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May 27, 2011

Ms. Elizabeth M. Murphy
Secretary, U.S. Securities & Exchange Commission
100 F Street, NE
Washington DC 20549-1090

Reference: File Number S7-12-11

Dear Ms. Murphy:

The undersigned submit this letter in response to the request by the Securities and Exchange Commission (the "SEC") for comments in its release entitled "Incentive-based Compensation Arrangements" published on March 30th 2011 (Release No. 34-64140, RIN 3255-AL06) (the "Proposal"). We are the Provost Professor of Finance, Leeds School of Business, University of Colorado and the Director and Associate Directors of the John L. Weinberg Center for Corporate Governance at the University of Delaware. Collectively, we have in-depth experience in the field of corporate governance, including from an academic perspective studying the effects incentive compensation can have on firm value, as practitioners, and as a sitting board member of a public company board.

We appreciate this opportunity to offer our comments and perspective on the Proposal, and commend the Commission and its staff for the extensive work it has undertaken to date, and has in front of it, in implementing the provisions of Dodd-Frank. We will focus on remarks on the provisions of the Proposal relating to incentive compensation and corporate governance generally.

The primary thrust of our comment is as follows: Executive compensation programs should be simple, transparent, and focused on creating and sustaining long-term shareholder value. In the attached paper, "Bank Executive Compensation and Capital Requirements Reform," also available at http://leeds-faculty.colorado.edu/bhagat/BankComp-Capital-Jan2011.pdf , the executive compensation structure in the largest 14 U.S. financial institutions during 2000-2008 is examined. The empirical results are supportive of the argument that incentives generated by executive compensation programs led to excessive risk-taking by banks leading to the current financial crisis. Also, the results are generally not supportive of the argument that the poor performance of banks during the crisis was the result of unforeseen risk.

We believe the Commission should continue to work with the exchanges, issuers and shareholders to promote best compensation practices for CEOs, CFOs, and other senior corporate executives of U.S. corporations. One practice that should be considered by shareholders is that *executive incentive compensation should consist only of restricted stock and restricted stock options – restricted in the sense that the executive cannot sell the shares or exercise the options for a period of time after their last day in office.* We refer to this as the Restricted Equity Best Practice. Such a best practice could contain liquidity exemptions, in which officers would be

permitted to annually liquidate certain amounts to meet legitimate cash flow needs; these exemptions, could for example, be about 10 percent of the executive's ownership position up to a maximum dollar amount of $5 million. Such a best practice will provide managers stronger incentives to work in the interests of long-term shareholders, and avoid excessive risk-taking. Importantly, the above compensation structure is simple, transparent, and focused on creating and sustaining long-term shareholder value.

The Proposal notes under "Deferral arrangements required for Executive Officers": "At these larger covered financial institutions, at least 50 percent of the incentive-based compensation of an "executive officer" (as previously defined), would have to be deferred over a period of at least three years. The Proposed Rule also would require that deferred amounts paid be adjusted for actual losses of the covered financial institution or other measures or aspects of performance that are realized or become better known during the deferral period." Conceptually this deferral arrangement has merit since it discourages managers from undertaking high-risk negative net present value investments and trading strategies.

We note three concerns with the above deferral arrangement. First, during the past decade annual incentive compensation for senior executives in large banks was often worth several hundreds of millions of dollars. Hence, if managers were allowed to liquidate even half of the above large sums annually in the form of sales of their stock and option holdings, deferral arrangement might not be a major consideration for these bank managers. Second, this deferral arrangement will not discourage managers from undertaking high-risk negative net present value investments if the negative cash flows occur in the latter years (after the third year) of the project. Third, the

implementation details would be important: How are "losses" and "performance" measured? In the past, managers have successfully taken advantage of any flexibility/ambiguity provided in their incentive compensation plans at the expense of long-term shareholders. Managers will likely take advantage of abovementioned deferral arrangement related implementation flexibility/ambiguity to benefit themselves at the expense of long-term shareholders.

The Restricted Equity Best Practice, noted above, whereby managers' incentive compensation consists solely of restricted stock and restricted stock options (that they are required to hold for two to four years post-retirement) is not subject to the above concerns. Furthermore, the Restricted Equity Best Practice (via the restricted stock and option holdings) provides for an automatic, ongoing, direct and proportionate impact of the change in a company's equity value on the manager's net worth.

In addition, the Proposal notes under "Strong Corporate Governance": "Strong and effective corporate governance is critical to the establishment of sound compensation practices." How is strong and effective corporate governance defined and measured? Based on the empirical findings noted below, and our own experiences, the Commission would be well advised to consider the amount of director equity ownership in the corporation as an indicator of good corporate governance.

In the attached paper, "Director Ownership, Governance and Performance," also available at http://leeds-faculty.colorado.edu/bhagat/GovernancePerformanceApril2011.pdf ,

the relationship between various measures of corporate governance (including independence of directors, and stock ownership of directors) and company performance are analyzed. The sample includes the 1,500 of the largest U.S. corporations over the period 1998-2007. *The principal finding is that companies perform better when their directors own more stock.* This finding is robust to different sub-periods, company sizes, and a battery of specification tests.

How much stock in their own company should a director own? For the companies in the largest size quartile in the above paper, the representative director in the poor-performing companies owned stock worth $1.2 million, whereas the representative director in the top-performing companies owned stock worth $1.8 million. For the companies in the smallest size quartile, the representative director in the poor-performing companies owned stock worth $0.6 million, whereas the representative director in the top-performing companies owned stock worth $1.2 million.

Although we recognize the Commission does not have a rule or an index for good corporate governance, the dollar ownership of the board members could very well be considered a surrogate index of good corporate governance. This is a simple, intuitive, and effective way to "measure" good governance. It is also less prone to measurement error, and not subject to the problem of weighting a multitude of governance provisions in constructing a governance index.

The Restricted Equity Best Practice logically leads to a complementary proposal regarding a bank's capital structure: The high leverage implied by debt ratios in the order of 95% (as was the case for many large banks in 2008) will magnify the impact of losses on equity value. As a

bank's equity value approaches zero (as they did for some banks in 2008), equity based incentive programs lose their effectiveness in motivating managers to enhance shareholder value. Hence, for equity based incentive structures to be effective, banks should be financed with considerable more equity than they are being financed currently. Our recommendation for significantly greater equity in a bank's capital structure is consistent with the recent recommendations of other finance scholars, such as, Admati, Demarzo, Hellwig and Pfleiderer (2010, "Fallacies, Irrelevant Facts, and Myths in the Discussion of Capital Regulation: Why Bank Equity is not Expensive," Rock Center for Corporate Governance at Stanford University Working Paper No. 86).

We appreciate this opportunity to comment on the proposal.

Yours sincerely,

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Director Ownership, Governance and Performance

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Abstract

We study the impact of Sarbanes-Oxley Act (SOX) on the relationship between corporate governance and company performance. We consider five measures of corporate governance during the period 1998-2007. We find a negative and significant relationship between board independence and operating performance during the pre-2002 period, but a *positive* and significant relationship during the post-2002 period; this is consistent with and supportive of the event-study results of DeFond, Hann, and Hu (2005) and Chhaochharia and Grinstein (2007). The stock ownership of directors is consistently positively and significantly related to performance for both sub-periods. Other measures, such as the governance indices introduced by Gompers, Ishii and Metrick (2003) and Bebchuk, Cohen and Ferrell (2009) provide inconsistent results. The above findings are robust to a battery of specification tests.

The most important contribution of this paper is our proposal of a governance measure, namely – dollar ownership of the board members – that is simple, intuitive, less prone to measurement error, and not subject to the problem of weighting a multitude of governance provisions in constructing a governance index. Consideration of this governance measure by future researchers would enhance the comparability of research findings with more robust progress in governance research.

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I. INTRODUCTION

The corporate scandals of the early 2000s, including Enron, Worldcom, Tyco and others, led to a wave of regulation aimed at improving the corporate governance environment. A common feature of this was the implementation of guidelines concerning the independence of the members of the board of directors. For example, the Sarbanes-Oxley Act of 2002 (SOX) mandates that all members of a listed firm's audit committee must be independent. Soon thereafter, both the New York Stock Exchange and the NASDAQ Stock Market required all listed companies to have a majority of independent directors.

The regulatory and institutional focus on board independence is surprising given that most of the prior academic research found no statistical relationship, and, in many cases, found a negative relationship, between board independence and firm performance. The above research, however, focuses on time period prior to this recent wave of regulation aimed at increasing board independence on boards and audit committees. Even those studies that do include some post-2002 data mostly include pre-2002 data, so it is difficult to separate the findings into pre-regulation and post-regulation relationships.

This paper fills the above gap in the literature: We study the relationships between various measures of corporate governance – especially board independence – and firm performance during the period 1998-2007. We explicitly separate the sample period into pre-2002 and post-2002 sub-periods to focus on the effects of the regulation. While we confirm the negative relationship between board independence and firm performance (that most prior research has identified) for the pre-2002 period, this result is reversed for the post-2002 period. *During the years 2003-2007, greater board independence is positively correlated with operating performance.* In other tests, we find that this result is driven by firms that increase their number

of independent directors. An event study provides independent evidence supportive of the above results – specifically, when a company goes from being non-compliant to being compliant with SOX's board independence requirement, the market response is significantly positive. The above findings are consistent with and supportive of the event-study results of Chhaochharia and Grinstein (2007) and DeFond, Hann, and Hu (2005). Chhaochharia and Grinstein find that firms that were less compliant with the rules imposed by SOX and the Exchanges earned more positive abnormal returns on the announcement of the rules. DeFond, Hann and Hu document a positive stock market reaction when a director with accounting expertise is appointed to the audit committee.

While SOX specifically affects board independence, perhaps the increased scrutiny of all firms' corporate governance environments forces firms to implement better corporate governance practices, regardless of how those governance practices are measured.[1] As such, board independence is not the only measure of governance that we consider. We find that the dollar value of director stock ownership is positively related to operating performance both pre-2002 and post-2002. We also find that whether or not a firm's CEO is also the board chair is negatively related to operating performance throughout the sample period. These findings are consistent with prior literature. We also consider two popular corporate governance indices: the G-Index of Gompers, Ishii and Metrick (GIM, 2003) and the E-Index of Bebchuk, Cohen and Ferrell (BCF, 2009). During 1998-2001, both the G-Index and the E-Index suggest a positive and significant relation between good governance and performance; these findings are consistent with the extant literature. However, during 2003-2007, the G-Index suggests a *negative* and

[1] For example, Brochet (2010) finds that Section 403 of SOX has brought about more timeliness and transparency in the communication of insider trading.

significant relation between good governance and performance. Also, during 2003-2007, the E-Index suggests an inconsistent relation between good governance and performance.

As many prior studies note, the relationship between corporate governance and company performance is plagued by endogeneity concerns. It is unclear whether performance causes governance or whether governance causes performance. To account for this, we utilize a four-equations system to allow for governance, performance, ownership, and capital structure to be potentially endogenous. We adopt an instrumental variables approach to estimate the system of equations, checking for the validity and strength of our instruments, and specification of the system of equations. In addition, as a robustness check we consider alternative methodologies less susceptible to the endogeneity concern – with consistent results.

Although most prior research has not found a positive relationship between board independence and firm performance prior to 2002, some research has found support for board independence in specific situations. Hermalin and Weisbach (2005) develop a model predicting that board independence provides greater oversight of managerial actions. Bhagat and Bolton (2008) find that firms with greater board independence are more likely to replace the CEO following periods of bad performance. We extend this CEO turnover test to our sample period and find this result persists in the post-2002 time period. In sum, these findings are consistent with the notion that the wave of corporate governance regulation that occurred during 2002 may have had some desired effect. Specifically, post-2002, companies whose boards are more independent are positively correlated with better operating performance.

In addition to studying the changing nature of corporate governance across the pre-2002 and post-2002 sub-periods, we make four addition contributions to the literature. First, consistent with the Efficient Market Hypothesis, we show that none of the governance measures

are correlated with current or future stock market performance, in contrast to the claims in papers such as GIM and BCF. Second, we find that given poor firm performance, the probability of disciplinary management turnover is positively correlated with stock ownership of board members and board independence. However, given poor firm performance, the probability of disciplinary management turnover is *negatively* correlated with better governance measures as proposed by GIM and BCF. In other words, so called "better governed firms" as measured by the GIM and BCF indices are *less* likely to experience disciplinary management turnover in spite of their poor performance. Third, we show that firms that are not compliant with SOX have significantly higher abnormal returns upon becoming compliant than do non-compliant firms that stay non-compliant; this is consistent with and supportive of the results of Chhaochharia and Grinstein (2007) and DeFond, Hann, and Hu (2005). The most important contribution of this paper is our proposal of a governance measure, namely – dollar ownership of the board members – that is simple, intuitive, less prone to measurement error, and not subject to the problem of weighting a multitude of governance provisions in constructing a governance index. Consideration of this governance measure by future researchers would enhance the comparability of research findings with more robust progress in governance research.

The remainder of this paper is organized as follows. The next section discusses the relevant literature. Section 3 introduces our model specification and sample. Section 4 presents the results on the relationship between corporate governance and company performance. Section 5 discusses results of an event study where we focus on the announcement by sample firms of the nomination of additional independent directors that would enable the firm to comply with SOX's board independence requirement for the audit committee. Section 6 considers the

relationship between corporate governance, company performance, and CEO turnover. Section 7 notes our conclusions.

II. CORPORATE GOVERNANCE AND BOARD INDEPENDENCE

The relationship between board independence and firm performance is one of the most studied relationships in the corporate governance literature. Hermalin and Weisbach (1991) find no relationship between board composition and performance (using Tobin's *Q* as the performance measure). Agrawal and Knoeber (1996) study the interrelationships among seven corporate governance mechanisms and find a negative relationship between independence and firm performance (as measured by Tobin's *Q*). Bhagat and Black (2002) document that firms with more independent boards do not perform better, using a variety of performance measures. They also find that poorly performing firms are more likely to increase the number of independent directors, but that this does not improve performance. More recently, Bhagat and Bolton (2008) find a negative relationship between board independence and operating performance. The overwhelming majority of work finds that having a more independent board of directors does not lead to better performance and may actually lead to worse performance.

Adams and Ferreira (2007) introduce a model that suggests CEOs may be reluctant to share information with more independent boards, thereby decreasing shareholder value. This suggests that the requirements of SOX and the stock exchanges for firms to increase director independence may potentially be detrimental to firm value. Laux (2008) presents a model considering CEO turnover and board independence, and shows that greater board independence might be detrimental to the firm because independent boards might be too active in replacing the CEO and in formulating CEO compensation. Raheja (2005) looks at the board's monitoring role with respect to investment projects. In her model, inside directors have more knowledge of the

firm's investments, so the optimal board structure will depend on the project verification costs to outsiders and private benefits from projects to insiders. This suggests greater board independence can be beneficial in some firms while being detrimental in other firms. Similarly, Coles, Daniel and Naveen's (2008) work suggests that smaller and more independent boards may not be superior in all cases. Using data from 1997-2000, Gillan, Hartzell and Starks (2007) show that firms with more powerful boards (or more independent boards) also have higher *G-Index* scores, suggesting that managers may become more entrenched to protect themselves from the oversight of an independent board. Finally, Chhaochharia and Grinstein (2007) find that firms that were less compliant with the rules imposed by SOX and the Exchanges earned positive abnormal returns on the announcement of the rules, relative to firms that were more compliant.

One common feature of these studies is that they mostly focus on boards and relationships prior to 2002. It is rare to see an exogenous shock to the corporate governance landscape, but the increased regulation of 2002 may be just the kind of event to provide a demarcation of corporate governance regimes. Section 301 of SOX mandates that the audit committees of public firms comprise entirely of independent directors and that the audit committee contain at least one 'finance expert.' While firms could meet the independence requirement by removing affiliated directors from the board, some firms might have to add independent directors in order to meet the 'finance expert' requirement.[2] Further, it stipulates that if a firm does not have a stand-alone audit committee, then the entire board functions as the audit committee and it, therefore, must comprise entirely of outside directors. Subsequent to the passage of SOX, the New York Stock Exchange and the NASDQ Stock Market simultaneously instituted standards requiring listed companies to have a majority of independent directors. This

[2] See Securities Exchange Act Release No. 47137 (January 8, 2003), 68 FR 2637, (January 17, 2003), or http://www.sec.gov/rules/sro/34-48745.htm.

regulation did force firms to add independent directors, as fewer than 80% of firms had majority of independent directors in 2003.[3] Further, SOX and the listing standards impose new responsibilities on firms' directors, such as regular meetings of the independent directors, approval of director nominations by independent directors, and approval of CEO compensation by independent directors. As a consequence of these policies boards began including more independent directors[4], and, arguably the independent directors became more engaged in the firm's governance processes.

While the explicit objective of the SOX and exchange regulations is increasing and improving board effectiveness through greater independence, it is possible that the firm's entire corporate governance environment changes, regardless of how corporate governance is measured. There are many plausible proxies for corporate governance, but there is no agreed upon "best" measure. As such, it is possible these other measures have also been impacted by the new regulations. GIM create a Governance Index (*G-Index*) using 24 anti-takeover provisions. They show that firms with strong shareholder rights outperform firms with weak shareholder rights by 8.50 percent per year during the 1990s. They further show that firms with strong shareholder rights have higher firm value, higher profits and higher sales growth. Core, Guay and Rusticus (2006) extend this work and show that firms with weaker governance as measured by *G-Index* have lower operating performance (and that this is anticipated by the market). BCF modify the *G-Index* using only six of the 24 provisions to create an Entrenchment Index (*E-Index*), and find that firms with higher *E-Index* scores (associated with weaker governance) have lower firm valuation.

[3] Firms could also meet the independence requirement by removing employee and affiliated directors from the board and reducing the size of the board.
[4] As shown in Table 1, the percentage of directors that are independent increased from 62% in 1998 to 72% in 2007.

Beyond looking at indices that comprise of various corporate governance components, a substantial body of work considers individual firm characteristics as measures of corporate governance. These studies focus on the relationship between one single firm governance characteristic and firm performance. The literature on board independence and firm performance is discussed above. Brickley, Coles and Jarrell (1997) study the benefits and costs of having the CEO also serve as the board chair. Bhagat and Bolton (2008) consider the stock ownership of directors.

Can a single board characteristic be as effective a measure of corporate governance as indices that include dozens of corporate charter and board characteristics?[5] While, ultimately, this is an empirical question, on both economic and econometric grounds it is possible. Bhagat, Bolton, and Romano (2008) argue that since boards have the power to make (or at least ratify) all important company decisions, it is plausible that board members with appropriate stock ownership will have the *incentive* to provide effective monitoring and oversight of these important corporate decisions. Also, simple measures such as board independence and director ownership can be a good proxy for overall good governance on econometric grounds: The measurement error associated with a simple variable such as board independence can be much less than the total measurement error in measuring a multitude of board processes, compensation structures, and charter provisions. Further, construction of a governance index requires proper weighting of these board characteristics, anti-takeover provisions, and compensation variables; if the weights in the index are not the same as the (unobservable) weights used by informed market participants in assessing the governance and performance relationship then incorrect inferences would be made.

[5] For example, Brown and Caylor's (2006) *Gov-Score* index includes 51 factors, while commercial providers such as RiskMetrics Group (formerly Institutional Shareholder Services), The Corporate Library, and Glass Lewis & Company offer proprietary governance indices using, sometimes, several hundred governance characteristics.

This paper is closest in spirit to Bhagat and Bolton (2008) (BB); however, we extend that work in three ways: First, BB consider governance-performance relationships only during the pre-SOX period of 1998-2002; we consider both pre-SOX (1998-2001) and post-SOX periods (2003-2007). Given the scope of Sarbanes-Oxley and that it was the first such significant corporate governance related regulation in decades, it is important to consider the extent to which governance-performance relationships changed subsequent to the passage of SOX. For example, board independence is negatively correlated with performance pre-SOX, but positively correlated with performance post-SOX. Second, this study documents that firms which are not compliant with SOX regarding audit committee independence have significantly higher abnormal returns upon becoming compliant than do non-compliant firms that stay non-compliant; BB do not consider any market responses to changes in board structure. Finally, BB consider governance-performance relationships during 1998-2002 and propose a new governance measure – namely, dollar ownership of board directors. This study corroborates the statistical and economic significance of their governance measure with out-of-sample data.

III. DATA DESCRIPTION AND MODEL SPECIFICATION

Data

Our primary source of corporate governance data is the RiskMetrics directors and governance databases (formerly the Investor Responsibility Research Center, IRRC). In addition, we use the Compustat Industrial Annual database for financial statement information, the Center for Research in Security Prices (CRSP) database for stock market data, and the Compustat Executive Compensation (Execucomp) database for CEO ownership and turnover

information. The SEC's EDGAR database of SEC filings is also used to obtain specific information from proxy statements.

The RiskMetrics databases track governance and director information for approximately 1,500 large U.S. companies from 1990 to 2007. The governance database provides corporate anti-takeover provisions on these companies, plus the *G-Index* score used in Gompers, Ishii and Metrick (2003). This database provides updates for 1990, 1993, 1995, 1998, 2000, 2002, 2004 and 2007. The director database provides detailed director information annually from 1996 to 2007. However, the director ownership data is not tracked consistently until 1998, so our primary sample is for 1998 to 2007. The Execucomp database provides compensation and ownership data on approximately 1,500 large U.S. firms annually from 1992-2007. There is considerable overlap across these sources which: the final merged sample has 1,000 to 1,400 firms per year. The final sample is an unbalanced panel with 10 years of data from 1998 to 2007 and a total of over 13,000 firm-year observations.

Governance Variables

This study considers the following five measures of corporate governance[6]:

Independence – Board independence is measured as the percentage of directors who are unaffiliated with the sample firm. This includes directors who are neither employees of the firm and directors who do not have any identifiable relationship with the sample firm.

DirectorOwn – Director ownership is measured as the natural log of the dollar value of common stock owned by the median director. We focus on the dollar value rather than percentage of ownership because it serves as a more direct measure of director incentives.

[6] In supplementary tests, we consider two other measures of corporate governance. *BusyBoards* is the percentage of directors who serve on more than 3 corporate boards; our results are consistent with that of Fich and Shivdasani (2006). *IndepInsider* is the number of sample firm's executives on the board who hold at least one additional outside directorship; our results are supportive of Masulis and Mobbs (2009).

Consistent with the political economy literature, we focus on the median director because they have the ability to cast the deciding vote on board issues; see Shleifer and Murphy (2004) and Milavonic (2004).

CEO-Duality – CEO-Chair duality is an indicator variable taking the value of 1 if the CEO of the sample firm is also the board chair, and 0 otherwise.

G-Index – From GIM, the *G- Index* is the compilation of anti-takeover provisions in the firm's bylaws. The Index is comprised of 24 corporate charter provisions, with a possible Index value ranging from 0 to 24. Consistent with GIM, higher Index values represent weaker corporate governance while lower Index values represent stronger corporate governance.

E-Index – From BCF, the *E-Index* is a subset of the *G-Index*. It includes only 6 of the 24 corporate charter provisions believed consistent with entrenching management, thus taking a value of 0 to 6.[7] Again, higher Index values represent weaker corporate governance.

Performance Variables

Consistent with Barber and Lyon (1996) and Core, Guay and Rusticus (2006), we consider Return on Assets (*ROA*) as our primary measure of firm operating performance. In supplementary tests, we also use stock return (*Return*) and Tobin's Q (*TobinsQ*) as alternative measures of firm performance. Industry-adjusted performance is obtained by subtracting the average performance of the sample firm's 4-digit SIC code from the sample firm's performance measure.

Other Endogenous and Control Variables

In addition to governance and performance, ownership and capital structure are also presumed to be endogenously determined. We consider *CEOOwn%* as the percentage of stock

[7] The six provisions are staggered boards, limits to shareholder bylaw amendments, supermajority requirements for mergers, supermajority requirements for charter amendments, poison pills, and golden parachutes.

owned by the CEO. *Leverage* is the capital structure measure, calculated as the long-term debt-to-assets ratio.

Regarding the control variables: Prior literature, for example, Core, Holthausen and Larcker (1999), Gillan, Hartzell and Starks (2003), and Core, Guay and Rusticus (2006), suggests that industry performance, return volatility, growth opportunities and firm size are important determinants of firm performance. Yermack (1996) documents a relation between board size and performance. Demsetz (1983) suggests that small firms are more likely to be closely-held suggesting a different governance structure than large firms. Theoretical work on board independence (Hermalin and Weisbach (1998), Raheja (2005), Adams and Ferreira (2007), and Harris and Raviv (2008)) suggests that more independent boards are not necessarily value-enhancing, rather there is an optimal level of board independence depending on the information cost that outside directors incur in becoming effective monitors. We consider the information cost (*InfoCost*) variables as developed in Krishnaswami and Subramanian (1999) as a determinant of board independence; specifically we consider the standard deviation of monthly stock returns, and the standard deviation of analyst forecasts.

FirmSize is the natural log of assets for the firm. *R&DAdvExp* is the ratio of research and development plus advertising expenses to assets; if the data are missing they are presumed to be zero. *MktBook* is the ratio of market to book value of equity. *BoardSize* is the number of directors on the board.

We adopt an instrumental variables approach to dealing with the potential endogeneity among governance, performance, ownership and capital structure. We identify the following primary instrumental variables used in the first-stage fitted regressions. We utilize three instruments for the governance variables. *Dir%Own* is the average *percentage* of common stock

owned by all directors (this is different from *DirectorOwn* which is the natural log of the dollar value of common stock owned by the median director). We use this variable as an instrument for all five governance variables. *Dir%CEOs* is the percentage of directors who are CEOs; this variable is used as an instrument for *Independence, DirectorOwn* and *CEO-Duality*. Hallock (1997) and Westphal and Khanna (2003) emphasize the role of networks among CEOs that serve on boards, and the adverse impact on the governance of such firms. *Dir%15Ten* is the percentage of directors who have served on the board for at least 15 years; this variable is used as an instrument for *G-Index* and *E-Index*. *TreasStock* is the ratio of treasury stock to assets, which we use as the primary instrument for performance (as in Palia (2001)). *CEOTenAge* is the ratio of CEO tenure to CEO age; this variable is used as the instrument for ownership. A CEO who has had five years of tenure at age 65 is likely to be of different quality and have a different equity ownership than a CEO that has had five years of tenure at age 50. These CEOs likely have different incentive, reputation, and career concerns. Gibbons and Murphy (1992) provide evidence on this. Therefore, we use the ratio of CEO tenure to CEO age as a measure of CEO quality, which will serve as an instrument for CEO ownership. *ZScore* is the modified Altman's Z-Score (1968); this variable is used as the instrument for leverage.[8] [9]

Model Specification

[8] Our choice of the instrument variables is motivated by the extant literature. However, it is difficult for us to argue that the instruments are uncorrelated with the regression error terms. A vast body of theoretical and empirical literature has focused on the interrelationships between performance, governance, ownership and capital structure; see Bhagat and Jefferis (2002). In light of the above interrelationships, and the model we are trying to estimate (equations 1a, 1b, 1c, and 1d as noted below), it is close to impossible - we think -to propose instruments that are in theory *uncorrelated* with the error terms. From an econometric perspective, validity of instruments is a matter of degree not kind; see Berkowitz, Caner and Fang (2008) and Chao and Swanson (2005). Ashbaugh-Skaife, Collins, and Lafond (2006) make a similar point in their study of the effects of corporate governance on firms' credit ratings. We implement a battery of tests checking for the validity and strength of our instruments, and specification of the system of equations; please see section IV and Appendix A.

[9] We consider alternative instruments for leverage such as Graham's (1996) marginal tax rate; *ZScore* is more appropriate based on our diagnostic tests.

The main relationship analyzed in this study is the effect that corporate governance has on firm performance. We note above the potential endogeneity between governance and performance. Bhagat and Jefferis (2002) highlight the reasons for focusing on the interrelationships between performance, governance, ownership and capital structure. Therefore, we specify the following four-equation system of equations allowing for these interdependencies:

(1a) $$Performance_{i,t} = Governance_{i,t} + Ownership_{i,t} + Leverage_{i,t} + IndustryPerformance_{i,t} + FirmSize_{i,t} + R\&DAdvExp_{i,t} + BoardSize_{i,t} + InfoCost_{i,t} + TreasStock_{i,t} + \varepsilon a_{i,t}$$

(1b) $$Governance_{i,t} = Performance_{i,t} + Ownership_{i,t} + Leverage_{i,t} + FirmSize_{i,t} + R\&DAdvExp_{i,t} + BoardSize_{i,t} + InfoCost_{i,t} + Dir\%Own_{i,t} + Dir\%CEOs_{i,t} + \varepsilon b_{i,t}$$

(1c) $$Ownership_{i,t} = Performance_{i,t} + Governance_{i,t} + Leverage_{i,t} + FirmSize_{i,t} + R\&DAdvExp_{i,t} + BoardSize_{i,t} + InfoCost_{i,t} + CEOTenAge_{i,t} + \varepsilon c_{ai,t}$$

(1d) $$Leverage_{i,t} = Performance_{i,t} + Governance_{i,t} + Ownership_{i,t} + IndustryLeverage_{i,t} + FirmSize_{i,t} + R\&DAdvExp_{i,t} + MktBook_{i,t} + BoardSize_{i,t} + InfoCost_{i,t} + ZScore_{i,t} + \varepsilon d_{i,t}$$

The primary focus of this study is on equation (1a), and specifically on the coefficient on *Governance* in that equation. This relationship is studied for different time periods and for different sub-samples.

In using instrumental variables estimation, two questions need to be addressed: Are the instruments valid and is instrumental variables (IV) estimation necessary? An instrument is "weak" if the correlation between the instruments and the endogenous variable is small. Nelson and Startz (1990) and Bound, Jaeger and Baker (1995) were among the first to discuss how instrumental variables estimation can perform poorly if the instruments are weak. Nelson and Startz show that the true distribution of the instrumental variables estimator may look nothing like the asymptotic distribution. Bound, Jaeger and Baker focus on two related problems. First, if the instruments and the endogenous variables are weakly correlated, then even a weak

correlation between the instruments and the error in the original structural equation (which should be zero) can lead to large inconsistencies in the IV estimates; this is known as the "bias" issue related to weak instruments. Second, finite sample results can differ substantially from asymptotic theory. Specifically, IV estimates are generally biased in the same direction as OLS estimates, with the magnitude of this bias increasing as the R^2 of the first-stage regression between the instruments and the endogenous variable approaches zero; this is known as the "size" issue related to weak instruments.

More recently, Stock and Yogo (2004) formalize the definitions and provide tests to determine if instruments are weak. They introduce two alternative definitions of weak instruments. First, a set of instruments is weak if the bias of the instrumental variables estimator, relative to the bias of the OLS estimator, exceeds a certain limit *b*. Second, the set of instruments is weak if the conventional α-level Wald test based on instrumental variables statistics has a size that could exceed a certain threshold *r*. These two definitions correspond to the "bias" and "size" problems mentioned earlier.

Consistent with the recommendations of Chenhall and Moers (2007), we use the Stock and Yogo (2004) test for weak instruments and the Hahn and Hausman (2002) test for the validity of the instruments; see 4.3.1 below. We also use the Durbin-Wu-Hausman specification test based on Hausman (1978) to test for differences between the OLS and 2SLS results and to determine which estimation method is more appropriate for statistical inference.[10]

IV. CORPORATE GOVERNANCE AND FIRM PERFORMANCE

Descriptive Statistics

[10] In addition to 2SLS we also consider 3SLS, which allows for cross-correlation in the errors of the equations in the system. There is qualitatively very little difference between the 2SLS and 3SLS results so we only report the 2SLS results.

Table 1 presents the descriptive statistics for the main governance, performance, and other variables, for the entire sample and for the pre-2002 and post-2002 subsamples. In general, the summary statistics for the entire sample period are similar to prior literature. The average board has 9.3 directors, 67% of whom are outsiders. The average *G-Index* is 9.2 and the average *E-Index* is 2.2. The median director owns about $887,000 worth of company stock, and the CEO is also the board chair in about 60% of the firms.

Some notable differences are seen when we compare the pre-2002 and post-2002 subsamples. We note that boards have become more independent, directors own more stock, boards have become more entrenched (with *G-Index* increasing from 8.9 to 9.4 and *E-Index* increasing from 2.0 to 2.3), but slightly fewer CEOs are serving as board chair. Fewer directors are active CEOs. The size of the board has remained relatively constant, but *Independence* has increased from 61.6% before 2002 to 72.0% after 2002. Median director ownership has significantly increased from about $790,000 before 2002 to about $1,100,000 after 2002.

Table 2 presents the correlation coefficients for select governance and other variables. For the most part, the governance variables are not highly correlated, with the exception of *G-Index* and *E-Index*. *Independence* and *G-Index* are moderately highly correlated, consistent with Gillan, Hartzell and Starks (2007).

Governance and Performance, pre-2002 and post-2002 periods

2002 was a seminal year in terms of corporate governance regulation, and specifically with respect to board independence. We use 2002 as the break-point for our two sub-periods since SOX was enacted in 2002; for this reason, we exclude 2002 from our analysis.[11]

[11] The results are robust to excluding both 2002 and 2003 from the analysis. We choose to include 2003 because many firms were compliant with SOX by 2003.

We find the most interesting result when we consider the relationship between Independence and *ROA* during the pre-2002 and post-2002 periods. Consistent with the extant literature, we find *Independence* is negatively related to *ROA* during the 1998-2001 period; see Table 3, Panel B.[12] However, during the 2003-2007 period, we find that *Independence* is *positively* and significantly related to *ROA;* see Table 3, Panel D. Boards have become more independent, and now this independence is positively correlated with better operating performance.

A second interesting result in Table 3 is that the relationship between *ROA* and *G-Index* is negative and significant in the pre-2002 period (panel B), but positive and significant during the post-2002 period (panel D). The other three governance variables – *DirectorOwn, CEO-Duality, and E-Index* – all have similar signs and significance pre- and post-2002. Director ownership is positively related to operating performance, whereas *CEO-Duality* and *E-Index* are negatively related. (Recall that lower values of the *E-Index* and *CEO-Duality* are associated with better governance.)

Table 3 also summarizes the relationship between various governance measures and stock market based measures of performance, *Return* and *TobinsQ*. Consistent with the Efficient Market Hypothesis, we do not find any consistent significant relation between any measure of governance (including those proposed by GIM and BCF) and stock market based measures of performance. This evidence is consistent with a growing body of evidence that does *not* find a consistent and significant relationship between governance measures proposed by GIM and BCF and stock market based measures of performance; for example, see Johnson, Moorman and

[12] In Table 3, Panels A and C, we report OLS and 2SLS results for completeness. However, the Hausman (1978) test indicates that the 2SLS estimates are more appropriate for inference; see Appendix A.

Sorescu (2009), Core Guay and Rusticus (2006), Lehn, Patro and Zhao (2007), and Cremers and Martijn (2005).

Table 4 summarizes the relationship between various governance measures and future firm performance. In general, these results are consistent with those discussed above. One exception to this is the relationship between *ROA* in the next two years *and E-Index,* which reverses from negative prior to 2002 to positive after 2002.

We next try to better characterize and understand the surprising significant *positive* relation between board independence and operating performance for the period 2003-2007. Using the sample of 13,135 firm-year observations, we determine the year-to-year change in the number of independent directors for each firm-year. An increase in the number of independent directors from the previous year is observed for only about one-third of these observations. In Table 5, Panel A, we observe a significant *positive* relation between board independence and contemporaneous operating performance for the period 2003-2007 for those observations where there is an increase in the number of independent directors from the previous year; in contrast to the negative relation for the period 1998-2001. In Table 5, Panel B, we consider observations where there is no increase in the number of independent directors from the previous year: we do not observe a significant relation between board independence and contemporaneous operating performance for the period 2003-2007. Hence, the positive relation between board independence and operating performance for the period 2003-2007 appears to be driven by those companies that increase their number of independent directors from the previous year. This is consistent with and supportive of the event-study results of Chhaochharia and Grinstein (2007) who find that firms that were less compliant with the rules imposed by SOX and the exchanges earned positive abnormal returns on the announcement of the rules.

We document above that director ownership is positively correlated with operating performance. It is possible that the positive relation between board independence and operating performance for the period 2003-2007 might be due to an increase in director ownership over the period 2003-2007. We examine this possibility in Table 6 by including both director ownership and board independence along with the other variables in equation (1a). This involves adding a fifth equation to the system, and using all three governance instrumental variables. Consistent with the evidence in Tables 3 and 4, we document a significant *positive* relation between board independence and contemporaneous operating performance for the period 2003-2007; this is in contrast to the negative relation for the period 1998-2001. Director ownership is positively associated with firm performance during both the sub-sample periods. This indicates that the reversal of the relationship between board independence and operating performance after SOX is independent of the governance effects of director ownership.

Robustness Checks

Validity and Strength of Instruments

We conduct the Stock and Yogo (2004) test to ensure that our instruments are strong. We also perform the Hahn and Hausman (2002) weak instrument test, and the Hansen-Sargan overidentification test as discussed in Davidson and Mackinnon (2004); inferences from these tests are consistent with the reported Stock and Yogo test results. Detailed results are noted in Appendix A.

Second, following the suggestion of Larcker and Rusticus (2009), we consider an alternate set of instruments in addition to the instruments noted above. Specifically, we consider (one year) lagged performance for performance, lagged ownership for ownership, and lagged

leverage for leverage.[13] Results using these instruments are consistent with the results reported above.

Third, following the suggestions of Stock, Wright and Yogo (2002) and Hall, Rudebusch and Wilcox (1996) we perform the Cragg-Donald test for model identification. The Cragg-Donald test indicates that our system of equations is well-specified.

Fourth, we perform the Anderson-Rubin test suggested by Dufour (1997) to test the joint significance of the set of endogenous variables in our system of equations. The Anderson-Rubin test supports the joint significance of our set of endogenous variables.

Fixed Effects Estimator

While we have tried to control for differences across sample firms, unobserved heterogeneity across the sample firms can confound our estimated governance-performance relation. A similar problem arises if we omit yearly variables that impact firms similarly but differently across years. To address these concerns, we estimate the performance-governance relationship using OLS with fixed effects estimator including firm and year fixed effects, and clustered (Rogers) standard errors. These results are noted in Appendix B and are consistent with those reported in Table 4.

k-class Estimator

In the case of simultaneously determined variables, 2SLS can address this problem by using instrumental variables. There are estimators other than the 2SLS estimator, such as the *k*-class estimator that can address the endogeneity problem; see Kennedy (2003) and Guggenberger (2005). The results for *k*-class estimators and next year's operating performance, next two years'

[13] Kennedy (2003) notes, "It may be possible to use as an instrument the lagged value of the independent variable in question; it is usually correlated with the original independent variable, and, although it is correlated with the disturbance vector, because it is lagged it is not contemporaneously correlated with the disturbance (assuming the disturbance is not autocorrelated)." We also conduct the Stock and Yogo (2004) and the Hahn and Hausman (2002) weak instrument tests on these lagged instruments.

operating performance, stock return and Tobin's Q (for contemporaneous and for the two additional time periods) as the performance measures are consistent with the results reported in Table 4.

Estimation of Standard Errors

Petersen (2009) and Wooldridge (2002) provide a careful analysis of the impact of correlated residuals on the bias in standard errors in panel data. While Petersen's work is quite helpful in understanding the standard error estimates for a single equation model, it is unclear how his conclusions might apply to a system of simultaneous equations. Note that both the economics and econometrics of the performance-governance relationship as analyzed above strongly suggest that this relationship needs to be estimated as a system of simultaneous equations. We estimate the performance-governance relationship using 2SLS and heteroscedasticity adjusted White and clustered (Rogers) standard errors. These results are consistent with those reported earlier.

Market-to-book in Governance and Ownership Equations

Market-to-book has been documented as a determinant of ownership structure and board structure by Himmelberg, Hubbard and Palia (1999) and Linck, Netter and Yang (2008), respectively. We include market-to-book in equations (1b) and (1c) above and re-estimate equations (1a) – (1d). The results are consistent with those reported in Table 4; see Appendix C.

Discretionary Accruals in Performance Equation

Cohen, Dey and Lys (2005, 2008) document a significant decrease in earnings management subsequent to the passage of SOX. As a robustness check, we use the Larcker and Richardson (2004) model to estimate discretionary accruals and use this as a control variable

when we consider ROA as the performance measure in equation (1a). Including this control variable does not qualitatively change our results in Table 4.

Alternative ROA Estimates

Core, Guay and Rusticus (2006) note "to the extent that governance affects firm performance through capital expenditure programs, depreciation expense is an important component of a firm's governance." For this reason, we also consider operating income after depreciation in estimating ROA. The results are consistent with the results in Table 4.

Firm Size and the Performance-Governance Relation

The performance-governance relationship could be sensitive to firm size for two reasons. First, SOX exempts firms with market capitalization less than $75 million. Second, Linck, Netter and Yang (2008) find that board structure determinants vary cross-sectionally with firm size. The first concern is not quite relevant for this study since less than 0.8% of sample firms have market capitalization less than $75 million in 2002; in 2006 all sample firms have market capitalization greater than $75 million. To address the second concern we estimate the system for five sub-samples categorized by size. During 1998-2001 (2003-2007) board independence is consistently negatively (positively) related to performance for all size quintiles; see Appendix D.

V. MARKET RESPONSE TO FIRMS' ANNOUNCEMENT OF COMPLIANCE

The focus of this paper is on the impact of SOX on the performance-governance relation. We find a negative and significant relationship between board independence and operating performance during 1998-2001, but a *positive* and significant relationship during 2003-2007. Also, we find that this result is driven by firms that increase their number of independent directors. Given that SOX attempts to increase the number and role of independent board members, the above evidence suggests a positive correlation between SOX's board independence

requirements and company performance. However, correlation is not causation – other economic events during 2003-2007 could lead to the above observed correlation; for example, increased shareholder activism and corporate scandals in that period.

To get additional insight on the impact of SOX on the relation between board independence and company performance, we conduct an event study. We focus on the announcement by sample firms of the nomination of additional independent directors that would enable the firm to comply with SOX's board independence requirements for the audit committee.[14] We use the filing of the firm's annual proxy statement as the event date. Table 7 summarizes the stock market's response to these announcements. When a company goes from being non-compliant to being compliant with SOX's board independence requirement, the market response (market adjusted cumulative abnormal return, CAR) is significantly positive for the post-SOX period (July 22, 2002 through December 31, 2007) using a three-day event window from day -1 to day +1.[15] Also, the market response is positive for each of the years 2002, 2003, 2004, 2005, 2006 and 2007. Similar results are obtained using longer event windows. The above findings are consistent with and supportive of the event-study results of Chhaochharia and Grinstein (2007) and DeFond, Hann, and Hu (2005). Chhaochharia and Grinstein find that firms that were less compliant with the rules imposed by SOX and the Exchanges earned more positive abnormal returns on the announcement of the rules. DeFond, Hann and Hu document a positive stock market reaction when a director with accounting expertise is appointed to the audit committee.

[14] Section III, subsection 301 of SOX required that all audit committee members of the board be independent. 69.9% of our sample firms were SOX compliant in 2002; 76.9% in 2003, 82.9% in 2004, 85.8% in 2005, 84.6% in 2006, and 96.8% in 2007. In practice, firms become compliant by removing affiliated directors from the board, or when the nature of an affiliated relationship changes.

[15] Value weighted market from CRSP (Center for Research in Security Prices) is used as the market index. We also estimated the CARs based on the market model with similar results. See MacKinlay (1977) for a discussion of event studies.

Table 7 also summarizes the stock market's response to announcements of annual board elections by firms that continue being non-compliant with SOX's board independence requirements during 2002-2007. The market response is insignificantly different from zero. Also, the difference in CARs of firms that go from being non-compliant to compliant and firms that stay non-compliant is significantly positive for the post-SOX period, and for each of the years 2002, 2003, 2005, 2006 and 2007. The above evidence is consistent with the argument that SOX's board independence requirement perhaps played a positive role in enhancing firm performance.

VI. CORPORATE GOVERNANCE AND CEO TURNOVER

The preceding analysis focuses on the relation between governance and performance generally and in the specific case of SOX compliance. However, governance scholars and commentators suggest that governance is especially critical in imposing discipline and providing fresh leadership when the corporation is performing particularly poorly. For this reason, we study the relationship between governance, performance, and CEO turnover.

Using Compustat's Execucomp database, we identify 1,951 CEO changes from 1998 to 2007. We hand-collect information from company press releases and press articles to determine whether the CEO departure was disciplinary or not. Table 8 documents the number of disciplinary and non-disciplinary CEO turnovers during this period. Our criteria for classifying CEO turnover as disciplinary or non-disciplinary is similar to that of Weisbach (1988), Gilson (1989), Huson, Parrino, and Starks (2001), and Farrell and Whidbee (2003). CEO turnover is classified as "non-disciplinary" if the CEO died, if the CEO was older than 63, if the change was the result of an announced transition plan, or if the CEO stayed on as chairman of the board for

more than a year. CEO turnover is classified as "disciplinary" if the CEO resigned to pursue other interests, if the CEO was terminated, or if no specific reason is given. [16]

We consider a multinomial logit regression, with three independent categories: no turnover, disciplinary turnover, and non-disciplinary turnover.[17] The dependent variable is equal to 0 if no turnover occurred in a firm-year, 1 if the turnover was disciplinary, and 2 if the turnover was non-disciplinary. We consider the past two years' stock return as the performance measure. We estimate the following baseline equation:

(2a) $$\textit{Type of CEO Turnover}_{i,t} = \textit{Last 2 Years' Return}_{i,t} + \textit{Last 2 Years' Industry Return}_{i,t} + \textit{CEOOwn\%}_{i,t} + \textit{FirmSize}_{i,t} + \textit{CEO Age}_{i,t} + \textit{CEOTenure}_{i,t} + \varepsilon a_{i,t}$$

The control variables are motivated by a substantial extant literature on performance and CEO turnover; for example, see Huson, Parrino, and Starks (2001), Farrell and Whidbee (2003), and Engel, Hayes and Wang (2003). To determine the role that governance plays in CEO turnover, we create an interactive variable that is equal to (Past 2 years' stock return *x* Governance). The reason behind this is that if the firm is performing adequately, good governance *per se* should not lead to CEO turnover; only when performance is poor do we expect better governed firms to be more likely to replace the CEO. To measure this effect, we estimate the following modified version of equation (2a):

(2b) $$\textit{Type of CEO Turnover}_{i,t} = \textit{Last 2 Years' Return}_{i,t} + \textit{Last 2 Years' Industry Return}_{i,t} + \textit{Governance}_{ii,t} + (\textit{Governance}_{it} \times \textit{Last 2 Years Return}_{it}) + \textit{CEOOwn\%}_{i,t} + \textit{FirmSize}_{i,t} + \textit{CEO Age}_{i,t} + \textit{CEOTenure}_{i,t} + \varepsilon a_{i,t}$$

[16] For our purposes, distinguishing between the different sub-categories within the "disciplinary" and "non-disciplinary" groups is not essential. There may be situations where a 65 year-old CEO leaves as part of a succession plan and stays on as board chair for 12 months. This is a "non-disciplinary" turnover, regardless of which sub-category it gets classified in.

[17] We also considered a fixed effects logit estimator model. However, there are concerns regarding the bias of such an estimator. Greene (2004) documents that when the time periods in panel data are five or less (as is the case in this study), nonlinear estimation may produce coefficients that can be biased in the range of 32% to 68%.

Table 9 highlights the relation between different measures of governance and disciplinary CEO turnover. Table 9, Panel A, details the multinomial logit regression results for the determinants of disciplinary CEO turnover for the pre-2002 period. Consider first the baseline results without governance variables in the regression. The baseline results indicate that a firm's stock market returns during the previous two years, CEO stock ownership, and CEO tenure are significantly negatively related to disciplinary CEO turnover; these findings are consistent with the prior literature noted above.

Does good governance have an impact on disciplinary CEO turnover directly, or is governance related to disciplinary turnover only in poorly performing companies? The results in Table 9, Panel A, shed light on this question for the pre-2002 period. Note that when the governance variables are included, the prior return variable is not significant in three of the five cases, suggesting that bad performance alone is not enough to lead to a change in senior management. Also note that the governance variable by itself is statistically not significant in most cases.[18] This suggests that good governance *per se* is not related to disciplinary turnover. The coefficient of the interactive term (Past 2 years' stock return *x* Governance) sheds light on the question whether governance is related to disciplinary turnover only for poorly performing firms. The interactive term suggests that good governance as measured by the dollar value of the median director's stock ownership and the percentage of directors who are independent, increases the probability of disciplinary turnover for poorly performing firms.[19] [20]

[18] The exception is that when the CEO is also the Chairman, he is less likely to experience disciplinary turnover.
[19] The finding of the probability of disciplinary CEO turnover (given poor prior firm performance) increasing with greater board independence is consistent with the extant literature, for example, see Fich and Shivdasani (2005), and Weisbach (1988).
[20] The economic importance of the dollar ownership of the median director is greater than board independence. We calculate the predicted probability of disciplinary and non-disciplinary turnover, using the coefficient estimates from Table 9. When all parameters are measured at their mean values, the probability of disciplinary turnover is 2.28% with the dollar ownership of the median director as the governance variable; this increases to 12.55% when the (Past

Table 9, Panels B shows the results for disciplinary turnover in the post-2002 period. The results in the 2003-2007 period are qualitatively unchanged from the results in the 1998-2001, with the following exception. Both the GIM and BCF measures of good governance are *negatively* related to the probability of disciplinary turnover for poorly performing firms. This suggests that better governed firms as measured by the GIM and BCF indices are *less* likely to experience disciplinary management turnover in spite of their poor performance. With respect to disciplining CEOs following poor firm performance, board independence appears to be an effective monitoring mechanism both before SOX and after SOX. It is important to note that we do not see the reversal post-SOX of the disciplining effect of board independence – in contrast to the performance-independence relation discussed above in Section 4.2.[21]

We also study the determinants of non-disciplinary CEO turnover. We do not expect any relation between good governance and non-disciplinary CEO turnover both unconditionally, and conditional on poor prior performance; untabulated results are consistent with this.

Robustness Checks

We conduct three robustness checks: We highlight above the endogenous relationships among corporate governance, performance, capital structure, and corporate ownership structure. It is possible that management turnover and performance (and ownership) are also endogenous.

Return *x* Director $ Ownership) interaction term decreases by one standard deviation. The corresponding probabilities are 2.90% and 7.96% for board independence.

[21] Similar to footnote 19, we again consider the economic importance of the dollar ownership of the median director, and board independence in disciplining CEOs of poorly performing firms. We calculate the predicted probability of disciplinary turnover, using the coefficient estimates from Table 9. We find a significant increase in the predicted probability of disciplinary turnover for both governance measures (dollar ownership of the median director and board independence). This suggests that the disciplinary role of independent directors and board holdings has increased subsequent to passage of SOX. The increased disciplinary role of independent directors subsequent to SOX is a potential explanation for the positive stock market response to companies becoming compliant to SOX's board independence requirement as noted above in Section V.

To address turnover endogeneity we estimate a system of five equations: 1a, 1b, 1c, 1d, and 2b.[22] Motivated by the findings of Fich and Shivdasani (2006) we use percentage of board members who are on more than three boards as an instrument for CEO Turnover. The Stock-Yogo (2004) test, the Hahn and Hausman (2002) test and the Hansen-Sargan test suggest that this is an appropriate instrument. Results from taking turnover endogeneity into account are consistent with the disciplinary turnover results noted in Table 9.

Second, we compute the clustered (Rogers) standard errors for the coefficients in the CEO turnover model; the results are consistent with those reported in Table 9.

Third, it is possible that the board considers industry adjusted performance instead of firm performance in deciding whether to discipline the CEO. Results considering industry adjusted performance are similar to those reported above.

VII. CONCLUSIONS

We study the impact of SOX on the relationship between corporate governance and company performance. A significant part of SOX and other exchange requirements increase the role of independent board members. Given that prior academic research suggests there is no positive relationship between board independence and firm performance, the above regulatory efforts are especially notable.

We find a shift in the relationship between board independence and firm performance after 2002. Prior to 2002, we document a *negative* relationship between board independence and operating performance. After 2002, we find a *positive* relationship between independence and operating performance. We find this result is driven by firms that increase their number of independent directors. An event study provides independent evidence supportive of the above

[22] Wooldridge (2002) cautions about the two-stage estimation procedure when the dependent variable in one of the equations is dichotomous. However, on the basis of the evidence in Angrist (2001) and Alvarez and Glasgow (1999) we interpret the signs of the two-stage estimates in the usual way.

results – specifically, when a company goes from being non-compliant to being compliant with SOX's board independence requirement, the market response is significantly positive.

We find a consistent positive performance-governance relationship for director ownership. On average, the median director's stock ownership is 45 percent greater in 2003-2007 than it was in 1998-2001 – and the relationship between director ownership and firm performance is consistently positive for both sub-periods; this relationship is robust to a battery of specification tests. Hence, this study proposes a governance measure, namely – dollar ownership of the board members – that is simple, intuitive, less prone to measurement error, and not subject to the problem of weighting a multitude of governance provisions in constructing a governance index. Consideration of this governance measure by future researchers would enhance the comparability of research findings with more robust progress in governance research.

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TABLE 1

Descriptive statistics

This table presents the mean, median and standard deviation for the primary governance, performance and other variables. The statistics are presented for three time periods: the full sample 1998-2007 and the two subsamples, 1998-2001 and 2003-2007. The variables are as defined in the text. The number of observations refers to observations with *Independence* only; the other governance variables may have slightly more or less observations depending on availability.

	1998-2007 *(n=13,135)*			**1998-2001** *(n=5,230)*			**2003-2007** *(n=6,683)*		
	Mean	Median	Std Dev	Mean	Median	Std Dev	Mean	Median	Std Dev
Governance Variables									
Independence	67.03%	70.00%	17.28%	61.56%	63.64%	19.90%	71.95%	75.00%	14.55%
DirectorOwn	13.696	13.739	1.584	13.580	13.486	1.890	13.898	13.943	1.348
CEO-Duality	59.55%	100.00%	43.05%	59.46%	100.00%	40.75%	58.28%	100.00%	42.26%
G-Index	9.176	9.000	2.663	8.887	9.000	2.789	9.356	9.000	2.579
E-Index	2.210	2.000	1.298	2.029	2.000	1.325	2.332	2.000	1.269
Performance Variables									
ROA	12.50%	12.38%	8.11%	12.63%	12.85%	8.49%	13.02%	12.28%	7.75%
Return	13.20%	7.28%	38.00%	13.81%	1.95%	42.72%	17.82%	13.72%	32.87%
Q	1.999	1.522	1.018	2.200	1.472	1.119	1.957	1.594	0.961
Other Variables									
CEOOwn%	1.78%	0.00%	3.86%	3.53%	0.00%	4.63%	1.32%	0.00%	3.02%
Leverage	18.56%	16.14%	13.45%	20.15%	17.65%	13.84%	17.62%	15.19%	12.97%
FirmSize	7.671	7.508	1.676	7.480	7.294	1.659	7.876	7.699	1.674
R&DAdvExp	3.90%	0.97%	4.63%	4.06%	0.52%	4.63%	3.62%	1.16%	4.62%
BoardSize	9.251	9.000	2.873	9.265	9.000	3.340	9.381	9.000	2.529
InfoCost	11.20%	9.32%	5.48%	14.49%	12.41%	6.05%	8.27%	7.38%	3.89%
TreasStock	5.71%	0.28%	10.57%	6.07%	0.28%	9.78%	8.01%	0.31%	10.65%
Dir%Own	0.41%	0.05%	2.24%	0.40%	0.05%	5.36%	0.14%	0.51%	0.45%
Dir%CEOs	24.22%	22.22%	13.87%	26.53%	25.00%	16.11%	21.36%	20.00%	11.92%
Dir%15Ten	15.95%	11.11%	19.59%	16.37%	10.00%	20.98%	14.26%	11.11%	16.01%
CEOTenAge	0.135	0.095	0.119	0.153	0.108	0.122	0.129	0.093	0.109
MktBook	2.684	2.240	1.708	3.397	2.200	1.912	2.763	2.303	1.560
ZSscore	2.037	1.986	0.950	2.028	1.985	0.971	2.061	1.997	0.940

TABLE 2

Correlation coefficients

This table presents the correlation coefficients for the primary governance variables and other select variables. Pearson correlation coefficients are below the diagonal; Spearman rank correlation coefficients are above the diagonal. Panel A presents the coefficients for 1998-2001 and Panel B presents the coefficients for 2003-2007.

Panel A: Correlation coefficients, 1998-2001

-	*Independence*	*DirectorOwn*	*CEO-Duality*	*G-Index*	*E-Index*	*ROA*	*Return*	*Q*	*Ownership*	*Leverage*	*FirmSize*	*BoardSize*
Independence	-	-0.29	0.06	0.29	0.28	-0.04	0.01	-0.04	-0.17	0.06	0.15	0.13
DirectorOwn	-0.23	-	-0.04	-0.12	-0.14	0.13	0.19	0.45	0.20	-0.16	0.09	-0.09
CEO-Duality	0.05	-0.03	-	0.10	0.07	0.01	-0.02	-0.03	0.07	0.05	0.16	0.14
G-Index	0.27	-0.04	0.10	-	0.74	0.02	0.00	-0.07	-0.12	0.12	0.21	0.30
E-Index	0.28	-0.10	0.07	0.74	-	-0.02	-0.01	-0.10	-0.10	0.12	0.08	0.17
ROA	0.02	0.07	0.01	0.02	-0.03	-	0.18	0.48	0.12	-0.04	-0.12	-0.02
Return	-0.02	0.15	-0.01	-0.04	-0.03	0.09	-	0.29	0.05	-0.05	0.04	0.03
Q	-0.06	0.31	-0.02	-0.11	-0.13	0.00	0.28	-	0.07	-0.28	-0.09	-0.11
Ownership	-0.19	0.10	0.10	-0.14	-0.15	0.07	0.02	0.03	-	-0.12	-0.23	-0.21
Leverage	0.00	-0.08	0.03	0.06	0.06	0.00	-0.02	-0.20	-0.10	-	0.21	0.15
FirmSize	0.16	0.08	0.15	0.17	0.05	0.08	-0.03	-0.12	-0.12	0.11	-	0.58
BoardSize	0.14	-0.04	0.14	0.24	0.13	0.07	-0.04	-0.12	-0.12	0.05	0.59	-

Panel B: Correlation coefficients, 2003-2007

-	*Independence*	*DirectorOwn*	*CEO-Duality*	*G-Index*	*E-Index*	*ROA*	*Return*	*Q*	*Ownership*	*Leverage*	*FirmSize*	*BoardSize*
Independence	-	-0.18	0.10	0.18	0.17	-0.04	-0.03	-0.04	-0.10	0.09	0.17	0.12
DirectorOwn	-0.17	-	-0.04	-0.09	-0.07	0.21	0.12	0.40	0.05	-0.13	0.13	-0.03
CEO-Duality	0.09	-0.05	-	0.11	0.07	-0.02	0.06	-0.06	0.06	0.06	0.14	0.05
G-Index	0.18	-0.07	0.11	-	0.71	-0.02	0.05	-0.10	-0.10	0.12	0.16	0.25
E-Index	0.18	-0.07	0.07	0.70	-	-0.07	0.04	-0.10	-0.05	0.09	0.02	0.12
ROA	-0.04	0.17	-0.02	-0.02	-0.07	-	0.11	0.61	-0.02	-0.08	-0.18	-0.12
Return	-0.05	0.08	0.03	0.02	0.02	0.08	-	0.21	0.01	0.00	0.02	0.00
Q	-0.04	0.31	-0.05	-0.09	-0.11	0.47	0.21	-	0.03	-0.34	-0.25	-0.21
Ownership	-0.15	0.01	0.07	-0.14	-0.14	0.04	-0.02	0.04	-	-0.10	-0.29	-0.24
Leverage	0.06	-0.09	0.03	0.08	0.06	-0.05	-0.03	-0.26	-0.08	-	0.30	0.22
FirmSize	0.16	0.10	0.14	0.12	0.00	-0.13	-0.04	-0.22	-0.15	0.20	-	0.61
BoardSize	0.09	0.01	0.05	0.21	0.10	-0.11	-0.05	-0.19	-0.14	0.11	0.61	-

TABLE 3

Governance and performance, equation (1a)

This table presents the results from estimating equation (1a), the performance equation. Five different specifications are presented with five different governance variables: *Independence,* board independence; *DirectorOwn,* the dollar value of the median director's stock ownership; *CEO-Duality*, whether or not the CEO is also the board chair; *G-Index,* the Gompers, Ishii and Metrick (2003) Governance Index; and, *E-Index*, the Bebchuk, Cohen and Ferrell Entrenchment index. *ROA,* return on assets in the current period is used as the measure of performance. All other variables are as defined in the text. Panel A presents the results using Ordinary Least Squares (OLS) for the 1998-2001 period; Panel B presents the results using Two-Stage Least Squares (2SLS) for the 1998-2001 period. Panel C presents the results using OLS for the 2003-2007 period; Panel D presents the results using 2SLS for the 2003-2007 period. An intercept and year and industry dummy variables are included but not presented. Standard errors are clustered by firm. Coefficients are presented with *p*-values below in parentheses.

Panel A: Ordinary least squares estimation, 1998-2001

	Dependent Variable: Return on Assets (ROA_t)				
	$Independence_t$	$DirectorOwn_t$	$CEO\text{-}Duality_t$	$G\text{-}Index_t$	$E\text{-}Index_t$
$Governance_t$	-0.027	0.015	-0.003	-0.001	-0.006
	(0.01)	*(0.00)*	*(0.57)*	*(0.54)*	*(0.00)*
$Ownership_t$	-0.001	-0.001	0.000	-0.001	-0.001
	(0.80)	*(0.38)*	*(0.59)*	*(0.93)*	*(0.51)*
$Leverage_t$	-0.123	-0.105	-0.122	-0.133	-0.131
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
Industry $Performance_t$	0.575	0.565	0.576	0.590	0.588
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
$FirmSize_t$	-0.003	-0.007	-0.003	-0.002	-0.003
	(0.11)	*(0.00)*	*(0.11)*	*(0.15)*	*(0.07)*
$R\&DAdvExp_t$	-0.895	-0.940	-0.897	-0.890	-0.898
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
$BoardSize_t$	-0.003	-0.002	-0.003	-0.003	-0.003
	(0.00)	*(0.05)*	*(0.00)*	*(0.00)*	*(0.00)*
$InfoCost_t$	-0.076	-0.094	-0.074	-0.053	-0.059
	(0.00)	*(0.00)*	*(0.00)*	*(0.06)*	*(0.04)*
$TreasStock_t$	0.263	0.266	0.263	0.261	0.261
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
# of Observations	5,156	4,665	5,156	4,566	4,566

Panel B: Two-stage least squares estimation, 1998-2001

	Dependent Variable: Return on Assets (*ROA*$_t$)				
	Independence$_t$	*DirectorOwn*$_t$	*CEO-Duality*$_t$	*G-Index*$_t$	*E-Index*$_t$
Governance$_t$	-0.739	0.028	-0.167	-0.097	-0.196
	(0.00)	*(0.02)*	*(0.00)*	*(0.00)*	*(0.00)*
Ownership$_t$	-0.014	-0.008	-0.001	-0.016	-0.014
	(0.00)	*(0.01)*	*(0.10)*	*(0.00)*	*(0.00)*
Leverage$_t$	-0.205	-0.200	-0.202	-0.213	-0.274
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
Industry Performance$_t$	0.714	0.694	0.694	0.791	0.708
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
FirmSize$_t$	0.015	0.006	0.002	0.006	-0.003
	(0.00)	*(0.33)*	*(0.00)*	*(0.30)*	*(0.67)*
R&DAdvExp$_t$	-0.689	-0.753	-0.658	-0.910	-0.795
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
BoardSize$_t$	-0.008	-0.006	-0.005	0.002	-0.004
	(0.00)	*(0.01)*	*(0.04)*	*(0.68)*	*(0.20)*
InfoCost$_t$	-0.226	-0.198	-0.190	-0.390	-0.251
	(0.00)	*(0.01)*	*(0.01)*	*(0.00)*	*(0.01)*
TreasStock$_t$	0.367	0.364	0.389	0.368	0.329
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
# of Observations	5,156	4,665	5,156	4,566	4,566

Panel C: Ordinary least squares estimation, 2003-2007

	Dependent Variable: Return on Assets (ROA_t)				
	Independence$_t$	*DirectorOwn*$_t$	*CEO-Duality*$_t$	*G-Index*$_t$	*E-Index*$_t$
Governance$_t$	0.014	0.015	-0.001	-0.001	-0.004
	(0.14)	*(0.00)*	*(0.65)*	*(0.07)*	*(0.00)*
Ownership$_t$	0.000	0.000	0.000	0.000	0.000
	(0.05)	*(0.07)*	*(0.02)*	*(0.08)*	*(0.17)*
Leverage$_t$	-0.042	-0.021	-0.042	-0.042	-0.041
	(0.00)	*(0.01)*	*(0.00)*	*(0.00)*	*(0.00)*
Industry Performance$_t$	0.478	0.461	0.477	0.470	0.468
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
FirmSize$_t$	-0.003	-0.006	-0.003	-0.003	-0.004
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
R&DAdvExp$_t$	-0.202	-0.242	-0.204	-0.199	-0.203
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
BoardSize$_t$	-0.003	-0.002	-0.003	-0.003	-0.002
	(0.00)	*(0.01)*	*(0.00)*	*(0.00)*	*(0.00)*
InfoCost$_t$	0.456	-0.414	-0.454	-0.460	-0.464
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
TreasStock$_t$	0.147	0.147	0.147	0.147	0.147
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
# of Observations	6,515	6,377	6,515	7,665	7,665

Panel D: Two-stage least squares estimation, 2003-2007

	Dependent Variable: Return on Assets (ROA_t)				
	Independence$_t$	*DirectorOwn*$_t$	*CEO-Duality*$_t$	*G-Index*$_t$	*E-Index*$_t$
Governance$_t$	0.178	0.006	-0.029	0.014	-0.493
	(0.01)	*(0.03)*	*(0.04)*	*(0.16)*	*(0.05)*
Ownership$_t$	0.002	0.000	0.001	0.001	0.018
	(0.05)	*(0.16)*	*(0.15)*	*(0.18)*	*(0.06)*
Leverage$_t$	-0.671	-0.656	-0.649	-0.673	-0.030
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.09)*
Industry Performance$_t$	0.537	0.537	0.537	0.544	0.501
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.07)*
FirmSize$_t$	0.005	-0.007	0.008	-0.008	-0.072
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.08)*
R&DAdvExp$_t$	-0.481	-0.453	-0.456	-0.396	-0.500
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.01)*
BoardSize$_t$	-0.003	-0.001	-0.001	-0.003	-0.031
	(0.28)	*(0.27)*	*(0.37)*	*(0.09)*	*(0.07)*
InfoCost$_t$	-0.266	-0.305	-0.313	-0.212	-0.288
	(0.00)	*(0.00)*	*(0.00)*	*(0.01)*	*(0.03)*
TreasStock$_t$	0.156	0.163	0.165	0.156	0.150
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.01)*
# of Observations	6,515	6,377	6,515	7,665	7,665

TABLE 4

Governance and performance, equation (1a), by sub-period

This table presents the results from estimating equation (1a), the performance equation, across two different time periods: 1998-2001 and 2003-2007. Only the coefficient and *p*-value associated with the *Governance* variable in equation (1a) is presented. Five different specifications are presented with five different governance variables: *Independence,* board independence; *DirectorOwn,* the dollar value of the median director's stock ownership; *CEO-Duality*, whether or not the CEO is also the board chair; *G-Index,* the Gompers, Ishii and Metrick (2003) Governance Index; and, *E-Index*, the Bebchuk, Cohen and Ferrell (2009) Entrenchment index. Only the coefficient on the *Governance* variable in equation (1a) is presented. Three different measures of performance are estimated: *ROA*, return on assets, *Return,* stock return, and *Q,* Tobin's Q. Performance is measured in three different time periods: *t, t+1, t+2*. All other variables are as defined in the text. Ordinary Least Squares (OLS) and Two-Stage Least Squares (2SLS) results are both presented. An intercept and year and industry dummy variables are included but not presented. Standard errors are clustered by firm. Coefficients are presented with *p*-values below in parentheses.

	Dependent Variable: Contemporaneous Performance				**Dependent Variable: Next Year's Performance**				**Dependent Variable: Next Two Years' Performance**			
	1998-2001		**2003-2007**		**1998-2001**		**2003-2007**		**1998-2001**		**2003-2007**	
	OLS	**2SLS**	**OLS**	**2SLS**	**OLS**	**2SLS**	**OLS**	**2SLS**	**OLS**	**2SLS**	**OLS**	**2SLS**
Independence$_t$												
ROA	-0.027	-0.739	0.014	0.178	-0.043	-0.401	0.019	0.116	-0.020	-0.081	0.016	0.013
	(0.01)	*(0.00)*	*(0.14)*	*(0.01)*	*(0.00)*	*(0.00)*	*(0.03)*	*(0.10)*	*(0.00)*	*(0.06)*	*(0.00)*	*(0.10)*
Return	-0.051	-0.352	0.021	-0.180	-0.033	-0.594	0.017	-0.129	-0.037	-0.357	0.008	-0.047
	(0.33)	*(0.27)*	*(0.56)*	*(0.39)*	*(0.61)*	*(0.13)*	*(0.60)*	*(0.47)*	*(0.21)*	*(0.05)*	*(0.59)*	*(0.61)*
Q	-0.537	-0.641	-0.250	0.351	-0.457	1.319	-0.269	0.833	-0.317	-2.210	-0.393	0.613
	(0.00)	*(0.55)*	*(0.06)*	*(0.19)*	*(0.01)*	*(0.32)*	*(0.13)*	*(0.23)*	*(0.07)*	*(0.05)*	*(0.33)*	*(0.14)*
# of Observations	5,156	5,156	6,515	6,515	4,537	4,537	5,738	5,738	3,354	3,354	4,558	4,558
DirectorOwn$_t$												
ROA	0.015	0.028	0.015	0.006	0.008	0.034	0.012	0.004	0.004	0.010	0.003	0.003
	(0.00)	*(0.02)*	*(0.00)*	*(0.03)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.13)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.07)*
Return	0.061	0.046	0.025	0.021	0.006	0.073	0.018	0.012	0.003	0.029	0.009	0.003
	(0.00)	*(0.03)*	*(0.00)*	*(0.10)*	*(0.41)*	*(0.00)*	*(0.28)*	*(0.28)*	*(0.35)*	*(0.09)*	*(0.11)*	*(0.26)*
Q	0.417	0.345	0.286	-0.033	0.308	0.452	0.234	0.015	0.174	0.250	0.142	0.142
	(0.00)	*(0.00)*	*(0.00)*	*(0.54)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.44)*	*(0.00)*	*(0.18)*	*(0.12)*	*(0.18)*
# of Observations	4,665	4,665	6,377	6,377	4,537	4,537	5,738	5,738	2,976	2,976	4,300	4,300

CEO-Duality$_t$												
ROA	-0.003	-0.167	-0.001	-0.029	-0.003	-0.094	-0.003	-0.024	-0.003	-0.023	-0.003	-0.005
	(0.57)	*(0.00)*	*(0.65)*	*(0.04)*	*(0.43)*	*(0.00)*	*(0.41)*	*(0.12)*	*(0.30)*	*(0.02)*	*(0.06)*	*(0.37)*
Return	-0.034	-0.088	-0.009	-0.019	-0.024	-0.193	-0.007	-0.027	-0.021	-0.950	-0.007	-0.012
	(0.18)	*(0.22)*	*(0.46)*	*(0.61)*	*(0.45)*	*(0.03)*	*(0.58)*	*(0.50)*	*(0.15)*	*(0.02)*	*(0.28)*	*(0.56)*
Q	-0.077	-0.243	-0.062	0.028	-0.121	-0.297	-0.082	0.091	0.058	-0.199	-0.048	-0.409
	(0.28)	*(0.27)*	*(0.18)*	*(0.86)*	*(0.17)*	*(0.28)*	*(0.09)*	*(0.59)*	*(0.50)*	*(0.45)*	*(0.50)*	*(0.21)*
# of Observations	5,156	5,156	6,515	6,515	4,537	4,537	5,738	5,738	3,354	3,354	4,558	4,558
G-Index$_t$												
ROA	-0.001	-0.097	-0.001	0.014	0.002	-0.040	-0.007	0.035	-0.001	-0.019	-0.001	0.014
	(0.54)	*(0.00)*	*(0.07)*	*(0.16)*	*(0.00)*	*(0.04)*	*(0.15)*	*(0.00)*	*(0.01)*	*(0.03)*	*(0.30)*	*(0.39)*
Return	-0.001	-0.049	0.003	-0.015	0.006	-0.106	-0.003	-0.006	-0.003	-0.073	0.001	0.007
	(0.82)	*(0.28)*	*(0.11)*	*(0.52)*	*(0.13)*	*(0.05)*	*(0.06)*	*(0.72)*	*(0.23)*	*(0.06)*	*(0.25)*	*(0.53)*
Q	-0.047	-0.583	-0.027	0.138	-0.031	-0.248	-0.020	0.144	-0.016	-0.150	-0.011	0.018
	(0.00)	*(0.00)*	*(0.00)*	*(0.18)*	*(0.00)*	*(0.05)*	*(0.00)*	*(0.08)*	*(0.19)*	*(0.39)*	*(0.40)*	*(0.90)*
# of Observations	4,566	4,566	7,665	7,665	3,758	3,758	6,733	6,733	2,909	2,909	5,479	5,479
E-Index$_t$												
ROA	-0.006	-0.196	-0.004	-0.493	-0.004	-0.247	-0.004	-0.126	-0.003	-0.047	-0.001	0.067
	(0.00)	*(0.00)*	*(0.00)*	*(0.05)*	*(0.00)*	*(0.01)*	*(0.00)*	*(0.17)*	*(0.00)*	*(0.03)*	*(0.02)*	*(0.01)*
Return	0.000	-0.118	0.007	-0.156	0.007	-0.488	0.007	-0.189	0.003	-0.176	0.004	-0.020
	(0.99)	*(0.28)*	*(0.10)*	*(0.24)*	*(0.48)*	*(0.04)*	*(0.30)*	*(0.26)*	*(0.54)*	*(0.05)*	*(0.05)*	*(0.68)*
Q	-0.135	-0.202	-0.072	0.383	-0.149	-2.428	-0.070	0.977	-0.074	-0.953	-0.059	-0.395
	(0.00)	*(0.00)*	*(0.00)*	*(0.21)*	*(0.00)*	*(0.01)*	*(0.00)*	*(0.17)*	*(0.01)*	*(0.05)*	*(0.28)*	*(0.12)*
# of Observations	4,566	4,566	7,665	7,665	3,758	3,758	6,733	6,733	2,909	2,909	5,479	5,479

TABLE 5

Governance and performance, equation (1a), by change in independent directors

This table presents the results from estimating equation (1a), the performance equation, across the two different time periods, 1998-2001 and 2003-2007, for two unique sub-samples: those firms that increased their number of independent directors and those that did not. Five different specifications are presented with five different governance variables: *Independence,* board independence; *DirectorOwn,* the dollar value of the median director's stock ownership; *CEO-Duality*, whether or not the CEO is also the board chair; *G-Index,* the Gompers, Ishii and Metrick (2003) Governance Index; and, *E-Index*, the Bebchuk, Cohen and Ferrell Entrenchment index. Only the coefficient on the *Governance* variable in equation (1a) is presented. Return on assets, *ROA,* is the measure of performance. Panel A shows the results for the subsample of firms that *increased* the number of independent directors on its board; Panel B shows the results for the subsample of firms that *did not increase* the number of independent directors on its board. All other variables are as defined in the text. Only Two-Stage Least Squares (2SLS) results are presented. An intercept and year and industry dummy variables are included but not presented. Standard errors are clustered by firm. Coefficients are presented with *p*-values below in parentheses.

Panel A: Increase in number of independent directors

	Dependent Variable: Contemporaneous *ROA*		**Dependent Variable: Next Year's *ROA***		**Dependent Variable: Next Two Years' *ROA***	
	1998-2001	**2003-2007**	**1998-2001**	**2003-2007**	**1998-2001**	**2003-2007**
Independence$_t$	-0.412	0.509	-0.583	0.114	-0.052	0.177
	(0.10)	*(0.00)*	*(0.00)*	*(0.10)*	*(0.29)*	*(0.03)*
# of Observations	1,344	2,066	1,187	1,982	887	1,588
DirectorOwn$_t$	0.018	0.001	0.017	0.009	0.011	0.007
	(0.03)	*(0.01)*	*(0.00)*	*(0.00)*	*(0.12)*	*(0.02)*
# of Observations	1,283	1,967	1,160	1,871	863	1,454
CEO-Duality$_t$	-0.087	-0.004	-0.092	0.000	-0.012	-0.075
	(0.18)	*(0.84)*	*(0.01)*	*(0.98)*	*(0.52)*	*(0.00)*
# of Observations	1,344	2,066	1,187	1,982	887	1,588
G-Index$_t$	-0.053	0.040	0.010	-0.047	0.005	-0.033
	(0.13)	*(0.08)*	*(0.27)*	*(0.00)*	*(0.56)*	*(0.01)*
# of Observations	1,208	2,015	1,085	1,958	793	1,621
E-Index$_t$	-0.063	-0.567	-0.169	-0.004	-0.008	-0.071
	(0.32)	*(0.27)*	*(0.00)*	*(0.00)*	*(0.58)*	*(0.03)*
# of Observations	1,208	2,015	1,085	1,958	793	1,621

Panel B: No Increase in number of independent directors

	Dependent Variable: Contemporaneous *ROA*		Dependent Variable: Next Year's *ROA*		Dependent Variable: Next Two Years' *ROA*	
	1998-2001	**2003-2007**	**1998-2001**	**2003-2007**	**1998-2001**	**2003-2007**
Independence$_t$	-0.230	-0.077	-0.133	0.181	-0.085	0.074
	(0.01)	*(0.40)*	*(0.03)*	*(0.23)*	*(0.01)*	*(0.02)*
# of Observations	3,812	4,449	3,350	3,756	2,468	2,970
DirectorOwn$_t$	0.018	0.019	0.015	0.024	0.005	0.010
	(0.00)	*(0.08)*	*(0.01)*	*(0.02)*	*(0.04)*	*(0.00)*
# of Observations	3,382	4,410	2,945	3,656	2,113	2,847
CEO-Duality$_t$	-0.061	-0.023	-0.217	-0.116	-0.048	-0.038
	(0.00)	*(0.18)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.01)*
# of Observations	3,812	4,449	3,350	3,756	2,468	2,970
G-Index$_t$	-0.036	0.039	0.041	0.019	-0.016	0.029
	(0.02)	*(0.10)*	*(0.00)*	*(0.07)*	*(0.04)*	*(0.00)*
# of Observations	3,358	5,650	2,673	4,775	2,115	3,858
E-Index$_t$	-0.064	-0.161	0.032	0.145	-0.032	0.217
	(0.03)	*(0.06)*	*(0.29)*	*(0.17)*	*(0.02)*	*(0.15)*
# of Observations	3,358	5,650	2,673	4,775	2,115	3,858

TABLE 6

Two endogenous governance variables

This table presents the results from estimating a modified version of equation (1a), the performance equation, across two different time periods: 1998-2001 and 2003-2007. A fifth equation is added to equation (1) for a second endogenous governance variable. *Independence,* board independence, is presumed to be endogenous in one equation, and *DirectorOwn,* is included as a second endogenous governance variable in a separate equation. Only the coefficients on the two *Governance* variables in equation (1a) are presented. Three measures of operating performance are considered: contemporaneous ROA, next year's ROA, and next two years' ROA. Two-Stage Least Squares (2SLS) results are presented. An intercept and year and industry dummy variables are included but not presented. Standard errors are clustered by firm. Coefficients are presented with *p*-values below in parentheses.

	Dependent Variable: Contemporaneous *ROA*		**Dependent Variable: Next Year's *ROA***		**Dependent Variable: Next Two Years' *ROA***	
	1998-2001	**2003-2007**	**1998-2001**	**2003-2007**	**1998-2001**	**2003-2007**
$DirectorOwn_t$	0.010	0.199	0.009	0.012	0.004	0.002
	(0.03)	*(0.03)*	*(0.00)*	*(0.17)*	*(0.00)*	*(0.00)*
$Independence_t$	-0.325	0.480	-0.015	0.391	-0.006	0.009
	(0.03)	*(0.04)*	*(0.15)*	*(0.02)*	*(0.37)*	*(0.02)*
# of Observations	4,492	6,035	2,515	5,332	1,861	4,217

TABLE 7

Event study results

This table presents the results from event studies performed on a sample of firms that were not compliant with Section 301 of SOX in year *t-1*. Section 301 requires that all members of a firm's audit committee be independent. Market Adjusted Cumulative Abnormal Returns (CAR) are calculated for days -1, 0 and +1 for years 2002 and 2003; day 0 being the proxy mailing date in year *t*. The value weighted market is used as the market index. Two sub-samples are considered: (a) firms that were not compliant in year *t-1* and became compliant in year *t* in columns (1) to (5); and, (b) firms that were not compliant in both year *t-1* and year *t* in columns (6) to (10). Firms audit committees consisting only of independent directors are denoted as "Compliant." Firms whose audit committees do not consist only of independent directors are denoted as "Not Compliant." Panel A presents results from only firms that became SOX compliant and added independent directors to the board; Panel B presents the results from all firms that became SOX compliant. The non-parametric test is the Wilcoxon signed-rank test. The "Difference in means" in the last column tests for the difference in CAR between columns (1) and (6).

Panel A: Firms that became compliant and added independent directors to the audit committee.

	Not Compliant in year *t-1* Compliant in year *t*					**Not Compliant in year *t-1* Not Compliant in year *t***					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(1) - (6)
Period	**CAR**	**z-statistic**	**Sample Size**	**Postive: Negative Returns**	**Non-parametric statistic**	**CAR**	**z-statistic**	**Sample Size**	**Postive: Negative Returns**	**Non-parametric statistic**	**Difference in means, *p*-value**
Post-SOX	0.41%	2.436	478	261:217	2.413	0.02%	0.075	691	321:370	-1.567	<0.0001
2002	0.97%	1.801	67	36:31	1.151	-0.20%	-0.680	256	119:137	-0.594	<0.0001
2003	0.86%	1.939	99	59:40	1.231	-0.08%	-1.233	219	101:118	-1.641	<0.0001
2004	0.27%	1.685	93	54:39	0.921	0.26%	0.298	150	67:83	0.698	0.1214
2005	0.61%	1.907	70	36:34	1.354	0.16%	0.768	130	69:61	0.266	<0.0001
2006	0.49%	0.771	38	20:18	0.854	-0.07%	-1.147	127	55:72	-0.698	<0.0001
2007	0.30%	0.754	166	86:80	0.240	-0.73%	-0.989	19	7:12	-1.062	<0.0001

Panel B: Firms that became compliant by adding independent directors to the audit committee, or removing inside directors from the audit committee.

	Not Compliant in year *t-1* Compliant in year *t*					**Not Compliant in year *t-1* Not Compliant in year *t***					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(1) - (6)
Period	**CAR**	**z-statistic**	**Sample Size**	**Postive: Negative Returns**	**Non-parametric statistic**	**CAR**	**z-statistic**	**Sample Size**	**Postive: Negative Returns**	**Non-parametric statistic**	**Difference in means, *p*-value**
Post-SOX	0.36%	2.841	671	367:304	2.386	0.02%	0.075	691	321:370	-1.567	<0.0001
2002	1.03%	1.725	89	50:39	1.137	-0.20%	-0.680	256	119:137	-0.594	<0.0001
2003	0.56%	2.087	158	92:66	1.612	-0.08%	-1.233	219	101:118	-1.641	<0.0001
2004	0.24%	2.269	149	87:62	1.876	0.26%	0.298	150	67:83	0.698	0.3716
2005	0.26%	1.255	97	50:47	1.299	0.16%	0.768	130	69:61	0.266	0.0008
2006	0.69%	1.646	57	32:25	0.602	-0.07%	-1.147	127	55:72	-0.698	<0.0001
2007	0.13%	0.781	194	100:94	0.005	-0.73%	-0.989	19	7:12	-1.062	<0.0001

TABLE 8

Reasons for CEO turnover

This table presents the classifications for reasons why CEO turnover occurred in a specific year. Lexis-Nexis archives were reviewed to determine the stated reason for why a CEO left the firm. CEO turnover data was obtained from Compustat's Execucomp database. CEO Turnover is classified as "Non-disciplinary" if the CEO died, if the CEO was older than 63, if the change was the result of an announced transition plan, or if the CEO stayed on as chairman of the board. CEO Turnover is classified as "Disciplinary" if the CEO resigned to pursue other interests, if the CEO was fired, or if no specific reason is given.

	Reasons for CEO Turnover: 1998 - 2007			
	Disciplinary	Non-Disciplinary	Other	Total
1998	65	118	18	201
1999	66	127	5	198
2000	92	143	9	244
2001	86	162	7	255
2002	81	100	1	182
2003	82	94	3	179
2004	49	122	3	174
2005	73	135	2	210
2006	61	126	0	187
2007	46	73	2	121
Total	**701**	**1,200**	**50**	**1,951**
% of Total	35.9%	61.5%	2.6%	100%

TABLE 9

CEO turnover-governance relation

This table presents the results from multinomial logistic regressions estimating the probability of CEO Turnover. The dependent variables are type of CEO turnover: 1 = Disciplinary turnover, 2 = Non-disciplinary turnover, 0 = no turnover. Baseline results without governance are presented in the first column; all other columns present results including Governance and (Performance *x* Governance) variables. The other control variables are described in the text 1. Year dummy variables are included but are not shown. Panel A presents the results for disciplinary turnover for 1998-2001; Panel B presents the results for disciplinary turnover for 2003-2007. Sample size refers to the entire sample for the particular period, and not just to cases of disciplinary turnover and non-disciplinary turnover.

Panel A: Disciplinary turnover, 1998-2001

		Governance Variable				
	Baseline Performance	$Independent_t$	$DirectorOwn_t$	$CEO\text{-}Duality_t$	$G\text{-}Index_t$	$E\text{-}Index_t$
Intercept	-3.330	-3.268	-4.000	-3.310	-2.978	-3.170
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
$Return_{t\text{-}2\ to\ t\text{-}1}$	-1.576	-0.486	-2.443	-0.956	-1.277	-1.483
	(0.00)	*(0.59)*	*(0.27)*	*(0.06)*	*(0.20)*	*(0.01)*
$IndustryReturn_{t\text{-}2\ to\ t\text{-}1}$	0.452	0.454	0.531	0.443	0.512	0.543
	(0.20)	*(0.19)*	*(0.12)*	*(0.21)*	*(0.14)*	*(0.12)*
$Governance_t$	-	-0.140	0.045	-0.513	-0.030	0.001
	-	*(0.22)*	*(0.42)*	*(0.01)*	*(0.36)*	*(0.99)*
$Return_{t\text{-}2\ to\ t\text{-}1}$ x	**-**	**-1.784**	**-0.044**	**-0.929**	**-0.004**	**-0.119**
$Governance_t$	-	***(0.07)***	***(0.08)***	***(0.12)***	***(0.85)***	***(0.60)***
$CEOOwn\%_t$	-0.119	-0.121	-0.121	-0.118	-0.114	-0.111
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
$FirmSize_t$	-0.093	-0.090	-0.094	-0.059	-0.077	-0.082
	(0.09)	*(0.10)*	*(0.09)*	*(0.30)*	*(0.17)*	*(0.14)*
$CEOAge_{t\text{-}1}$	0.020	0.020	0.021	0.022	0.015	0.014
	(0.12)	*(0.11)*	*(0.10)*	*(0.08)*	*(0.23)*	*(0.27)*
$CEOTenure_{t\text{-}1}$	-0.025	-0.026	-0.027	-0.025	-0.020	-0.019
	(0.07)	*(0.07)*	*(0.06)*	*(0.08)*	*(0.15)*	*(0.18)*
Years Included	1998-2001	1998-2001	1998-2001	1998-2001	1998-2001	1998-2001
Sample Size	4,257	4,257	4,228	4,257	4,075	4,075

Panel B: Disciplinary turnover, 2003-2007

		Governance Variable				
	Baseline Performance	*Independent$_t$*	*DirectorOwn$_t$*	*CEO-Duality$_t$*	*G-Index$_t$*	*E-Index$_t$*
Intercept	-0.978	-14.468	-11.677	-13.555	-12.921	-12.879
	(0.98)	*(0.87)*	*(0.90)*	*(0.88)*	*(0.88)*	*(0.88)*
Return$_{t\text{-}2\ to\ t\text{-}1}$	-3.510	-0.712	-0.161	-2.942	0.628	-2.194
	(0.00)	*(0.83)*	*(0.92)*	*(0.00)*	*(0.72)*	*(0.03)*
IndustryReturn$_{t\text{-}2\ to\ t\text{-}1}$	0.344	0.456	0.542	0.491	0.337	0.309
	(0.05)	*(0.49)*	*(0.41)*	*(0.46)*	*(0.58)*	*(0.61)*
Governance$_t$	-	1.935	-0.121	-0.948	-0.009	-0.025
	-	*(0.14)*	*(0.26)*	*(0.10)*	*(0.83)*	*(0.76)*
***Return$_{t\text{-}2\ to\ t\text{-}1}$* x**	**-**	**-3.726**	**-0.248**	**-1.407**	**-0.519**	**-0.777**
Governance$_t$	-	***(0.09)***	***(0.05)***	***(0.21)***	***(0.01)***	***(0.03)***
CEOOwn%$_t$	-0.205	-0.230	-0.221	-0.206	-0.289	-0.285
	(0.04)	*(0.08)*	*(0.09)*	*(0.11)*	*(0.03)*	*(0.04)*
FirmSize$_t$	0.079	0.074	0.101	0.145	0.103	0.105
	(0.14)	*(0.23)*	*(0.10)*	*(0.02)*	*(0.06)*	*(0.06)*
CEOAge$_{t\text{-}1}$	0.056	0.068	0.067	0.078	0.059	0.058
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
CEOTenure$_{t\text{-}1}$	-0.030	-0.036	-0.039	-0.029	-0.035	-0.034
	(0.07)	*(0.07)*	*(0.04)*	*(0.12)*	*(0.05)*	*(0.05)*
Years Included	2003-2007	2003-2007	2003-2007	2003-2007	2003-2007	2003-2007
Sample Size	6,410	5,547	5,501	5,547	5,876	5,876

Appendix A: Endogeneity and Instrument Validity Tests

Hausman (1978) test for endogeneity – This tests for differences between the OLS and IV estimates. The test statistic normalizes the differences in coefficients by the differences in standard errors. Large differences between OLS and IV will result in large test statistics and low p-values, suggesting that endogeneity is a problem and that the IV results are more consistent than OLS results.

Stock and Yogo (2004) test for weak instruments – This test evaluates the strength of the first stage regression by considering the *F*-statistic of the reduced form first stage regression of excluded instruments. High *F*-statistics and low p-values suggest strong instruments.

Hahn and Hausman (2002) test for instrument validity – This test is a variation of the Hausman (1978) test for endogeneity, applied to the instruments rather than the specification. This test compares the 'forward' and 'reverse' IV estimates. If the instruments are valid, the difference between the 'forward' and the inverse of the 'reverse' estimates should be small, leading to large test statistics and small p-values.

Cragg-Donald (1993) – This is a test of underidentification. The Stock and Yogo (2004) test was, in part, derived from this test. If the Cragg-Donald *F*-statistic is below the critical value, or the p-value is high, the instruments are deemed to be weak.

Hansen-Sargan – This is a test for overidentifying restrictions, testing the joint significance of the set of endogenous variables in the system of equations. It has a Chi-square distribution (with degrees of freedom equal to the number of instruments minus the number of parameters), and the null hypothesis is that the instruments are valid. Large p-values suggest that the instruments are valid.

Anderson-Rubin – This is a test of the joint significance of a set of endogenous variables in a system of equations. It tests for the joint significance of the excluded instruments by essentially substituting the first-stage reduced-form equations into the second-stage structural equations. The test statistic has a Chi-square distribution; large test statistics and small p-values suggest instrument validity and joint significance of the system.

Shea (1997) Partial R^2 – This test provides the partial R^2 for the excluded instruments on the fitted value of the endogenous regressors. Higher partial R^2 values are deemed to represent valid instruments, although there is no formal test statistic.

Instruments: For each governance variable, we utilize two of three instruments for our governance variables. *Dir%Own* is the average percentage of common stock owned by all directors. *Dir%CEOs* is the percentage of directors who are CEOs. *Dir%15Ten* is the percentage of directors who have served on the board form at least 15 years. *Dir%Own* is used as an instrument for all governance variables. *Dir%CEOs* is used as an instrument for *Independence, DirectorOwn,* and *CEO-Duality; Dir%15Ten* is used as an instrument for *G-Index* and *E-Index*.

TreasStock is the ratio of treasury stock to assets, which we use as the instrument for performance. *CEOTenAge* is the ratio of CEO tenure to CEO age; this variable is used as the instrument for ownership. *ZScore* is the modified Altman's Z-Score; this variable is used as the instrument for leverage

APPENDIX A TABLE

Endogeneity and instrument validity tests

This table presents the results from performing our endogeneity and weak instruments tests in estimating equation (1a). The p-values from each test are given. Brief descriptions of each test are given above. The results are given considering 5 different measures of governance, and considering 3 different time periods for measuring operating performance: Contemporaneous ROA, Next Year's ROA, and Next Two Years' ROA. The governance variables are Board Independence, Median Director Dollar Ownership, Gompers, Ishii and Metrick (2003) G-Index, and Bebchuk, Cohen and Ferrell (2009) E-Index. The Hausman (1978) is a test for endogeneity, comparing the OLS and IV results; the other tests in this table are various forms of evaluating the strength and/or relevance of the instruments used in the instrumental variables analyses. For the Stock and Yogo (2004) test and the Shea Partial R^2, the p-values are given for each first-stage equation. For the other tests, the p-value pertains to the entire system.

	Dependent Variable: Contemporaneous *ROA*		**Dependent Variable: Next Year's *ROA***		**Dependent Variable: Next Two Years' *ROA***	
	1998-2001	**2003-2007**	**1998-2001**	**2003-2007**	**1998-2001**	**2003-2007**
Independence$_t$						
Hausman Test	0.004	0.002	0.007	0.002	0.005	0.003
Stock & Yogo						
Governance	0.007	0.004	0.013	0.012	0.016	0.023
Ownership	0.019	0.004	0.037	0.006	0.047	0.012
Leverage	0.046	0.113	0.020	0.010	0.036	0.054
Hahn & Hausman	0.020	0.043	0.006	0.025	0.048	0.001
Cragg-Donald	0.001	0.004	0.012	0.007	0.009	0.007
Hansen-Sargan	0.847	0.902	0.473	0.605	0.352	0.506
Anderson-Rubin	0.036	0.039	0.025	0.045	0.059	0.054
Shea Partial R^2						
Governance	0.231	0.404	0.264	0.244	0.187	0.277
Ownership	0.330	0.360	0.220	0.302	0.143	0.189
Leverage	0.308	0.332	0.264	0.302	0.220	0.291

	Dependent Variable: Contemporaneous *ROA*		Dependent Variable: Next Year's *ROA*		Dependent Variable: Next Two Years' *ROA*	
	1998-2001	**2003-2007**	**1998-2001**	**2003-2007**	**1998-2001**	**2003-2007**
DirectorOwn$_t$						
Hausman Test	0.001	0.004	0.002	0.001	0.006	0.007
Stock & Yogo						
Governance	0.002	0.003	0.015	0.004	0.007	0.011
Ownership	0.004	0.023	0.028	0.031	0.003	0.018
Leverage	0.004	0.045	0.029	0.095	0.148	0.130
Hahn & Hausman	0.074	0.046	0.008	0.020	0.034	0.064
Cragg-Donald	0.002	0.000	0.008	0.004	0.006	0.004
Hansen-Sargan	0.737	0.671	0.253	0.616	0.209	0.220
Anderson-Rubin	0.060	0.033	0.024	0.016	0.083	0.026
Shea Partial R^2						
Governance	0.264	0.288	0.231	0.230	0.154	0.175
Ownership	0.297	0.432	0.220	0.273	0.220	0.248
Leverage	0.308	0.346	0.187	0.359	0.198	0.204

	Dependent Variable: Contemporaneous *ROA*		Dependent Variable: Next Year's *ROA*		Dependent Variable: Next Two Years' *ROA*	
	1998-2001	**2003-2007**	**1998-2001**	**2003-2007**	**1998-2001**	**2003-2007**
G-Index$_t$						
Hausman Test	0.001	0.000	0.005	0.005	0.008	0.002
Stock & Yogo						
Governance	0.003	0.004	0.019	0.005	0.003	0.009
Ownership	0.006	0.027	0.005	0.036	0.017	0.034
Leverage	0.019	0.021	0.015	0.051	0.014	0.045
Hahn & Hausman	0.017	0.066	0.058	0.015	0.026	0.047
Cragg-Donald	0.003	0.003	0.000	0.000	0.001	0.004
Hansen-Sargan	0.341	0.649	0.231	0.242	0.165	0.352
Anderson-Rubin	0.056	0.018	0.013	0.008	0.042	0.004
Shea Partial R^2						
Governance	0.297	0.432	0.220	0.230	0.220	0.219
Ownership	0.253	0.389	0.275	0.359	0.220	0.291
Leverage	0.308	0.418	0.220	0.287	0.154	0.175

	Dependent Variable: Contemporaneous *ROA*		Dependent Variable: Next Year's *ROA*		Dependent Variable: Next Two Years' *ROA*	
	1998-2001	**2003-2007**	**1998-2001**	**2003-2007**	**1998-2001**	**2003-2007**
E-Index$_t$						
Hausman Test	0.002	0.005	0.008	0.008	0.007	0.007
Stock & Yogo						
Governance	0.008	0.009	0.013	0.016	0.015	0.024
Ownership	0.001	0.014	0.033	0.010	0.030	0.048
Leverage	0.086	0.052	0.049	0.082	0.080	0.084
Hahn & Hausman	0.002	0.007	0.022	0.012	0.079	0.026
Cragg-Donald	0.001	0.006	0.007	0.002	0.004	0.004
Hansen-Sargan	0.550	0.418	0.264	0.385	0.451	0.308
Anderson-Rubin	0.017	0.012	0.016	0.038	0.030	0.051
Shea Partial R^2						
Governance	0.286	0.418	0.242	0.244	0.176	0.291
Ownership	0.319	0.432	0.198	0.230	0.165	0.248
Leverage	0.231	0.346	0.264	0.345	0.143	0.189

APPENDIX B TABLE

Fixed effects estimation

This table presents the results from estimating equation (1a), the performance equation, using fixed effects estimation. Specifications are presented with five different governance variables: *Independence,* board independence; *DirectorOwn,* the dollar value of the median director's stock ownership; *CEO-Duality*, whether or not the CEO is also the board chair; *G-Index,* the Gompers, Ishii and Metrick (2003) Governance Index; and, *E-Index*, the Bebchuk, Cohen and Ferrell Entrenchment index. *ROA,* return on assets in the current period is used as the measure of performance. Only the coefficient and corresponding *p*-value for the *Governance* variable in equation (1a) is presented. All other variables in equation (1a) are as defined in the text, and are included in the estimation but not shown in the Table. Panel A presents the results for the 1998-2001 period; Panel B presents the results for the 1998-2001 period. An intercept and year and firm fixed effects are also included but not presented. Standard errors are clustered by firm. Coefficients are presented with *p*-values below in parentheses.

Panel A: 1998-2001

	Fixed Effects Estimation				
	Dependent Variable: Return on Assets (*ROA*$_t$)				
	Independence$_t$	*DirectorOwn*$_t$	*CEO-Duality*$_t$	*G-Index*$_t$	$_t$
Governance$_t$	-0.009	0.004	-0.002	-0.001	-0.004
	(0.04)	*(0.00)*	*(0.06)*	*(0.06)*	*(0.20)*
				E-Index	
# of Observations	5,156	4,665	5,156	4,566	4,566

Panel B: 2003-2007

	Fixed Effects Estimation				
	Dependent Variable: Return on Assets (*ROA*$_t$)				
	Independence$_t$	*DirectorOwn*$_t$	*CEO-Duality*$_t$	*G-Index*$_t$	$_t$
Governance$_t$	0.020	0.005	0.003	-0.002	-0.002
	(0.01)	*(0.00)*	*(0.90)*	*(0.11)*	*(0.02)*
				E-Index	
# of Observations	6,515	6,377	6,515	7,665	7,665

APPENDIX C TABLE

Market-to-book in governance and ownership equations

This table presents the results from estimating equation (1a), the performance equation, including Market-to-book in governance and ownership equations. Specifications are presented with five different governance variables: *Independence,* board independence; *DirectorOwn,* the dollar value of the median director's stock ownership; *CEO-Duality*, whether or not the CEO is also the board chair; *G-Index,* the Gompers, Ishii and Metrick (2003) Governance Index; and, *E-Index*, the Bebchuk, Cohen and Ferrell Entrenchment index. *ROA,* return on assets in the current period is used as the measure of performance. Only the coefficient and corresponding *p*-value for the *Governance* variable in equation (1a) is presented. All other variables in equation (1a) are as defined in the text, and are included in the estimation but not shown in the Table. Panel A presents the results for the 1998-2001 period; Panel B presents the results for the 1998-2001 period. An intercept and year and firm fixed effects are also included but not presented. Standard errors are clustered by firm. Coefficients are presented with *p*-values below in parentheses.

Panel A: 1998-2001

	2SLS Estimation				
	Dependent Variable: Return on Assets (ROA_t)				
	$Independence_t$	$DirectorOwn_t$	$CEO\text{-}Duality_t$	$G\text{-}Index_t$	$E\text{-}Index_t$
$Governance_t$	-0.441	0.022	-0.199	-0.078	-0.145
	(0.02)	*(0.01)*	*(0.00)*	*(0.01)*	*(0.07)*

Panel B: 2003-2007

	2SLS Estimation				
	Dependent Variable: Return on Assets (ROA_t)				
	$Independence_t$	$DirectorOwn_t$	$CEO\text{-}Duality_t$	$G\text{-}Index_t$	$E\text{-}Index_t$
$Governance_t$	0.209	0.006	-0.106	0.028	-0.192
	(0.00)	*(0.02)*	*(0.02)*	*(0.12)*	*(0.20)*

APPENDIX D TABLE

Board independence on performance by size quintile

This table presents the results from estimating equation (1a) with *Independence* as the governance variable by quintiles sorted by the market value of equity. Only the coefficient and corresponding *p*-value on *Independence*, the *Governance* variable in equation (1a) is presented. All other variables in equation (1a) are as defined in the text, and are included in the estimation but not shown in the Table. The smallest firms are in Quintile 1; the largest firms are in Quintile 5. *ROA* is the performance variable. The Mean MVE shows the average market value of equity for each quintile. Two-Stage Least Squares (2SLS) estimation is used. Panel A presents the results for the 1998-2001 period; Panel B presents the results for the 2003-2007 period. An intercept and year and industry dummy variables are included but not presented. Standard errors are clustered by firm. Coefficients are presented with *p*-values below in parentheses.

Panel A: 1998-2001

	2LS Estimation				
	Dependent Variable: Return on Assets (ROA_t)				
	Smallest Firms----------Sorted by Market Value of Equity----------*Largest Firms*				
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Independence$_t$	-0.124	-0.353	-0.082	-0.157	-0.026
	(0.18)	*(0.11)*	*(0.23)*	*(0.10)*	*(0.08)*
Mean MVE (millions)	$185.6	$643.3	$1,435.6	$3,555.7	$14,508.1
# of Observations	1,028	1,027	1,027	1,028	1,027

Panel B: 2003-2007

	2LS Estimation				
	Dependent Variable: Return on Assets (ROA_t)				
	Smallest Firms----------Sorted by Market Value of Equity----------*Largest Firms*				
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Independence$_t$	0.561	0.227	0.082	0.104	0.120
	(0.05)	*(0.13)*	*(0.14)*	*(0.05)*	*(0.02)*
Mean MVE (millions)	$455.3	$1,077.3	$2,206.6	$5,036.3	$18,447.8
# of Observations	1,301	1,300	1,300	1,301	1,301

Bank Executive Compensation And Capital Requirements Reform

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Abstract

We study the executive compensation structure in the largest 14 U.S. financial institutions during 2000-2008. Our results are mostly consistent with and supportive of the findings of Bebchuk, Cohen and Spamann (2010), that is, managerial incentives matter - incentives generated by executive compensation programs led to excessive risk-taking by banks leading to the current financial crisis. Also, our results are generally not supportive of the conclusions of Fahlenbrach and Stulz (2011) that the poor performance of banks during the crisis was the result of unforeseen risk.

We recommend the following compensation structure for senior bank executives: Executive incentive compensation should only consist of restricted stock and restricted stock options – restricted in the sense that the executive cannot sell the shares or exercise the options for two to four years after their last day in office.

The above equity based incentive programs lose their effectiveness in motivating managers to enhance shareholder value as a bank's equity value approaches zero (as they did for the too-big-to-fail banks in 2008). Hence, for equity based incentive structures to be effective, banks should be financed with considerable more equity than they are being financed currently.

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Policy makers at the highest levels continue to be engaged with the ongoing global financial crisis. Factors that have been identified as contributing to this crisis include misguided government policies to an absence of market discipline of financial institutions that had inadequate or flawed risk-monitoring and incentive systems.[1] Such government policies include low interest rates by the Federal Reserve and promotion of subprime risk-taking by government-sponsored entities dominating the residential mortgage market so as to increase home ownership by those who could not otherwise afford it. Sources of inadequate market discipline include ineffective prudential regulation including capital requirements that favored securitized subprime loans over more conventional assets. Internal organizational factors contributing to the crisis include business strategies dependent on high leverage and short-term financing of long-term assets, reliance on risk and valuation models with grossly unrealistic assumptions, and poorly-designed incentive compensation. These factors, taken as a whole, encouraged what was, as can readily be observed with the benefit of hindsight, excessive risk-taking.

However, of the items on the extensive list of factors contributing to the crisis only one issue has consistently been a focal point of the reform agenda across nations: executive compensation. In the United States, for example, multiple legislative and regulatory initiatives have regulated the compensation of executives of financial institutions receiving government assistance. The governments of many European nations have followed a similar regulatory strategy, while the European Union's Competition Commissioner has announced that it will be

[1] See, for example, French et al (2010), Diamond and Rajan (2009) and Calomiris (2009).

examining banks' compensation in light of government support received during the crisis.[2] An important assumption behind these regulatory reform efforts is the supposition that incentives generated by executive compensation programs led to excessive risk-taking. In an insightful recent paper, Bebchuk, Cohen and Spamann (2010) study the compensation structure of the top executives in Bear Stearns and Lehman Brothers and conclude, "…given the structure of executives' payoffs, the possibility that risk-taking decisions were influenced by incentives should not be dismissed but rather taken seriously." We refer to this as the *Managerial Incentives Hypothesis*: *Incentives generated by executive compensation programs led to excessive risk-taking by banks leading to the current financial crisis; the excessive risk-taking would benefit bank executives at the expense of the long-term shareholders.*

Fahlenbrach and Stulz (2011) focus on the large losses experienced by CEOs of financial institutions via the declines in the value of their ownership in their company's stock and stock option during the crisis and conclude, "Bank CEO incentives cannot be blamed for the credit crisis or for the performance of banks during that crisis." They argue that bank CEOs and senior executives could not or did not foresee the extreme high risk nature of some of the bank's investment and trading strategies. The poor performance of these banks during the crisis is attributable to an extremely negative realization of the high risk nature of their investment and trading strategy. We refer to this as the *Unforeseen Risk Hypothesis*: *Bank executives were faithfully working in the interests of their long-term shareholders; the poor performance of*

[2] Regulating bank executives' compensation took a prominent place on the agenda of the October 2009 G-20 summit, which produced a set of principles as a guideline for nations' regulation of financial executives' pay. Jonathan Weisman, *Obama Retakes Global Stage, but With Diminished Momentum*, Wall Street Journal, Sept. 19-20, 2009, (noting that French President Nicolas Sarkozy threatened to walk out of the G-20 summit if leaders do not adopt strict compensation limits for financial executives).

their banks during the crisis was the result of unforeseen risk of the bank's investment and trading strategy.

The Unforeseen Risk Hypothesis is supported by the Culture of Ownership that many banks publicly revere and espouse.[3] Per this Culture of Ownership, bank employees - especially senior executives - are supposed to have significant stock ownership in their bank such that their incentives are aligned with that of the long-term shareholders.

We study the executive compensation structure in the largest 14 U.S. institutions during 2000-2008. We focus on the CEO's buys and sells of their bank's stock. We find that CEOs are 30 times more likely to be involved in a sell trade compared to an open market buy trade. The ratio of the dollar value of their sells to buys is even more lop-sided. The dollar value of sales of stock by bank CEOs of their own bank's stock is about 100 times the dollar value of open market buys of stock of their own bank's stock. Is the notion of a Culture of Ownership consistent with the empirical fact of bank CEOs selling shares of their bank 100 times the amount they buy?

Our results are mostly consistent with and supportive of the findings of Bebchuk, Cohen and Spamann (2010), that is, managerial incentives matter: incentives generated by executive compensation programs led to excessive risk-taking by banks and contributing to the current financial crisis. Also, our results are generally not supportive of the conclusions of Fahlenbrach

[3] See, for example, Goldman Sachs 2007 Annual Report: "Retaining the Strengths of an Owner Culture: The core of the Goldman Sachs partnership was shared long-term ownership." Lehman Brothers 2005 Annual Report states: "The Lehman Brothers Standard means…Fostering a culture of ownership, one full of opportunity, initiative and responsibility, where exceptional people want to build their careers…"

and Stulz (2011) that the poor performance of banks during the crisis was the result of unforeseen risk.

The remainder of the paper is organized as follows. The next section develops the Managerial Incentives Hypothesis, the Unforeseen Risk Hypothesis, and their testable implications. Section 2 details the sample selection and data sources. Section 3 highlights bank managers' payoffs during 2000-2008, and interprets this data in the context of the Managerial Incentives Hypothesis and the Unforeseen Risk Hypothesis. The following section compares various manager incentive compensation proposals designed to serve long-term shareholder interests and avoid excessive risk-taking. Section 5 presents our proposal for bank capitalization reform which is complementary to the manager incentive compensation proposal. Section 6 focuses on board compensation. The final section concludes with a summary.

1. Managerial Incentives Hypothesis versus the Unforeseen Risk Hypothesis

The Managerial Incentives Hypothesis posits that incentives generated by executive compensation programs led to excessive risk-taking by banks and contributing to the current financial crisis. The excessive risk-taking would benefit bank executives at the expense of the long-term shareholders; that is, projects that led to the excessive risk-taking were ex ante value-diminishing (negative net present value).

How might the incentives generated by executive compensation programs in banks lead to their excessive risk-taking and benefit these executives at the expense of long-term shareholders? Consider an investment project or trading strategy that in any given year can lead

to six cash flow outcomes with equal probability: $500 million, $500 million, $500 million, $500 million, $500 million, and the sixth outcome is -$5 billion (a loss of $5 billion).[4] The probability and the magnitude of the cash flows of the six outcomes are known only to the bank executives. However, given the information disclosed to the investing public, the stock market is led to believe that the trading strategy can lead to the following six annual cash flow outcomes with equal probability: $500 million, $500 million, $500 million, $500 million, $500 million, and the sixth outcome is -$1 billion (a loss of $1 billion).[5]

How should the bank executives respond to the above investment strategy if they were acting in the interest of the long-term shareholders? Since these six outcomes are equally likely, the expected cash flow from this trading strategy is negative - given what the bank executives know. Hence, the bank should not engage in this trading strategy.

Will the bank executives invest in the above trading strategy? To answer this, we have to consider the compensation structure of the bank executives or CEO. Assume the bank CEO owns a significant number of bank shares, say, 100 million shares. Furthermore, these shares are *unrestricted*, that is, they have either vested or have *no vesting requirements*. If the bank

[4] These cash flows and probabilities have been simplified for illustrative purposes to clarify the intuition of our argument. Instead of the abovementioned cash flows and probabilities, it would be straightforward to consider a project with a 99% probability of a cash flow of $500 million, and a 1% probability of a loss of $100 billion. More complicated cash flows and probabilities can be considered; all we need from this numerical illustration is the project have a negative net present value.

[5] Continuing with the numerical example noted in the above footnote: Given the information disclosed to the investing public, the stock market is led to believe that the trading strategy has a 99% probability of a cash flow of $500 million, and a 1% probability of a loss of $10 billion. Again, more complicated cash flows and probabilities can be considered; all we need from this numerical illustration is the project be perceived to have a positive net present value.

adopts the above trading strategy, and given the beliefs of the stock market about this trading strategy, the bank share price will increase. In any given year there is a very high probability (5/6 = 83%) that the trading strategy will generate very large positive cash flow of $500 million. If the realization from the trading strategy is one of the positive cash flow outcomes (and there is an 83% probability of this), the bank share price goes up by, say, $3, – the bank declares generous bonuses to key employees, and the CEO liquidates a significant part of her equity holdings, say, worth $200 million.

To be sure, the bank CEO knows that the expected cash flow from this trading strategy is negative. Hence, there is some probability (17%) that in any given year the trading strategy will lead to the extremely negative cash flow outcome of -$5 billion. What then? In the textbook corporate finance paradigm, the bank's share price drops significantly, and, depending on the bank's equity capitalization, the bank may have to declare bankruptcy.[6] This bankruptcy or close-to-bankruptcy scenario will certainly have a collateral significant negative impact on the value of the CEO's bank stockholdings. However, if during the first few years of this trading strategy the cash flow outcomes have been positive and the CEO has liquidated significant amount of her stockholdings, even when the bank faces bankruptcy in a future year, the CEO's personal fortune may well be still quite substantial.

Fahlenbrach and Stulz (2011) document the significant value losses from holdings of stock and vested unexercised options in their companies of these and other bank CEOs during 2008. The authors point to this wealth loss in 2008 as evidence "…inconsistent with the view

[6] Given the events of fall of 2008, the following is a realistic alternative: The bank can claim that it is too big to fail, that is, its bankruptcy would have a significant negative impact on the economy; hence the bank should be bailed out with taxpayer funds.

that CEOs took exposures that were not in the interests of shareholders. Rather, this evidence suggests that CEOs took exposures that they felt were profitable for their shareholders *ex ante* but that these exposures performed very poorly *ex post*." This is the essence of the Unforeseen Risk Hypothesis noted earlier. Under the Unforeseen Risk Hypothesis, the bank executives only invest in projects that, ex ante, have a positive net present. In this case, we should not see the executives engage in insider trading that suggests that they are aware of the possibility of an extreme negative outcome. If the firm does suffer from the negative $5 billion outcome due to risks associated with the investment that the executives could not anticipate, they will suffer as much or more than the long-term shareholder will.

The predictions of the Unforeseen Risk Hypothesis are in contrast to the risk-taking incentives of bank executives - as per the Managerial Incentives Hypothesis noted above. The Managerial Incentives Hypothesis posits that incentives generated by executive compensation programs led to excessive risk-taking by banks that benefited bank executives at the expense of the long-term shareholders. Bank executives receive significant amounts of stock and stock option as incentive compensation. If the vesting period for these stock and option grants is "long," managers will identify more closely with creating long-term shareholder value. If the vesting period for these stock and option grants is "short," managers will identify more closely with generating short term earnings, even at the expense of long-term value.

Managers that own significant amounts of *vested* stock and options have a strong incentive to focus on short term earnings. If these short term earnings are generated by value-enhancing projects, there would be no conflict vis-a-vis serving long-term shareholder interests. What if managers invest in value-decreasing (negative net present value) projects that generate

positive earnings in the current year (and perhaps a few subsequent years) but lead to a large negative earnings outcome after a few years? If managers and outside investors have similar understanding of the magnitude and probability of the large negative outcome, managers will be discouraged from investing in such value-decreasing projects, because stock market participants will impound the negative impact of such projects on share prices of these banks. (The negative impact on share prices will have a similar negative effect on the value of the managers' stock and option holdings.) However, managers have discretion over the amount, substance and timing of the information about a project they release to outside investors.[7] Hence, given the information provided the outside investors, the stock market may underweight the probability of a very negative outcome – and view a value-decreasing project as value-enhancing.

How might managers behave if they were presented with a value-decreasing (negative net present value) project that generated positive earnings in the current year (and perhaps a few subsequent years) but leads to a large negative earnings outcome after a few years? If these managers were acting in the interests of long-term shareholders, they would not invest in such a project. If the managers were not necessarily acting in the interests of long-term shareholders but in their own self-interest only, and if they owned sufficient (vested) stock and options, they would have an incentive to invest in such a value-decreasing project. If the earnings from the project are positive in the current and the next few years, the company's share price rises giving managers the opportunity to liquidate their (vested) stock and option holdings at a higher

[7] There is substantial evidence in the finance literature that insiders have an informational advantage and use it to generate superior returns; for example, see Ben-David and Roulstone (2010).

price.[8] In other words, managers can take a significant amount of money "off the table" during the early years of the project. If the large negative earnings outcome occurs after a few years, the firm's share price will decline and the managers will incur a wealth loss via their stock and option ownership. While these wealth losses can be large, they can be less than the money the managers have taken off the table in the earlier years. The end result is – Managers make positive profits in spite of investing in a value-decreasing project; long-term shareholders, of course, experience a negative return.

The above discussion suggests a way to empirically distinguish whether the Unforeseen Risk Hypothesis or the Managerial Incentives Hypothesis leads to a better understanding of bank manager incentives and behavior during the past decade. The Manager Incentive Hypothesis predicts that manager payoffs would be positive over a period of years whereas long-term shareholders will experience a negative return over this same period. The Unforeseen Risk Hypothesis predicts that both manager payoffs and long-term shareholder returns would be negative during this period. Table 1, Panel A, outlines the testable implications from these two hypotheses.

Table 1, Panel B, notes another way, complementary to the one noted above, to empirically distinguish whether the Unforeseen Risk Hypothesis or the Managerial Incentives Hypothesis leads to a better understanding of bank manager incentives and behavior during the past decade. The Manager Incentive Hypothesis suggests that manager trades of the shares of their bank's stock (sale of shares, and exercise of options and subsequent sale of shares) are "unusually large" during the financial crisis and the prior period. In contrast, the Unforeseen

[8] What if the earnings from the project are negative in the current year? See the discussion above and footnote 6.

Risk Hypothesis holds that manager trades of the shares of their bank's stock are "normal" during the financial crisis and the prior period.

2. Sample, Data, and Variable Construction

2.1. Sample Selection

The 14 firms studied in this analysis were chosen due to their role in the U.S. financial crisis during 2008. Nine firms are included because the U.S. Treasury required them to be the first participants in Trouble Asset Relief Program (TARP) in October 2008. These firms are Bank of America, Bank of New York Mellon, Citigroup, Goldman Sachs, JP Morgan Chase, Morgan Stanley, State Street, Wells Fargo, and Merrill Lynch, which was subsequently acquired by Bank of America.[9] Bear Stearns and Lehman Brothers are included because we suspect they would have been included in this first round of TARP funding had they been independent going concerns in October 2008. Bear Stearns was acquired by JP Morgan Chase in May 2008 and Lehman Brothers declared bankruptcy in September 2008. Mellon Financial merged with Bank of New York in July 2007; it is included to allow for consistency throughout the period under study. Countrywide Financial is included because it was one of the largest originators of subprime mortgages prior to the crisis. Countrywide was acquired by Bank of America in July 2008, so all of its investments and liabilities became Bank of America's investments and liabilities at that time. Finally, American International Group, or AIG, is included because of its central role in the crisis. While not a depository institution or

[9] Bank of America reached an agreement to acquire Merrill Lynch on September 15, 2008; the acquisition was completed on January 1, 2009. As such, Merrill Lynch is analyzed as an independent institution for the majority of this study.

investment bank, AIG was a trading partner with most of the other institutions in this study, and was involved in the real estate market by selling credit default swaps and other mortgage-related products to these institutions and other investors. AIG was also one of the largest recipients of TARP funds and is one of the few TARP recipients in this study that has not repaid the Treasury's investment, yet. In our discussion below we refer to AIG and the 13 other firms noted above as too-big-to-fail (TBTF) "banks."

Besides the 14 TBTF banks, for comparison purposes we consider two additional samples of lending institutions. An initial list of lending institutions was obtained from the appendix in Fahlenbrach and Stulz (2011). The first comparative sample includes 49 lending institutions that received TARP funds several months after many of the TBTF banks received the TARP funds; we refer to these 49 lending institutions as later-TARP banks or L-TARP. The second comparative sample includes 37 lending institutions that did not receive TARP funds; we refer to these 37 lending institutions as No-TARP. Appendices A and B note details of the L-TARP and No-TARP banks. Table 2 provides summary data on the size (total assets and market capitalization) of the TBTF, L-TARP and No-TARP banks. As expected, TBTF banks are much larger than L-TARP and No-TARP banks. L-TARP and No-TARP banks are of similar size.

2.2. Data

The insider trading data comes from the Thomson Insiders database. We rely on Form 4 data filed with the Securities and Exchange Commission for this study. In addition to direct acquisitions and dispositions of common stock, we also consider acquisitions of stock through

the exercise of stock options.[10] Many individual Form 4 filings are manually reviewed on the SEC website to ensure the consistency of the data.

Director ownership data are from RiskMetrics, formerly Investor Responsibility Research Center, or IRRC. The compensation data are from Compustat's ExecuComp. Individual proxy statements are reviewed to corroborate director ownership and compensation data. In some cases, for example, the ownership data used is slightly different than the RiskMetrics data because of disclosures about the nature of the ownership provided in the footnotes of the proxy statement. For example, in the 2001 Bear Stearns' proxy statement, 45,669 shares of common stock owned by CEO James Cayne's wife are not included in his beneficial ownership; in the 2002 proxy, these same 45,669 shares are included in his beneficial ownership. Manually reviewing the proxy statements and the relevant footnotes allow us to be more consistent across time and across firms. Further, manually reviewing the proxy statements allows us to distinguish and appropriately characterize securities such as unexercised options or restricted stock.[11]

Finally, stock price data are from Center for Research in Securities Prices, CRSP, and financial statement data are from Compustat. Again, individual financial statements are reviewed to better characterize the information in some cases.

2.3. Variables

[10] It is common practice for insiders to exercise stock options only to immediately sell the stock in the open market. By making both trades simultaneously, the insider avoids using any cash to exercise the options.

[11] The beneficial ownership we consider includes common stock equivalents that the individuals have immediate access to. This generally includes common stock, in-the-money and vested options, and vested restricted stock received through incentive plans. It does not include options that are not exercisable and restricted stock that has not vested. Options may not be exercisable because the market price of the stock is below the option exercise price or because the option has not vested.

The primary variable used in this study is *Net Trades*. This variable subtracts the dollar value of all of an insider's purchases of common stock during a fiscal year from the dollar value of all of that insider's sales of common stock during the year. Exercising options to acquire stock is considered a purchase of common stock in the calculation of *Net Trades.* We consider the post-trade ownership after each transaction. One information item disclosed on the Form 4 is "amount of securities beneficially owned following reported transaction." We multiply the number of shares disclosed on the Form 4 with the transaction price of the stock from the Form 4 to get the dollar value of ownership following the transaction. We add back the value of shares sold or subtract off the value of shares purchased to determine the pre-trade ownership stake.

We consider *Salary* and *Bonus* for compensation data, which represent current cash consideration. We do not directly consider stock or option grants. We analyze any stock or option compensation only when the insider converts that into cash through selling the stock or exercising the option.[12]

We also calculate the *Estimated Value Lost,* or the change in beneficial ownership for each CEO in 2008. This amount is estimated by subtracting *Net Trades* from *Beginning Beneficial Ownership* in number of shares to get estimated shares at end of 2008. This is multiplied by the ending stock price change and then subtracted from the *Beginning Beneficial Ownership* in dollars to get the estimated value lost. We calculate the *Estimated Value*

[12] We consider exercising options as a purchase of stock. In many cases, when insiders exercise options, they immediately sell the stock received. These two transactions are frequently disclosed on the same day. In 2007, Angelo Mozilo of Countrywide filed more than 30 Form 4s in which he disclosed exercising exactly 70,000 options and then immediately selling exactly 70,000 shares of common stock. In the same year, he filed another 30 Form 4s in which he disclosed the same pair of trades on exactly 46,000 options and shares. By simultaneously exercising options and selling shares, he likely did not have to use any cash to exercise the options.

Remaining at the end of 2008 using the above estimate of shares owned at end of 2008, multiplied by ending stock price. This is not necessarily the same as Beneficial Ownership at the beginning of 2009 because it does not include stock gifts or compensation received during 2008. We do not include these values because doing so would not directly capture the effects of the financial crisis on the CEO's ownership stake during 2008.

3. The Culture of Ownership and Bank CEOs' Buys and Sells during 2000-2008

3.1. The Bankers' Culture of Ownership?

Appendix B lists the names of the CEOs during 2000-2008 for the sample of large banks. Table 3 details the buys and sells of these CEOs in the shares of their own companies during 2000-2008. As a group these CEOs bought shares of their respective banks 73 times during 2000-2008, but sold their shares 2,048 times during the same period. In dollar terms, they purchased shares worth $36 million but sold shares worth $3,467 million during 2000-2008. In addition, CEOs acquired stock by exercising options 470 times during the 2000-2008 period at a total cost of $1,660 million. Because they typically paired these option exercises with open market sales, they did not necessarily invest $1,660 million of (pre-sale) cash to acquire these shares. Even including the option purchases, CEOs sold twice as much stock as they acquired during this period. There are two reasons why CEOs are more likely to sell their shares than buy:

a. CEOs are less well-diversified with regard to equity holdings in their bank. This situation is exacerbated given that their human capital is also tied to their company.

The size of their equity holdings might necessitate a liquidity discount if they wished to sell within a short timeframe. For these diversification and liquidity reasons, CEOs would value a dollar of their company's stock at less than a dollar.

b. CEOs receive significant grants of shares as part of their incentive compensation. To create liquid funds from these shares, they have to sell.

While the above two reasons provide a partial explanation for the lopsided nature of the sells to buys, it does raise the question: Is the notion of a Culture of Ownership consistent with the empirical fact of bank CEOs selling shares of their bank 100 times the amount they buy on the open market?

3.2. Net Payoff to Bank CEOs during 2000-2008

Table 3 provides details on the CEOs' buys and sells of their own company stock during 2000-2008. During this period the 14 CEOs as a group bought stock in their companies 73 times and sold shares of their companies 2,048 times. In other words, CEOs are about 30 times more likely to be involved in a sell trade compared to an open market buy trade. The ratio of the dollar value of their sells to buys is even more lop-sided. During 2000-2008 the 14 bank CEOs bought stock in their banks worth $36 million, but sold shares worth $3,467 million. The dollar value of sales of stock by bank CEOs of their own bank's stock is about 100 times the dollar value of open market buys of stock of their own bank's stock.[13] In addition, CEOs acquired stock by exercising options at a total cost of $1,660 million.

[13] Even the 24 CEO 'buys' in 2008 worth over $32 million can be misleading: only 2 of these trades worth about $11.3 million occurred prior to the mandatory TARP investments being announced on October 14, 2008. All others occurred after October 20, 2008.

Table 3 also notes the *Value of Net Trades* for these CEOs in the shares of their own company; *Value of Net Trades* subtracts the dollar value of all purchases of common stock from the dollar value of all sales of common stock. There is significant cross-sectional variation in the net trades of the CEOs during 2000-2008. Lehman Brothers CEOs engaged in the largest dollar value of net trades of about $428 million, followed by Countrywide CEO at $402 million, and Bear Stearns CEO at $243 million. On the low end, AIG CEOs engaged in net acquisitions of $7 million, while Mellon Financial and Bank of America CEOs engaged in net trades worth $17 million and $24 million, respectively.

Observers of U.S. capital markets know that investors in these 14 banks fared poorly during 2008; see figure 1. Since these CEOs owned significant blocks of stock in their companies, they also suffered significant declines in the value of their stockholdings. As a group these CEOs suffered value losses (from stockholdings in their companies) in 2008 of about $2,013 million. Individually these losses range from a low of about $3 million (Wells Fargo) to about $796 million (Lehman Brothers).[14]

Both bank CEOs and their shareholders experienced negative returns during 2008. This evidence is consistent with both the Manager Interests Hypothesis and the Unforeseen Risk Hypothesis. To distinguish between the Unforeseen Risk Hypothesis and the Managerial Incentives we would need to consider their returns during a period prior to 2008. The Manager Incentive Hypothesis predicts that manager payoffs would be positive during the period whereas long-term shareholders will experience a negative return over this same period. The

[14] Mellon Financial CEOs actually gained just over $1 million; however, this does not include the 2008 crisis. Mellon Financial merged with Bank of New York in mid-2007, so this gain is for 2007, not 2008.

Unforeseen Risk Hypothesis predicts that both manager payoffs and long-term shareholder returns would be negative during this period.

To distinguish between the Unforeseen Risk Hypothesis and the Managerial Incentives Hypothesis we need to consider manager payoffs for a period of years prior to 2008. What time period is implied by this "period of years prior to 2008?" Conceptually this period would include the years when bank managers initiated or started emphasizing excessively risky investments or trading strategy. Chesney, Stromberg, and Wagner (2010) consider bank CEO incentives during 2002-2005 arguing that, "…the vast majority of deals related to the subprime and mortgage backed security market originated in the early part of the decade…" Bebchuk, Cohen and Spamann (2010) consider the period 2000-2008 in their case study of manager compensation in Bear Stearns and Lehmann.[15] Consistent with this literature, we consider 2000-2008 as our period for analysis. As a robustness check, in a later section, we consider two additional overlapping time-periods in our analysis: 2002-2008, and 2004-2008.

Table 4, Panel A, notes that as a group these 14 CEOs experienced a cash inflow of $1,771 million from their net trades during 2000-2008. In addition, these 14 CEOs received cash compensation worth $891 million during this period. Combining these two numbers – as a group, CEOs of the 14 banks experienced cash inflow worth $2,662 million; we refer to this as *CEO Payoff*. Compare this with their estimated combined losses from beneficial stock holdings in 2008 of $2,013 million.[16] The *CEO Payoff* sum of $2,662 million for the 14 CEOs as a group

[15] Inside Mortgage Finance (2010) provides data on issuance of subprime mortgage backed securities; these data illustrate the dramatic increase in issuance of subprime mortgage backed securities around 2000 - see figure 2.

[16] This ignores the possibility that the CEOs were able to renegotiate and restructure stock and option holdings during 2008. Boards frequently re-issue new options with new exercises for stock options that are substantially

can be considered as money these CEOs took "off the table" as their banks continued with the high risk but negative net present value trading/investment strategies during 2000-2008. However, the high risk but negative net present value trading/investment strategy would ultimately lead to a large negative outcome – namely, the large loss of $2,013 million in 2008. The sum of net trades and cash compensation for 2000-2008 is greater than the value lost in 2008 (from beneficial stock holdings) by $649 million for these 14 CEOs as a group – we refer to this as the *Net CEO Payoff*. The data for the CEOs of the 14 companies as a group are consistent with the Managerial Incentives Hypothesis and inconsistent with the Unforeseen Risk Hypothesis.

Table 4, Panel A, also provides data on the net trades, cash compensation, and value losses in 2008 for CEOs of each of the 14 companies. The *Net CEO Payoff* is positive for CEOs in 10 of the 14 sample firms; Bank of America, Goldman Sachs, Lehman Brothers and State Street are the exception. The *Net CEO Payoff* ranges from $221 million for Citigroup and $377 million for Countrywide to losses of $126 million for Goldman Sachs and $311 million for Lehman Brothers. However, even for Goldman Sachs and Lehman Brothers, *CEO Payoffs* for 2000-2008 are quite substantial at $132 million and $485 million, respectively. In other words, the CEOs of Goldman Sachs and Lehman Brothers enjoyed *realized* cash gains of $132 million and $485 million, respectively, during 2000-2008, but suffered *unrealized* paper losses that exceeded these amounts. Overall, the evidence from individual *Net CEO Payoffs* is consistent with the Managerial Incentives Hypothesis and inconsistent with the Unforeseen Risk Hypothesis.

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out-of-the-money. See, for example, Chen (2004). In reality, the value lost after restructuring their beneficial ownership was likely less than $2,013 million.

3.3. Robustness check: Different sample periods

Table 4, Panel B, notes that as a group these 14 CEOs experienced a cash inflow of $1,398 million from their net trades during 2002-2008. In addition, these 14 CEOs received cash compensation worth $667 million during this period. Combining these two numbers – as a group CEOs of the 14 banks experienced *CEO Payoff* worth $2,065 million, including costs associated with exercising options. As noted earlier, these CEOs suffered combined losses from beneficial stock holdings in 2008 of $2,013 million. Consistent with our findings for the 2000-2008 period, the data for the CEOs of the 14 companies as a group are consistent with the Managerial Incentives Hypothesis and inconsistent with the Unforeseen Risk Hypothesis.

The sum of net trades and cash compensation for 2002-2008 is greater than the value lost in 2008 (from beneficial stock holdings) for CEOs at half of the 14 sample firms. Even for the CEOs of the banks with *Net CEO Payoff* losses, the realized *CEO Payoff* for 2002-2008 is quite substantial, ranging from $35 million up to $391 million. Notice that the above *CEO Payoff* amounts were taken off the table by the CEOs of these seven banks during 2002-2008 before they incurred the large 2008 losses from the drop in the value of their stockholdings. Similar to our conclusion for 2000-2008, we interpret this evidence as consistent with the Managerial Incentives Hypothesis and inconsistent with the Unforeseen Risk Hypothesis.

Table 4, Panel C, focuses on the period 2004-2008. As a group these 14 CEOs experienced a cash inflow of $1,132 million from their net trades. In addition, these 14 CEOs received cash compensation worth $469 million during this period. As noted earlier, these CEOs suffered combined losses from beneficial stock holdings in 2008 of $2,013 million. The *Net CEO Payoff* for the 14 CEOs as a group is negative $412 million for 2004-2008. It is

worth noting that the *Net CEO Payoff* for the 14 CEOs as a group would be positive were it not for the large negative *Net CEO Payoff* of $486 million for Lehman Brothers (which declared bankruptcy in September 2008). Even for Lehman Brothers, the realized cash from *CEO Payoff* during 2000-2008 is $310 million – this amount was taken off the table; of course, the unrealized paper losses during this period are $796 million.

The sum of net trades and cash compensation for 2004-2008 is greater than the value lost in 2008 (from beneficial stock holdings) for CEOs in half of the 14 sample firms. Even for the CEOs of the seven banks with negative *Net CEO Payoffs*, the realized cash from *CEO Payoffs* for 2004-2008 ranges from $15 million to $310 million. We note that the abovementioned sums of money were taken off the table by the CEOs of these banks during 2004-2008 before they incurred the large 2008 losses from the drop in the value of their stockholdings.

3.4. Robustness check: Comparing TBTF, L-TARP and No-TARP banks

The dollar value of the net trades of the 14 TBTF bank CEOs during 2000-2008 provides an important perspective on the payoff these executives received from working in their banks. An important question is whether the net trades of the 14 TBTF bank CEOs is normal or abnormal. We compare the net trades of the 14 TBTF bank CEOs to the net trades of the 49 L-TARP bank CEOs and the 37 No-TARP bank CEOs. Since TBTF banks are considerably larger than L-TARP and No-TARP banks, we consider the ratio of the CEO's net trades during the sample period to the CEO's holdings at the beginning of the period. We consider three sample periods: 2000-2008, 2002-2008, and 2004-2008.

As detailed in Table 5 Panel A, the median ratio of the CEO's net trades during 2000-2008 to the CEO's holdings in 2000 is 59.7% for the TBTF banks, compared to 17.6% for L-TARP banks and 4.0% for the No-TARP banks.[17] We find consistent results for the two other sample periods. The median ratio of the CEO's net trades during 2002-2008 to the CEO's holdings in 2002 is 21.9% for the TBTF banks, compared to 8.4% for L-TARP banks and 2.6% for the No-TARP banks. The median ratio of the CEO's net trades during 2004-2008 to the CEO's holdings in 2004 is 11.8% for the TBTF banks, compared to 3.5% for L-TARP banks and 0.1% for the No-TARP banks.[18] *This provides strong evidence that net trades of the 14 TBTF bank CEOs during 2000-2008 was abnormally high.* [19] This evidence is consistent with the Managerial Incentives Hypothesis and inconsistent with the Unforeseen Risk Hypothesis.

3.5. Robustness check: Net trades of officers and directors

In the analysis above we have focused on the trades and incentives of the CEO since he is the most significant decision maker. However, other officers and directors can have significant impact on the bank's trading/investment strategies. Table 6 provides data on the net trades of the officers and directors of these 14 banks. Data on the compensation and beneficial holdings are less readily available or unavailable for the officers and directors. We note the data on net trades to provide as complete a perspective as possible regarding the incentives of decision

[17] Statistical tests confirm that the median ratio of the CEO's net trades during 2000-2008 to the CEO's holdings in 2000for the TBTF banks is significantly greater than the corresponding ratio for the No-TARP banks.

[18] Statistical tests confirm that the median ratio of the CEO's net trades during 2002-2008 (2004-2008) to the CEO's holdings in 2002 (2004) for the TBTF banks is significantly greater than the corresponding ratio for the No-TARP banks.

19 Table 5, Panel C, provides evidence consistent with the joint hypothesis that net trades of the 14 TBTF bank CEOs during 2000-2008 was abnormally high and the shareholders of these banks fared poorly - compared to the No-TARP banks. Direct evidence on shareholder returns is provided below in Table 7.

makers in these banks. Officers and directors of these 14 banks were involved in 14,687 sales during 2000-2008, but only 1,671 buys during this period. Officers and directors acquired stock via option exercises in 3,454 separate transactions. Net trades, including the costs of exercising options, of officers and directors of these 14 banks sums to almost $127 billion. On the high side, net trades of officers and directors of Goldman Sachs was $32 billion, followed by AIG at $28 billion and Citigroup at $19 billion. Notice that the above figures do not include the value of any cash compensation received by these officers and directors from their banks.

3.6. Shareholder returns to TBTF, L-TARP and No-TARP banks

Table 7 summarizes abnormal shareholder returns for the TBTF, L-TARP and No-TARP banks for 2000-2008, 2002-2008, and 2004-2008. We use the Fama-French Carhart (1997) four-factor model to compute these abnormal returns. Shareholders of the No-TARP banks enjoyed significantly more positive returns than the TARP banks for 2000-2008, 2002-2008 and 2004-2008. Shareholders of the No-TARP banks also enjoyed significantly more positive returns than the L-TARP banks for these periods. This evidence coupled with the evidence in sections 3.2 and 3.4 suggests a positive correlation between bank CEOs retaining more of the stock they receive as incentive compensation, and their shareholders' return.

4. Solutions to Excessive Risk-taking by Bank Managers

4.1. The Restricted Equity Proposal

How might we prevent the bank executives from undertaking excessively risky and value-destroying trading or operating strategies? One solution could be to offer bank executives

compensation contracts consistent with the proposal of Bhagat and Romano (2009) (BR). These authors propose that *executive incentive compensation should only consist of restricted equity (restricted stock and restricted stock option)* – restricted in the sense that the executive cannot sell the shares or exercise the options for two to four years after their last day in office. We refer to this as the Restricted Equity proposal.

If the bank executives in the scenario noted above in section 2 had been offered incentive compensation contracts consistent with the above proposal, they would have had different incentives regarding whether or not to invest in the high-risk but negative net present value trading strategy. To wit, the CEO's equity holdings would now consist only of restricted stock and restricted stock options. Not only would the CEO be required to hold these shares and options for the duration of their employment in the bank, but for two to four years subsequent to their retirement/resignation. If the trading strategy resulted in a positive cash flow in a certain year, the bank's share price would go up, the CEO's net worth would go up, *but the CEO would not be able to liquidate their stockholdings in their bank*. The CEO would have to make an assessment of the likelihood of the large negative cash flow outcome during the years they continue to be employed at the bank plus two to four years. After making this assessment, any CEO is less likely to authorize or encourage the high-risk but negative net present value trading strategy. If the bank does not engage in the negative net present value trading strategy, this would also serve the interests of the long-term shareholders.

The Restricted Equity proposal is consistent with several recent theoretical papers which suggest that a significant component of incentive compensation should consist of stock and stock options with long vesting periods; for example, see Edmans et al (2010), and Peng and

Roell (2009). If these vesting periods were "sufficiently long" they would be similar to the above proposal.

BR note three important caveats to their proposal. First, if executives are required to hold restricted shares and options, then they would most likely be under-diversified. This would lower the risk-adjusted expected return for the executive. One way of bringing an executive's risk-adjusted expected return back up to the former level (that before the executive was required to hold the shares and options) would be to increase the expected return by granting additional restricted shares and options to the executive. To ensure that the incentive effects of restricted stock and options are not undone by self-help efforts at diversification, executives participating in such compensation plans should be prohibited from engaging in transactions, such as equity swaps, or borrowing arrangements, that hedge the firm-specific risk from their having to hold restricted stock and options (where not already restricted by law). Of course, derivative transactions based on other securities, such as a financial industry stock index, could be used to undo the executives' interest in the restricted shares, subjecting the executive to the lower level of basis risk (the risk that co-movements in the firm's stock and the security or securities underlying the hedge are not perfect). To address this possibility, approval of the compensation committee or board of directors should be required for other (non-firm-specific) derivative transactions, such as a put on a broader basket of securities. In addition, to ensure that under-diversification does not result in managers taking a suboptimally low level of risk, compared to the risk preferences of shareholders (behavior that may be of particular concern as an aging executive nears retirement and may wish to protect the value of accrued shares), the incentive plan can be fine-tuned to provide a higher proportion in restricted options than restricted shares to increase the bank CEO's incentive to take risk.

Second, if executives are required to hold restricted shares and options post-retirement, it would raise concerns regarding lack of liquidity. Third, the proposal could lead to early management departures, as executives seek to convert (after the two to four year waiting period) illiquid shares and options into more liquid assets.

The concerns regarding under-diversification, lack of liquidity, and early departure are valid. To address these concerns we recommend managers be allowed to liquidate annually a small fraction of their stock and option holdings in their bank. What is the magnitude of the "small fraction?" Given the evidence in Table 4, we recommend managers be permitted to annually liquidate about 5% to 15% of their ownership positions. Table 4 documents the rather large dollar holdings of some managers. 15% of stock holdings in 2000 would exceed $100 million for several CEOs. Allowing managers to take such a significant sum off the table would significantly lessen their incentive to serve the interests of long-term shareholders. The 85% of their stock-holdings that they still own will provide incentives to serve shareholder interests for the next several years - as they continue liquidating (up to) 15% of their holdings every year. Hence, we also recommend that these ownership position annual liquidations be restricted to an amount of $5 million to $10 million.

If incentive compensation were constrained to restricted stock and restricted stock options, managers will attempt to circumvent this by arguing for higher, perhaps much higher, cash compensation. Higher cash compensation will tend to negate the effects of incentive compensation. For this reason, we are suggesting a limit of $2 million on annual cash compensation.

The above amounts may seem low compared to what bank executives have received during the past several decades. However, that is not necessarily the case. This proposal only limits the annual cash payoffs the executives can realize. *Under this proposal, the net present value of all salary and stock compensation can be higher than they have received historically, so long as they invest in projects that lead to value creation that persists in the long-term.*

To be clear, we are not recommending the Restricted Equity proposal be the basis for additional regulations. Rather the proposal is just a set of ideas for corporate boards, rather their compensation committees, and their institutional investors to consider. In implementing the proposal, we think corporate boards should be the principal decision-makers regarding:

a) The mix of restricted stock and restricted stock options a manager is awarded.

b) The amount of restricted stock and restricted stock options the manager is awarded.

c) The maximum percentage and dollar value of holdings the manager can liquidate annually.

d) Number of years post retirement/resignation for the stock and options to vest.

While our focus here is on banks, the incentives generated by the above compensation structure would be relevant for maximizing long-term shareholder value in other industries. For example, consider the cases of Enron, WorldCom and Qwest whose senior executives have been convicted of criminal violation of insider trading laws.[20] Senior executives in these companies made misleading public statements regarding the earnings of their respective

20 See, for example, http://www.forbes.com/2005/03/15/cx_da_0315ebbersguilty.html; "Appeals Court Restores Qwest Insider Trading Conviction," at http://www.nytimes.com/2009/02/26/business/26qwest.html.

companies. These misleading statements led to a temporary rise in the share prices of these companies. These executives liquidated significant amounts of their equity positions during the period while their companies' share price was temporarily inflated. If these executives' incentive compensation had consisted of only restricted stock and restricted stock option that they could not liquidate for two to four years after their last day in office, they would not have had the financial incentive to make the abovementioned misleading statements. Hence, corporate board compensation committees and institutional investors in firms in other industries should also give the above Restricted Equity executive incentive compensation structure serious consideration.

4.2. Clawbacks

French et al (2010) in *The Squam Lake Report* recommend "…that government regulators require systemically important financial firms to hold back for several years a fraction of each employee's annual compensation. Employees would forfeit these holdbacks if the firm declares bankruptcy or receives extraordinary government assistance." Conceptually this proposal has merit since the clawback will discourage managers from undertaking high-risk negative net present value investments and trading strategies.

We note three concerns with this proposal. Table 4 documents that annual cash compensation (salary plus bonus) is, on average, only about 50 % of manager payoff from net trades.[21] Hence, if managers were allowed to take large sums off the table annually in the form

[21] For some banks cash compensation (salary plus bonus) can be less than 25% of manager payoff via net trades, for example, Lehman Brothers and Countrywide Financial.

of sales of their stock and option holdings, clawbacks of compensation might not be a major consideration for these bank managers. Second, incentives generated from the above clawback provisions are not *directly* aligned with that of the long-term shareholders. Decreases in firm value may have no impact on manager compensation (via the clawback provisions) as long as the firm is not "bankrupt" or recipient of "extraordinary government assistance." These same decreases in firm value, of course, have a negative impact on shareholder wealth.

Third, the implementation details would be important: How much is held back and for how long? What constitutes "bankruptcy" and "extraordinary government assistance?" BR note that, in the past, managers have successfully taken advantage of any flexibility/ambiguity provided in their incentive compensation plans at the expense of long-term shareholders. Managers will likely take advantage of abovementioned clawback related implementation flexibility/ambiguity to benefit themselves at the expense of long-term shareholders.[22]

The Restricted Equity proposal, noted above, whereby managers' incentive compensation consists solely of restricted stock and restricted stock options (that they are required to hold for two to four years post-retirement) is not subject to the above concerns. Furthermore, the Restricted Equity proposal (via the restricted stock and option holdings) provides for an automatic, ongoing, *direct and proportionate* impact of the change in a company's equity value on the manager's net worth.

22 The recently enacted Financial Reform Act mandates the SEC to require companies to adopt clawback policies; for example, see Joann Lublin "Law Sharpens 'Clawback' Rules for Improper Pay*," Wall Street Journal*, July 26, 2010. However, industry observers are raising concerns regarding the implementation of such clawback policies - similar to the implementation concerns noted above.

4.3. Grant-based and Aggregate Limitations on Unwinding

Bebchuk and Fried (2010) (BF) provide an insightful set of recommendations for structuring executive incentive compensation to serve long-term shareholder interests. They recommend grant-based and aggregate restrictions on the unwinding of vested equity incentives: "All equity-based awards should be subject to aggregate limitations on unwinding so that, in each year (including a specified number of years after retirement), an executive may unwind no more than a specified percentage of her equity incentives that is not subject to grant-based limitations on unwinding at the beginning of the year."

The BF proposal has considerable merit since it focuses the attention of managers to long-term value creation by limiting their ability to liquidate their vested equity. The BF recommendations are conceptually consistent with the Restricted Equity proposal whereby managers' incentive compensation consists solely of restricted stock and restricted stock options (that they are required to hold for two to four years post-retirement).[23]

5. Capital Structure and Executive Compensation

5.1. Restricted-Equity-More-Equity-Capital

[23] There are two minor implementation differences between the Restricted Equity proposal and the BF proposal: a) The Restricted Equity proposal requires executives to hold the restricted stock and restricted stock options for two to four years post-retirement. BF suggest a period of five years post-retirement during which the aggregate unwinding limitation expires. b) Given the rather large dollar holdings of some bank managers during 2000-2008, even a 10% stock-holding in 2000 could exceed $100 million for several CEOs. Allowing managers to take such a significant sum off the table would significantly lessen their incentive to serve the interests of long-term shareholders. Hence, the Restricted Equity proposal recommends that these ownership position annual liquidations be restricted to an amount of $5 million to $10 million. BF's unwinding limitations are based only on percentage ownership whereas the Restricted Equity proposal restrictions on annual liquidations are based on percentage *and* dollar value of stock and option holdings.

Corporate capital structure is arguably the most intensely and thoroughly researched topic in corporate finance. Any standard corporate finance textbook would argue that bankruptcy costs and financial distress costs (incurred prior to bankruptcy) are a significant determinant of a company's capital structure; for example, see Ross, Westerfield and Jaffe (2010). Hence, companies with greater uncertainty of operating income should be financed mostly with equity. In the U.S. about 90% of a bank's capital is debt capital, and this ratio is even higher for the larger banks, about 95%; for example, see Bolton, Mehran and Shapiro (2010). Compared to the debt ratio in other industries, banks have one of the highest, if not the highest debt ratio; for the corporate sector as a whole – debt ratio is about 47%. Given the alleged systemic risk and resulting significant negative impact on the other sectors of the economy from large banks' going into bankruptcy (or facing serious financial distress), banks (especially the larger banks) should move towards a much lower debt ratio. How low of a debt ratio should large banks consider? Given that large banks comprise one of the riskier industries and perhaps the riskiest in light of recent economic experience, their debt ratio should be one of the lowest in the economy and certainly in the neighborhood of the median economy-wide debt ratio of 47%.

The three solutions to excessive risk-taking by banks noted above are predicated on equity based incentives for bank managers. The high leverage implied by debt ratios in the order of 95% will magnify the impact of losses on equity value. As a bank's equity value approaches zero (as they did for some banks in 2008), equity based incentive programs lose their effectiveness in motivating managers to enhance shareholder value. Hence, for equity based incentive structures to be effective, banks should be financed with considerable more equity than they are being financed currently; we refer to this as the Restricted-Equity-More-Equity-Capital proposal. Our recommendation for significantly greater equity in a bank's

capital structure is consistent with the recent recommendations of Admati, Demarzo, Hellwig and Pfleiderer (2010) and Fama (2010). [24]

It is also possible that if bank managers' incentive compensation is structured along the lines of the Restricted Equity proposal noted above, managers would voluntarily move to a lower debt ratio in their capital structure since this would lower the probability of bankruptcy (or serious financial distress). Lowering the debt ratio may not only serve the interests of long-term shareholders of these banks, but would also lessen the probability of alleged systemic risk resulting from the failure of one or more large banks.[25]

5.1.1. Regulatory Hybrid Security

French et al (2010) in *The Squam Lake Report* propose a thoughtful solution to the current thin equity capitalization of large banks, "The government should promote a long term debt instrument that converts to equity under specific conditions. Banks would issue these bonds before a crisis and, if triggered, the automatic conversion of debt into equity would transform an undercapitalized or insolvent bank into a well-capitalized bank at no cost to taxpayers." Figure 3 provides a stylized depiction of a large bank's capital structure under three scenarios: the current situation, The Regulatory Hybrid Security proposal, and the Restricted-Equity-More-Equity-Capital proposal noted in 5.1 above.

[24] Fama (2010) suggests, "The simple solution is to make sure these firms have a lot more equity capital—not a little more, but a lot more, so they are not playing with other people's money. There are other people here who think that leverage is an important part of the system. I am not sure I agree with them."

[25] Wallison (2010 a) questions the conventional wisdom whether failure of even a large bank can lead to a systemic financial crisis.

A potential advantage of the Regulatory Hybrid Security proposal is it requires less equity capital upfront. However, several authors have raised concerns about the incentive and other problems the triggering mechanism (that would lead to the conversion of the hybrid capital to equity) would generate; for example, see Duffie (2010) and McDonald (2010). Furthermore, Admati, Demarzo, Hellwig and Pfleiderer (2010) provide a thorough and detailed analysis of the flaws in the current received wisdom that large banks should be mostly financed with debt; in other words, they question the potential advantage of the Regulatory Hybrid Security proposal's requirement of less equity capital upfront. Besides providing the correct incentives to managers to create and sustain long-term shareholder value, the Restricted-Equity-More-Equity-Capital proposal has the advantage of being simple and transparent. Capital market participants, especially bondholders, will value simplicity and transparency in a bank's capital structure - in light of their recent experience with large banks,

5.2. Manager Incentives and Risk-Shifting

There is a consensus in corporate finance that with risky debt outstanding, managers acting in the interest of shareholders have an incentive to invest in high-risk projects even if they are value-decreasing (negative net present value); for example, see Smith and Warner (1979). Consistent with this argument, several authors have argued that bank CEO compensation should be restructured so as to maximize the value of bank equity *and* debt. For example, Bolton, Mehran and Shapiro (2010) (BMS) suggest that bank managers' compensation should be tied to the bank's default probability as reflected in their default spread (CDS).

Conceptually, we are supportive of the BMS suggestion and think it has considerable merit. However, we note two concerns with this recommendation. First, the above shareholder-bondholder conflict of interest becomes relevant when the bank has risky debt outstanding. If a bank's debt is relatively "safe" the relevance of this recommendation is less critical. On the other hand, if the bank debt is quite risky, the recommendation is quite relevant. At what point does a bank's debt transition from being relatively safe to quite risky? Second, and related to the first point, Bhagat and Romano (2010) emphasize that executive compensation structures should be transparent and simple; the transparency and simplicity criteria would enhance investor confidence in the company's compensation and governance structure. Tying managers' compensation to the bank's CDS would make managers' compensation both less transparent and less simple. Furthermore, managers will have an incentive to misrepresent financial/accounting numbers (which may be partially under their control) that outside analysts use to compute the CDS.[26]

6. Director Compensation and Incentives

While the theoretical and empirical literature on executive compensation is extensive, the literature on director compensation is relatively modest. Director compensation typically consists of a cash component (called the retainer) and incentive compensation in the form of stock and stock option grants which vest over a period of time. If directors are allowed to

[26] Some have argued that managers can misreport financial/accounting numbers to influence share prices in the short run. However, under the restricted equity proposal the incentive to misreport is minimized since managers have to hold the shares until well after their retirement, that is, they cannot benefit from short term share price movements.

liquidate their vested stock and options, and a director feels the need to liquidate her position in the near future - she may focus on short-term performance perhaps to the detriment of long-term shareholder value. Hence, we suggest that director incentive compensation be constructed along the lines of the Restricted Equity proposal noted above. Specifically, all incentive compensation for directors *should only consist of restricted equity (restricted stock and restricted stock option)* – restricted in the sense that directors cannot sell the shares or exercise the options for two to four years after their last board meeting.[27]

However, we are not recommending the Restricted Equity proposal be the basis for additional regulations. Rather the proposal is just a set of ideas for corporate boards and their institutional investors to consider.[28] In implementing the proposal on director compensation, we think corporate boards should be the principal decision-makers regarding:

a) The mix of restricted stock and restricted stock options directors are awarded.

b) The amount of restricted stock and restricted stock options directors awarded.

c) The maximum percentage and dollar value of holdings directors can liquidate annually.

d) Number of years after the last board meeting for the stock and options to vest.

6.1. Mid-level Managers

[27] Board members are supposed to be successful professionals. Hence, we do not see any incentive compensation related reason for a cash retainer. We recommend boards diminish/eliminate the cash retainer part of their compensation and correspondingly increase the size of their restricted stock and restricted stock option grants.

[28] Bhagat and Tookes (2010) document that many boards have recently started implementing mandatory stock ownership requirements on themselves. These mandatory stock ownership requirements are steps in the right direction; however, the other elements of the Restricted Equity proposal also need to be considered.

The Restricted Equity incentive compensation proposal noted above is appropriate for only the senior-most executives and directors in a company. The Restricted Equity incentive compensation proposal is *not* appropriate for mid-level managers, and even less appropriate for rank and file employees; the under-diversification problem would be a particularly serious problem for rank and file employees. Once the incentives of senior executives are aligned with that of long-term shareholders, the senior executives should be entrusted with the task of constructing incentive programs for the mid-level managers.

7. Summary and Conclusions

Before stating our conclusions, it is important to note that executive compensation reform is not a panacea. While incentives generated by executive compensation programs led to excessive risk-taking by banks contributing to the current financial crisis, there are several more important causes of the current financial and economic crisis. For example, the perverse incentives created by Fannie Mae and Freddie Mac encouraged individuals to purchase residential real estate - ultimately at considerable public taxpayers' expense; this is perhaps the single most important cause of the current financial and economic crisis. Ironically, the recent Financial Reform Act signed into law in July 2010 did not even acknowledge, much less address, the perverse incentives created by Fannie Mae and Freddie Mac.[29]

We study the executive compensation structure in the largest 14 U.S. financial institutions during 2000-2008. Our results are mostly consistent with and supportive of the

[29] See, for example, Michael Corkey, "The Ultimate Taboo: The Overhaul of Fannie Mae and Freddie Mac," *Wall Street Journal*, June 21, 2010; and Wallison (2010 b).

findings of Bebchuk, Cohen and Spamann (2010), that is, managerial incentives matter - incentives generated by executive compensation programs led to excessive risk-taking by banks contributing to the current financial crisis. Also, our results are generally not supportive of the conclusions of Fahlenbrach and Stulz (2009) that the poor performance of banks during the crisis was the result of unforeseen risk.

We recommend the following compensation structure for senior bank executives (the Restricted Equity proposal): Executive incentive compensation should only consist of restricted stock and restricted stock options – restricted in the sense that the executive cannot sell the shares or exercise the options for two to four years after their last day in office. However, to address liquidity concerns, managers should be permitted to annually liquidate about 5% to 15% of their ownership positions, but these ownership position annual liquidations should be restricted to an amount of $5 million to $10 million. This compensation structure will provide the managers stronger incentives to work in the interests of long-term shareholders, and avoid excessive risk-taking.[30]

The above incentive compensation proposal is consistent with several recent theoretical papers which suggest that a significant component of incentive compensation should consist of stock and stock options with long vesting periods; for example, see Edmans et al (2010), and Peng and Roell (2009). If these vesting periods were "sufficiently long" they would be similar to the above proposal.

[30] The above amounts may seem low compared to what bank executives have received during the past several decades. However, that is not necessarily the case. This proposal only limits the annual cash payoffs the executives can realize. Under this proposal, the net present value of all salary and stock compensation can be higher than they have received historically, so long as they invest in projects that lead to value creation that persists in the long-term.

The Restricted Equity proposal logically leads to a complementary proposal regarding a bank's capital structure: The high leverage implied by debt ratios in the order of 95% (as was the case for many large banks in 2008) will magnify the impact of losses on equity value. As a bank's equity value approaches zero (as they did for some banks in 2008), equity based incentive programs lose their effectiveness in motivating managers to enhance shareholder value. Hence, for equity based incentive structures to be effective, banks should be financed with considerable more equity than they are being financed currently. Our recommendation for significantly greater equity in a bank's capital structure is consistent with the recent recommendations of Admati, Demarzo, Hellwig and Pfleiderer (2010) and Fama (2010).

While our focus here is on banks, the incentives generated by the above compensation structure would be relevant for maximizing long-term shareholder value in other industries. Hence, corporate board compensation committees and institutional investors in firms in other industries should also give the above executive incentive compensation structure serious consideration. Additionally, if banks and other firms want to establish a Culture of Ownership for their officers, incentive compensation policies such as those recommended in this study need to be established to better match the incentives of insiders and long-term outside investors. Finally, we suggest that directors should adopt a similar incentive compensation structure with regard to their own incentive compensation.

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Table 1: Testable implications of the Managerial Incentives Hypothesis and Unforeseen Risk Hypothesis

Panel A: Testable implication regarding *Net CEO Payoff*

	Manager Incentives	*Net CEO Payoff* during financial crisis *and* period prior to the crisis
Managerial Incentives Hypothesis	Acting in own self-interest sometimes dissipating long-term shareholder value	+
Unforeseen Risk Hypothesis	Manager consistently acting to enhance long-term shareholder value	-

Net CEO Payoff during 2000-2008 is (A) + (B) + (C)
(A) *CEO Payoff* during 2000-2008 from *Net Trades* in their own company's stock.
(B) Total cash compensation (salary plus bonus) during 2000-2008.
(C) Estimated value lost by the manager from the decrease in the value of their beneficial holding during 2008.

Panel B: Testable implication regarding CEO's *Net Trades*

	Manager Incentives	CEO's *Net Trades* during financial crisis *and* period prior to the crisis
Managerial Incentives Hypothesis	Acting in own self-interest sometimes dissipating long-term shareholder value	Abnormally large
Unforeseen Risk Hypothesis	Manager consistently acting to enhance long-term shareholder value	Normal

"Normal" CEO's *Net Trades* are with reference to CEOs of banks that did not seek TARP funds and whose shareholders fared well during financial crisis and period prior to the crisis.

Table 2: Selected Descriptive Statistics, by sample

This table presents the mean and median dollar amount of Assets and Market Capitalization as of the end of 2000, 2006 and 2008 for each of the three primary samples: the 14 TBTF firms, the 49 L-TARP firms, and the 37 No-TARP firms.

	END OF 2000		END OF 2006		END OF 2008	
	Assets (000s)	**Market Capitalization (000s)**	**Assets (000s)**	**Market Capitalization (000s)**	**Assets (000s)**	**Market Capitalization (000s)**
TBTF Sample (n=14)						
Mean	$326,499,343	$73,627,243	$733,089,630	$98,809,110	$1,072,356,700	$47,368,914
Median	281,093,000	48,122,194	670,873,000	80,444,709	872,482,500	33,746,034
L-TARP Sample (n=49)						
Mean	$23,088,619	$4,996,060	$48,612,142	$9,146,771	$43,454,635	$3,570,823
Median	5,919,657	1,472,203	11,157,000	1,959,887	13,552,842	1,413,087
No-TARP Sample (n=37)						
Mean	$16,803,982	$2,776,577	$32,386,871	$5,117,365	$23,498,223	$1,694,581
Median	5,162,983	1,136,433	11,558,206	2,021,643	8,353,488	1,166,516

TBTF refers to the 14 too-big-to-fail financial institutions including Bank of America, Bank of New York Mellon, Citigroup, Goldman Sachs, JP Morgan Chase, Morgan Stanley, State Street, Wells Fargo, Merrill Lynch, Bear Stearns, Lehman Brothers and AIG. L-TARP includes 49 lending institutions that received TARP funds several months after many of the TBTF banks received the TARP funds. No-TARP sample includes 37 lending institutions that did not receive TARP funds.

Table 3: Trades by CEOs during 2000-2008

This table presents the stock ownership, trading, and compensation information for the CEOs of the 14 identified firms during 2000-2008. Panel A presents the trades by firm. Panel B presents the trades by year, summing all 14 firms' trades. The Value of Buys and Value of Sales represents the cumulative cash flows realized through stock acquisitions or dispositions during the period. The Value of Option Exercises represents the cost of acquiring stock through exercising options, and is calculated as number of options acquired multiplied by exercise price. The Value of Net Trades is the Value of Buys and Value of Option Exercises, subtracted from the Value of Sales. The Ratio of Net Trading to Post Trade Form 4 Holdings represents the ratio of stock traded to the amount of stock owned following each trade, based on the information disclosed on the Form 4 filing with the SEC.

Table 3, Panel A: Trades by CEOs during 2000-20008, by firm

Company	# of Buys	# of Option Exercises	# of Sales	Value of Buys	Value of Option Exercises	Value of Sales	Value of Net Trades: (Sales - Buys) 2000-2008	Ratio of Net Trading to Post-Trade Form 4 Holdings (Average Across Years)
AIG	1	14	0	$10,568	$7,392,620	$0	-$7,403,188	0.0%
Bank of America	11	17	292	2,129,776	197,404,497	223,725,511	24,191,238	27.8%
Bank of New York	29	26	566	128,480	21,877,806	77,786,666	55,780,380	15.1%
Bear Stearns	0	0	15	0	0	243,053,692	243,053,692	4.2%
Citigroup	9	43	99	8,430,672	763,368,027	947,325,315	175,526,616	18.4%
Countrywide Financial	0	267	274	0	128,199,209	530,143,206	401,943,997	55.1%
Goldman Sachs	0	0	15	0	0	40,475,735	40,475,735	1.4%
JP Morgan Chase	8	12	24	11,069,195	60,518,375	101,074,462	29,486,892	11.9%
Lehman Brothers	1	15	304	19,272	150,274,172	578,502,379	428,208,935	24.2%
Mellon Bank	11	32	65	3,311,837	10,308,283	30,287,267	16,667,147	8.5%
Merrill Lynch	1	8	69	11,250,000	6,323,804	95,478,463	77,904,659	16.0%
Morgan Stanley	0	15	46	0	62,173,905	150,980,730	88,806,825	6.8%
State Street	0	6	178	0	13,500,127	37,995,090	24,494,963	18.3%
Wells Fargo	2	15	101	50,841	238,266,366	410,583,053	172,265,846	32.4%
ALL FIRMS	**73**	**470**	**2,048**	**$36,400,641**	**$1,659,607,191**	**$3,467,411,569**	**$1,771,403,737**	**15.3%**

Table 3, Panel B: Trades by CEOs during 2000-2008, by year

YEAR	# of Buys	# of Option Exercises	# of Sales	Value of Buys	Value of Option Exercises	Value of Sales	Value of Net Trades: (Sales - Buys) 2000-2008	Ratio of Net Trading to Post-Trade Form 4 Holdings (Average Across Years)
2000	2	45	81	$4,671	$707,882,633	$962,970,443	$255,083,139	38.6%
2001	2	22	43	14,968	35,859,131	153,851,211	117,977,112	9.2%
2002	6	20	83	585,334	60,407,064	124,253,270	63,260,872	4.3%
2003	5	42	213	23,361	92,537,722	295,147,013	202,585,930	8.6%
2004	5	41	240	22,674	98,441,507	265,625,885	167,161,704	11.0%
2005	9	110	529	187,256	102,993,845	577,315,758	474,134,657	15.3%
2006	11	84	430	2,912,955	428,598,544	575,492,859	143,981,360	14.3%
2007	9	100	399	485,323	119,857,907	428,158,406	307,815,176	14.1%
2008	24	6	30	32,164,099	13,028,838	84,596,724	39,403,787	31.2%
ALL YEARS	**73**	**470**	**2,048**	**$36,400,641**	**$1,659,607,191**	**$3,467,411,569**	**$1,771,403,737**	**15.3%**

Table 4: CEO Payoff, TBTF Institutions

This table presents the cash flows realized by each firm's CEO during the relevant period through stock trades and cash compensation, as well as the Estimated Value Lost in 2008 and the Estimated Value Remaining in 2008. Panel A presents cash flows for 2000-2008. Panel B presents cash flows for 2002-2008. Panel C presents cash flows for 2004-2008. The Value of Stock Holdings at the beginning of each period represents the dollar value of stock beneficially owned by the CEO at that time. Note that this value only pertains to the owner who was CEO at that time; no adjustments are made to this number for subsequent CEO changes. This number is presented for perspective only, and is not included in any calculations performed within this table. Column (A) shows the dollar value of Total Net Trades made by each CEO during the period. Total Net Trades are Sales less Buys and Option Exercises. Column (B) shows the dollar value of cash compensation the CEO received through Salary and Bonus payments. The *CEO Payoff* Column is the sum of Columns (A) and (B), and represents the realized cash gains to the CEO. The *Estimated Value Lost*: 2008 is shown in Column (C). This column estimates the dollar value of beneficial ownership each CEO lost during 2008. It is calculated by subtracting the net shares sold during the year from the number of shares beneficially owned at the beginning of the year to estimate the number of shares owned at the end of the year. This number is then adjusted by the decrease (or increase) in the firm's stock price during 2008. The *Net CEO Payoff* Column sums Columns (A), (B) and (C), or CEO Payoff less Estimated Value Lost: 2008. The final column shows the Estimated Value Remaining: End of 2008, which is calculated by multiplying the estimated number of shares owned at the end of the year (based on the Column (C) calculation) by the stock price at the end of the year. This number is based off of the beginning of 2008 beneficial ownership, adjusted by intra-year transactions, and does not include stock gifts or compensation grants received during the year.

Because not all 14 firms were independent going-concerns throughout 2008, several assumptions are necessary. The following notes relate to unique situations concerning Estimated Value Lost during 2008 and Estimated Value Remaining at the end of 2008 at four firms:

(1) For purposes of calculating Estimated Value Lost and Estimated Value Remaining, Bear Stearns' ending 2008 stock price is assumed to be $9.35, or the estimated price JP Morgan Chase paid per share on June 2, 2008.
(2) Countrywide Financial was acquired by Bank of America in July 2008. Countrywide did not file a 2008 10-K or proxy statement. No information is available about Cash Compensation for CEO Angelo Mozilo for 2008, so it is set at $0 for the year. Estimated Value Lost is based on Mozilo's estimated stock holdings at the beginning of the year and the change in Countrywide Financial stock price through June 30, 2008. Estimated Value Remaining is based on Mozilo's estimated holdings in Countrywide as of June 30, 2008.
(3) Lehman Brothers filed for bankruptcy on September 15, 2008. For purposes of calculating Estimated Value Lost and Estimated Value Remaining, Lehman Brothers' ending 2008 stock price is assumed to be $0.
(4) Mellon Financial was acquired by Bank of New York in July 2007. Mellon did not file a 2007 10-K or proxy statement. No information is available about Cash Compensation for CEO Robert Kelly for 2007, so it is set at $0 for the year. Estimated Value Lost is based on Kelly's estimated stock holdings at the beginning of the year and the change in Mellon Financial stock price through June 30, 2007. Estimated Value Remaining is based on Kelly's estimated holdings in Mellon as of June 30, 2007.

Table 4, Panel A: 2000-2008 CEO Payoff

Company	Value of Stock Holdings: Beginning of 2000	Total Net Trades: 2000-2008 (A)	Total Cash Compensation: 2000-2008 (B)	CEO Payoff (Realized Cash Gains): 2000-2008 (A)+(B)	Estimated Value Lost (Unrealized Paper Loss):2008 (C)	Net CEO Payoff: 2000-2008 (A)+(B)+(C)	Estimated Value Remaining: End of 2008
AIG	$3,288,184,509	-$7,403,188	$53,000,338	$45,597,150	-$20,052,183	$25,544,967	$554,943
Bank of America	42,931,341	24,191,238	41,645,833	65,837,071	-124,620,911	-58,783,840	64,557,116
Bank of New York	35,277,000	55,780,380	62,187,998	117,968,378	-13,609,007	104,359,371	18,871,423
Bear Stearns (1)	299,219,861	243,053,692	83,528,081	326,581,773	-324,691,895	1,889,878	38,385,395
Citigroup	1,217,275,401	175,526,616	85,156,839	260,683,455	-38,914,762	221,768,693	11,487,816
Countrywide Financial (2)	66,775,746	401,943,997	90,211,728	492,155,725	-114,773,127	377,382,598	104,005,498
Goldman Sachs	371,469,755	40,475,735	91,489,574	131,965,309	-257,534,257	-125,568,948	166,334,884
JP Morgan Chase	107,767,012	29,486,892	83,361,250	112,848,142	-105,420,736	7,427,406	274,250,479
Lehman Brothers (3)	263,173,216	428,208,935	56,700,000	484,908,935	-796,322,784	-311,413,849	0
Mellon Financial (4)	26,402,150	16,667,147	19,208,205	35,875,352	1,212,310	37,087,662	28,833,326
Merrill Lynch	199,120,374	77,904,659	89,407,692	167,312,351	-20,192,048	147,120,303	6,583,385
Morgan Stanley	840,975,081	88,806,825	69,103,887	157,910,712	-144,474,839	13,435,873	62,513,526
State Street	26,501,303	24,494,963	20,767,340	45,262,303	-51,530,173	-6,267,870	48,404,149
Wells Fargo	133,412,007	172,265,846	45,468,535	217,734,381	-2,758,746	214,975,635	114,546,238
ALL FIRMS	**$6,846,638,948**	**$1,771,403,737**	**$891,237,300**	**$2,662,641,037**	**-$2,013,683,157**	**$648,957,880**	**$939,328,179**

Table 4, Panel B: 2002-2008 CEO Payoff

Company	Value of Stock Holdings: Beginning of 2002	Total Net Trades: 2002-2008 (A)	Total Cash Compensation: 2002-2008 (B)	CEO Payoff (Realized Cash Gains): 2002-2008 (A)+(B)	Estimated Value Lost (Unrealized Paper Loss): 2008 (C)	Net CEO Payoff: 2002-2008 (A)+(B)+(C)	Estimated Value Remaining: End of 2008
AIG	$3,594,451,657	-$5,382,707	$46,000,338	$40,617,631	-$20,052,183	$20,565,448	$554,943
Bank of America	91,786,388	23,366,558	32,612,500	55,979,058	-124,620,911	-68,641,853	64,557,116
Bank of New York	142,638,677	52,035,882	41,392,260	93,428,142	-13,609,007	79,819,135	18,871,423
Bear Stearns (1)	430,959,258	217,312,893	62,189,373	279,502,266	-324,691,895	-45,189,629	38,385,395
Citigroup	1,644,100,384	11,947,821	47,685,677	59,633,498	-38,914,762	20,718,736	11,487,816
Countrywide Financial (2)	113,447,815	399,466,126	78,693,417	478,159,543	-114,773,127	363,386,416	104,005,498
Goldman Sachs	370,810,790	40,475,735	64,682,474	105,158,209	-257,534,257	-152,376,048	166,334,884
JP Morgan Chase	127,334,850	25,590,073	66,080,000	91,670,073	-105,420,736	-13,750,663	274,250,479
Lehman Brothers (3)	447,312,706	349,144,912	42,450,000	391,594,912	-796,322,784	-404,727,872	0
Mellon Financial (4)	39,351,461	8,367,088	14,833,205	23,200,293	1,212,310	24,412,603	28,833,326
Merrill Lynch	232,105,475	52,421,714	71,457,692	123,879,406	-20,192,048	103,687,358	6,583,385
Morgan Stanley	344,463,808	43,321,434	47,328,887	90,650,321	-144,474,839	-53,824,518	62,513,526
State Street	114,098,116	19,329,608	16,106,995	35,436,603	-51,530,173	-16,093,570	48,404,149
Wells Fargo	194,214,701	160,946,349	35,603,535	196,549,884	-2,758,746	193,791,138	114,546,238
ALL FIRMS	**$7,887,076,084**	**$1,398,343,486**	**$667,116,353**	**$2,065,459,839**	**-$2,013,683,157**	**$51,776,682**	**$939,328,179**

Table 4, Panel C: 2004-2008 CEO Payoff

Company	Value of Stock Holdings: Beginning of 2004	Total Net Trades: 2004-2008 (A)	Total Cash Compensation: 2004-2008 (B)	CEO Payoff (Realized Cash Gains): 2004-2008 (A)+(B)	Estimated Value Lost (Unrealized Paper Loss):2008 (C)	Net CEO Payoff: 2004-2008 (A)+(B)+(C)	Estimated Value Remaining: End of 2008
AIG	$3,002,954,389	-$3,064,736	$32,500,338	$29,435,602	-$20,052,183	$9,383,419	$554,943
Bank of America	145,346,983	-3,429,732	18,862,500	15,432,768	-124,620,911	-109,188,143	64,557,116
Bank of New York	164,790,978	44,119,270	28,898,240	73,017,510	-13,609,007	59,408,503	18,871,423
Bear Stearns (1)	551,226,148	140,090,185	40,773,191	180,863,376	-324,691,895	-143,828,519	38,385,395
Citigroup	84,295,049	1,889,769	39,081,666	40,971,435	-38,914,762	2,056,673	11,487,816
Countrywide Financial (2)	465,597,033	376,914,498	46,730,652	423,645,150	-114,773,127	308,872,023	104,005,498
Goldman Sachs	407,201,420	40,475,735	57,228,974	97,704,709	-257,534,257	-159,829,548	166,334,884
JP Morgan Chase	173,500,840	21,587,849	48,400,000	69,987,849	-105,420,736	-35,432,887	274,250,479
Lehman Brothers (3)	434,592,614	276,359,002	33,250,000	309,609,002	-796,322,784	-486,713,782	0
Mellon Financial (4)	63,387,356	7,115,917	10,708,205	17,824,122	1,212,310	19,036,432	28,833,326
Merrill Lynch	127,231,556	52,400,569	49,757,692	102,158,261	-20,192,048	81,966,213	6,583,385
Morgan Stanley	339,906,794	24,729,360	33,053,887	57,783,247	-144,474,839	-86,691,592	62,513,526
State Street	136,857,334	14,441,482	11,053,079	25,494,561	-51,530,173	-26,035,612	48,404,149
Wells Fargo	360,778,278	138,867,516	19,113,535	157,981,051	-2,758,746	155,222,305	114,546,238
ALL FIRMS	**$6,457,666,773**	**$1,132,496,684**	**$469,411,959**	**$1,601,908,643**	**-$2,013,683,157**	**-$411,774,514**	**$939,328,179**

Table 5: CEO Trading and CEO Holdings

This table compares the total CEO trading activity (Total Net Trades from Table 4) and CEO stock ownership by period and by sample. The three time periods are 2000-2008, 2002-2008 and 2004-2008. The three samples are the 14 TBTF firms, the 49 L-TARP firms and the 37 No-TARP firms. Panel A presents the mean and median dollar amount of Total Net Trades for each sample and time period, as well as the mean and median ratio of Total Net Trades to Beginning of Period Holdings (2000, 2002 and 2008). Panel B presents the calculation of the mean and median values of Net CEO Payoff: 2000-2008 for each of the three samples. Net CEO Payoff is calculated as in Table 4. Panel C presents the estimated value remaining at the end of three periods and the ratio of value remaining at the end of the period to the value at the beginning of the period for each sample.

Table 5, Panel A: Total Net Trades and Beginning Holdings.

	Total Net Trades: 2000-2008	**Total Net Trades: 2002-2008**	**Total Net Trades: 2004-2008**	**Ratio of Trades to Beginning Holdings: 2000-2008**	**Ratio of Trades to Beginning Holdings: 2002-2008**	**Ratio of Trades to Beginning Holdings: 2004-2008**
TBTF Firms (n=14)						
Mean	$126,528,838	$99,881,678	$80,892,620	103.4% ***	52.2% ***	23.4% **
Median	$66,842,520	$41,898,585	$32,602,548	59.7% ***	21.9% **	11.8%**
L-TARP Firms (n=49)						
Mean	$5,724,901	$4,893,079	$3,158,121	100.4% ***	19.1% *	10.2% *
Median	$1,090,134	$878,228	$561,761	17.6% *	8.4% *	3.5%*
No-TARP Firms (n=37)						
Mean	$11,826,280	$11,239,377	$9,107,443	43.9%	12.1%	-1.3%
Median	$1,226,977	$599,057	$32,818	4.0%	2.6%	0.1%

Difference tests are performed to determine if the Ratio of Trades to Beginning Holdings for the No-TARP sample is significantly different from the same ratio for each of the TBTF and L-TARP samples. * indicates statistically different ratios at the 10% level, ** indicates statistically different ratios at the 5% level, and *** indicates statistically different ratios at the 1% level.

Table 5, Panel B: 2000-2008 CEO Payoff, by sample

Company	Value of Stock Holdings: Beginning of 2000	Total Net Trades: 2000-2008 (A)	Total Cash Compensation: 2000-2008 (B)	CEO Payoff: 2000-2008 (A)+(B)	Estimated Value Lost: 2008 (C)	Net CEO Payoff: 2000-2008 (A)+(B)+(C)
TBTF Firms (n=14)						
Mean Values	$494,177,483	$126,528,838	$63,659,807	$190,188,646	($143,834,511)	$46,354,134
Median Values	$166,266,190	$66,842,520	$65,645,943	$144,938,011	($78,475,455)	$19,490,420
L-TARP Firms (n=49)						
Mean Values	$29,803,554	$5,724,901	$11,778,980	$17,503,880	($13,506,398)	$3,997,482
Median Values	$14,322,737	$1,090,134	$10,437,874	$12,256,013	($3,985,288)	$5,208,903
No-TARP Firms (n=37)						
Mean Values	$25,390,421	$11,826,280	$10,707,257	$22,533,537	($18,131,515)	$9,792,473
Median Values	$11,278,785	$1,226,977	$8,400,500	$9,279,892	($5,397,493)	$5,728,988

Table 5, Panel C: CEO Estimated Value Remaining, by date

Company	Estimated Value Remaining: End of 2002	Estimated Value Remaining: End of 2004	Estimated Value Remaining: End of 2008	Ratio of Estimated Value Remaining 2008 to Estimated Value Remaining 2000	Ratio of Estimated Value Remaining 2008 to Estimated Value Remaining 2002	Ratio of Estimated Value Remaining 2008 to Estimated Value Remaining 2004
TBTF Firms (n=14)						
Mean Values	$563,362,577	$461,261,912	$67,094,870	75.8% ***	45.8% ***	31.0% **
Median Values	$213,160,088	$256,703,817	$43,394,772	49.1% ***	30.3% **	20.4% **
L-TARP Firms (n=49)						
Mean Values	$48,243,797	$61,721,262	$33,536,667	232.5%	94.1% ***	67.4% **
Median Values	$25,912,886	$31,371,055	$12,054,871	115.8% *	69.6% **	50.7% **
No-TARP Firms (n=37)						
Mean Values	$47,335,631	$79,895,581	$40,859,879	302.3%	608.0%	146.3%
Median Values	$29,914,936	$42,666,290	$17,983,848	247.1%	121.1%	101.0%

Difference tests are performed to determine if the Ratio of Estimated Value Remaining at the end of each period to the Value at the beginning of the period for the No-TARP sample is significantly different from the same ratio for each of the TBTF and L-TARP samples. * indicates statistically different ratios at the 10% level, ** indicates statistically different ratios at the 5% level, and *** indicates statistically different ratios at the 1% level.

Table 6: Trades by All Insiders, including officers and directors, 2000-2008

This table presents the stock ownership, trading, and compensation information for the CEOs of the 14 identified firms during 2000-2008. Panel A presents the trades by firm. Panel B presents the trades by year, summing all 14 firms' trades. The Value of Buys and Value of Sales represents the cumulative cash flows realized through stock acquisitions or dispositions during the period. The Value of Option Exercises represents the cost of exercising options, calculated as number of options exercised multiplied by exercise price. The Value of Net Trades is the Value of Buys subtracted from the Value of Sales. The Ratio of Net Trading to Post Trade Form 4 Holdings represents the ratio of stock traded to the amount of stock owned following each trade, based on the information disclosed on the Form 4 filing with the SEC.

Table 6, Panel A: Trades by All Insiders, 2000-2008, by firm

Company	# of Buys	# of Option Exercises	# of Sales	Value of Buys	Value of Option Exercises	Value of Sales	Value of Net Trades: (Sales - Buys) 2000-2008	Ratio of Net Trading to Post-Trade Form 4 Holdings (Average Across Years)
AIG	213	343	356	$845,336,054	$99,348,973	$28,607,422,695	$27,662,737,668	2.6%
Bank of America	101	179	1,929	622,740,251	491,762,285	2,599,516,805	1,485,014,269	17.5%
Bank of New York	1,018	254	2,926	577,717,648	112,548,478	5,940,553,101	5,250,286,975	8.3%
Bear Stearns	57	14	267	767,736,009	27,640,980	12,272,990,704	11,477,613,715	5.7%
Citigroup	77	520	1,268	3,197,466,366	1,528,122,839	23,688,319,446	18,962,730,241	11.7%
Countrywide Financial	20	1,077	1,241	1,155,309,803	324,718,206	8,427,583,600	6,947,555,591	11.9%
Goldman Sachs	12	7	1,950	5,547,803,152	10,090,836	37,725,387,806	32,167,493,818	12.2%
JP Morgan Chase	43	135	378	523,367,697	267,793,650	4,838,519,988	4,047,358,641	9.2%
Lehman Brothers	8	96	1,166	1,375,487,324	423,175,832	4,638,292,995	2,839,629,839	21.1%
Mellon Financial	26	207	574	145,818,377	44,642,852	1,666,696,004	1,476,234,775	7.7%
Merrill Lynch	14	75	692	519,773,797	70,775,414	2,804,184,934	2,213,635,723	14.2%
Morgan Stanley	32	114	485	615,610,159	197,124,169	9,661,073,884	8,848,339,556	5.7%
State Street	6	82	808	164,101,279	58,954,559	552,267,889	329,212,051	21.6%
Wells Fargo	44	351	647	1,086,739,992	698,093,602	5,057,961,919	3,273,128,325	16.7%
ALL FIRMS	**1,671**	**3,454**	**14,687**	**$17,145,007,908**	**$4,354,792,675**	**$148,480,771,771**	**$126,980,971,188**	**9.7%**

Table 6, Panel B: Trades by All Insiders, 2000-2008, by year

YEAR	# of Buys	# of Option Exercises	# of Sales	Value of Buys	Value of Option Exercises	Value of Sales	Value of Net Trades: (Sales - Buys) 2000-2008	Ratio of Net Trading to Post-Trade Form 4 Holdings (Average Across Years)
2000	246	579	1,344	$4,717,183,583	$1,157,085,399	$17,019,980,683	$11,145,711,701	19.7%
2001	230	323	1,167	2,270,309,993	252,859,783	20,829,849,138	18,306,679,362	9.3%
2002	242	273	819	2,089,804,441	307,255,898	8,275,345,275	5,878,284,936	19.5%
2003	182	371	1,305	1,180,185,242	347,236,054	14,316,327,557	12,788,906,261	6.6%
2004	193	468	1,853	1,281,017,607	481,009,313	18,373,207,366	16,611,180,446	5.9%
2005	192	529	1,816	1,108,591,232	405,368,091	15,342,500,464	13,828,541,141	6.1%
2006	168	504	2,417	2,612,637,201	853,471,050	20,348,529,583	16,882,421,332	10.8%
2007	95	324	2,522	1,606,875,211	397,003,384	26,880,668,526	24,876,789,931	5.1%
2008	123	83	1,444	278,403,398	153,503,703	7,094,363,180	6,662,456,079	3.5%
ALL YEARS	**1,671**	**3,454**	**14,687**	**$17,145,007,908**	**$4,354,792,675**	**$148,480,771,771**	**$126,980,971,188**	**9.7%**

Table 7: Fama-French / Carhart 4-Factor Abnormal Return Regressions

This table presents the summary results from Carhart (1997) 4-factor regressions performed on each of the three samples – No-TARP, L-TARP, and TBTF – as well as on arbitrage portfolios comparing the No-TARP sample to each of the others. Equally weighted portfolios are formed using daily returns for all firms within each sample. These daily portfolio returns are then regressed in the model:

$$R_{Portfolio\text{-}t} = \alpha + \beta_1(R_{Mkt}\text{-}R_f)_t + \beta_2(SMB)_t + \beta_3(HML)_t + \beta_4(UMD)_t + \varepsilon_t,$$

where (R_{Mkt}-R_f) is the market factor, or the excess return on the market portfolio, SMB is the size factor, or the excess return on a portfolio long small company stocks and short large company stocks, HML is the value factor, or the excess return on a portfolio long high book-to-market stocks and short low book-to-market stocks and UMD is the momentum factor, or the excess return on a portfolio long recent winners and short recent losers. Each of these four factors is obtained from Ken French's website. Therefore, α represents the abnormal return on each of the bank portfolios after controlling for each of these four factors. $\alpha_{No\text{-}TARP}$ is the abnormal return for the 37 No-TARP firms, $\alpha_{L\text{-}TARP}$ is the abnormal return for the 49 L-TARP firms, and α_{TBTF} is the abnormal return for the 14 TBTF. Two arbitrage portfolios are formed using the bank portfolios: $\alpha_{No\text{-}TARP - TBTF}$ is the abnormal return for a portfolio long the 37 No-TARP firms and short the 14 TBTF firms, and $\alpha_{No\text{-}TARP - L\text{-}TARP}$ is the abnormal return for a portfolio long the 37 No-TARP firms and short the 49 L-TARP firms. Abnormal returns are provided for each of the three portfolios over each of three time periods: All Years, or 2000-2008, 2002-2008, and, 2004-2008. Abnormal returns are provided with robust t-statistics below in parentheses.

		Abnormal Returns: *No-TARP - TBTF*		
		$\alpha_{No\text{-}TARP}$	α_{TBTF}	$\alpha_{No\text{-}TARP\text{ - }TBTF}$
(1)	All Years, Daily	0.033	-0.002	0.035
		(1.90)	*(0.09)*	*(2.45)*
(2)	2002-2008, Daily	0.023	-0.021	0.043
		(2.20)	*(0.77)*	*(2.64)*
(3)	2004-2008, Daily	0.021	-0.030	0.051
		(1.91)	*(0.89)*	*(2.66)*

		Abnormal Returns: *No-TARP - L-TARP*		
		$\alpha_{No\text{-}TARP}$	$\alpha_{L\text{-}TARP}$	$\alpha_{No\ TARP\text{ - }L\text{-}TARP}$
(1)	All Years, Daily	0.033	0.005	0.028
		(1.90)	*(0.24)*	*(2.48)*
(2)	2002-2008, Daily	0.023	-0.001	0.023
		(2.20)	*(0.04)*	*(1.89)*
(3)	2004-2008, Daily	0.021	-0.005	0.025
		(1.91)	*(0.17)*	*(1.62)*

Appendix A: TARP Recipient Information

This appendix shows how much TARP money each of the 49 L-TARP firms received and when they first received TARP funding.

		TARP Amount Received ($000s)	Date Received Initial TARP Funding			TARP Amount Received ($000s)	Date Received Initial TARP Funding
(1)	Anchor Bancorp Inc./WI	$110,000	January 30, 2009	(27)	Provident Bankshares Corp.	$151,500	November 14, 2008
(2)	Associated Banc-Corp.	525,000	November 21, 2008	(28)	Regions Financial Corp.	3,500,000	November 14, 2008
(3)	BB&T Corp.	3,133,640	November 14, 2008	(29)	South Financial Group Inc.	347,000	December 5, 2008
(4)	Boston Private Financial Holdings	154,000	November 21, 2008	(30)	Sterling Bancorp/NY	42,000	December 23, 2008
(5)	Cascade Bancorp	38,970	November 21, 2008	(31)	Sterling Bancshares/TX	125,198	December 12, 2008
(6)	Cathay General Bancorp	258,000	December 5, 2008	(32)	Sterling Financial Corp./WA	303,000	December 5, 2008
(7)	Central Pacific Financial Corp.	135,000	January 9, 2009	(33)	Suntrust Banks Inc.	4,850,000	November 14, 2008
(8)	City National Corp.	400,000	November 21, 2008	(34)	Susquehanna Bancshares Inc.	300,000	December 12, 2008
(9)	Comerica Inc.	2,250,000	November 14, 2008	(35)	SVB Financial Group	235,000	December 12, 2008
(10)	East West Bancorp Inc.	306,546	December 5, 2008	(36)	Synovus Financial Corp.	967,870	December 19, 2008
(11)	Fifth Third Bancorp	3,408,000	December 31, 2008	(37)	TCF Financial Corp.	361,172	November 14, 2008
(12)	First Bancorp	424,174	January 16, 2009	(38)	U S Bancorp	6,599,000	November 14, 2008
(13)	First Financial Bancorp Inc./OH	80,000	December 23, 2008	(39)	UCBH Holdings Inc.	298,737	November 14, 2008
(14)	First Horizon National Corp.	866,540	November 14, 2008	(40)	Umpqua Holdings Corp.	214,181	November 14, 2008
(15)	First Midwest Bancorp Inc.	193,000	December 5, 2008	(41)	United Community Banks Inc.	180,000	December 5, 2008
(16)	First Niagara Financial Group	184,011	November 21, 2008	(42)	Wachovia Corp.	239	July 1, 2009
(17)	Firstmerit Corp.	125,000	January 9, 2009	(43)	Washington Fed Inc.	200,000	November 14, 2008
(18)	Flagstar Bancorp Inc.	266,657	January 30, 2009	(44)	Webster Financial Corp.	400,000	November 21, 2008
(19)	Huntington Bancshares	1,398,071	November 14, 2008	(45)	Westamerica Bancorporation	83,726	February 13, 2009
(20)	Independent Bank Corp./MI	74,426	December 12, 2008	(46)	Wilmington Trust Corp.	330,000	December 12, 2008
(21)	Keycorp	2,500,000	November 14, 2008	(47)	Wilshire Bancorp. Inc.	62,158	December 12, 2008
(22)	M&T Bank Corp.	600,000	December 23, 2008	(48)	Wintrust Financial Corp.	250,000	December 19, 2008
(23)	Marshall & Ilsley Corp.	1,715,000	November 14, 2008	(49)	Zions Bancorporation	1,400,000	November 14, 2008
(24)	Northern Trust Corp.	1,576,000	November 14, 2008				
(25)	PNC Financial Services Group Inc.	7,579,200	December 31, 2008		**TOTAL**	**$50,437,016**	
(26)	Popular Inc.	935,000	December 5, 2008				

Appendix B: CEOs by firm

	Company	2000 CEO	2008 CEO
TBTF Sample:			
(1)	AIG	Maurice Greenberg	Edward Liddy
(2)	Bank of America	Ken Lewis	Ken Lewis
(3)	Bank of New York	Thomas Renyi	Robert Kelly
(4)	Bear Stearns	James Cayne	Alan Schwartz
(5)	Citigroup	Sandy Weill	Vikram Pandit
(6)	Countrywide Financial	Angelo Mozilo	Angelo Mozilo
(7)	Goldman Sachs	Henry Paulson	Lloyd Blankfein
(8)	JP Morgan	William Harrison	James Dimon
(9)	Lehman Brothers	Richard Fuld	Richard Fuld
(10)	Mellon Bank	Martin McGuinn	Robert Kelly (2007)
(11)	Merrill Lynch	David Komansky	John Thain
(12)	Morgan Stanley	Philip Purcell	John Mack
(13)	State Street	Marshall Carter	Ronald Logue
(14)	Wells Fargo	Richard Kovacevich	John Stumpf
L-TARP Sample:			
(1)	Anchor Bancorp Inc./WI	Douglas J. Timmerman	Douglas J. Timmerman
(2)	Associated Banc-Corp.	Robert C. Gallagher	Paul S. Beideman
(3)	BB&T Corp.	John A. Allison, IV	John A. Allison, IV
(4)	Boston Private Financial Holdings	Timothy Landon Vaill	Timothy Landon Vaill
(5)	Cascade Bancorp	Patricia L. Moss	Patricia L. Moss
(6)	Cathay General Bancorp	Dunson K. Cheng, Ph.D.	Dunson K. Cheng, Ph.D.
(7)	Central Pacific Financial Corp.	Joichi Saito	Clint Arnoldus
(8)	City National Corp.	Russell Goldsmith	Russell Goldsmith
(9)	Comerica Inc.	Eugene A. Miller	Ralph W. Babb, Jr.
(10)	East West Bancorp Inc.	Dominic Ng	Dominic Ng
(11)	Fifth Third Bancorp	George A. Schaefer, Jr.	Kevin T. Kabat
(12)	First Bancorp	Angel Alvarez-Perez	Luis M. Beauchamp
(13)	First Financial Bancorp Inc./OH	Stanley Pontius	Claude Davis
(14)	First Horizon National Corp.	Ralph Horn	Gerald L. Baker
(15)	First Midwest Bancorp Inc.	Robert P. O'Meara	John M. O'Meara
(16)	First Niagara Financial Group	William Swan	John R. Koelmel
(17)	Firstmerit Corp.	John R. Cochran	Paul Greig
(18)	Flagstar Bancorp Inc.	Thomas J. Hammond	Mark T. Hammond
(19)	Huntington Bancshares	Frank G. Wobst	Thomas E. Hoaglin
(20)	Independent Bank Corp./MI	Charles van Loan	Michael M. Magee, Jr.
(21)	Keycorp	Robert W. Gillespie	Henry L. Meyer, III
(22)	M&T Bank Corp.	Robert G. Wilmers	Robert G. Wilmers
(23)	Marshall & Ilsley Corp.	James B. Wigdale	Mark F. Furlong
(24)	Northern Trust Corp.	William A. Osborn	Frederick H. Waddell
(25)	PNC Financial Services Group Inc.	James E. Rohr	James E. Rohr
(26)	Popular Inc.	Richard L. Carrion	Richard L. Carrion
(27)	Provident Bankshares Corp.	Peter M. Martin	Gary N. Geisel
(28)	Regions Financial Corp.	Carl E. Jones, Jr.	C. Dowd Ritter
(29)	South Financial Group Inc.	Mack I. Whittle, Jr.	Mack I. Whittle, Jr.
(30)	Sterling Bancorp/NY	Louis J. Cappelli	Louis J. Cappelli
(31)	Sterling Bancshares/TX	George Martinez	J. Downey Bridgwater
(32)	Sterling Financial Corp./WA	Harold B. Gilkey	Harold B. Gilkey
(33)	Suntrust Banks Inc.	L. Phillip Humann	James M. Wells, III
(34)	Susquehanna Bancshares Inc.	Robert S. Bolinger	William John Reuter
(35)	SVB Financial Group	John C. Dean	Kenneth Parmalee Wilcox
(36)	Synovus Financial Corp.	James H. Blanchard	Richard E. Anthony

Appendix B, continued:

	Company	2000 CEO	2008 CEO
L-TARP Sample (continued):			
(37)	TCF Financial Corp.	Bill Cooper	Lynn A. Nagorske
(38)	U S Bancorp	Jerry A. Grundhofer	Richard K. Davis
(39)	UCBH Holdings Inc.	Thomas S. Wu	Thomas S. Wu
(40)	Umpqua Holdings Corp.	Raymond P. Davis	Raymond P. Davis
(41)	United Community Banks Inc.	Jimmy Tallent	Jimmy Tallent
(42)	Wachovia Corp.	G. Kennedy Thompson	G. Kennedy Thompson
(43)	Washington Fed Inc.	Guy C. Pinkerton	Roy Whitehead
(44)	Webster Financial Corp.	James C. Smith	James C. Smith
(45)	Westamerica Bancorporation	David L. Payne	David L. Payne
(46)	Wilmington Trust Corp.	Ted Thomas Cecala	Ted Thomas Cecala
(47)	Wilshire Bancorp. Inc.	Soo Bong Min	Joanne Kim
(48)	Wintrust Financial Corp.	Edward Joseph Wehmer	Edward Joseph Wehmer
(49)	Zions Bancorporation	Harris H. Simmons	Harris H. Simmons
No-TARP Sample:			
(1)	Astoria Financial Corp.	George L. Engelke, Jr.	George L. Engelke, Jr.
(2)	Bank Mutual Corp.	Michael T. Crowley, Jr.	Michael T. Crowley, Jr.
(3)	Bank of Hawaii Corp.	Lawrence M. Johnson	Al Landon
(4)	Brookline Bancorp Inc.	Richard P. Chapman, Jr.	Richard P. Chapman, Jr.
(5)	Chittenden Corp.	Paul A. Perrault	Paul A. Perrault (2007)
(6)	Colonial Bancgroup	Robert E. Lowder	Robert E. Lowder
(7)	Commerce Bancorp Inc./NJ	Vernon W. Hill, II	Vernon W. Hill, II (2007)
(8)	Compass Bancshares Inc.	D. Paul Jones Jr.	D. Paul Jones Jr. (2006)
(9)	Corus Bankshares Inc.	Robert J. Glickman	Robert J. Glickman
(10)	Cullen/Frost Bankers Inc.	Richard W. Evans, Jr.	Richard W. Evans, Jr.
(11)	Dime Community Bancshares	Vincent F. Palagiano	Vincent F. Palagiano
(12)	Downey Financial Corp.	Daniel D. Rosenthal	Daniel D. Rosenthal
(13)	First Commonwealth Financial Corp./PA	Joseph E. O'Dell	John J. Dolan
(14)	First Indiana Corp.	Marni McKinney	Robert H. Warrington (2007)
(15)	Firstfed Financial Corp./CA	Babette E. Heimbuch	Babette E. Heimbuch
(16)	Franklin Bank Corp.	Anthony J. Nocella	Anthony J. Nocella (2006)
(17)	Fremon General Corp.	James A. McIntyre	James A. McIntyre (2007)
(18)	Glacier Bancorp Inc.	Michael J. Blodnick	Michael J. Blodnick
(19)	Greater Bay Bancorp	David L. Kalkbrenner	Byron A. Scordelis (2007)
(20)	Hanmi Financial Corp.	Chung Hoon Youk	Jay Seung Yoo
(21)	Hudson City Bancorp Inc.	Leonard Gudelski	Ronald E. Hermance, Jr.
(22)	Indymac Bancorp Inc.	Michael W. Perry	Michael W. Perry
(23)	Investors Financial Services Corp.	Kevin J. Sheehan	Kevin J. Sheehan (2007)
(24)	Irwin Financial Corp.	William I. Miller	William I. Miller
(25)	Jefferies Group Inc.	Frank E. Baxter	Richard B. Handler
(26)	MAF Bancorp Inc.	Allen H. Koranda	Allen H. Koranda (2007)
(27)	Mercantile Bankshares Corp.	H. Furlong Baldwin	Edward J. Kelly, III (2007)
(28)	National City Corp	David A. Daberko	Peter E. Raskind
(29)	New York Community Bancorp Inc.	Joseph R. Ficalora	Joseph R. Ficalora
(30)	Prosperity Bancshares Inc.	David Zalman	David Zalman
(31)	SLM Corp.	Albert L. Lord	Albert L. Lord
(32)	Sovereign Bancorp Inc.	Jay S. Sidhu	James Campanelli
(33)	TD Banknorth Inc.	William J. Ryan	William J. Ryan (2007)
(34)	Trustco Bank Corp/NY	Robert A. McCormick	Robert J. McCormick
(35)	Unionbancal Corp.	Takahiro Moriguchi	Masaaki Tanaka
(36)	United Bankshares Inc./WV	Richard M. Adams	Richard M. Adams
(37)	Washington Mutual Inc.	Kerry K. Killinger	Kerry K. Killinger

Appendix C: Net CEO Payoff, 2000-2008, L-TARP and No-TARP firms

	L-TARP Sample	Value of Stock Holdings: First Available year	Total Net Trades: 2000-2008 (A)	Total Cash Compensation: 2000-2008 (B)	CEO Payoff: 2000-2008 (A)+(B)	Estimated Value Lost: 2008 (C)	Net CEO Payoff: 2000-2008 (A)+(B)+(C)	Estimated Value Remaining: Last Available Year
(1)	Anchor Bancorp Inc./WI	$26,883,312	$3,798,047	$5,192,086	$8,990,133	($23,352,645)	($14,362,512)	$4,023,879
(2)	Associated Banc-Corp.	8,874,040	(30,001,135)	10,036,279	(19,964,856)	(2,514,926)	(22,479,782)	10,651,717
(3)	BB&T Corp.	21,728,513	(192,218)	19,920,237	19,728,019	(9,082,332)	10,645,687	69,856,043
(4)	Boston Private Financial Holdings	2,967,297	5,267,959	9,584,909	14,852,868	(1,786,159)	13,066,709	3,043,417
(5)	Cascade Bancorp	954,474	2,306,853	4,382,294	6,689,147	(871,749)	5,817,398	1,658,455
(6)	Cathay General Bancorp	7,674,180	(980,910)	12,863,900	11,882,990	5,729,173	17,612,163	51,744,861
(7)	Central Pacific Financial Corp.	945,087	(301,657)	6,214,516	5,912,859	(2,520,893)	3,391,966	2,872,846
(8)	City National Corp.	156,887,269	(37,714,990)	16,117,173	(21,597,817)	(3,985,288)	(25,583,105)	242,211,301
(9)	Comerica Inc.	37,008,078	3,280,726	18,839,384	22,120,110	(15,280,838)	6,839,272	24,624,024
(10)	East West Bancorp Inc.	1,418,168	56,001,460	14,864,316	70,865,776	(2,120,623)	68,745,153	18,937,545
(11)	Fifth Third Bancorp	94,954,671	16,004,385	18,070,201	34,074,586	(7,763,859)	26,310,727	7,031,606
(12)	First Bancorp	45,775,262	(2,501,250)	15,018,008	12,516,758	2,187,039	14,703,797	23,368,066
(13)	First Financial Bancorp Inc./OH	2,873,880	(413,182)	4,816,840	4,403,658	(244,623)	4,159,035	6,270,294
(14)	First Horizon National Corp.	23,241,420	375,598	11,880,415	12,256,013	(501,156)	11,754,857	2,948,692
(15)	First Midwest Bancorp Inc.	14,742,812	(862,537)	8,189,626	7,327,089	(5,912,611)	1,414,478	3,319,214
(16)	First Niagara Financial Group	1,327,892	514,706	7,965,734	8,480,440	683,777	9,164,217	5,739,089
(17)	Firstmerit Corp.	17,860,203	(6,003,165)	8,860,208	2,857,043	(9,467)	2,847,576	6,337,911
(18)	Flagstar Bancorp Inc.	45,270,316	11,201,395	19,186,296	30,387,691	(43,717,085)	(13,329,394)	6,764,771
(19)	Huntington Bancshares	52,930,054	(1,083,970)	10,556,604	9,472,634	(5,627,131)	3,845,503	10,083,762
(20)	Independent Bank Corp./MI	1,465,205	1,090,134	3,786,875	4,877,009	(1,625,078)	3,251,931	452,215
(21)	Keycorp	24,300,354	4,695,583	20,237,912	24,933,495	(36,317,124)	(11,383,629)	24,788,625
(22)	M&T Bank Corp.	265,037,489	90,350,005	9,085,770	99,435,775	(113,182,135)	(13,746,360)	268,105,332
(23)	Marshall & Ilsley Corp.	45,209,703	15,672,931	15,648,886	31,321,817	(8,294,696)	23,027,121	15,274,236
(24)	Northern Trust Corp.	70,233,651	14,326,627	24,018,750	38,345,377	(9,471,342)	28,874,035	38,157,929
(25)	PNC Financial Services Group Inc.	23,326,198	27,578,906	25,155,677	52,734,583	(34,503,496)	18,231,087	121,397,696
(26)	Popular Inc.	24,550,247	(2,617,270)	8,197,988	5,580,718	(21,051,901)	(15,471,183)	16,843,164
(27)	Provident Bankshares Corp.	5,652,313	993,635	5,673,032	6,666,667	(279,756)	6,386,911	2,782,014
(28)	Regions Financial Corp.	12,396,381	(565,296)	17,301,072	16,735,776	(43,953,037)	(27,217,261)	34,317,749
(29)	South Financial Group Inc.	2,191,101	452,030	10,437,874	10,889,904	(3,703,946)	7,185,958	3,913,017
(30)	Sterling Bancorp/NY	5,879,775	2,575,267	11,518,086	14,093,353	(1,681,301)	12,412,053	12,935,239
(31)	Sterling Bancshares/TX	7,054,247	838,199	4,590,931	5,429,130	(564,560)	4,864,570	1,126,229
(32)	Sterling Financial Corp./WA	1,567,650	803,276	6,372,000	7,175,276	(3,712,860)	3,462,416	5,864,179
(33)	Suntrust Banks Inc.	34,081,567	(8,221,733)	15,774,785	7,553,052	(18,290,432)	(10,737,380)	23,110,708
(34)	Susquehanna Bancshares Inc.	334,207	547,821	5,346,337	5,894,158	(467,600)	5,426,558	2,053,472

Appendix C, continued:

	L-TARP Sample (Cont.	Value of Stock Holdings: First Available year	Total Net Trades: 2000-2008 (A)	Total Cash Compensation: 2000-2008 (B)	CEO Payoff: 2000-2008 (A)+(B)	Estimated Value Lost: 2008 (C)	Net CEO Payoff: 2000-2008 (A)+(B)+(C)	Estimated Value Remaining: Last Available Year
(35)	SVB Financial Group	4,622,784	12,635,192	8,174,164	20,809,356	(4,567,862)	16,241,494	6,498,273
(36)	Synovus Financial Corp.	54,912,811	(117,344)	11,148,955	11,031,611	(6,262,324)	4,769,287	19,362,713
(37)	TCF Financial Corp.	49,462,373	10,610,158	14,014,293	24,624,451	(15,840,669)	8,783,782	57,282,527
(38)	U S Bancorp	52,502,559	48,810,074	27,831,430	76,641,504	(23,469,447)	53,172,057	86,149,221
(39)	UCBH Holdings Inc.	2,883,021	3,589,388	13,110,000	16,699,388	(3,450,231)	13,249,157	27,597,035
(40)	Umpqua Holdings Corp.	1,978,915	2,718,719	5,515,478	8,234,197	(490,928)	7,743,269	7,758,148
(41)	United Community Banks Inc.	11,171,789	(2,653,737)	6,006,000	3,352,263	(2,806,476)	545,787	12,054,871
(42)	Wachovia Corp.	11,549,139	(2,665,951)	36,960,000	34,294,049	(96,106,292)	(61,812,243)	120,916,584
(43)	Washington Fed Inc.	453,935	(2,906,287)	3,529,059	622,772	(1,728,100)	(1,105,328)	3,488,208
(44)	Webster Financial Corp.	22,512,768	4,112,804	10,912,779	15,025,583	(19,151,297)	(4,125,714)	14,699,167
(45)	Westamerica Bancorporation	32,713,282	12,314,172	7,093,024	19,407,196	(3,391,607)	16,015,589	113,824,504
(46)	Wilmington Trust Corp.	14,322,737	2,028,626	10,462,281	12,490,907	(8,649,788)	3,841,119	23,807,253
(47)	Wilshire Bancorp. Inc.	7,715,768	3,251,684	1,846,397	5,098,081	110,822	5,208,903	1,116,477
(48)	Wintrust Financial Corp.	4,561,083	11,834,959	5,931,149	17,766,108	(6,792,709)	10,973,399	9,959,418
(49)	Zions Bancorporation	101,414,151	9,741,440	8,930,000	18,671,440	(55,425,946)	(36,754,506)	66,172,980

	No-TARP Sample	Value of Stock Holdings: First Available year	Total Net Trades: 2000-2008 (A)	Total Cash Compensation: 2000-2008 (B)	CEO Payoff: 2000-2008 (A)+(B)	Estimated Value Lost: 2008 (C)	Net CEO Payoff: 2000-2008 (A)+(B)+(C)	Estimated Value Remaining: Last Available Year
(1)	Astoria Financial Corp.	$27,725,496	$15,733,993	$14,191,675	$29,925,668	($41,424,965)	($11,499,297)	$68,517,281
(2)	Bank Mutual Corp.	1,646,859	(5,266,976)	6,316,900	1,049,924	1,864,654	2,914,578	28,731,969
(3)	Bank of Hawaii Corp.	20,187,172	25,347,162	7,835,004	33,182,166	(1,811,046)	31,371,120	17,983,848
(4)	Brookline Bancorp Inc.	1,779,179	(1,160,977)	5,533,125	4,372,148	(1,393,151)	2,978,997	17,888,741
(5)	Chittenden Corp.	7,233,448	233,727	5,495,261	5,728,988	-	5,728,988	24,840,332
(6)	Colonial Bancgroup	64,473,910	(9,627,753)	13,072,593	3,444,840	(54,926,318)	(51,481,478)	17,154,148
(7)	Commerce Bancorp Inc./NJ	55,200,152	54,401,611	16,040,000	70,441,611	-	70,441,611	206,000,731
(8)	Compass Bancshares Inc.	23,469,767	20,771,960	14,913,707	35,685,667	-	35,685,667	101,927,174
(9)	Corus Bankshares Inc.	116,412,613	194,701	8,375,000	8,569,701	(107,251,980)	(98,682,279)	14,057,012
(10)	Cullen/Frost Bankers Inc.	9,887,202	11,471,908	9,224,000	20,695,908	(1,459,412)	19,236,496	34,520,378
(11)	Dime Community Bancshares	5,404,096	10,720,836	7,688,600	18,409,436	(6,197,389)	12,212,047	19,427,150
(12)	Downey Financial Corp.	2,163,080	(40,631)	6,955,575	6,914,944	(1,820,244)	5,094,700	1,993,807
(13)	First Commonwealth Financial Corp./PA	735,782	(317,201)	3,871,755	3,554,554	46,832	3,601,386	768,179
(14)	First Indiana Corp.	64,066,536	646,975	2,673,667	3,320,642	-	3,320,642	4,115,535

Appendix C, continued:

	No-TARP Sample (Cont.)	Value of Stock Holdings: First Available year	Total Net Trades: 2000-2008 (A)	Total Cash Compensation: 2000-2008 (B)	CEO Payoff: 2000-2008 (A)+(B)	Estimated Value Lost: 2008 (C)	Net CEO Payoff: 2000-2008 (A)+(B)+(C)	Estimated Value Remaining: Last Available Year
(15)	Firstfed Financial Corp./CA	4,890,072	(472,417)	7,065,740	6,593,323	(12,944,373)	(6,351,050)	922,131
(16)	Franklin Bank Corp.	3,535,558	(997,565)	1,970,624	973,059	-	973,059	8,530,947
(17)	Fremon General Corp.	50,683,705	68,189,404	8,400,500	76,589,904	-	76,589,904	200,727,074
(18)	Glacier Bancorp Inc.	1,757,644	(841,617)	3,234,718	2,393,101	(63,707)	2,329,394	8,355,277
(19)	Greater Bay Bancorp	4,937,347	1,344,217	6,465,697	7,809,914	-	7,809,914	5,129,375
(20)	Hanmi Financial Corp.	642,744	(454,846)	4,110,290	3,655,444	(533,000)	3,122,444	739,000
(21)	Hudson City Bancorp Inc.	8,052,291	37,915,698	19,819,233	57,734,931	(10,918,115)	46,816,816	80,729,111
(22)	Indymac Bancorp Inc.	8,257,405	(3,640,208)	12,920,100	9,279,892	(13,700,529)	(4,420,637)	15,657,748
(23)	Investors Financial Services Corp.	33,339,912	65,389,925	18,442,898	83,832,823	-	83,832,823	99,301,219
(24)	Irwin Financial Corp.	161,347,080	25,713	8,598,961	8,624,674	(45,732,991)	(37,108,317)	14,639,366
(25)	Jefferies Group Inc.	37,132,782	(7,065,004)	42,246,707	35,181,703	(19,092,724)	16,088,979	154,881,740
(26)	MAF Bancorp Inc.	17,555,668	5,856,942	4,065,879	9,922,821	-	9,922,821	48,126,603
(27)	Mercantile Bankshares Corp.	11,278,785	(5,307,271)	9,099,300	3,792,029	-	3,792,029	15,079,013
(28)	National City Corp	30,274,819	10,491,812	16,753,095	27,244,907	(6,026,823)	21,218,084	7,366,940
(29)	New York Community Bancorp Inc.	16,142,005	22,282,297	9,240,000	31,522,297	(36,516,665)	(4,994,368)	71,064,299
(30)	Prosperity Bancshares Inc.	6,083,402	3,742,015	5,378,094	9,120,109	602,724	9,722,833	19,925,077
(31)	SLM Corp.	16,556,546	79,675,704	24,466,057	104,141,761	(36,440,126)	67,701,635	52,049,817
(32)	Sovereign Bancorp Inc.	22,092,853	1,708,739	10,053,423	11,762,162	(4,768,162)	6,994,000	7,009,348
(33)	TD Banknorth Inc.	9,990,045	6,898,869	8,994,186	15,893,055	-	15,893,055	28,212,482
(34)	Trustco Bank Corp/NY	30,788,697	1,226,977	12,199,558	13,426,535	838,685	14,265,220	10,817,321
(35)	Unionbancal Corp.	165,375	(45,144)	3,703,454	3,658,310	48,680	3,706,990	98,160
(36)	United Bankshares Inc./WV	4,022,832	(1,266,544)	8,301,138	7,034,594	5,399,778	12,434,372	27,328,167
(37)	Washington Mutual Inc.	59,532,727	29,805,336	28,452,000	58,257,336	(77,199,025)	(18,941,689)	77,199,025

Figure 1: Relative Portfolio Returns of Bank Portfolios, 2000-2008

This figure presents the relative portfolio returns from 2000-2008 of three different bank portfolios. The green line on top represents the cumulative portfolio returns of the 37 *No-TARP* institutions, or those that never received TARP funding. The blue line in the middle represents the cumulative portfolio returns of the 49 *L-TARP* institutions, or those that did receive TARP funding, but only after October 2008. The dotted-red line represents the cumulative portfolio returns of the 14 *TBTF* firms, or those designated as Too Big to Fail. Monthly returns are used to form equally weighted portfolios. Cumulative portfolio returns are noted for each of the three portfolios as of the end of both 2006 and 2008.

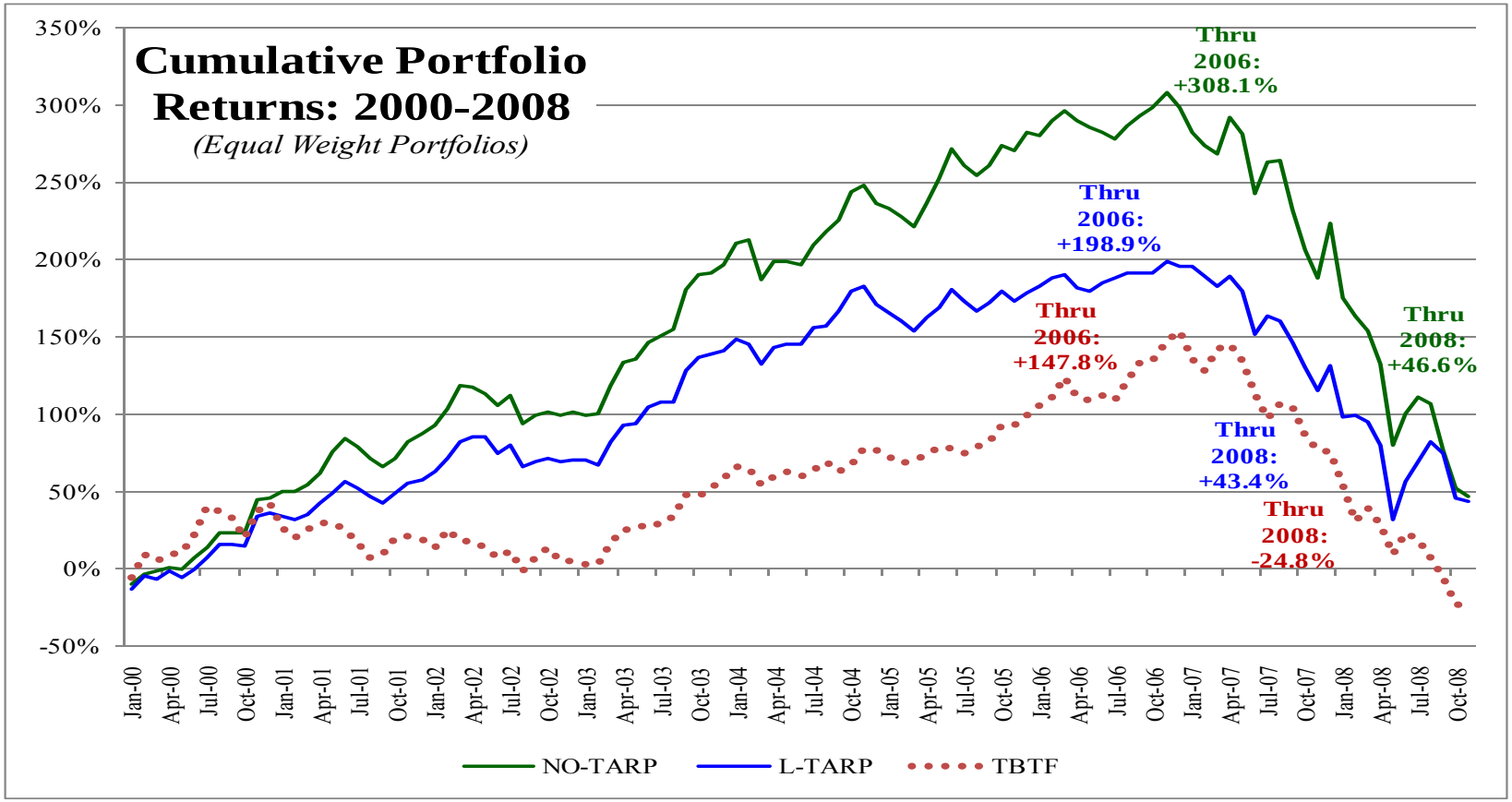


Figure 2: Mortgage Backed Security Issuance

This figure presents the total amounts of mortgage backed securities that were issued annually from 1997 to 2008. Dollar amounts of security issuance are provided in billions. Source: *Inside Mortgage Finance.*

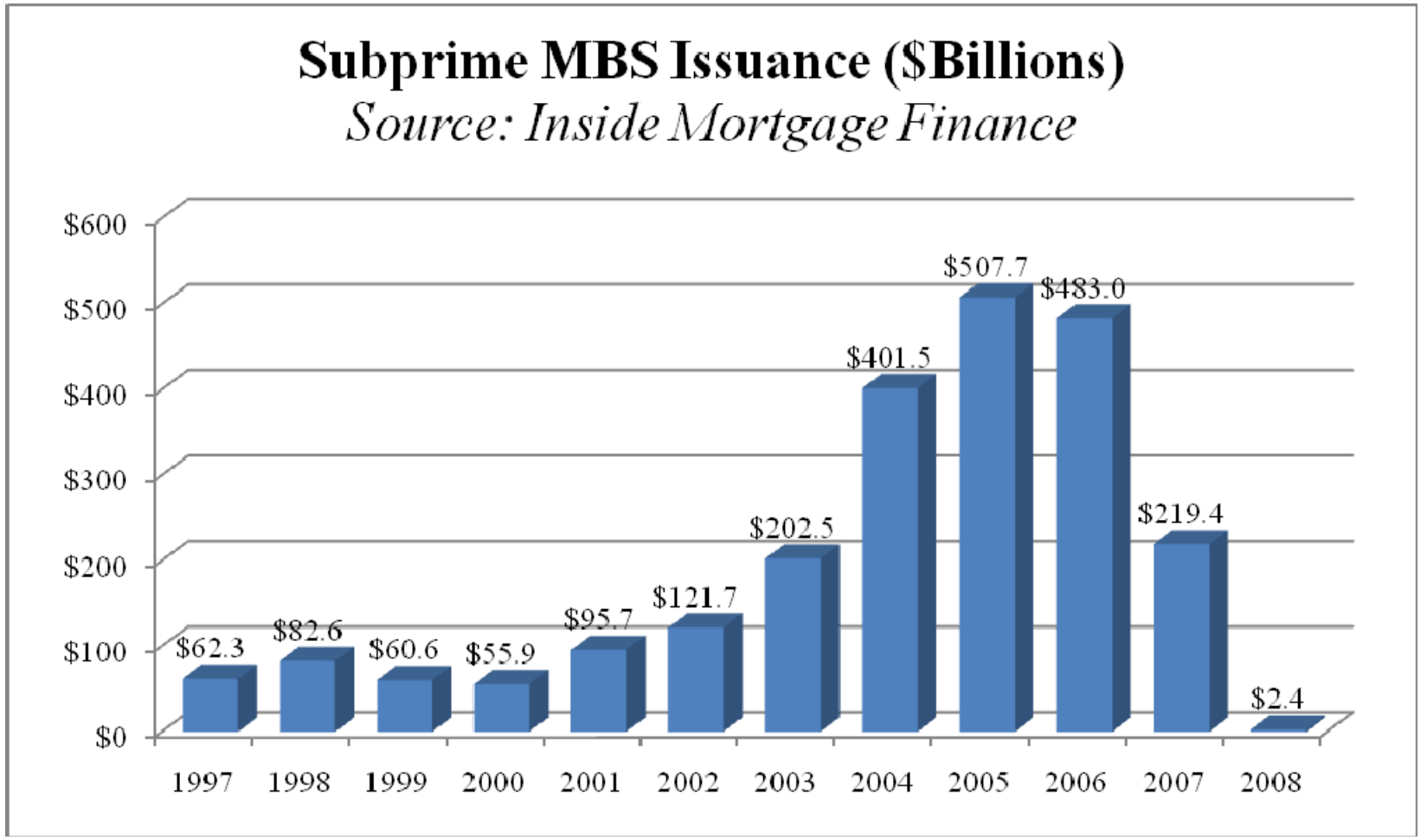
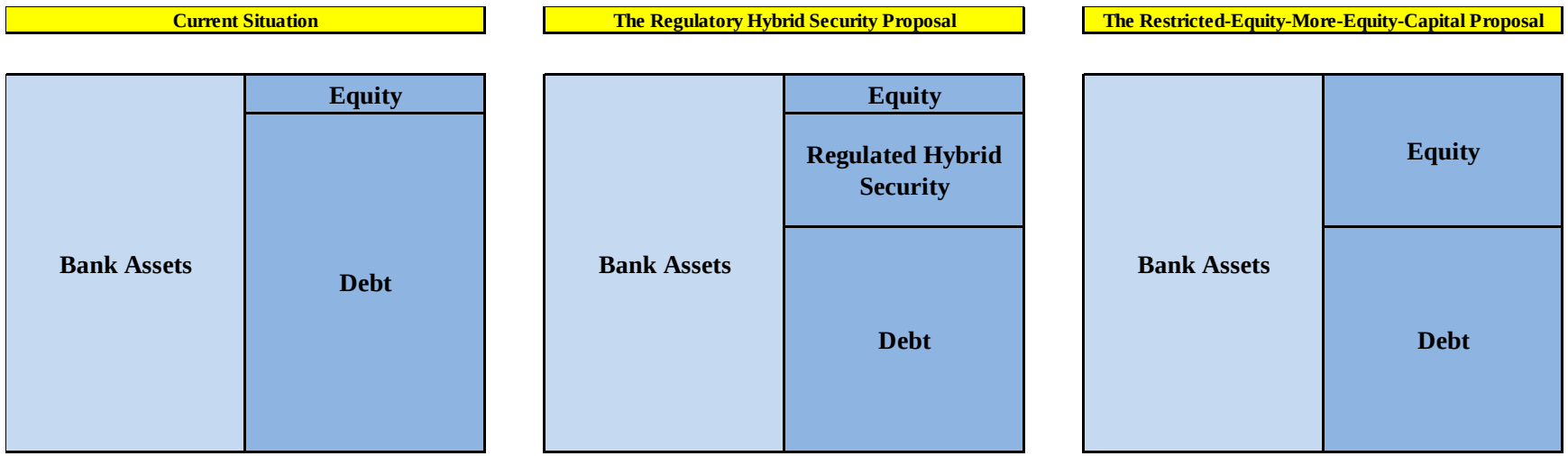


Figure 3: Balance Sheet of a Large Bank

This figure presents stylized depictions of a large bank's capital structure under three scenarios: the current situation, The Regulatory Hybrid Security proposal, and the Restricted-Equity-More-Equity-Capital proposal noted in Section 5.1.