-values for the *F*-test for both of these variables between the pre- and post-crisis periods are <0.001. The adjusted R^2 for the regression model in the post-financial crisis period is 33.73%. However, when we conduct the *F*-test, we do not find any significant differences for *Stock_Return* and *Leverage* coefficients between the pre- and post-crisis periods.

The findings of our study regarding the associations between total compensation and firm performance variable are consistent with the literature. For example, Chalmers et al. (2006), Vemala (2014), and John and Qian (2010) report significant positive association between firm size and compensation and the coefficient value ranges from 0.28 to 0.44. In our study, the coefficient value is 0.476 in the pre-crisis period and 0.40 in the post-crisis period. By using pre-financial crisis data, Chamlers et al. (2006) finds a significant positive association (coefficient value = 0.017) between and total compensation. Our analysis also show a significant positive coefficient for *Mkt_to _Book*, a value 0.029 in the pre-crisis period and 0.006 in the post crisis period. Although we expected a negative coefficient for leverage, the results show a significant positive coefficient in the total compensation regression model. One possible explanation of the positive coefficient is that highly leveraged firms are more likely to be complex and risky, which requires highly-skilled executives, who may demand higher compensation.

[Insert Table 7 Here]

5.4 Results of Additional Tests

The dependent variable in Table 8, Panel A shows the results of cash compensation, which is the sum of the salary and the bonus. In this table, we observe that in the pre-crisis period, *ROE*

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is significantly and negatively associated with cash compensation, whereas in the post-crisis period cash compensation is determined by both stock returns and ROE. The coefficient on *Stock_Ret_Leverage* is not significant in any of the models in Panel A. The adjusted R^2 dropped noticeably in the post-crisis period.

[Insert Table 8 Panel A Here]

Table 8, Panel B shows the relationship between the total incentive compensation (bonus + long-term compensation) and the firm economic performance variables. Overall, it shows that there is no significant difference of this relationship between the pre- and post-crisis period except for the *Mkt_to_Book* ratio. In both periods, total incentive compensation is determined by *Stock_Ret*, *ROE* and *Size*. These variables are positively associated with total incentive compensation. In pre-crisis period, *Mkt_to_Book* is significantly and positively related to incentive compensation, however, there is no association between these two variables in the post-crisis period. In both periods, *Stock_Ret_Leverage* is significantly and negatively associated with the incentive compensation but the magnitude of the coefficient is smaller in the post-crisis period. The adjusted R^2 for the model are 32.15% and 33.50% in the pre- and post-crisis period accordingly.

[Insert Table 8 Panel B Here]

Table 8, Panel C shows the regression results of long-term compensation for both the pre- and post-financial crisis periods. In this table, the dependent variable is long-term compensation, which includes all long-term incentive plans, stock grants and option-related compensation. Long-term compensation is significantly and positively associated by size, stock return and ROE in both the pre- and post-crisis periods. One notable difference between the two periods is the relationship

between leverage and long-term compensation. There is no association between these two in the pre-crisis period, but leverage positively influences long-term compensation in the post-crisis period. Our last variable of interest in the model is *Stock_Ret_Leverage,* which determines the role of leverage on pay for stock market performance sensitivity. According to our predictions, we find a negative association between compensation and *Stock_Ret_Leverage* in this model. However, a further *F*-test confirms that the statistical and economic significance of the coefficient on *Stock_Ret_Leverage* is lower in the post-financial crisis period, which suggests that the influence of bondholders on the incentive system, and especially on compensation for stock performance, is reduced in the post-crisis period, which is contradictory with H4 (c).

[Insert Table 8 Panel C Here]

6. Summary, Conclusions and Implications

This study examines the role of economic performance in determining executive compensation and what, if any, changes occurred in the post-financial crisis period. Using data from 477 US financial institutions we find that the mean of CEOs' total compensation during the post-crisis period of our study is significantly lower compared to the mean total compensation of the pre-crisis period. However, the overall trend in the post-crisis period shows upward movements of total and incentive compensation spanning years. The evidence suggests that CEO compensation and the risk-attitude of the firms has not significantly changed even after the financial crisis. Therefore, the board of directors, especially the compensation committee, should be careful in monitoring firm performance and determining executive compensation.

Our analysis also finds that, in the pre-crisis period, total compensation is determined mostly by accounting-based performance, stock returns, and the firms' leverage. However, in the post-crisis period, there is no association between total compensation and accounting-based

performance of the firms. We also find that the pay for performance sensitivity is significantly reduced by the influence of leverage. However, the role of leverage in mediating the pay for performance sensitivity in the post crisis period is lower than in the pre-crisis period. As additional tests, we perform the same analysis for different components of the compensation, and document notable differences between the pre- and post-crisis period with respect to those economic factors in determining different components of CEO compensation.

The aim of our paper is to examine the impact of economic determinants of executive compensation in the pre- and post-financial crisis eras and to conduct a comparative analysis on those economic determinants. To conduct the comparative analysis, we consider five years before and five years after the financial crisis of 2008. Overall, the study's results reveal significant changes in the economic determinants of CEO compensation in the post-financial crisis period. We introduce the Dodd-Frank Act into the discussion of our post-crisis analysis because the Act was passed in response to financial crisis, and was intended to create major changes in the financial service institutions' regulatory aspects. However, the years 2009-2013—the post-crisis period in our study—combine the pre- and post-Dodd-Frank eras. The Act, signed in 2010, came into effect in 2011. Still, not all of the Act's provisions are in place even now and some are subject to change. Therefore, it is difficult to conclude within our limited analysis whether the Dodd-Frank Act is successful in making the compensation contract more optimal. Nonetheless, granting additional monitoring mechanisms to shareholders and the requirements of the Act may have caused some changes that we observed in the post-crisis period. Further research is needed to gain deeper insights into what occurred and to explore those factors that contribute to the long-term sustainability of financial service companies. In future, it would also be interesting to explore other determinants of executive compensation (such as corporate governance variables, including board

of director composition), CEO-specific variables (such as CEO tenure, CEO power, corporate social responsibilities, and other non-financial factors), and to examine whether the influence of these factors in determining compensation have changed from the pre-crisis to post-crisis period.

The findings of our study would be a great interest to the board of directors and managers. Especially it should be beneficial to the compensation committee in determining an optimal contract for the managers that would be properly aligned with corporate goals. Regulators and shareholders should be aware of the trends and compensations structures of the firms between the pre- and post-crisis period. Regulators should further examine whether additional regulations are required to discipline the market and executive incentive system.

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Table 1 Panel A: Sample Selection Process

Database and Sample Selection	No. of Financial Institutions	No. of Observations
All financial institutions (SIC code from 6000 to 6999) from the COMPUSTAT database for the year 2002 to 2013	5,965	39,407
Data excluded for missing values of the financial variables and for creating lag variables	(3,456)	(22,743)
COMPUSTAT data for the year 2003 to 2013 with all required financial variables	2,509	16,664
Data excluded for missing values after merging with the EXECUCOMP database	(2,032)	(13,089)
Sample with all financial variables and CEO compensations data for the year 2003 to 2013	477	3,575

Table 1 Panel B: No. of Financial Institution and Observation during Pre-Crisis, Crisis and Post-Crisis Periods

	Year	No. of Financial Institutions	No. of Observation
Pre-Crisis	2003 – 2007	443	1,460
Financial Crisis	2008	365	365
Post-Crisis	2009 - 2013	380	1,750

Table 2, Panel A: Sample Distribution by 3-Digits-SIC, Sales and Net Income Mean Values for the Year 2003 to 2013

SIC_3_Digit	Industry Categories	No. of Financial Institutions	No. of Observation	Percentage of Observation	Sales ($ million)	Net Income ($ million)
6000 - 6099	Depository Institutions	173	1,230	34%	4,405.3	576.5
6100 – 6199	Non-Depository Credit Institutions	20	152	4.3%	22,786.2	824.8
6200 – 6299	Security and Commodity Brokers and Dealers	49	385	10.8%	5,870.9	656.6
6300 – 6399	Insurance Carriers	101	829	23.2%	9,762.8	521.7
6400 – 6499	Insurance Agents, Brokers and Service	16	95	2.7%	3,284.6	276.1
6500 – 6599	Real Estate	6	39	1.1%	2,638.2	95.2
6700 – 6799	Holding and other Investment Offices	112	845	23.6%	702.7	115.0
	Mean Value				5,657.9	460.56
		477	3,575	100%		
	Std. Dev				15845.7	3532.1

Table 2, Panel B: Sample Distribution by 3-Digits-SIC and CEO Compensation Means for the Year 2003 to 2013

SIC_3_Digit	Industry Categories	No. of Institutions	Salary ($ thousand)	Bonus ($ thousand)	Long-Term and Equity Incentive ($ thousand)	Total Compensation ($ thousand)
6000 - 6099	Depository Institutions	173	760.8	378.0	3,077.4	4,217.5
6100 - 6199	Non-Depository Credit Institutions	20	861.2	1,728.6	10,375.5	12,965.3
6200 - 6299	Security and Commodity Brokers and Dealers	49	653.4	1,594.9	8,472.8	10,725.3
6300 - 6399	Insurance Carriers	101	888.9	711.0	6,666.3	8,266.2
6400 - 6499	Insurance Agents, Brokers and Service	16	795.8	258.0	7,165.7	8,219.5
6500 - 6599	Real Estate	6	809.5	218.9	4,764.4	5,792.8
6700 - 6799	Holding and other Investment Offices	112	590.1	381.8	3,984.7	4,959.4
	Mean Value	477	744.3	639.6	5,143.9	6,529.9
	Std. Dev		394.3	1,791.6	11,183.51	11,844.6

Table 3: Year-Wise Mean Compensation and Stock Price

Year	No. of Observation	Total Compensation ($ thousand)	Long-Term and Equity Incentive ($ thousand)	Bonus ($ thousand)	Salary ($ thousand)	Stock Price ($)	ROE	Sales ($ million)
2003	248	6,726.4	4,426.1	1,586.8	713.5	34.3	0.1396	5,553.93
2004	250	7,563.0	5,384.7	1,455.4	722.9	40.0	0.1116	5,601.77
2005	268	8,761.5	6,386.2	1,647.1	728.2	41.5	0.1378	6,274.77
2006	317	8,881.8	7,481.9	694.7	689.5	43.3	0.1464	6,332.14
2007	377	7,058.5	5,885.6	494.5	678.4	40.8	0.1444	5,915.97
2008	365	4,578.2	3,606.7	280.0	689.8	28.3	-0.3209	4,468.79
2009	359	3,848.7	2,791.5	331.8	723.4	32.3	-0.0621	5,032.06
2010	357	5,885.7	4,716.0	365.0	804.7	33.0	0.0229	5,645.27
2011	348	5,784.3	4,678.7	295.3	810.2	32.2	0.0616	5,724.57
2012	344	7,286.6	6,170.8	310.8	805.0	33.0	0.0888	5,950.66
2013	342	6,708.8	5,550.7	350.7	807.4	41.5	0.0844	5,961.06
Mean Value	325	6,529.9	5,143.9	639.6	744.3	36.14	0.04	5678.272
Std. Dev	47.46	11,844.6	11,183.51	1,791.6	394.3	59.97	2.03	538.4237

Figure 1: Year-Wise Mean Compensation and Stock Price

Figure 2: Year-Wise Mean Compensation and ROE
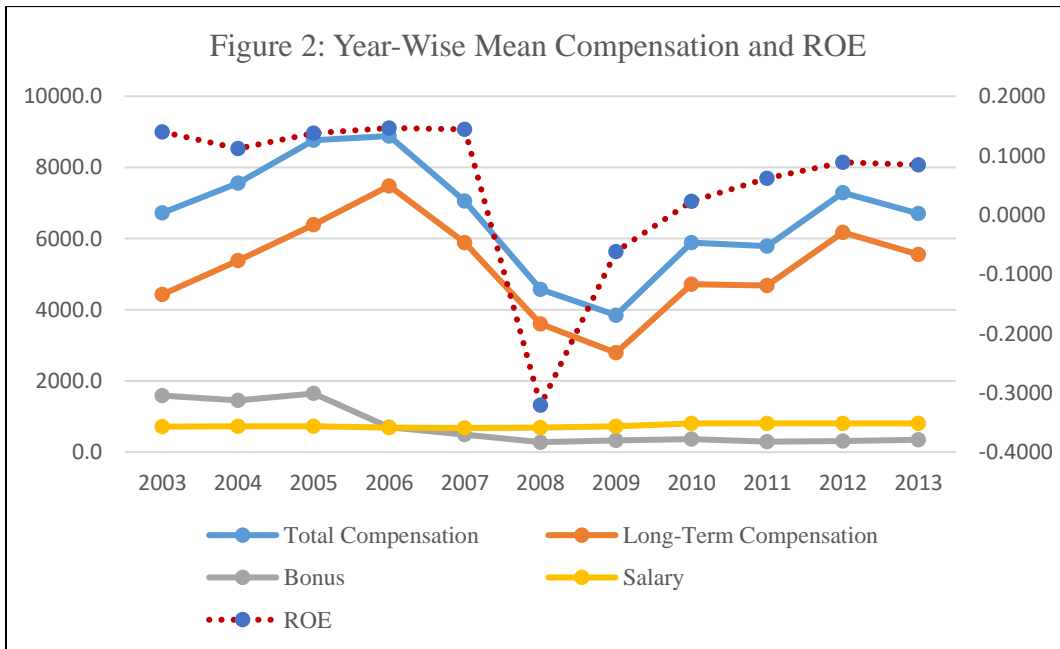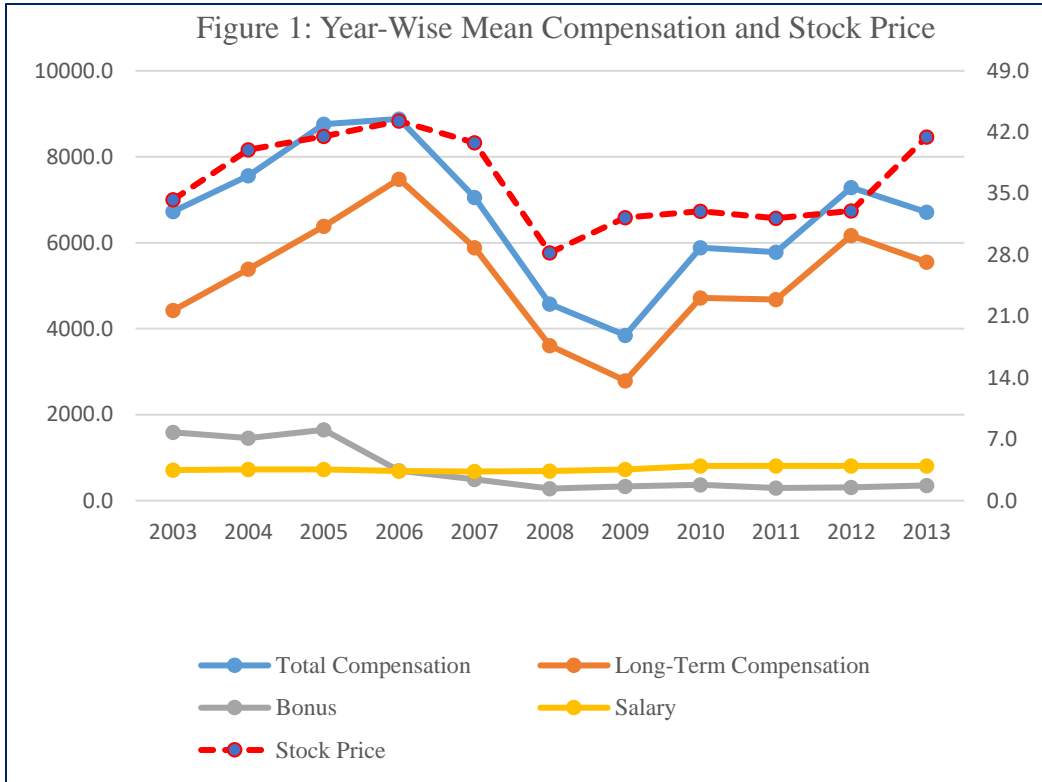
Table 4, Panel A: Year-Wise Weight of Different Components of Compensation

Year	No. of Observation	Salary	Bonus	Long-Term Incentive
2003	248	10.6%	23.6%	66%
2004	250	9.6%	19.2%	71%
2005	268	8.3%	18.8%	73%
2006	317	7.8%	7.8%	84%
2007	377	9.6%	7.0%	83%
2008	365	15.1%	6.1%	79%
2009	359	18.8%	8.6%	73%
2010	357	13.7%	6.2%	80%
2011	348	14.0%	5.1%	81%
2012	344	11.0%	4.3%	85%
2013	342	12.0%	5.2%	83%
Mean	325	11.9%	10.2%	77.9%
Std. Dev	47.46	3.3%	6.9%	6.3%

Table 4 Panel B: Mean Difference of the Weight of Different Components of the Compensation between Pre- and Post-Crisis Period

Period	Salary	Bonus	Long-Term and Equity Incentive
Pre-Crisis (N = 1,460)	9.10%	15.08%	75.82%
Post-Crisis (N = 1,750)	13.39%	5.60%	80.96%
Difference (Pre-Post)	-4.29%	9.48%	-5.14%
t-Stat	-2.73***	4.69***	-1.21

Table 5 Panel A: Descriptive Statistics for All Variables from 2003 to 2013

Variable	N	Mean	Std. Dev	Q1	Median	Q3
Salary ($, thousand)	3575	744.32	394.32	500.00	711.02	950.00
Bonus ($, thousand)	3575	639.63	1,791.55	0.00	0.00	500.00
Cash_Comp ($, thousand)	3575	1,383.95	1,883.70	600.00	876.75	1,330.00
Long_Term_Comp ($, thousand)	3575	5,143.96	11,183.51	495.60	1,900.03	5,403.94
Incentive_Comp ($, thousand)	3575	5,784.71	11,738.71	773.64	2,310.29	6,150.89
Total_Comp ($, thousand)	3575	6,529.88	11,844.61	1,405.85	3,092.86	7,069.87
Stock_Price ($)	3575	36.14	59.97	16.77	28.37	44.05
Size ($, million)	3575	5,657.97	15,845.67	332.81	874.67	3,339.82
ROE	3575	0.04	2.03	0.05	0.10	0.15
Mkt_to_Book	3575	1.67	26.93	1.07	1.55	2.27
Leverage	3575	0.89	6.69	0.21	0.53	1.24

Table 5 Panel B: Mean Difference of the Variables between Pre- and Post-Crisis Period

Variable	Pre-Crisis (2003 to 2007) N = 1,460	Post-Crisis (2009 to 2013) N = 1,750	Mean Difference (Pre-Post)	t-Stat
	Mean	Mean		
Salary ($, thousand)	703.55	789.71	-86.17	-5.07***
Bonus ($, thousand)	1,099.61	330.88	768.73	6.04***
Cash_Comp ($, thousand)	1,803.16	1,120.60	682.56	10.01***
Long_Term_Comp ($, thousand)	5,985.28	4,764.01	1,221.27	2.99***
Incentive_Comp ($, thousand)	7,088.32	5,095.08	1,993.24	4.65***
Total_Comp ($, thousand)	7,793.25	5,885.06	1,908.19	4.41***
Stock_Price ($)	40.24	34.36	5.88	2.66***
Size ($, million)	5,956.64	5,656.99	299.65	0.521
ROE	0.14	0.04	0.10	4.05***
Mkt_to_Book	2.60	1.73	0.87	3.78***
Leverage	1.15	0.76	0.38	2.61***

Table 6, Panel A: Correlation Matrix (Pre-Crisis Period, 2003 to 2007)

Variables	Salary	Bonus	Cash_ Comp	Long_ Term_ Comp	Incentive _Comp	Total_ Comp	Stock_ Return	Size	ROE	Mkt_to_ Book
Salary										
Bonus	0.442***									
Cash_Comp	0.588***	0.895***								
Long_Term_Comp	0.437***	0.388***	0.359***							
Incentive_Comp	0.487***	0.682***	0.597***	0.874***						
Total_Comp	0.598***	0.681***	0.654***	0.857***	0.953***					
Stock_ Return	0.251***	0.308***	0.313***	0.369***	0.424***	0.451***				
Size	0.588***	0.603***	0.599***	0.467***	0.554***	0.622***	0.453***			
ROE	0.037	0.154***	0.053*	0.022	0.066**	0.058**	0.090***	0.065***		
Mkt_to_Book	-0.008	-0.022	-0.014	-0.002	-0.002	-0.000	0.011	-0.003	0.829***	
Leverage	0.01419	0.093***	0.056**	0.036	0.044*	0.054**	0.023	0.093***	0.392***	0.295***

Table 6, Panel B: Correlation Matrix (Post-Crisis, 2009 to 2013)

Variables	Salary	Bonus	Cash_ Comp	Long_ Term_ Comp	Incentive _Comp	Total_ Comp	Stock_ Return	Size	ROE	Mkt_to_ Book
Salary										
Bonus	0.358***									
Cash_Comp	0.850***	0.805***								
Long_Term_Comp	0.310***	0.371***	0.283***							
Incentive_Comp	0.329***	0.639***	0.402***	0.936***						
Total_Comp	0.499***	0.618***	0.541***	0.894***	0.944***					
Stock_ Return	0.121***	0.219***	0.170***	0.438***	0.467***	0.429***				
Size	0.305***	0.377***	0.290***	0.502***	0.522***	0.532***	0.27***			
ROE	-0.039*	0.002	-0.022	0.077***	0.097***	0.063***	0.128***	0.024		
Mkt_to_Book	-0.050**	-0.080*	-0.036	0.017	0.026	0.011	0.100***	-0.083*	0.095*	
Leverage	-0.0394	-0.094**	-0.024	-0.034	-0.026	-0.029	0.084***	-0.083***	-0.439***	0.268***

Table 7: Multiple Lagged Regression of CEO Total Compensation

Dependent Variable = Total Compensation

$CEO\ Total\ Compensation_t$
$$= \alpha + \beta_1\ Stock\_Return_{t-1} + \beta_2\ ROE_{t-1} + \beta_3\ Leverage_{t-1} + \beta_4\ Stock\_Ret\_Leverage_{t-1}$$
$$+ \beta_5\ Mkt\_to\_Book_{t-1} + \beta_6\ Size_{t-1} + \sum \gamma_j\ Year\_Dummy + \varepsilon_t$$

	Pre-Crisis (2003 to 2007)				Post-Crisis (2009 to 2013)			
Variables	**Expected Sign**	**Parameter**	**t-Value**	**Pr > |t|**	**Expected Sign**	**Parameter**	**t-Value**	**Pr > |t|**
Intercept		**3.820**	**24.110**	**<.0001**		**4.192**	**48.180**	**<.0001**
Lag_Stock_ Ret	+	**0.373**	**7.830**	**<.0001**	+	**0.416**	**12.150**	**<.0001**
Lag_ROE	+	**0.381**	**3.100**	**0.002**	+	0.017	1.570	0.115
Lag_Leverage	-	**0.217**	**3.050**	**0.002**	-	**0.024**	**2.170**	**0.030**
Lag_Stock_Ret_Leverage	-	**-0.158**	**-3.050**	**0.002**	-	**-0.012**	**-1.835**	**0.071**
Lag_Mkt_to_Book	+	**0.029**	**2.970**	**0.003**	+	0.006	0.790	0.429
Lag_Size	+	**0.411**	**23.400**	**<.0001**	+	**0.320**	**22.540**	**<.0001**
Adjusted R^2		40.67%				33.73%		
N		1460				1750		

F-test values for equality of coefficients between the pre- and post-crisis period:

Lag_Leverage (p-value = 0.027), Lag_Stock_Ret_Leverage (p-value < 0.001)

Table 8 Panel A: Additional Tests: Multiple Regression of CEO Cash Compensation

	Dependent Variable = Cash Compensation (Salary + Bonus)							

$$CEO\ Cash\ Compensation_t$$
$$= \alpha + \beta_1\ Stock\_Return_{t-1} + \beta_2\ ROE_{t-1} + \beta_3\ Leverage_{t-1}$$
$$+ \beta_4\ Stock\_Ret\_Leverage_{t-1} + \beta_5\ Mkt\_to\_Book_{t-1} + \beta_6\ Size_{t-1} + \sum \gamma_j\ Year\_Dummy$$
$$+ \varepsilon_t$$

	Pre-Crisis (2003 to 2007)				Post-Crisis (2009 to 2013)			
Variables	**Expected Sign**	**Parameter**	**t-Value**	**Pr > |t|**	**Expected Sign**	**Parameter**	**t-Value**	**Pr > |t|**
Intercept		**4.966**	**37.570**	**<.0001**		**5.549**	**56.250**	**<.0001**
Lag_Stock_Ret	+	-0.030	-0.770	0.439	+	**0.062**	**2.640**	**0.008**
Lag_ROE	+	**0.167**	**1.890**	**0.058**	+	**0.050**	**2.050**	**0.040**
Lag_Leverage	-	0.001	0.010	0.991	-	0.006	0.610	0.542
Lag_Stock_Ret_Lev	-	-0.001	-0.060	0.951	-	-0.003	-0.690	0.489
Lag_Mkt_to_Book	+	0.007	0.940	0.345	+	-0.003	-1.030	0.302
Lag_Size	+	**0.306**	**24.150**	**<.0001**	+	**0.148**	**11.510**	**<.0001**
Adjusted R^2		34.26%				9.36%		
N		1460				1750		

F-test values for equality of coefficients between the pre- and post-crisis period: ROE (p-value = 0.016)

Table 8 Panel B: Additional Test: Multiple Regression of CEO Total Incentive Compensation

Dependent Variable = Total Incentive Compensation (Bonus + Long-Term Compensation)

$$CEO\ Incentive\ Compensation_t$$
$$= \alpha + \beta_1\ Stock\_Return_{t-1} + \beta_2\ ROE_{t-1} + \beta_3\ Leverage_{t-1} + \beta_4\ Stock\_Ret\_Leverage_{t-1}$$
$$+ \beta_5\ Mkt\_to\_Book_{t-1} + \beta_6\ Size_{t-1} + \sum \gamma_j\ Year\_Dummy + \varepsilon_t$$

		Pre-Crisis (2003 to 2007)				Post-Crisis (2009 to 2013)		
Variables	**Expected Sign**	**Parameter**	**t-Value**	**Pr > |t|**	**Expected Sign**	**Parameter**	**t-Value**	**Pr > |t|**
Intercept		2.741	12.300	<.0001		3.306	21.900	<.0001
Lag_Stock_ Ret	+	0.425	6.300	<.0001	+	0.506	14.070	<.0001
Lag_ROE	+	0.528	2.970	0.003	+	0.077	2.050	0.041
Lag_Leverage	-	-0.018	-1.120	0.262	-	-0.004	-0.370	0.710
Lag_Stock_Ret_Lev	-	-0.035	-3.200	0.001	-	-0.004	-2.010	0.045
Lag_Mkt_to_Book	+	0.036	2.500	0.012	+	-0.004	-0.960	0.335
Lag_Size	+	0.476	19.250	<.0001	+	0.400	20.850	<.0001
Adjusted R²		32.15%				33.50%		
N		1460				1750		

F-test values for equality of coefficients between the pre- and post-crisis period:

ROE (p-value < 0.001), Lag_Stock_Ret_Leverage (p-value < 0.001), Lag_Mkt_to_Book (p-value < 0.001)

Table 8 Panel C: Additional Test: Multiple Regression of CEO Long-term Compensation

Dependent Variable = Long-Term Compensation (Long-Term Incentive + Stock Grants + Options)								

$$CEO\ Long-Term\ Compensation_t$$
$$= \alpha + \beta_1\ Stock\_Return_{t-1} + \beta_2\ ROE_{t-1} + \beta_3\ Leverage_{t-1} + \beta_4\ Stock\_Ret\_Leverage_{t-1}$$
$$+ \beta_5\ Mkt\_to\_Book_{t-1} + \beta_6\ Size_{t-1} + \sum \gamma_j\ Year\_Dummy + \varepsilon_t$$

		Pre-Crisis (2003 to 2007)				Post-Crisis (2009 to 2013)		
Variables	**Expected Sign**	**Parameter**	**t-Value**	**Pr > |t|**	**Expected Sign**	**Parameter**	**t-Value**	**Pr > |t|**
Intercept		**2.663**	**11.750**	**<.0001**		**3.299**	**21.920**	**<.0001**
Lag_Stock_ Ret	+	**0.434**	**6.430**	**<.0001**	+	**0.583**	**13.260**	**<.0001**
Lag_ROE	+	**0.510**	**2.870**	**0.004**	+	**0.010**	**2.650**	**0.008**
Lag_Leverage	-	0.165	1.630	0.102	-	**0.037**	**2.170**	**0.030**
Lag_Stock_Ret_Lev	-	**-0.046**	**-4.130**	**<.0001**	-	**-0.004**	**-3.270**	**0.001**
Lag_Mkt_to_Book	+	**0.032**	**2.250**	**0.024**	+	-0.001	-0.030	0.979
Lag_Size	+	**0.481**	**19.340**	**<.0001**	+	**0.414**	**21.110**	**<.0001**
Adjusted R²		32.25%				38.87%		
N		1460				1750		

F-test values for equality of coefficients between the pre- and post-crisis period:

ROE (p-value < 0.001), Lag_Stock_Ret_Leverage (p-value < 0.001)