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A Unified Analysis of Executive Pay: The Case of the Banking Industry

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The views expressed in this paper are those of the authors, not necessarily those of the Federal Reserve Bank of St. Louis or the Federal Reserve System.

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A Unified Analysis of Executive Pay:
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Abstract

This study examines executive compensation determinants in the U.S. banking industry. Multiple theories of executive pay are discussed and tested using a relatively homogenous sample. We perform an in-depth look at the corporate governance and ownership structure of the companies selected. We explore the simultaneous relationship between compensation, firm performance, and board strength, exploiting variables unique to the banking industry. Our primary finding is that after controlling for both regulatory oversight and external market discipline, a strong board is associated with higher firm performance and lower levels of executive pay, consistent with such a board of directors providing a strong monitoring function.

A Unified Analysis of Executive Pay: The Case of the Banking Industry

I. Introduction

The structure of executive compensation has been subjected to extensive academic research in almost all fields of management. It involves issues ranging from labor economics and industrial organization, to accounting, finance, law, organization behavior and strategic management.[1] As a consequence, numerous theories have been advanced with each providing another aspect of the puzzle. The purpose of the current study is to consider many of these factors in a unified test. In doing so, we augment the compensation analysis with an in-depth look at the corporate governance and ownership structure of the companies selected. We choose to focus the study on the banking industry. Banks are relatively homogenous in many of their operational characteristics, thereby allowing for a reasonable control of unspecified factors. Within the sector, we distinguish between various levels of internal, external market and regulatory monitoring, thereby allowing for testing hypotheses of executive compensation in the presence of multiple governance and monitoring mechanisms.

Executive compensation in banks has been examined in several previous studies. Barro and Barro (1990) analyze the pay-for-performance relation for a sample of large commercial banks. They show compensation to be affected by firm performance, and that the sensitivity of the relation diminishes with the experience of the CEO. Crawford, Ezzell and Miles (1995) and Hubbard and Palia (1995) each test for the effect of bank regulatory changes on the pay-performance relation. Both studies confirm executive pay sensitivity increases during the 1980s following deregulation of commercial banks (e.g., the 1980 Depository Institution Deregulation

and Monetary Control Act and legislation by nearly all states to allow interstate banking). Houston and James (1995) examine whether the form of compensation contracts in commercial banks promotes more risk taking. The authors find lower use of stock-based compensation in banks than in other industries. They interpret this evidence as being consistent with contracting theory but inconsistent with the incentive for increased risk taking resulting from depository insurance.[2] For a sample of saving and loan institutions, Hermalin and Wallace (2001) show that allowing heterogeneity in the model specification results in a stronger correlation between firm performance on managerial compensation than that found in previous studies (notably, Jensen and Murphy, 1990). These studies are only concerned with the pay-performance relation in depository institutions. Fields and Fraser (1999) examine the pay-performance in bank holding companies with securities activities around their introduction period and compare it to a handful sample of investment banks.

Our study departs from the previous literature in several ways. First, our study includes additional variables beyond firm structure and performance in order to accommodate complementing theories of pay determination that have been advanced in the economic and business strategy literatures. In particular, we examine in detail the corporate governance structure (e.g., board characteristics) of the financial institutions in the sample and consider their contracting implications. Second, we look at the effect of CEO ownership on executive compensation and extend much of the previous literature by considering the incentive effects of not only direct share ownership, but also of CEO option holdings. Third, we exploit the unique

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[1] Research on executive compensation can be traced back as far as Taussig and Barker (1925). For a review of the literature, see Gomez-Mejia (1994) and Murphy (1999).

[2] John, Saunders and Senbet (2000) have analytically linked bank capital regulation to management compensation and derive pricing of FDIC insurance premium that mitigate bank risk shifting incentives. Along similar lines, see Kane (2001) on the motivation for regulators to impose incentive-based deferred compensation for CEO's of deposit insured institutions.

claim structure in banks to examine market-based monitoring forces. Although bank holding companies are subject to similar regulation, we utilize confidential BOPEC rating data into our model to control for differences in regulatory oversight among bank holding companies. In examining the sensitivity of our results to model specification, we allow CEO compensation, firm performance and corporate governance to be simultaneously determined.

Overall, we find evidence that the relative strength of the board of directors is positively associated with firm performance and negatively associated with executive compensation. These results are consistent with a strong board providing a monitoring role within the corporate governance structure.

The remainder of the paper is organized as follows. Section II reviews the main economic and strategic theories of executive compensation. Statistics pertaining to CEO compensation and governance characteristics are presented in Section III. Section IV presents the results on the determinants of top executive remuneration. We summarize the main findings in section V.

II. Theories of Executive Remuneration

A. Principal-Agent Theory and Firm performance

Economic theory of executive pay has focused on the design of optimal compensation schemes to align the interests of hired managers and shareholders. Agency theory has identified several factors by which these interests may differ; including the level of effort exerted by the manager and problems resulting from the unobservabilty of the agent's relevant skills. The design of

optimal compensation contracts essentially trades-off between different incentive problems and risk-sharing considerations.[3]

Research has also been directed to the identification of proper performance standards for evaluation and compensation. The empirical literature has identified a strong linkage between accounting measures of return and top executive compensation (e.g., Lewellen and Huntsman, 1970, Sloan, 1993 and Joskow and Rose, 1994). Accordingly, our study will consider the accounting measure of return on assets (ROA) as a determinant of compensation. We predict a positive relation between firm performance and total compensation.

H1 Ceteris paribus, a positive association will exist between firm performance and CEO compensation.

B. Managerial Discretion and Task Complexity

In a parallel strand, recent studies in strategic management argue that managerial strategic discretion and the complexity of their job may be important determinants of CEO compensation. Managerial discretion is defined as task complexity and the latitude of options top managers have in making strategic choices. Finkelstein and Boyd (1998) refer to managerial discretion as the extent to which an organization's form and fate sit within the control of its top managers. Central to this concept is the idea that the greater the level of discretion, the greater the potential impact of actions taken by the CEO on the firm and, hence, on the ability to directly influence its performance. Thus, executive compensation is expected to be higher in high discretion contexts, which is in accord with agency theory insights on the use of subjective measures, given the difficulties outlined above to measure performance.

We measure management discretion by company size, growth, and outcome variability. Company size provides an indication of managerial responsibility and job complexity. Ceteris

[3] For a review of the incentives in firms, see Prendergast (1999) and Indjejikian (1999).

paribus, the larger the size of the company, the greater is the manager's discretion to influence the absolute value of shareholders wealth.[4] It is argued that it is more difficult to monitor management in larger firms (Smith and Watts, 1992, Eaton and Rosen, 1983, and Sloan, 1993). We predict a positive relation between firm size, proxied by the natural log of assets (ASSETS) and CEO compensation. Another important measurement of managerial discretion is the growth of operations. We use the firm ratio of market to book values (MKBK) as our proxy for potential future growth and predict MKBK will be positively associated with CEO compensation.

High discretion also suggests a greater variability of outcomes. As Finkelstein and Boyd point out: "When multiple courses of action are possible, uncertainty and complexity go up, and it becomes more difficult to predict firm performance with much accuracy. High discretion contexts also tend to be inherently more risky because firms cannot easily rely on industry recipes or norms in their strategic direction" (1998, p. 181). Hence uncertainty and job complexity go together. We measure outcome variability as the standard deviation of ROA (σROA) measured over the preceding five years, and predict a positive association between our risk/outcome variability measure and CEO compensation.

H2 Ceteris paribus, a positive association will exist between firm size and CEO compensation.

H3 Ceteris paribus, a positive association will exist between firm growth/investment opportunity and CEO compensation.

H4 Ceteris paribus, a positive association will exist between firm variability and CEO compensation.

[4] Lazear and Rosen's (1981) tournament theory offers another explanation that ties executive compensation to company size.

In the banking industry, job complexity is also a function of the intensity of regulatory oversight. CEOs facing more regulatory monitoring have typically less discretion in their strategic choices such as entering new businesses and types of products. While the past few decades have seen a trend toward deregulation away from the Glass-Steagall Act, the banking sub-group of the 1990s still faced regulation concerning what services could be provided as will as ownership restrictions.[5] Empirical findings support the fact that CEOs of regulated firms are paid less than in unregulated ones (Joskow, Rose and Shepard, 1993).

A unique feature of the banking industry is the regulator's confidential rating system for bank-holding companies (referred to as the BOPEC), and we use the composite BOPEC rating as a measure of regulatory oversight. The BOPEC composite rating is an assessment of a bank holding company's financial performance. To assess the overall financial condition of a bank holding company, regulators evaluate five aspects of holding company performance and soundness—"B" for the condition of banking subsidiaries, "O" for the condition of other nonbank subsidiaries, "P" for the condition of the parent company, "E" for the strength of holding company earnings, and "C" for the adequacy of holding company capital. A grade of 1 (best) through 5 (worst) is assigned to the "B", "O", "P", "E", and "C."[6] The composite performance evaluation, also on a 1 (best) through 5 (worst) scale, reflects supervisors' overall assessment of a holding company's safety and soundness. Bank holding companies with a composite rating of 3, 4 or 5 are considered less than satisfactory and the regulator concludes that performance is flawed, managerial attention may be required to prevent further deterioration, or the institution is in need of immediate remedial attention. A bank holding company that has a composite rating of 3, 4, or 5 is more likely to be subject to regulatory intervention; for example,

[5] See Skeel (1999) and Gibson, Dunn, and Crutcher (1999) for a discussion of regulation in the financial sector.

the regulator may take action to suspend dividend payments or prevent acquisitions. In contrast, bank holding companies with a composite BOPEC rating of 1 or 2 are "strong" or "satisfactory" and are less likely to have their operations constrained by the regulator. In order to be consistent with the use of BOPEC classification in practice, we utilize a dummy variable set equal to one if BOPEC is in (1,2) or zero if BOPEC is in (3,4,5). We predict that CEO compensation will be negatively related to the degree of regulatory monitoring.

H5 Ceteris paribus, a negative association will exist between firm regulatory monitoring and CEO compensation.

In addition to regulatory monitoring, banks are also subject to market discipline from various debt-holders.[7] We created a measure of risk-priced funding (referred to as RPF) that includes subordinated debt, federal funds, and jumbo CDs. All three of these claims are not insured deposits and, thus, potentially subject banks to market discipline. Subordinated debt is long-term, unsecured debt and is not insured by the FDIC. Federal funds are interbank loans that are uninsured and uncollateralized. Jumbo CDs are CDs of $100,000 or more. Jumbo CD holders have a greater incentive to monitor because any amount over $100,000 is not insured by the FDIC. Since each of these claimants are more likely to face losses in the event of a bank failure, they are the more likely to monitor and discipline bank holding companies. The empirical evidence suggests that each of these claimants exert discipline on large banks. First, many studies clearly demonstrate that subordinated debtholders exert market discipline on banks (e.g., Evanoff and Wall, 2001; Flannery and Sorescu, 1996). Second, studies support the notion that the federal funds market appears to exert a small amount of discipline on banks (e.g.,

[6] For more detail see section 4070 of the Federal Reserve Board of Governors' *Bank Holding Company Supervision Manual* (as of June 2003).

[7] These debtholders, because they are subject to large losses in the event of bank insolvency, have incentives similar to the regulators with respect to bank monitoring. The potential monitoring resulting from subordinated debtholders

Furfine, 2001; King, 2003). Finally, the empirical evidence also clearly supports the notion that uninsured depositors such as Jumbo CD holders discipline large banks (e.g., Ellis and Flannery, 1992; Martinez Peria and Schmukler, 2001). The ratio of risk-priced funding (i.e., the sum of jumbo CDs, federal funds and subordinated debt) to total assets is our measure of market discipline. We predict that the larger the percentage of risk-priced funding in the bank's capital structure, the more intense will be the market monitoring, leading to the following hypotheses.

H6 Ceteris paribus, a negative association will exist between firm's external market monitoring and CEO compensation.

We should also point out that the concept of managerial discretion in strategy is closely related to the finance and accounting research on the link between investment opportunities and managerial marginal products. CEOs in firms with larger investment opportunities are expected to have more skills and receive higher compensation.[8]

C. CEO Variables

We also account for two CEO specific factors. First, managerial tenure may be a determinant of compensation. This may be ambiguous though, as there are counteracting arguments on the relation between tenure and compensation. In terms of information asymmetry, the passage of time on the job allows managers the opportunity to accumulate a track record thereby improving their bargaining power. On the other hand, Hambrick and Finkelstein (1995) argue that long tenured CEOs may have a lower mobility, thereby lowering their bargaining power. Furthermore, "If the long-tenured CEO becomes very committed to established policies and

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has spawned numerous regulatory proposals requiring banks to hold minimum levels of subordinated debt. See, for example, the U.S. Shadow Financial Regulatory Committee (SFRC 2000).

[8]See Smith and Watts (1992), Bizjak, Brickley and Coles (1993), Gaver and Gaver (1993), Baber, Janakiraman and Kang (1996), and Mueller and Yun (1997) for further empirical evidence on the link between investment opportunities sets and compensation.

strategies and gives little consideration to new directions, then the person's worth to the organization is diminished… As long as the firm experiences 'satisfactory' experience, the executive will not be replaced… However the CEO's pay may start resembling the figurehead role he or she may have evolved into" (p. 181). From a corporate governance standpoint, the longer the CEOs serve in their positions, the more influence they may accumulate over the nomination of board members, thereby weakening the board independence. Therefore, while we include the variable TENURE in our tests of executive compensation, we do not make any prediction as to the direction of the association.

Managerial stock ownership is probably the most intricate determinant of compensation. Morck, Shleifer and Vishny (1988) hypothesize that the relation between firm performance and the degree of managerial share ownership is non-monotonic and present evidence in support of their prediction. At low levels managerial share ownership provides a better congruence of interest with outside shareholders. As their share ownership increases, managers gain a tighter control and may engage in non-value maximizing activities. However, at a higher ownership level, such activities have too high a personal cost and a closer realignment of objectives with outside shareholders is once again achieved. Stoughton and Talmor (1998) argue that managerial initial ownership position fundamentally influences the optimal mechanism-design compensation schedule. Depending on the relative bargaining power, they show that incentives provided by share ownership and option awards may act in opposite directions.

Much of the prior literature includes only actual stock ownership to proxy for the incentive effects of equity ownership and ignores stock options (e.g., Core, Holthausen, and Larcker, 1999). We follow the procedure outlined in Core and Guay (1998, 1999), where the sensitivity of the managers' option portfolio to a percentage change in the underlying stock price

can be estimated. We combine the sensitivity of the manager's option holdings to their stock holdings, including beneficial ownership. We define the variable OWNER as the total combined (stock plus options) sensitivity to a 1% change in stock price.

Prior empirical literature has found equity's incentive alignment effect to dominate, leading to a negative relation between OWNER and manager compensation (e.g. Core, Holthausen, and Larcker, 1999). We predict a negative relation between OWNER and CEO compensation.

H7 Ceteris paribus, a negative association will exist between CEO share ownership and CEO compensation.

D. Corporate Governance and External Ownership

The need for corporate governance arises since managerial employment contracts cannot fully resolve the agency problems from the separation of ownership and control. Incomplete state verification and prohibitive costs make it unrealistic for shareholders to map the firm strategic choices and other managerial actions, thereby disallowing a sole reliance on a pure contracting specification to align interests. Of the different corporate governance mechanisms, "the board is the shareholders' first line of defense against incompetent management" (Weisbach 1988, p. 431).[9]

The implementation of board governance remains, however, a source of concern. In practice, shareholders vote for the slate of directors proposed by management, the very CEO these directors are supposed to monitor (Hermalin and Weisbach, 1998). Worse yet, the CEO usually has the veto power on the renewal or termination of a director's service term on the board. Consequently, directors are likely to feel obligated to the CEO both for the initial appointment and at his discretion for future renewals. This led scholars to question whether

directors can be effective monitors. A counterargument, most forcefully expressed by Fama and Jensen (1983), is that directors' concern for developing reputation as experts in decision controls, provides them with the incentive to ensure the well-running of the company. This argument really applies to outside directors, as inside directors (i.e., other corporate officers on the board) are rarely in a position to challenge the CEO in the boardroom, and certainly are not expected to play a detrimental factor when setting the CEO compensation. Outside directors, however, may be concerned with the company compensation structure in the interest of shareholders to solidify a reputation capital as competent board members.[10]

Critics of corporate governance suggest that placing a large number of insiders on the board is a mechanism to minimize board control. Insiders are directors who are also officers of the firm. Weisbach (1988) provides empirical evidence that supports the view that insider are detrimental to board independence. He reports that CEOs of poorly performing firms are more likely to be removed in companies with outsider-dominated than insider-dominated boards. The National Association of Corporate Directors (NACD), in their Blue Ribbon Commission on director professionalism state, "Board independence is crucial to ensure that the board effectively carries out its mission and responsibilities, and fairly holds management accountable to shareholders." (NACD 1996, p. 9). The NACD goes on to recommend that boards require that independent directors fill the substantive majority of board seats. In addition to being employed by the firm, relations that can compromise independence include director interlocks, and significant consulting or employment relations.

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[9] For a thorough perspective of the legal environment of the corporate governance of financial intermediaries, see Skeel (1999).

[10] Supporting evidence on the effective monitoring role of outside directors include Byrd and Hickman (1992) on the market reaction to tender offers, Weisbach (1988) on the sensitivity of CEO turnover to firm performance, and Brickley, Coles, and Tory (1994) on the decision to adopt poison pills. For the banking industry, Brickley and James (1987) report that the presence of outside directors tends to reduce management perquisites.

We denote the variable INSIDE as the ratio of executive directors to the total number of directors. Interlocked directors, denoted LOCK, is defined as inside directors who sit on the boards of outside director's firms. Board members who are not full-time employees but affiliated with the company in another way, denoted GRAY, includes such individuals as consultants, lawyers and investment bankers or others who have a business relationship with the firm, as well as directors with family ties to a company employee, usually the CEO (Weisbach 1988). Gray directors may be less independent than other outsider directors because of their family ties and business relations.[11] Each of these potential impairments of board independence, insiders, interlocked directors, and gray directors, are predicted to be associated with a lower level of monitoring and hence a higher level of CEO compensation.

It is suggested that board effectiveness may depend on the director's commitment and ability. With regard to commitment, the NACD states, "Obviously, director professionalism requires a significant dedication of time. In addition to limitations of the calendar, which restrict the amount of time for thinking, advising, and preparing for and attending meetings, there are limitations of the mind, which restrict the number of companies for which a director can maintain current knowledge. As a result, the number of boards on which an individual can serve and meet the standard set forth herein is necessarily limited." (NACD 1996, p. 11) Since serving on four or more independent boards in not common, we have selected a threshold number of three boards to define a busy outside director (denoted BUSY).

The NACD further favors "a strong director evaluation process to assure the board members retain the necessary energy, enthusiasm, commitment, and creativity to forestall habitual or simply reactive – and therefore less effective – director participation." (NACD 1996,

[11] We classify a gray director who holds a block of five or more percent of shares as an outside director. Our reasoning is that a sizable ownership interest is more significant than considerations for past or affiliated business

p. 13). Among the NACD recommendations is a mandatory retirement age. To test the effect of aging on board effectiveness we denote OLD as the number of outside directors over age 65.

The CEO's power base widens when the CEO also serves as the chairman of the board. This led Jensen (1993) and others to recommend that the function of board chair be separated from the CEO. We define DUAL as a binary variable that indicates if a CEO duality exists. Board size may also be related to board effectiveness (Jensen 1993, Yermack 1996). Jensen (1993) argues for smaller boards in a view he refers to as overcrowding of the board. This attitude concerning the relative lower effectiveness of large board is also commonly expressed in the popular press. We define the total number of board members as TOTAL.

As with the potential impairments of board independence, each of the potential impairments to board effectiveness, BUSY, OLD, DUAL, and TOTAL, are predicted to be associated with a lower level of monitoring and a higher level of CEO compensation.[12]

Because the degree of board strength can result from a large number of factors, we create an overall measure of board strength from a composite of these seven individual board characteristics.[13] Our procedure for the construction of the board strength variable (BOARD) appears in the appendix. BOARD is constructed such that a higher value represents a potentially more independent and effective board and therefore a theoretically stronger board.

H8 Ceteris paribus, a negative association will exist between Board strength and CEO compensation.

E. Summary

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relations. We do not, however, apply this rule to family directors.

[12] Fama and Jensen (1983) provide a counter-argument regarding busy board members when they argue that outside board members who hold multiple directorships have greater incentives to monitor corporate decisions because of their reputation capital as decision experts. In addition, Baysinger and Butler (1985) provide a counter-argument with regard to total board size when they argue that corporate boards have a variety of responsibilities in addition to monitoring management. Hence, a larger board may offer a more diverse set of talents to deal with these responsibilities, thereby increasing the board's overall effectiveness

Four strands of considerations have been discussed for influencing the design of executive compensation: principal-agent theory, managerial discretion, CEO characteristics, and corporate governance. In this paper we explore the predictions of these theories with respect to CEO compensation. It should be stressed that the predictions of the theories above are not independent. As is pointed out, managerial discretion is related to economic-based research on the link between compensation and the investment opportunities set. Agency theory is also weaved into other considerations such as corporate governance. As for the specific variables, a few such as CEO stock ownership may be identified with more than one theory. Table 1 provides a summary list of the explanatory variables we use in subsequent regression analysis, along with their predicted effect on compensation.

(Insert Table 1 here)

III. Compensation and Governance Practices in Financial Institutions

The data for the study includes all the 76 bank holding companies for which executive compensation data is available in Standard and Poor's ExecuComp database. The study uses data for the years 1992-1997.

The ExecuComp database includes all the compensation items from the annual proxy statement (Schedule 14a). It lists separately all major forms of cash compensation: salary, bonus, payout from long-term incentive plans, and other annual compensation (such as perquisites, payments to cover taxes, etc.). It also includes disclosed information regarding stock-based compensation: restricted stock awards, stock options grants and stock appreciation

[13] Examples of studies that have created aggregate measures of board strength include Bushman, Chen, Engel and

rights.[14] We gathered data on board memberships directly from Schedule 14a. Regulatory ratings were obtained directly from the Federal Reserve. Company financials are obtained from Standard and Poor's Compustat.

We note that compensation reported in the ExecuComp database for executives who served as CEOs for part of a year is not distinguished from those who served a full year and is thus distorted. Clearly, if a CEO was appointed in October, the disclosed compensation is seriously biased downward. On the other hand, turnovers are occasionally associated with upward biases since the compensation at that time may include unusual items (such as golden parachutes) of extraordinary magnitude. We identify all cases of CEO succession and remove the company year from our sample data. Tables 2 and 3 displays compensation and governance summary statistics for our sample firms. For comparison purposes we have also included summary statistics for the 728 manufacturing (SIC 2000-3999) and 176 (non-financial) service companies (SIC 7000-8999) in the database (as before, observations pertaining to turnover years are removed). All figures are cross-sectionally pooled across the period 1992–1997, thus representing aggregate statistics for the entire period.

Panels A and B of Table 2 report summary statistics for the components of CEO compensation. Both the salary and bonus compensation are larger, on average, in the financial sector relative to the other sectors. A direct comparison, however, may be misleading in view of the average size difference between companies of the three sectors. In terms of the percentage mix of pay, the breakdown between cash CEO compensation (salary, bonus and long-term incentive plan payouts (LTIP)) vs. stock-based compensation (options and restricted stock) is about the same for the financial and non-financial sectors. However, in terms of the individual

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Smith (1999) and Milliron (2000).

components, financial companies rely more heavily on bonus pay, LTIP and restricted stocks and less on base salary or stock options.

(Insert Table 2 here)

Table 3 provides descriptive statistics of governance variables. For our sample of bank holding companies, board size averages about 16, with an average of just over two of these members insiders. In almost all cases, the CEO is also the chairman of the board.

(Insert Table 3 here)

IV. Analysis of CEO compensation determinants

Theoretical work has argued that compensation policy is not determined separately from firm performance, and firm governance (Demsetz and Lehn, 1985, Hermalin and Weisbach, 1998). Instead, these relations may be simultaneously determined. Several empirical studies have provided evidence of the endogeneity of these relations (Boschen and Smith, 1995, and Anderson, Banker, and Ravindran, 2000).

We model a system of simultaneous equations that incorporates the relations between CEO compensation, firm performance, and board strength. Our system recognizes three endogenous variables, PAY, ROA, and BOARD, along with the remaining explanatory variables appearing in Table 1. Descriptive statistics of the regression sample are in Table 4. We employ a

[14] Option grants and restricted share ownership data are adjusted for stock splits occurring during the sample period. The value of stock options granted is based on Black-Scholes valuation.

three-stage least squares estimation in order to increase the efficiency of our estimation by taking cross-equation correlations into account.[15]

(Insert Table 4 about here)

Table 5 provides the results for our estimation of the three simultaneous equations. In order to lessen the effect of scale differences, we transform CEO compensation (PAY) to a natural log and use the transformed variable as the dependent variable (Barro and Barro, 1990, Sloan, 1993). With respect to the first equation, PAY, we note CEO compensation is significantly associated with the accounting measure of firm performance, (ROA). This result is consistent with the literature, which has typically identified a strong linkage between accounting measures of return to top executive pay. Second, all three of the measures of managerial discretion and job complexity are significant. Consistent with the previous literature, company size, measured by the natural log of assets (ASSETS) has a strong positive effect on executive pay (e.g., Ciscel and Carroll, 1980, Leonard, 1990, Schaefer, 1998, and Baker and Hall, 1998). Our proxy for future growth, MKBK, is also highly significant. This is consistent with the Smith and Watts (1992) finding, where they interpret MKBK as a measure of the firm's growth options. They argue that managers' expertise provides more value added for firms with greater growth opportunities. Finally, σROA is statistically significant and in the predicted direction. This supports our prediction, and is consistent with theory that based on risk sharing higher volatility should be associated with a higher level of compensation.

[15] A possible concern with three-stage least squares is the hazard of a mis-specification appearing throughout the system. We ran two-stage least squares and had qualitatively similar results. A concern when interpreting output from regressions is the potential impact of influential observations. We first test for influential points by using Cook's D statistic. We remove seven observations from the sample based on comparing the Cook's D value to an F distribution.

Neither of our two CEO specific variables proved statistically significant. Likewise, neither the external market monitoring of the risk-based funding, nor the regulatory monitoring proved to be a significant determinant of variability in CEO compensation.

Next, we consider the corporate governance variable BOARD. Recall that Board is a composite variable computed from seven individual variables proxying for board independence and efficiency. BOARD displays a significantly negative relation to CEO compensation. Thus stronger boards are associated with lower compensation after controlling for economic and regulatory determinants. This negative sign on BOARD can be interpreted as evidence that the board of directors plays an important role in monitoring and rewarding the CEO.

The results for the ROA regression provide some evidence that there is a simultaneous relation between performance and the structure of compensation, and also between firm performance and the board of directors. After controlling for other determinants, there exists a statistically positive relation between CEO compensation and performance and between board strength and performance. For our sample, a higher percentage of compensation is associated with better performance as is a stronger board.

The final column contains the results of the BOARD regression. After controlling for other determinants, we note a negative association between board strength and CEO compensation. This is consistent with our prior finding that stronger boards are associated with lower levels of compensation (a monitoring function). Consistent with the prior column, we also note a positive association between firm performance and board strength. One somewhat surprising result is the negative association between regulatory oversight, worse BOPEC ratings, and board strength. This may be mean that either the regulator inspires some changes in control as a result of problems at the bank or that stronger boards are used to compensate for other

factors that create problems at the bank and simultaneously cause it to have a poor BOPEC rating.

(Insert Table 5 here)

V. Summary

Four major strands have evolved within the executive compensation literature. In this paper we perform a comprehensive study of executive compensation determinants by providing a unifying analysis of these strands: principle-agency theory, managerial discretion, external ownership and corporate governance, and CEO specific characteristics. We examine financial sector data, which provides a relatively homogeneous setting. Using data from the period 1992-1997, we first examine 15 individual variables (seven of these are combined in the BOARD variable), drawn from the four major classes of variables to analyze executive compensation in the banking industry.

We first look at the determinants of CEO compensation. The higher levels firm performance, ROA, appear to be positively associated with higher pay. For our sample of firms, larger firms with future growth potential and greater variability in firm performance pay their CEOs more. Finally, the Board of Directors appears to play a monitoring role. Potentially stronger boards are associated with lower CEO compensation. Also, there is a positive association between firm performance and board strength.

Due to the need for hand collecting many of our governance variables, our study was limited only to one industry. While the exclusive use of bank holding companies is potentially a limitation, it has also potential strengths. Firstly, as noted above, the use of a single industry

affords us a manageable sample. With this sample we are able to gather the necessary data to provide a unified test encompassing theory and associated variables from many separate studies that looked at individual aspects of the executive compensation question. Using a single industry also provides a sample of firms with relatively homogeneous operational characteristics, thus offering a reasonable control of unspecified factors. We are also able to exploit some unique characteristics of bank-holding companies in order enhance our tested model. In particular we included variables that capture both regulatory oversight and also external market monitoring from debtholders. In addition, we do not know of any a priori reasons why this industry should differ from the general population of firms with regard to executive pay.

Appendix A: Constructing a composite board strength variable.

The variable (BOARD) represents a composite variable measuring overall board strength. We give equal weight to each characteristic in the overall BOARD measure; however we also recognize the substitutability of measures within the board. We accomplish this through the following procedure:

1. Create a variable called INDEPENDENCE by summing the two mutually exclusive percentage variables INSIDE and GRAY.
2. Partition the sample observations into quartiles based on INDEPENDENCE and assign a score of 1 to observations in the top quartile, a score of 0 to observations in the middle two quartiles, and a score of –1 to observations in the bottom quartile. Higher scores represent greater board independence and therefore a theoretically stronger board. Using the same strategy, the observations are partitioned on LOCK.
3. Since the four remaining effectiveness measures are not mutually exclusive and are not of the same units, we cannot simply sum them to together. Instead, we again partition the observations into quartiles based on each of the four effectiveness measures. As in step two, we assign scores based on quartile, with a score of 1 to the upper quartile and –1 to the bottom quartile. Higher numbers represent greater effectiveness and therefore a theoretically stronger board.
4. Finally, we add together the score for both the independence variables and the effectiveness variables to create an overall board strength measure. To recognize that these individual characteristics may be substitutes, we again partition the observations, this time based on the computed strength score. We assign a score of 1 to observations in the top quartile, a score of 0 to observations in the middle two quartiles, and a score of –1 to observations in the bottom quartile where the positive value represents a theoretically stronger board.

References:

Anderson, M., R. Banker, and S. Ravindran (2000). "Executive Compensation in the Information Technology Industry," *Management Science 46*, pp. 530-547.

Baber, W.R., S.N. Janakiraman, and S.H. Kang (1996). "Investment Opportunities and the Structure of Executive Compensation," *Journal of Accounting and Economics* 21, pp. 297-318.

Baker, G.P. and B.J. Hall (1998). "CEO Incentives and Firm Size," NBER Working Paper 6868, December.

Bank Holding Company Supervision Manual (as of June 2003). Board of Governors of the Federal Reserve System; Washington D.C. 20551.

Barro, J.R. and R.J. Barro (1990). "Pay, Performance and Turnover in Bank CEOs," *Journal of Labor Economics* 8, October, pp. 448-481.

Baysinger, B.D. and H.N. Butler (1985). Corporate Governance and the Board of Directors: Performance Effects of Changes in Board Composition," *Journal of Law, Economics and Organization* 1, Spring, pp. 101-124.

Bizjak, J.M., J.A. Brickley, and J.L. Coles (1993). "Stock-based Incentive Compensation and Investment Behavior," *Journal of Accounting and Economics* 16, pp. 349-372.

Boschen, J.F. and K.J. Smith (1995). "You Can Pay Me Now *and* You Can Pay Me Later: The Dynamic Response of Executive Compensation to Firm Performance," *Journal of Business* 68, October, pp. 577-608.

Brickley, J.A., J.L. Coles, and R.L. Tory (1994). "Outside Directors and the Adoption of Poison Pills," *Journal of Financial Economics* 35, June, pp. 371-390.

Brickley, J.A. and C.M. James (1987). "The Takeover Market, Corporate Board Composition, and Ownership Structure: The Case of Banking," *Journal of Law and Economics* 30, April, pp. 161-180.

Bushman, R., Q. Chen, E. Engel, and A. Smith (1999). "The Sensitivity of Corporate Governance Systems to the Timeliness of Accounting Earnings," Working paper, University of Chicago.

Byrd, J.W. and K.A. Hickman (1992). "Do Outside Directors Monitor Managers?" *Journal of Financial Economics* 32, pp. 195-221.

Ciscel, D.H. and T.M. Carroll (1980). "The Determinants of Executive Salaries: An Econometric Survey," *Review of Economics and Statistics* 62, pp. 7-13.

Core, J.E. and W. Guay (1998). "Estimating the Incentive Effects of Executive Stock Option Portfolios," Working paper, University of Pennsylvania.

Core, J.E. and W. Guay (1999). "The Use of Equity Grants to Manage Optimal Equity Incentive Levels," *Journal of Accounting and Economics 28*, pp. 151-184.

Core, J.E., R.W. Holthausen, and D.F. Larcker (1999). "Corporate Governance, Chief Executive Officer Compensation, and Firm Performance," *Journal of Financial Economics 51*, pp. 371-406.

Crawford, A.J., J.R. Ezzell, and J.A. Miles (1995). "Bank CEO Pay-performance Relations and the Effects of Deregulation," *Journal of Business* 68, pp. 231-256.

Demsetz, H. and K. Lehn (1985) "The Structure of Corporate Ownership: Causes and Consequences," *Journal of Political Economy* 93, pp. 1155-1177.

Eaton, J. and H. Rosen (1983) "Agency, delayed compensation and the structure of executive renumeration," *Journal of Finance* 38, pp. 1489-1505.

Ellis, David M. and Mark J. Flannery (1992). "Does the Debt Market Assess Large Banks' Risk? Time Series Evidence from Money Center CDs," *Journal of Monetary Economics* 30(1992): 481-502.

Evanoff, Douglas D. and Larry D. Wall (2001). "Sub-debt Yield Spreads as Bank Risk Measures." *Journal of Financial Services Research* 20 (2001): 121-145.

Fama, E.F. and M.C. Jensen (1983). "The Separation of Ownership and Control," *Journal of Law and Economics* 26, pp. 301-325.

Fields, L.P. and D.R. Fraser (1999). "On the Compensation Implications of Commercial Bank entry into Investment Banking," *Journal of Banking and Finance* 23, pp. 1261-1276.

Finkelstein, S. and J. Boyd (1998). "How Much Does the CEO Matter? The Role of Managerial Discretion in the Setting of CEO Compensation," *Academy of Management Journal* 41, April, pp. 179-199.

Flannery, Mark J. and Sorin M. Sorescu (1996). "Evidence of Bank Market Discipline in Subordinated Debenture Yields: 1983–1991." *Journal of Finance* 51(4): 1347-1377.

Furfine, Craig (2001). "Banks as Monitors of Other Banks: Evidence from the Overnight Market for Federal Funds," *Journal of Business* 74 (January 2001): 33-57.

Gaver, J. and K. Gaver (1993). Additional Evidence on the Association between the Investment Opportunity Set and Corporate Financing, Dividend, and Compensation Policies, *Journal of Accounting and Economics* 16, pp. 125-160.

Gibson, Dunn & Crutcher LLP (1999). The Gramm-Leach-Bliley Act, P.L. 106-102, Financial Services Modernization, Working Summary No. 4.

Gomez-Mejia, L.R. (1994). "Executive Compensation: A Reassessment and A Future Research Agenda," *Research in Personnel and Human Resources Management* 12, JAI Press, pp. 161-222.

Hambrick, D.C. and S. Finkelstein (1995). "The Effects of Ownership Structure on Conditions at the Top: The Case of CEO Pay Raises," *Strategic Management Journal* 16, March, pp. 175-193.

Hermalin, B.E. and N.E. Wallace (2001). "Firm Performance and Executive compensation in the Savings and Loan Industry," Journal of Financial Economic 61, pp. 139-170.

Hermalin, B.E. and M.S. Weisbach (1998). "Endogenously Chosen Boards of Directors and Their Monitoring of the CEO," *American Economic Review*, March, pp. 96-118.

Houston, J. F. and C. James (1995). "CEO Compensation and Bank Risk: Is Compensation in Banking Structured to Promote Risk Taking?" *Journal of Monetary Economics* 36, pp. 405-431.

Hubbard R.G. and D. Palia (1995). "Executive Pay and Performance: Evidence from the U.S. Banking Industry," *Journal of Financial Economics* 39, pp. 105-130.

Indjejikian, R.J. (1999). "Performance Evaluation and Compensation Research: An Agency Perspective," *Accounting Horizons* 13, June, pp. 147-157.

Jensen, M.C. (1993). "The Modern Industrial Revolution, Exit, and the Failure of Internal Control Systems," *Journal of Finance* 48, July, pp. 831-857.

Jensen, M.C. and K.J. Murphy (1990). "Performance Pay and Top-Management Incentives," *Journal of Political Economy* 98, April, pp. 225-264.

John, K., A. Saunders, and L.W. Senbet (2000). "A Theory of Bank Regulation and Management Compensation, *Review of Financial Studies* 13, Spring, pp. 95-125.

Joskow, P.L. and N.L. Rose (1994). "CEO Pay and Firm Performance: Dynamics, Asymmetries, and Alternative Performance Measures," MIT working paper, December.

Joskow, P.L., N.L. Rose, and A. Shepard (1993). "Regulatory Constraints on CEO Compensation," *Brookings Papers on Economic Activity – Microeconomics*, 1, pp. 1-58.

Kane, E. J. (2001). "Using Deferred Compensation to Strengthen the Ethics of Financial Regulation," NBER Working Paper W8399.

King, Thomas B (2003). "Discipline and Liquidity in the Market for Federal Funds," Federal Reserve Bank of St. Louis–Supervisory Policy Analysis Working Paper 2003-02.

Lazear, E.D. and S. Rosen (1981). "Rank Order Tournaments as Optimum Labor Contracts," *Journal of Political Economy* 89, October, pp. 841-864.

Leonard, J.S. (1990). "Executive Pay and Firm Performance," *Industrial and Labor Relations Review* 43, February, pp.11s-29s.

Lewellen, W.G. and B. Huntsman (1970). "Managerial Pay and Corporate Performance," *American Economic Review* 60, September, pp. 710-720.

Martinez Peria, Maria Soledad and Sergio L. Schmukler (2001). "Do Depositors Punish Banks for Bad Behavior? Market Discipline, Deposit Insurance and Banking Crises." *Journal of Finance* 56(3): 1029-1051.

Milliron, J. (2000). "Board of Director Alignment and the Design of Executive Compensation Contracts," PhD Thesis, University of Chicago.

Morck, R., A. Shleifer, and R.W. Vishny (1988). "Management Ownership and Market Valuation--An Empirical Analysis," *Journal of Financial Economics* 20, pp. 293-315.

Mueller, D.C. and S.L. Yun (1997). "Managerial Discretion and Managerial Compensation," International *Journal of Industrial Organization* 15, July, pp. 441-454.

Murphy, K. J (1999). "Executive Compensation," in O. Ashenfelter and D. Card, eds., *Handbook of Labor Economics* 3, North Holland, Chapter 38.

National Association of Corporate Directors, (1996). "NACD Blue Ribbon Commission Report on Director Professionalism."

Prendergast, C. (1999). "The Provision of Incentives in Firms," *Journal of Economic Literature* 37, March, pp. 7-63.

Schaefer, S. (1998). "The Dependence of Pay-Performance Sensitivity on the Size of the Firm," *Review of Economics and Statistics* 80, August, pp. 436-443.

Skeel, D.A. (1999). "The Market Revolution in Bank and Insurance Firm Governance: its Logic and Limits," *Washington University Law Quarterly* 7, Summer, pp. 433-459.

Sloan, R.G. (1993). "Accounting Earnings and Top Executive Compensation," *Journal of Accounting and Economics* 16, January-July, pp. 55-100.

Smith, C. and R. Watts (1992). "The Investment Opportunity Set and Corporate Financing, Dividends, and Compensation Policies," *Journal of Financial Economics* 32, pp. 263-292.

Stoughton, N.M. and E. Talmor (1999). "Managerial Bargaining Power in the Determination of Compensation Contracts and Corporate Investment," *International Economic Review* 40, February, pp. 69-83.

Taussig, F.W. and W.S. Barker (1925). "American Corporations and their Executives: A Statistical Inquiry," *Quarterly Journal of Economics*, November, pp. 1-51.

U.S. Shadow Financial Regulatory Committee (2000). "Reforming Bank Capital Regulation: A Proposal by the U.S. Shadow Financial Regulatory Committee," Washington, D.C.: American Enterprise Institute

Weisbach, M.S. (1988). "Outside Directors and CEO Turnover," *Journal of Financial Economics 20*, pp. 431-460.

Yermack, D., (1996). "Higher market valuation for firms with a small board of directors," *Journal of Financial Economics 40*, pp. 185-211.

Table 1

Variable definitions and predicted effect on executive compensation.

Variable	Acronym	Definition	Predicted effect on executive compensation
Return on assets	ROA	Net income divided by average total assets	+
Natural log of assets	ASSETS	The natural log of total assets	+
Standard deviation of ROA	σ(ROA)	Standard deviation of return on assets over trailing five years	+
Market to Book	MKBK	The ratio of the market value of equity to the book value of equity	+
CEO tenure	TENURE	Number of years as CEO	+
Sensitivity of CEO equity	OWNER	Sensitivity of CEO stock and option holding to a 1% change in stock price.	-
Regulator rating	BOPEC	The BOPEC rating for Bank holding companies as determined by the federal regulators	+
Risk-priced funding	RPF	The proportion of risk-priced funding (jumbo CDs, federal funds, and subordinated debt) to total assets	-
Board Strength	BOARD	A composite board strength variable made up of the below seven variables. BOARD is constructed such that a larger value represents a theoretically stronger Board	-
Compensation	PAY	Salary, other annual, annual bonus, LTIP, restricted stock granted, and stock options granted	

Table 2

Descriptive compensation statistics based on 1992-1997 data for 76 bank holding companies, 176 non-financial service firms and 728 manufacturers.

Panel A: Components of CEO Compensation

	Bank Holding Companies		Manufacturing		Services	
	Mean	Median	Mean	Median	Mean	Median
Salary (000$)	846.99	786.64	631.05	550.00	550.8	459.55
Bonus (000$)	933.79	501.44	514.41	338.35	565.5	231.00
LTIP (000$)	229.20	0.00	163.03	0.00	52.65	0.00
Restricted Stock (000$)	381.41	0.00	157.85	0.00	202.19	0.00
Options (000$)	1,099	566.40	1,122	386.85	1,915	348.61
Total	3,490		2,588		3,286	

Panel B: Compensation Percentages

	Bank Holding Companies	Manufacturing	Services
Salary	36.02	40.76	41.09
Bonus	26.52	22.30	20.33
LTIP	5.79	3.73	1.49
Restricted Stock	7.07	4.02	3.78
Options	24.60	29.19	33.31
	100.00	100.00	100.00

Variable definitions:

Banks	Bank Holding Companies defined as firms with SIC from 6000-6099 and FR Y9-C filers (regulatory report form of the Federal Reserve System).
Manufacturing	Manufacturing defined as firms with SIC from 2000-3999
Services	Services defined as firms with SIC from 7000-8999
Salary	Salary and other annual compensation
Bonus	Annual bonus
LTIP	Long-term Incentive Plan payouts
Restricted Stock	Value of restricted stock granted
Options	Black-Scholes aggregate value of stock options granted

Table 3

Descriptive statistics on corporate governance characteristics based on data for 1992-1997.

	Mean	Median
DUAL (%)	90.33	100.00
Total Board Members (TOTAL)	15.79	16.00
Insiders (INSIDE) (% of Total)	15.58	13.33
Gray (GRAY) (% of Total)	4.53	0.00
Busy (BUSY) (% of Total)	46.11	50.00
Old (OLD) (% of Total)	23.76	21.05
Interlock (LOCK) (% of Total)	15.00	0.00
Risk-priced funding (RPF)	8.15	6.58
Regulator rating (BOPEC) 1(best) to 5 (worst	1.57	2.00

Distribution of Composite BOPEC Rating					
Regulator rating (BOPEC) from 1(best) to 5 (worst)	1	2	3	4	5
Percent of Sample	48.1	48.4	1.95	1.56	0.0

Table 4

Descriptive statistics for the regression sample. The sample contains 240 firm-year observations.

	Mean	Std. Dev.	Min	Q1	Median	Q3	Max
ROA	1.16	0.45	-1.96	0.95	1.18	1.37	2.85
PAY	7.97	0.76	6.30	7.40	7.90	8.53	10.00
ASSETS	12.21	3.11	7.85	9.97	11.08	15.35	19.53
σ(ROA)	0.29	0.29	0.01	0.10	0.20	0.36	1.49
MKBK	2.11	0.96	0.78	1.46	1.84	2.48	6.95
TENURE	7.29	4.97	0.99	3.17	6.00	10.59	22.01
OWNER	360.32	1,298.94	0.26	69.62	129.18	272.00	18,664.47
RPF	8.15	5.51	0.00	4.70	6.58	9.45	30.29
BOPEC	0.96	—	—	—	—	—	—
BOARD	-0.15	—	—	—	—	—	—

Variable	Acronym	Definition
Return on assets	ROA	Net income divided by average total assets
Compensation	PAY	Salary, other annual, annual bonus, LTIP, restricted stock granted, and stock options granted
Natural log of assets	ASSETS	The natural log of total assets
Standard deviation of ROA	σ(ROA)	Standard deviation of return on assets over trailing five years
Market to Book	MKBK	The ratio of the market value of equity to the book value of equity
CEO tenure	TENURE	Number of years as CEO
Sensitivity of CEO equity	OWNER	Sensitivity of CEO stock and option holding to a 1% change in stock price.
Risk-priced funding	RPF	The proportion of risk-priced funding (jumbo CDs, federal funds, and subordinated debt) to total assets
Regulator rating	BOPEC	The BOPEC rating for Bank holding companies as determined by the federal regulators
Board Strength	BOARD	A composite variable made up of seven variables that equals negative one if the score is in the bottom quartile, zero if it's in the two middle quartiles and one if it is in the top quartile. BOARD is constructed such that a larger value represents a theoretically stronger Board

Table 5

Determinants of CEO compensation for Bank Holding Companies; simultaneous estimation using three-stage least squares. Data from 1992 to 1997; t-statistics in parentheses.

Independent Variable	PAY	ROA	BOARD
INTERCEPT	2.277 (4.54)**	-1.116 (-1.59)	3.611 (3.45)**
ROA	0.503 (2.83)**		1.531 (7.50)**
PAY		0.690 (2.64)**	-1.223 (-3.10)*
ASSETS	0.487 (14.92)**	-0.315 (-2.26)*	0.530 (2.49)**
σ(ROA)	0.407 (3.07)**	-0.250 (-1.35)	0.259 (0.89)
MKBK	0.149 (3.16)**	-0.022 (-0.32)	0.082 (0.76)
TENURE	-0.007 (-1.07)	0.009 (1.39)	-0.015 (-1.47)
OWNER	3.90e-05 (-1.48)	-2.335e-06 (-0.09)	2.10e-05 (0.46)
RPF	-0.001 (-0.08)	0.008 (1.25)	-0.012 (-1.13)
BOPEC	-0.344 (-1.14)	0.083 (0.28)	-1.312 (-2.72)**
BOARD	-0.338 (-3.51)**	0.527 (7.16)**	
N	240		

** Significant at the 1% level, one-tailed
* Significant at the 5% level, one-tailed