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**Executive compensation packages: A tool for resolving the
owner-manager conflict**

Balsam, Steven, Ph.D.

City University of New York, 1991

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EXECUTIVE COMPENSATION PACKAGES: A TOOL FOR RESOLVING
THE OWNER-MANAGER CONFLICT

by

Steven Balsam

A dissertation submitted to the Graduate Faculty
in Business in partial fulfillment of the requirements
for the degree of Doctor of Philosophy
The City University of New York

1991

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This manuscript has been read and accepted for the Graduate Faculty in Business in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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1. Introduction

Executive compensation packages play an important role in resolving the conflict between management and shareholders. This study examines their design and implementation. Structuring the compensation package is important, as maximizing firm value requires motivating the executive at a minimum cost to the firm. In chapter 2, changes in the structure of the compensation package in the years surrounding the Tax Reform Act of 1986 and the Market Crash of 1987 are analyzed to see if they are consistent with value maximization. In chapter 3 the effect of the portfolio of accounting procedures, mandated accounting changes, and writeoffs on CEO compensation are examined. Understanding the calculation and components of accounting income, and their effect on compensation, is important when accounting income is used to measure performance, and provide the proper incentives to management. Chapter 4 examines the effect of ownership of the firm, control of the board of directors, and the market for corporate control, on the level of CEO compensation and the correlation between CEO compensation and firm performance. The results provide information on how the conflict between management and shareholders is being resolved and the most effective means of resolution.

1.1 Motivation

The separation of ownership and control of the modern American corporation has been a concern for many years (see for example, Berle and Means (1932)). Of concern is the ability of 'absentee' owners to control management and motivate them to maximize shareholder value. Shareholders elect directors to monitor and control management, and make major decisions (merge, divest, etc.). The Board has the power to appoint, replace, and set the compensation of management. Unfortunately, Mace (1986) asserts that management controls the Board. This arises because the diffusion of stock ownership "enhances the power of whoever controls the proxy machinery" (Herman (1981), p. 53). That 'whoever' is management. Whether the directors are insiders (part of management) or outsiders, they are likely to be favorably disposed toward management. Herman (1981), finds "a very large proportion of 'outside directors' have ties and obligations to insiders that are likely subtly to compromise their independence." In nominal terms "56 percent of the directors of the 100 largest industrials are outside directors." However after subtracting "former employees, relatives of key insiders," "directors doing business with the company," and "those who are on other boards in common with inside directors," the proportion of 'independent' outside directors drops below 25 percent. Mace (1986) asserts there are only two scenarios under which the Board exercises

control. One is where performance is extremely poor, the other where a large shareholder has Board representation.

Compensation is a major area of conflict between shareholders and management. If the cash flows of the firm are fixed in amount, an increase in management compensation reduces cash accruing to shareholders and vice-a-versa. For this reason, management compensation (CEO compensation in particular) attracts the attention of individuals in government, the press and academia. The Securities and Exchange Commission through Item 402 of regulation S-K requires disclosure of cash and other compensation paid to the "five most highest compensated executive officers whose cash compensation . . . exceeds \$60,000." Business periodicals (Business Week, Fortune, Forbes, and The Wall Street Journal) conduct annual surveys of CEO compensation. Finally, as described throughout this paper, academic studies have shown CEO compensation related to size, performance, and other firm specific variables.

Much of the academic interest in executive compensation is motivated by the conflict or divergence of interests between shareholders and management, and the hypothesized role of compensation in mitigating that conflict.¹ The compensation

¹ For example, Leonard (1990) finds "Companies with long-term incentive plans enjoyed significantly greater increases in ROE ...", while Abowd (1990) writes "... that pay-for-performance systems based on after-tax gross economic return and total shareholder return may be effective, since I find evidence that increasing the sensitivity of compensation to either of these measures may be associated with better performance on that measure in the future."

package can be used to align the interests of shareholders and management, by tying compensation to one or more measures of performance or firm value. In designing compensation packages, the board of directors, as an agent of shareholders, chooses among alternative forms of compensation, each with differing motivational and tax benefits. While motivating management is the primary goal, if directors act to maximize firm value, they design the compensation package at a minimum cost to shareholders.

1.2 Summary

The influence of taxes on the compensation package is examined in Chapter 2. The form of compensation influences the timing and amount of corporate and individual tax payments. If the form of compensation is chosen to minimize the joint tax burden, the tax savings can be shared by management and shareholders. Further, if plans are designed with taxes as a consideration, their composition will change with changes in the tax law that affect their costliness. This is tested by examining changes in the compensation package after the Tax Reform Act of 1986. According to the model developed by Miller and Scholes (1982) the reduction in individual tax rates reduces the advantages of deferring cash compensation, while the increase in the capital gains tax rate increases the advantages of stock compensation. Furthermore, the increase in the capital gains tax rate, and the reduction in both the

individual and corporate tax rates, decrease the advantages of incentive stock options.

Chapter 2 also investigates changes in the compensation package in reaction to perceived changes in risk. Employees require the present value of the compensation package exceed their reservation wage, their next best opportunity. Certain forms of compensation are less certain (more risky), and thus employees apply a higher discount rate to these forms when calculating their present value. Directors choose among these forms, attempting to provide the employee with the proper incentives, while minimizing the cost of the compensation package. The firm, because it is less risk averse than the employee (in some analyses the firm is assumed to be risk neutral), applies a lower discount rate to risky compensation. The firm would minimize the present value of its cost by providing the executive with risk-free or cash compensation. Still, it chooses to include risky, or stock-based compensation, because of the motivational benefits. The corporation is willing to increase its cost of the compensation package because of the motivational benefits. At the margin, the increased cost to the corporation should equal the benefits received from a motivated executive. If a change in the environment occurs (for example a change in the risk of stock compensation), the discount rate applied by employees is affected. If directors maximize firm value, they respond to the changing environment by changing the composition of the compensation package. This is tested by examining the effect

of the October 1987 Stock Market Crash on the composition of the compensation package. The market crash is hypothesized to make stock compensation more risky and less desirable to executives, who respond by raising the discount rate they apply to it. This effectively makes stock compensation more expensive for the firm, which must then increase the amount of stock compensation substituted for a given amount of cash compensation. If directors react to the change in environment, the portion of the compensation package represented by stock compensation is reduced.

Accounting income is used in determining compensation. The link between compensation and income can be explicit, as in accounting-based bonus plans, or implicit. To avoid creating dysfunctional incentives, adjustments should be made for items that have differential effects on accounting income and firm value, and for items that are out of management's control. Failure to adjust for items that affect accounting income and firm value differently could lead to management taking cosmetic (or value reducing) actions in an attempt to increase accounting income. Failure to adjust for items that are out of management control increases management risk, and weakens the perceived link between pay and performance. Chapter 3 examines if adjustments are made for accounting procedures, changes in accounting procedures, and writeoffs.

The effect of firm ownership, board composition and the market for corporate control on the relation between pay and

performance, is examined in Chapter 4. For a corporation characterized by dispersed shareholdings, large shareholders, an independent board, and the market for corporate control are alternative, but not mutually exclusive, mechanisms for controlling managerial behavior. Shareholders by virtue of their ability to elect the Board, control management. However, in a large corporation with dispersed shareholdings, management controls the proxy mechanism and with it the election of directors. Directors act in shareholder interests only when certain conditions are met (the board is independent of management) or incentives exist (large shareholders control or are on Board). In the absence of these factors, or in conjunction with them, the market for corporate control acts as a force in constraining management, for if management strays too far from value maximization or takes too much compensation, a takeover is more likely to occur. To examine if these factors constrain management, Chapter 4 examines the effect of firm ownership, board composition, and the effectiveness of the market for corporate control, on the level of compensation, the association between compensation and performance, and the composition of the compensation package.

2. Design of Compensation Plans

This chapter examines the effect of the Tax Reform Act of 1986, and the October 1987 Stock Market Crash on executive compensation packages.

Compensation plans contain a vast array of components, which can be broadly categorized as either cash or stock compensation (see Figure 2.1 and Appendix A). Falling under the rubric of cash compensation are salary, bonuses, and pension benefits, while stock compensation includes restricted stock, stock options, and stock appreciation rights. The above categorization can be further decomposed. Cash compensation can be paid currently or deferred to a future period. Stock options can either be qualified (incentive) or nonqualified for tax purposes. Finally, compensation can be fixed in amount, or conditioned on performance, where performance is measured using accounting measures or stock returns (see Figure 2.2). Choices among these components and measurement tools are made to provide motivation and minimize taxes.

The first part of this chapter examines the effect of the Tax Reform Act of 1986 on the executive compensation package. Hypotheses one through five examine the choice to defer salary and bonus payments (hypotheses one and two), the division of compensation between cash and stock (hypothesis three), and the choice between incentive and nonqualified stock options

(hypotheses four and five). The second part of this chapter examines the effect of the October 1987 Market Crash on the compensation package. Hypotheses six and seven examine the use of accounting-based and stock-based compensation. The chapter then continues with a discussion of the methodology (section 2.3), data (section 2.4), and sample (section 2.5). The empirical results are found in section 2.6. The chapter concludes with a summary of the results (section 2.7).

2.1 Tax Reform Act of 1986

The timing and amount of income recognized by the executive and deduction (if any) taken by the firm depends on the form of compensation. Assuming the executive is interested in after-tax compensation, and stockholders, after considering motivational factors, want to minimize their after-tax cost, the incentive exists to select the forms of compensation that minimize total (individual and corporate) taxes.

Miller and Scholes (1982) describe the tax advantages of the components of the compensation package. In contrast, Eaton and Rosen (1983) and Smith and Watts (1982) develop alternative, but not mutually exclusive, explanations for the existence of the various forms of compensation. Eaton and Rosen (1983) develop an explanation for deferred compensation based upon bonding or tying the executive to the firm, while Smith and Watts (1983) use agency theory to explain the

components of the compensation package. Smith and Watts (1983) conclude:

It is apparent that tax motivations cannot explain the existence of, and variations in, U.S. firms' compensation plans. A combination of salary and pension plan is as efficient in reducing taxes and does not increase the manager's exposure to risk as much as incentive plans.

If agency theory alone explains the composition of the compensation package, the Tax Reform Act of 1986 would not affect the components of the compensation package. The hypotheses in this chapter test the effect of the Tax Reform Act of 1986 on the components of the compensation package. They do not test the above agency theories.

Deferred Pay

The Tax Reform Act of 1986 dramatically cut both individual and corporate tax rates. In the short run it encouraged executives to defer income, i.e., from 1986 and 1987 to 1988. In contrast, it provided incentives for corporations to accelerate deductions to take them at the higher rates.² In the long run, lower tax rates reduce the advantages of deferring income, thereby making current compensation

² Regulation 1.404(b)-1T allowed the timing of compensation payments so that executives could defer income into the subsequent year, thus paying the lower rate, while the corporation could take the deduction in the year earned, at the higher rate. Basically it allows that where an employee receives compensation within 2.5 months after the end of the employers taxable year in which the compensation is earned, an accrual method corporation can use the deduction in the year earned, while the executive recognizes income in the year received.

relatively more attractive. If executives were choosing to defer income in response to tax incentives, the portion of income currently taxable (deferred) should increase (decrease) after the Tax Reform Act of 1986.

This tax arbitrage argument was more fully developed in Miller and Scholes (1982). In their model, which assumes both corporate and personal tax rates are intertemporally constant³, the tax advantage of deferring cash compensation arises because the marginal individual tax rate exceeds the marginal corporate tax rate. Thus, the benefits of deferral depend on the marginal tax rates faced by corporations and executives. The Tax Reform Act of 1986 reduced both marginal rates, but more importantly for deferral purposes, resulted in the highest corporate tax rate (34%) exceeding the highest individual tax rate (28%), reversing the Miller and Scholes (1982) condition for tax arbitrage. While deferral is still beneficial for firms facing low marginal tax rates, for most firms and executives, deferral is less advantageous after the Tax Reform Act of 1986. This leads to the following hypothesis:

H1: The deferred portion of salary and bonus declines after the Tax Reform Act of 1986.

³ This assumption may not hold. A likely scenario is the employee defers income until retirement, when he is in a lower tax bracket. However, incorporating a lower individual tax rate in the period of receipt only increases the benefit of deferral.

Lewellen (1972 and 1975) investigated the effect of changes in the tax law during the 1960s and early 1970s. For both the top executive and the top five executives, he examined changes in the after-tax composition of the following components of pay packages: salary plus bonus, pension, deferred pay, and stock options. In his 1972 paper, he hypothesized, but did not find, the proportion of income currently taxable (salary plus bonus) higher than in earlier periods. In his 1975 paper, Lewellen hypothesized, and found, the proportion of income currently taxable higher than in earlier periods.

Lewellen's methodology can be criticized on several levels. First, unlike Miller and Scholes (1982), Lewellen does not recognize that changes in tax rates have differing effects on the various components of the compensation package. For example, the Miller and Scholes (1982) model predicts deferred pay decreases, and stock compensation increases, after the Tax Reform Act of 1986. Second, the findings are circumspect because of the way Lewellen measures compensation. In particular, he measures the value of stock options using the appreciation in stock price after the date of grant (see Lewellen (1968) pp. 55-57), rather than valuing them at the date of grant. In periods of declining or stagnant stock prices, it appears he could assign a negative valuation to the option component of compensation⁴, thereby increasing the

⁴ Under his procedure, a 10 year stock option issued in year t will be included in compensation of years t through $t+9$. The amount included is calculated by taking the difference between the year-end market value and exercise

percentage of total compensation represented by salary plus bonus. Since the period (1970-73) examined in his 1975 paper was characterized by poor stock market performance, this valuation method could lead to his findings. Consistent with this explanation, and inconsistent with his hypothesis, Lewellen (1975) finds the other non-current components of compensation, pension and deferred pay, higher than in the earlier period. Finally, Lewellen totally ignores changes in corporate tax rates. As shown by Miller and Scholes (1982), it is the difference between individual and corporate tax rates that leads to the tax advantages of deferred pay.

As in Lewellen's studies, the time-series behavior of deferred pay is examined to infer the effect of the change in the tax law. In addition the cross-sectional variation in the use of deferred pay is examined (hypothesis two) to see if it can be explained by differences in corporate tax rates. Since the test is based on the Miller and Scholes (1982) tax arbitrage argument, deferred pay is defined as a percentage of salary plus bonus, and not as a percentage of total compensation (which Lewellen uses).⁵ Unfortunately, reporting requirements have changed (see Lewellen, Loderer and Martin (1987)), and

price, and allocating that difference on a pro-rata basis over the term of the option (with some adjustment for present values). If the market value of the stock drops, it appears Lewellen will value the option component as negative in the year of the drop.

⁵ Throughout this paper salary plus bonus refers to compensation earned by the executive in the current fiscal year, whether paid currently or deferred to a future period.

deferred pay is usually included in salary plus bonus as reported in the proxy statement, not separately identified. While many proxies disclose that reported cash compensation include amounts deferred, few disclose the amount of deferred pay. Hypotheses one and two are tested on the subset of firms that disclose deferred pay. While suffering from self-selection bias, Murphy (1985), Jung (1990) and Finkelstein and Hambrick (1989) have also used the subset of firms disclosing the relevant components of the compensation package. Furthermore, if the hypotheses are worth investigating, in the absence of full disclosure, this is the only available alternative. The bias may not be a problem for hypothesis one, since the hypothesis refers to changes in the composition of the compensation package over time, and not across firms. In contrast, since hypothesis two refers to tax rates across firms, this bias is more of a problem. For both hypotheses, the results are not generalizable to the population.

An additional difference between this study and Lewellen's is the use of before, rather than after-tax compensation. This avoids using subjective assumptions and valuation techniques, which unnecessarily complicate the analysis.⁶ The executive wishes to maximize the after-tax value of his compensation package, while the corporation wishes to minimize its after-tax cost. A reduction in the tax benefits of deferral is

⁶ Murphy (1985) uses before-tax compensation.

expected to lead to an increase in the currently taxable component on both a before and after-tax basis.

As pointed out above, the tax advantage of deferring income depends on the individual's tax rate exceeding the corporation's. Given the tax rate schedule in effect during the period under examination, it is a fair assumption that top executives are in the top marginal tax bracket. Thus the advantage of deferring income therefore depends on the corporation's marginal tax rate, and the amount of compensation deferred should vary with it. A proxy for the corporation's marginal tax rate can be calculated using the formula put forth by Zimmerman (1983) and used for this purpose by Ghicas (1990). Under the formula the tax rate is calculated as:

$$\frac{\text{(income tax expense + the change in deferred taxes)}}{\text{operating cash flows}}$$

The above tax rate is defined as a linear function, whereas the actual marginal tax rate is a step function. Furthermore since lower rates apply to the first \$100,000 of income, most corporations (even those getting refunds) are in the top marginal bracket. Only firms with tax loss carryforwards face a different tax rate. This rate is determined by the corporation's ability to use the carryforward in the future. The further in the future the carryforward is used, the lower the present value of its benefits, and the lower the

corporation's marginal tax rate.⁷ In the extreme case where the carryforward is never used, the marginal tax rate is zero. The likelihood of the corporation being able to use its tax loss carryforward depends on its future deductions. A capital intensive firm with high leverage has large depreciation and interest deductions and is less likely to be able to use its tax loss carryforward. Following this line of thought, the marginal tax rate declines with tax loss carryforwards, capital intensity, and leverage. Operationalizing this theory would prove difficult, thus a dichotomous measure, the existence of tax loss carryforwards, is used as a second proxy for the marginal tax rate. Stober (1986) and Tse (1990) use the existence of tax loss carryforwards to proxy for the firms tax status, while Johnson and Dhaliwal (1988) use both the effective tax rate (defined as $[(\text{income tax expense} - \text{change in deferred taxes}) / \text{pretax income}]$) and available tax offsets (operating loss carryforward*statutory rate + available investment tax credits) as proxies for the firms tax status.

H2: The deferred portion of salary and bonus declines with increases in the corporation's marginal tax rate.

⁷ Dopuch and Pincus (1988) write:

For firms having carryforwards that would otherwise be used in the future, the relevant tax rate is the future statutory rate discounted back to the present at the appropriate cost of capital. The marginal rate would be zero in the extreme case where carryforwards would otherwise expire unused.

Stock Compensation

While the above formulation applies to a scenario where the executive defers a portion of his salary and bonus, and the firm invests it for him in interest bearing securities, Miller and Scholes (1982) also consider the tax advantages of stock compensation.⁸ In their equation 8, they derive the advantages of restricted, phantom or performance shares to be equal to:

$$t_s = w_1(1-t_p) (P_L/P_1)t_g(1-1/[1 + r(1-t_p)])$$

where:

t_s is the tax savings associated with stock compensation
 w_1 is the before-tax current wage foregone
 t_p is the personal tax rate on earned income
 t_g is the personal tax rate on capital gains
 P_1 is the stock price on the day of grant
 P_L is the stock price on the day the restrictions expire
 r is the riskless rate of return

While equation 8 is derived in reference to restricted, phantom or performance shares, Miller and Scholes (1982) note

⁸ Strictly speaking stock compensation is a form of deferred compensation, as the executive is taxed, and the corporation receives a deduction (if any) at some future date. The tax incentives related to stock compensation differ from those leading to deferred pay in the form of interest bearing securities. The latter, as discussed above, involves tax arbitrage, whereby taxes are saved by having the party with the lower tax rate invest the funds. The Tax Reform Act of 1986 made the top individual tax rate lower than the top corporate tax rate reversing the incentive to defer compensation in the form of interest bearing securities. The tax advantage of stock compensation involves the avoidance of capital gains tax on the appreciation between the time of grant and the time the grant becomes taxable. The Tax Reform Act of 1986 increased the capital gains tax rate thereby increasing the tax benefits of stock compensation.

the tax "advantages of a nonqualified option or SAR would be analogous to those of restricted stock or phantom stock relative to direct stock purchase. That is, no capital gains tax would be payable on any price appreciation over the life of the option." The Tax Reform Act of 1986 decreased t_p and increased t_g . Inserting the new rates into the above equation, it is easy to see that both rate changes increased the tax advantages of stock based compensation. This leads to hypothesis three:

H3: Stock-based compensation as a portion of total compensation increases after the Tax Reform Act of 1986.

Total compensation, as defined in this study, equals the sum of salary, bonus, and stock-based compensation, valued as of the date of grant (the formulation suggested by Smith and Zimmerman (1976) is used to value the stock options). Pensions are ignored, mainly because of the difficulty of estimating the current income equivalents, but also because the firm may be bound by contractual obligations, and it is easier to change the other components of compensation in response to changes in tax incentives.

Stock Options

The Tax Reform Act of 1986 had both positive and negative effects on Incentive Stock Options. Incentive Stock Options issued after 1986 no longer had to be exercised in the order

received to qualify for favorable tax treatment, and the previous \$100,000 grant limit for Incentive Stock Options was replaced with a \$100,000 limit on the value of the stock which becomes exercisable in any one year. This increased flexibility increased the value of Incentive Stock Options. However, the loss of the long-term capital gains deduction, and the possibility that exercise of Incentive Stock Options will trigger the alternative minimum tax, reduced their value. Further the corporate deduction which is passed up with an Incentive Stock Option is now worth more (34%) than the deferral to the executive (28% if taxes are never paid on the difference between exercise price and the market value upon exercise). In fact, the corporation could increase the employee's compensation to offset the tax paid by the employee and still come out ahead, because the corporate tax rate exceeds the individual tax rate.⁹

Overall the Tax Reform Act of 1986 appears to decrease the advantages of Incentive Stock Options. If the form of compensation is sensitive to changes in tax laws, it is expected (Johnson (1986), Knight and Knight (1988), Mazer (1988), Walter (1987)) that firms adapt by (1) issuing only

⁹ Assume a corporation wishes to provide an executive with options worth \$X on an after tax basis. If the corporation were to issue Incentive Stock Options (to simplify assume the executive never pays taxes on Incentive Stock Options) the after tax cost to the corporation would be \$X. Now let the corporation issue Nonqualified Stock Options with the same after tax benefit to the executive - \$X. For an executive in the 28% bracket the pre-tax cost to the corporation equals \$1.39X. However, the after tax cost for a corporation in the 34% bracket is \$0.92X.

Nonqualified Stock Options in the future and (2) either disqualifying or providing executives with incentive to disqualify already outstanding Incentive Stock Options.¹⁰ Thus, the relative frequency of Incentive Stock Option grants should decline, and that of Nonqualified Stock Options increase, after the Tax Reform Act of 1986.

Hite and Long (1981) examined the switch from qualified to nonqualified stock options after the Tax Reform Act of 1969, which reduced the tax benefits of qualified options. They examined actual stock option plans for the Fortune 100, finding the firms shifted from plans offering qualified, to those offering nonqualified options. Today most plans allow firms to issue either Incentive Stock Options or Nonqualified Stock Options. For example, Arreglado and Peck (1989, p. 4) found 82% of firms have plans that allow for the issuance of both Incentive Stock Options and Nonqualified Stock Options. Thus the objective is not to see whether the plans changed, but to see whether the type of option issued, changed after the Tax Reform Act of 1986. Arreglado and Peck (1989) found 16% of firms issued Incentive Stock Options, 59% issued Nonqualified Stock Options, and 26% issued both during 1988. In an earlier study, Fox and Peck (1985) found 25% of firms issued Incentive Stock Options, 19% issued Nonqualified Stock

¹⁰ One way for a corporation to disqualify already issued Incentive Stock Options is to issue Stock Appreciation Rights (that attach to previously issued options) for which payment exceeds 100% of the difference between fair market value at time of exercise and the exercise price.

Options, and 56% issued both during 1984. While the difference in the findings of the two studies is consistent with the theory outlined above, further testing is needed because the two studies do not necessarily contain the same firms.

H4: The frequency of Incentive Stock Option grants decrease after the Tax Reform Act of 1986.

As a further extension of Hite and Long (1981), this study examines whether the choice depends on the corporation's marginal tax rate, i.e., firms in the 34% bracket are expected to issue Nonqualified Stock Options, while those not paying taxes are expected to issue Incentive Stock Options. This choice is dependent on the expected tax rate at the anticipated date of exercise (the time the tax deduction is taken - see Appendix A for more details), which is dependent on both corporate performance and future tax laws, both of which are unobservable. The current marginal tax rate (as defined above) is used to proxy for the future tax rate. The second proxy for the marginal tax rate developed above, is particularly appropriate here. From the corporations point of view the difference between an incentive and nonqualified stock option is that a deduction is taken at the time of exercise with a nonqualified option, whereas none is recognized for an incentive option. A corporation currently possessing tax loss carryforwards, or having high capital intensity or leverage is less likely to need the deduction in

the future, and is more likely to grant incentive stock options.

H5: The probability of Incentive Stock Option grants decrease with increases in the corporation's marginal tax rate.

While firms are required to disclose the grant of stock options to top executives, they are not required to disclose whether the options are incentive or nonqualified. Hypotheses four and five are tested on the subset of firms that disclose the type of option issued. The same qualifications that applied to testing hypotheses one and two apply here.

The effects of the Tax Reform Act of 1986 on financial accounting performance should not be ignored. Firms with net deferred tax liabilities recorded at the higher tax rates in effect prior to the Tax Reform Act of 1986, were able to reduce their liabilities, and recognize income in the year the tax rates changed under SFAS 96. This effect may have caused firms to adopt SFAS 96, whose effect on compensation is examined in chapter 3.

2.2 Effect of 1987 Market Crash

The market crash affected executive wealth by reducing the value of their stock and options. It also reinforced the risk associated with stock-based compensation (i.e., that uncontrollable events affect stock prices), thereby changing

the desired compensation package from the viewpoint of risk-averse executives (Greenlaw (1988), Mazer (1988), Verespej (1988)). If the board is responsive to these desires, a substitution away from stock options and other market-based compensation should be observed. This leads to the prediction that stock-based compensation makes up a smaller portion of the compensation package after the crash.

H6: After the October 1987 Stock Market Crash, stock-based compensation makes up a smaller portion of total compensation.

A problem arises because the prediction of this hypothesis conflict with that of hypothesis three. Hypothesis three predicts that the proportion of stock-based compensation increases after the Tax Reform Act of 1986, while this hypothesis predicts that the proportion of stock-based compensation decreases after the October 1987 Stock Market Crash. The problem arises because the period subsequent to the first event overlaps with the period after the second event.

As is further discussed in chapter 3, firms use conditional compensation, both accounting-based and stock-based, to align the interests of management and shareholders. If the board wants to maintain a constant proportion of conditional compensation then a reduction in the portion of stock-based compensation is accompanied by an increase in the portion of accounting-based compensation.

H7: After the October 1987 Stock Market Crash, accounting-based compensation makes up a larger portion of total compensation.

As above, the measure of compensation includes salary, bonus, and stock-based compensation. While there is no problem in testing hypothesis six, once again, disclosure requirements lead to a problem in testing hypothesis seven. Firms are not required to disclose salary and bonus separately. Thus, hypothesis seven is tested on the subset of firms that disclose salary and bonus separately. Once again, the qualifications that applied to testing hypotheses one, two, four and five apply to testing hypothesis seven.

2.3 Methodology

Hypotheses one, three, four, six and seven predict changes in the composition of executive compensation after the occurrence of a specified event. They are examined using both parametric and nonparametric tests that compare averages before and after the event. Hypotheses one, three, six and seven are tested using data on CEO compensation, while hypothesis four uses data on executive officers as a group.¹¹

¹¹ Corporations are not required to disclose the type of option granted, and relatively few do. Furthermore, the corporation may not issue any options to its CEO in a given year. To avoid losing data points, this hypothesis is tested by examining the type of options granted to executive officers as a group. Some corporations merely indicate the type of option issued, or that both types of options were issued, while fewer disclose the numbers of incentive and nonqualified

Hypotheses two and five specify a relation between the composition of the compensation package and the corporation's marginal tax rate. These two hypotheses are examined using parametric and nonparametric tests that compare averages across groups.

The years selected are those surrounding the adoption and implementation of the Tax Reform Act of 1986, and October 1987 Stock Market Crash. The year prior to adoption is 1985, so it is clearly unaffected by the act. In contrast, once the act was adopted in 1986, firms and executives, had incentives to shift income across periods. As stated above, the reduction of tax rates in 1987, and again in 1988, provided executives with the incentive to defer income to 1988. All income shifting is expected to be completed by 1988, and thus 1989 is the first clean year in the new tax regime. The sample period consists of, 1985 part of the old tax regime, the transition years of 1986 through 1988, and 1989 part of the new tax regime. While the time series components of compensation are

options issued. From the corporations point of view, incentive options should strictly dominate nonqualified options or vice-versa. Thus the corporation should either issue the maximum amount of incentive options allowed or none at all. For that reason this hypothesis will be tested by examining the proportion of corporations that issue incentive options. The corporation will be coded as issuing incentive options if incentive options were issued to any of the executive officers.

examined over the entire period, the major comparisons of interest are those between 1985 and 1989.

2.4 Data

Data on compensation is obtained from Corporate Proxy Statements. Item 402 of Regulation S-K governs the disclosure of executive compensation. It requires disclosure of cash compensation, including bonuses and "all compensation that would have been paid in cash to the named individuals ... but for the fact that the payment of such compensation was deferred." While "the registrant may segregate cash bonuses and deferred compensation" the majority of firms do not.¹² The firm must also disclose the number of stock options granted during the last fiscal year, the average per share exercise price, and if the exercise price was less than the market price on the date of issue, such market price. They are not required to disclose whether the options were incentive or nonqualified. Unfortunately, this information is required to test hypotheses one, two, four, five and seven. Given the qualifications specified above, these hypotheses are tested on the subset of firms that make the necessary disclosures.

¹² Murphy (1985) found 46%, and Finkelstein and Hambrick (1989) found 44% of their samples separately disclosed salary and bonus.

Hypotheses one, two, three, six and seven, require valuation techniques for the components of the compensation plan. In general, cash compensation is considered compensation in the year earned, whether paid or deferred, while stock is considered compensation in the year of grant, as long as it is not conditional on future performance (these rules are consistent with those used in Murphy (1985)). Under this rule, restricted stock and stock options are considered compensation in the year of grant even though they require continued employment. In contrast, performance shares are considered compensation in the period(s) earned, not at the earlier grant date. The details of the valuation process are presented in Appendix B.

Hypotheses two and five require an estimate of the marginal corporate tax rate. As described above more than one proxy for the marginal tax rate is used. The information required for these estimates is obtained from Compustat.

2.5 Sample

Proxy statements for the period 1976-1990 were requested from each of the 800 firms included in the 1990 Forbes Executive Compensation Survey. At least one proxy was received from 665 of the firms. Most of the firms provided proxies for more than one year and 77 firms provided proxies for the entire fifteen year period.

Different samples were used in this section. The firms used to test H1 and H2 include all firms (out of the above 665) consistently disclosing deferred pay over the 1985 through 1989 period. H1 and H2 were tested using CEO only and then replicated using all executive officers as a group. A total of 35 (25) firms disclosed deferred pay for the CEO (executive officers as a group) consistently from 1985 through 1989. The sample used to test H3, H6, and H7 included 70 of the Fortune 100 firms (the pilot sample), plus 62 firms that provided complete data for the 1975-1989 period (15 of the firms that provided complete data were included in the pilot sample). The latter group of firms were selected to economize on data collection (the data collected will be required for future research). The sample used to test H4 and H5 included all firms granting options and disclosing the type of option granted during each year from 1985 through 1989. A total of 73 firms granted and disclosed the type of option granted each year.

2.6 Empirical Results

2.6a Effect of Tax Reform Act of 1986

H1: The deferred portion of salary and bonus declines after the Tax Reform Act of 1986.

The disclosure of deferred pay is voluntary. Each of the proxies received was examined to determine whether the company

disclosed the amount (if any) of deferred compensation for either the CEO and/or executive officers as a group. Only 35 (25) firms disclosed the amount deferred by the CEO (executive officers as a group) consistently over the five year period (fiscal years ending) 1985-1989.

Panel A of Table 2.1 (p. 41) presents the proportion of Salary plus Bonus deferred for the CEO and executive officers as a group. Panel B reports the significance of three comparisons of deferred Salary plus Bonus before and after the Tax Reform Act of 1986. The first comparison in Panel B of Table 2.1 compares the amounts deferred in 1985 to those deferred in 1987, 1988, and 1989. Because the rate reductions were phased in, in 1987 the incentive existed to defer income to 1988. For that reason the second and third comparisons were conducted (also shown in Panel B of Table 2.1), both of which yielded stronger results. Taken together, they provide strong evidence that the Tax Reform Act of 1986, by changing incentives, caused executives to reduce the amount of income they chose to defer.

H2: The deferred portion of salary and bonus declines with increases in the corporation's marginal tax rate.

The following regression was used to test H2:

$$\begin{aligned} & (\text{Deferred Salary} + \text{Bonus}) / (\text{Total Salary} + \text{Bonus}) \\ & = a_0 + a_1 * \text{Marginal Tax Rate} + e \end{aligned} \quad (1)$$

Yearly regressions (1985-1989) were conducted, first for the CEO, and then for executive officers as a group, a total of ten regressions. Several variables were used to proxy for the corporation's marginal tax rate. First, the marginal tax rate was estimated using the formulation suggested by Zimmerman (1983). None of the regressions were significant, and thus none are presented. A second variable used to proxy for the marginal tax rate was the existence of tax loss carryforwards. However since only one firm had a tax loss carryforward (and then for only three of the five years in the sample period) that variable had to be dropped from the analysis. Finally, the marginal tax rate was proxied for using alternative sources of deductions. It is hypothesized that firms with large depreciation and/or interest deductions are less likely to need the deductions associated with compensation and are thus more willing to permit their executives to defer compensation. Thus it is hypothesized that the amount deferred will be positively associated with capital intensity (measured as gross property, plant and equipment/total assets) and/or leverage (measured as long-term debt/common equity). A total of twenty univariate regressions were run (2 independent variables - capital intensity & leverage, * 2 dependent variables - percentages deferred by CEO & executive officers, * 5 years). Only three (percentage of CEO compensation deferred in 1985 & 1989 regressed on leverage, and percentage of CEO compensation deferred in 1986 regressed on capital intensity) were significant at the 10% level.

As an alternative test, correlations were calculated. Given the small sample size, the Spearman Rank Correlation is the most appropriate choice. A total of 30 correlations were calculated, one for each of the five years, two measures of the amount deferred (CEO, executive officers) and three explanatory variables (marginal tax rate, capital intensity and leverage). A total of six were significant at conventional levels, with the correlations in the predicted direction (indicating the increased use of deferred compensation with decreases in marginal tax rate, or increases in alternative sources of deductions). In summary despite the alternative measures used to proxy for the marginal tax rate, the evidence does not support H2.

H3: Stock-based compensation as a portion of total compensation increases after the Tax Reform Act of 1986.

Total compensation includes cash compensation, plus the value of stock options and stock granted in the current year. Stock options were valued using the formula suggested by Smith and Zimmerman (1976). Under their formula, the value of the option is the difference between the current value of the shares and the present value of the exercise price. The present value of the exercise price was calculated assuming, unless explicitly stated otherwise, the options would be exercised in 10 years (most plans permit a ten year life), and the interest rate would be 10% per year. Stock grants were valued at the current value of the shares, or if no value was

given, either (1) the exercise price of stock options granted during the year, or (2) the mid-point between the high and low prices for the year.

As can be seen from the Panel A of Table 2.2 (p. 42), with the exception of 1988, the proportion of stock compensation increased throughout the period. T-tests indicated these differences were significant at the 1% level. This significance was confirmed with non-parametric tests (not shown), including the Wilcoxon Rank Sum and Median Score tests, all of which were significant at the 1% level or better. Taken together, these comparisons provide strong evidence that the Tax Reform Act of 1986 by changing incentives, changed the amount of stock included in the compensation package. It is possible that these results (increased proportion of stock compensation) are not the results of the tax act at all, but merely the continuation of a trend started in earlier years. To examine this possibility, future research will examine earlier years to see if this result is merely the continuation of a trend began prior to the Tax Act.

H4: The frequency of Incentive Stock Option grants decreased relative to those of Nonqualified Stock Options, after the Tax Reform Act of 1986.

As with H1, firms are not required to disclose this information, and relatively few do (sample size 73). In

addition the following constraints limit sample size. First, firms do not grant options to each executive each year. Second, some firms merely indicate the type of option issued, or that both types of options were issued, while fewer disclose the numbers of incentive and nonqualified options issued. From the firms point of view, incentive options should strictly dominate nonqualified options or vice-versa. Thus the firm should either issue the maximum amount of incentive options allowed or none at all. To maximize the number of data points, firms were included in the same if they disclosed the type of options granted to executive officers as a group.

Using the proportion of firms that issue incentive options as the test variable, Table 2.3 (p. 43) shows that consistent with H4, firms are less likely to grant ISOs after the Tax Reform Act of 1986.¹³ T-tests indicated these differences

¹³ The same argument could be made with regards to deferred pay (H1 & H2). Firms disclose the existence of deferral plans without disclosing if they are used or the amount deferred. No data points would be added by using whether deferrals occurred or not. Firms generally either disclose the amount deferred or are silent as to whether any occurred. Possible areas to investigate in the future include the existence and parameters of the plan. The act of deferring compensation requires action on the part of both the firm and executive, and thus must be advantageous to both. For the firm there are tax, motivational, and cash conservation advantages, while for the executive there appear to be only tax advantages. If the deferral of compensation is beneficial for the firm it will establish a plan and set the parameters so that executives find it beneficial to defer income. The parameters of concern are the interest rate offered on deferred compensation, as well as the conditions under which the executive would forfeit deferred pay, if any. More detailed examination of the rates could in itself lead to an interesting study, as these rates should vary with the

were significant at the 1% level (see Hand (1989), footnote 15 for details of the T-test).

H5: The probability of Incentive Stock Option grants relative to those of Nonqualified Stock Options, decreases with increases in the corporation's marginal tax rate.

This hypothesis predicts firms granting Incentive Stock Options face a lower marginal tax rate than firms granting only Nonqualified Options. It was tested on a yearly basis using as proxies for the marginal tax rate the variables specified in H2. These variables were the effective tax rate as defined by Zimmerman (1983), the existence of tax loss carryforwards, the debt/equity ratio, and capital intensity. Because the choice of option type is discrete, logit analysis was used to test whether the effective tax rate, debt/equity ratio, and/or capital intensity explained the type of option issued. Univariate regressions were run on a yearly basis for each independent variable, and a multiple regression was run to test the joint effect of the variables on the choice. None of these regressions was significant at conventional levels. Parametric (T-tests) and nonparametric (Wilcoxon, Median) tests were also conducted to see if these variables differ depending on the type of option issued, but no significant differences were found. The existence of tax loss carryforwards was tested using 2 X 2 contingency tables.

perceived benefits.

Perhaps because of the small number of firms reporting tax loss carryforwards in any particular year (maximum of six)¹⁴ none of the resulting chi-square statistics was significant. In summary, despite the alternative measures used to proxy for the marginal tax rate, the evidence does not support H5.

2.6b Effect of 1987 Market Crash

H6: After the October 1987 Stock Market Crash, stock-based compensation makes up a smaller portion of total compensation.

This hypothesis is tested by using the same information as H3 above. A problem arises because the Tax Reform Act and Market Crash are clustered in time and have conflicting predictions. The decrease in the proportion of stock compensation in 1988 is consistent with this hypothesis, while the increase in 1989 is not. A possible explanation, given that the market almost immediately resumed its upward climb, is that the effect of the Market Crash was transitory. T-tests (see Panel B of Table 2.4, p. 44) were conducted comparing percentage stock compensation before and after the Market Crash act. While the first and third comparisons are significant at conventional levels, it must be pointed out that the averages in the post-crash period exceed those in the pre-crash period. Thus, the

¹⁴ For two reasons it is not advisable to pool data over time. First, because the same firms are used, the observations are not independent over time. Second, the merging of data from different tax regimes would lead to a nonhomogeneous data set.

results are counter to the predictions of H6. The comparison of means between 1987 and 1988 (second line) is in the right direction, but insignificant. Similar results were obtained using nonparametric tests.

H7: After the October 1987 Stock Market Crash, accounting-based compensation makes up a larger portion of total compensation.

Once again, firms are not required to separately disclose accounting-based compensation (payouts from long-term plans are included in accounting-based compensation), and not all do. For this sample 45 of the above 132 firms, 34%, separately disclose bonuses. This hypothesis is based on the theory that compensation conditioned on accounting performance, substitutes for compensation conditioned on stock performance. (Compensation falls into both categories when the amount is based on accounting performance and paid in stock.) Consistent with the hypothesis results in table 2.5 (p. 45) indicate the percentage of accounting-based compensation increased in 1988, and although it decreased in 1989, it remained above its pre-Crash level. Consistent with the underlying theory of stock and accounting-based compensation being substitutes, in 2 of 3 years, the median change in the proportion of stock-compensation and the change in the proportion of accounting-based compensation have opposing signs.

Although the mean differences are in the direction predicted by the hypothesis, none of the T-tests are significant at conventional levels. Using nonparametric tests, the Wilcoxon and Median Score tests, all three comparisons are significant, providing evidence that the 1987 Stock Market Crash caused firms to increase their reliance on accounting-based compensation.

2.7 Summary of Results

The results in this chapter provide strong support for the hypothesis that the Tax Reform Act of 1986 affected the composition of the compensation package. Significant results were found for hypotheses 1, 3 and 4. They show that the Tax Reform Act of 1986 affected the percentage of deferred compensation (-), stock compensation (+), and proportion of firms issuing incentive stock options (-). Contrary to expectations the results did not show the percentage of deferred compensation (H2) and proportion of firms issuing incentive stock options (H5), varying cross-sectionally with the corporation's marginal tax rate. This lack of results may have been caused by the small sample size or because the proxy for marginal tax rate was weak.

The results in this chapter do not show the 1987 stock market crash affecting the percentage of stock compensation (H6), although they do show that the percentage of accounting-based compensation (H7) increased after the 1987 Stock Market Crash.

The lack of results for H6 may arise because the incentives provided by the Tax Reform Act of 1986 to increase stock compensation dominate the effect of the 1987 Market Crash or because the effect of the Market Crash was transitory. The latter explanation seems to have some merit as the percentage of stock compensation dropped slightly from 1987 to 1988 (difference not significant) before resuming its upward climb in 1989.

Figure 2.1
Components of Compensation Package

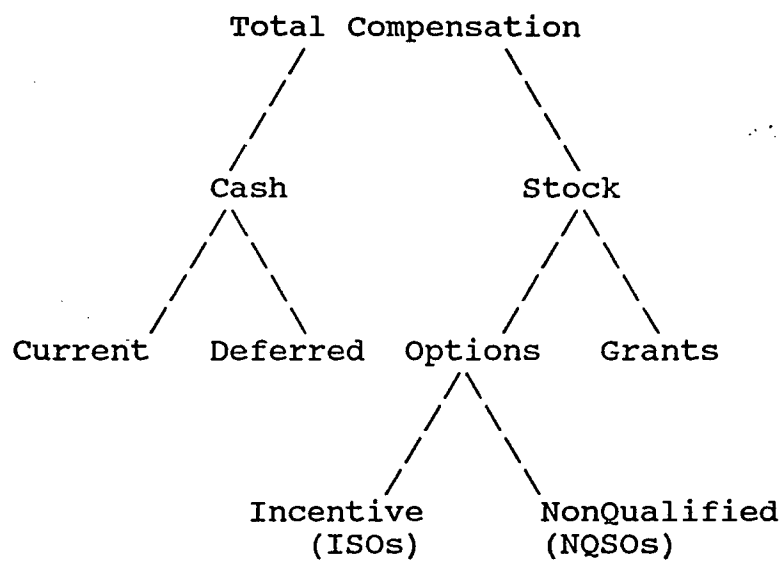


Figure 2.2
Fixed versus Conditional Compensation

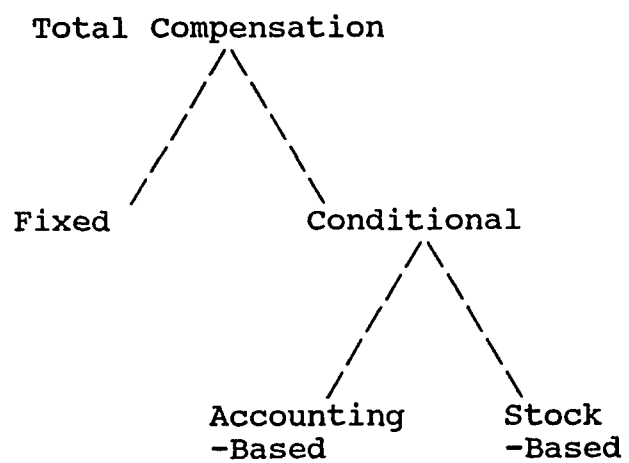


Table 2.1
 Analysis of Deferred Salary and Bonus in the period
 surrounding the Tax Reform of 1986

Panel A - Average Deferrals* for 1985 through 1989

Fiscal Year	CEO	Executive officers
1985	16	10
1986	18	11
1987	15	10
1988	10	6
1989	7	5

Panel B - Significance levels from T-tests comparing the percentages deferred before and after the tax act.

	CEO	Executive officers
1985 vs 1987-1989	0.09	0.17
1985 vs 1988-1989	0.03	0.02
1985 vs 1989	0.02	0.01

* $(\text{Deferred Salary} + \text{Bonus}) / (\text{Total Salary} + \text{Bonus})$

Table 2.2
Analysis of Stock Compensation in the period surrounding the
Tax Reform of 1986

Panel A - Proportion Stock Compensation* 1985 through 1989

Fiscal Year Ending	Mean (Median)
1985	27 (27)
1986	33 (36)
1987	34 (37)
1988	33 (32)
1989	37 (38)

Panel B - Significance levels from T-tests comparing the
percentage Stock Compensation before and after the tax act.

1985 vs 1987-1989	0.01
1985 vs 1988-1989	0.01
1985 vs 1989	0.01

* Stock Compensation/Total Compensation

Table 2.3
 Analysis of Stock Option Grants in the period surrounding the
 Tax Reform of 1986

Panel A - Proportion of Firms Granting Incentive Stock Options

Fiscal Year Ending	Proportion of Firms Granting ISOs
1985	73
1986	63
1987	41
1988	34
1989	26

Panel B - Significance levels from T-tests comparing the proportion of firms issuing incentive stock options before and after the tax act.

1985 vs 1987-1989	0.01
1985 vs 1988-1989	0.01
1985 vs 1989	0.01

Table 2.4
 Analysis of Stock Compensation in the period surrounding the
 1987 Stock Market Crash

Panel A - Proportion Stock Compensation* 1985 through 1989

Fiscal Year Ending	Mean (Median)
1985	27 (27)
1986	33 (36)
1987	34 (37)
1988	33 (32)
1989	37 (38)

Panel B - Significance levels from T-tests comparing the
 percentage Stock Compensation before and after the Market
 Crash.

	Mean Pre-Crash	Post-Crash	Significance
1985-1986 vs 1988-1989	30	35	0.03
1987 vs 1988	34	33	0.80
1985-1987 vs 1988-1989	31	35	0.08

* Stock Compensation/Total Compensation

Table 2.5
Analysis of Accounting-Based Compensation in the period
surrounding the 1987 Stock Market Crash

Panel A - Proportion Accounting-Based* Compensation 1985 - 1989

Fiscal Year	mean	(median)
1985	25	(21)
1986	25	(21)
1987	26	(22)
1988	31	(29)
1989	26	(27)

Panel B - Significance levels from T-tests comparing the percentage Accounting-Based Compensation before and after the Market Crash.

	Pre-Crash	Mean Post-Crash	Significance
1985-1986 vs 1988-1989	25	28	0.13
1987 vs 1988	26	31	0.17
1985-1987 vs 1988-1989	25	28	0.15

Panel C - Significance levels from Nonparametric tests comparing the percentage Accounting-Based Compensation before and after the Market Crash.

	Wilcoxon	Median Test
1985-1986 vs 1988-1989	0.06	0.02
1987 vs 1988	0.09	0.10
1985-1987 vs 1988-1989	0.06	0.04

* Accounting-Based Compensation/Total Compensation

3. Use of Accounting Numbers as Performance Measures in Determining Compensation

Chapters three and four examine the association between CEO compensation and firm performance, where performance is measured using accounting income. An association between CEO compensation and accounting income will be found if (1) CEO compensation is based on firm performance, and (2) accounting income proxies for firm performance. The existence of accounting-based bonus plans indicate that both conditions are likely to be met.

This introductory section is followed by section 3.1 which examines whether the association between CEO compensation and accounting income varies with the conservatism of the firm's accounting policies (hypothesis eight). Section 3.2 then examines the effect of mandated accounting changes (hypothesis nine), writeoffs (hypothesis ten), and income smoothing (hypothesis eleven) on CEO compensation. The chapter concludes with a discussion of the results (section 3.3).

Determining CEO Compensation

Mace (1986, especially p.181) believes the CEO is omnipotent within his own corporation, possessing the power to set his own compensation. The CEO is only limited by the fear of provoking outrage among shareholders and/or regulators and perhaps awakening corporate raiders. Even under this scenario

there may be an association between CEO compensation and firm performance, as better performance allows the CEO to justify greater remuneration. Further, his power will differ across firms with variation in ownership of the firm and control of the Board of Directors. Even Mace (1986) recognizes the CEO's power will be checked when a large stockholder is represented on the Board.

Alternatively, CEO compensation is determined by both the market for executives, and by firm performance. This can be best illustrated with the basic principal-agent model. Under the model, the principal selects the compensation contract that maximizes firm value. The expected payoff from that contract must exceed the utility provided by the agent's reservation wage, which is determined by his alternatives in the marketplace. Furthermore, since the agent prefers to provide as little effort as possible, and because firm value is positively correlated with the agent's effort, compensation will be based on a mutually observable variable (or variables) positively correlated with effort. This is true even though the risk averse agent prefers a fixed wage, and would accept a lower fixed wage, rather than a wage conditioned on firm performance.¹⁵ The agent prefers a fixed wage because he is unable to costlessly hedge the risks involved (for example he

¹⁵ In game theory jargon this is known as a second-best solution. The first-best solution, which provides for optimal risk sharing (all borne by risk-neutral principal), requires the principal be able to monitor the agent completely and costlessly.

is not allowed to short-sell the stock of his employer). Further, he probably has the bulk of his wealth, both his undiversifiable human capital and financial investments (stock, options, pension) tied to the value of his employer. Herman (1975, p. 95) found "in 11 of 16 cases examined, a reasonable probability was established that company stock accounted for over half of the individual's personal assets."

For a compensation plan to be effective it must motivate management to act in the interests of shareholders. To do so it must align the interests of managers with those of shareholders, and convince managers that their efforts affect those common interests. Stock-based compensation aligns the interests of managers and shareholders by tying management compensation to shareholder wealth, and is affected by managerial effort through the effect of effort on stock prices. A problem exists if management does not believe its efforts affect the firm's stock price. Even though management effort can increase stock price, their efforts may go for naught because other factors (for example, the October 1987 Stock Market Crash) also affect stock prices. For this reason, stock price may not be a valid measure of corporate and/or managerial performance, and used alone, may not motivate managers. In situations where managers feel their actions do not affect stock price, linking compensation to stock price not only does not provide motivation, but also

increases managerial risk¹⁶, causing management to raise their reservation wage (level of compensation required).

For this reason, corporations often base part of management compensation on non-market performance measures.¹⁷ The most common of these are accounting-based short-term incentive plans and long-term performance plans. However, accounting-based measures of firm performance are also subject to economy wide and industry influences. Thus many plans adjust for industry factors.

Compensation can be explicitly or implicitly tied to income. If compensation is explicitly tied to income, a bonus plan is set up designating the payment of a percentage of income directly to a manager or to the bonus pool. If compensation is implicitly tied to income, management may be rewarded, either through bonuses or through increases in future salary.

¹⁶ Any form of conditional compensation increases managerial risk. Since managers are assumed to be risk averse, they respond to the increase in risk by increasing the compensation they require. In a properly designed compensation package, the expected cost to shareholders should at least be offset by the expected benefits received from having a motivated manager.

¹⁷ This can also be explained using game theory. The principal attempts to minimize required compensation by reducing the risk borne by the agent. He does so by combining various (less than perfectly correlated) forms of conditional compensation into the compensation package. He also uses more than one signal to measure performance. Assuming the CEO owns stock and options that tie his wealth to that of shareholders, cash compensation should depend on other performance proxies to diversify CEO risk and reduce equilibrium compensation. See Coughlin and Schmidt (1985) and Lambert and Larcker (1987) for similar arguments.

In either case, the compensation committee of the board of directors must approve the payment and may consider factors other than reported income. Almost all plans leave determination of the award amounts to the compensation committee, with some explicitly identifying items subject to adjustment. For example, the Management Incentive Program of Amoco contains the following (1986 proxy, p. 34):

"Amounts payable with respect to any grant of performance units shall be subject to such adjustment, in light of the Corporation's relative performance in the industry and such factors as acquisitions and divestitures, regulatory or legislative changes, accounting changes or other circumstances, as the Directors' Compensation Committee deems appropriate."

Relationship between Pay and Performance

In an attempt to determine whether management acts to maximize firm value by maximizing profits, or its own welfare by maximizing some other variable, such as firm size, Masson (1971) and Lewellen and Huntsman (1972) examine empirically whether management compensation is based on firm profitability or total revenues. Masson (1971), using a time-series approach, regresses the percentage change in management wealth on the contemporaneous and lagged percentage changes in sales, earnings per share, and firm value. He finds executive compensation significantly associated with stock market performance, but not earnings per share or sales. Lewellen and Huntsman (1972) using a cross-sectional regression, find both cash and total compensation, significantly related to profits and market value, but not sales.

Murphy (1985) and Coughlin and Schmidt (1985) reinvestigate the findings of Masson (1971) and Lewellen and Huntsman (1972). Murphy (1985), using time-series data, finds both salary plus bonus, and total compensation, positively related to stock returns and sales growth. In contrast, Coughlin and Schmidt (1985) using cross-sectional data, find cumulative abnormal returns significantly, but sales growth insignificantly related to changes in salary plus bonus.

Antle and Smith (1986), Gibbons and Murphy (1990) and Lambert and Larcker (1987) examine the performance measures in more detail. Antle and Smith (1986) and Gibbons and Murphy (1990) examine whether managers are compensated based on performance relative to competitors. Using a time-series model, Antle and Smith (1986) regress the change in management wealth on both the systematic and unsystematic components of stock returns and accounting return on assets. They find increases in both systematic and unsystematic returns increase management wealth, with the increase being greater if the return is unsystematic. However, when they attempt to replicate this using salary plus bonus as the dependent variable, they do not find a difference between the systematic and unsystematic components of returns. Gibbons and Murphy (1990) regress the change in CEO pay on shareholder return, industry return and market return. They find changes in pay positively related to shareholder return but negatively related to industry and market return, indicating that industry and market effects are at least partially filtered out. Lambert and Larcker (1987)

examine whether the relative weight placed on a performance measure increases with the signal to noise ratio. In a time-series framework (they later aggregate the test statistics cross-sectionally), they used cash compensation as their dependent variable, and stock returns and accounting return on equity as their two performance measures. They find firms generally place more weight on return on equity, shifting weight to market performance when (1) the variance of return on equity is high relative to the variance of stock returns, (2) the firm experiences high growth rates, and (3) the value of the manager's personal holdings of the firm's stock is low.

A summary of the above studies can be found in Table 3.1 (p. 55), Panel A. To summarize their findings, regardless of the proxy variables used for compensation (cash compensation, total compensation, or change in managerial wealth), or performance (profit before taxes, return on equity, return on assets, raw stock returns, cumulative abnormal returns), a positive and significant relationship was found between CEO compensation and firm performance. The only exception was Masson (1971), who did not find the change in earnings per share to be significant.

Bonus Hypothesis

The bonus hypothesis (see Watts and Zimmerman (1986)) posits that the existence of accounting-based bonus plans leads management to choose income-increasing accounting methods.

Implicitly it argues that management is able to increase its remuneration through judicious choice of accounting methods.

Three recent studies investigate whether CEO (cash) compensation is affected by voluntary accounting changes. Abdel-Khalik (1985) cross-sectionally investigates firms switching to LIFO, finding that CEO compensation is not adversely affected by the switch to LIFO. This leads him to conclude that the compensation committee adjusts for accounting changes. Abdel-Khalik, Chi and Ghicas (1987), also using a cross-sectional model, examine changes to LIFO and changes in actuarial cost methods, concluding that increases in compensation are associated with accounting changes that increase firm value, even if they decrease accounting income. In contrast, Healy, Kang and Palepu (1987), use a time-series model to examine the compensation effect of changes to LIFO and straight-line depreciation, finding compensation based on reported income, which suggests that the compensation committee does not adjust for accounting changes. Still, they cannot conclude that accounting changes affect compensation:

"We cannot reject the hypothesis that the compensation committee nullifies the effect of an accounting change on bonus and salary awards by modifying the parameters of the compensation-earnings relation. We believe that this result is inconclusive because the effect of the accounting change on compensation, . . . is too small compared to the time-related effects to allow us to discriminate between the null and alternative hypotheses."

In a slightly different context, Defeo, Lambert and Larcker (1989) find income-increasing, early debt redemptions associated with insignificant increases in compensation.

A summary of the above studies can be found in Table 3.1, Panel B. To date the evidence is inconclusive as to whether accounting changes affect CEO compensation.

This study extends the above studies in two ways. First, rather than examine the effect of one voluntary accounting change on CEO compensation, the effect of the portfolio of accounting policies on CEO compensation is investigated. Examining the portfolio of accounting procedures rather than one voluntary change should prove interesting because while the income effect of the portfolio of accounting procedures can be greater than the income effect of one voluntary accounting change, it is not disclosed. This increases the costs the Board of Directors must incur to make adjustments to income in determining compensation, while potentially reducing the pressure from shareholders to do so. Still if the managerial labor market is efficient, management should not be able to increase its compensation with its accounting choices. Second, the effect of mandated accounting changes and writeoffs on CEO compensation is investigated. If these items are less discretionary than voluntary accounting changes, or if they affect firm value differently, the compensation committee might be more (or less) willing to adjust for them in setting compensation.

Table 3.1
Summary of Related Literature

Panel A - Relationship between Pay and Performance

<u>Study</u>	<u>Findings</u>
Masson (1971)	Compensation significantly associated with stock market performance.
Lewellen and Huntsman (1972)	Compensation significantly related to both profits and market value.
Murphy (1985)	Compensation related to stock returns and sales growth.
Coughlin and Schmidt (1985)	Compensation related to cumulative abnormal returns.
Antle and Smith (1986)	Compensation related to both systematic (industry related) and unsystematic components of stock returns and accounting return on assets.
Gibbons and Murphy (1990)	Compensation related to stock returns after industry and market returns are filtered out.
Lambert and Larcker (1987)	Use of return on equity and market return as performance measures depends upon (1) their relative variances, (2) the firm's growth, and (3) the value of the manager's stockholdings.

Panel B - Effect of Accounting Choices on Compensation

Abdel-Khalik (1985)	Compensation is not adversely affected by switch to LIFO.
Abdel-Khalik, Chi and Ghicas (1987)	Increases in Compensation are associated with accounting changes that increase firm value.
Healy, Kang and Palepu (1987)	Compensation based on reported income, i.e., after effect of accounting change.
Defeo, Lambert and Larcker (1989)	Compensation is not significantly affected by early-debt-redemptions.

3.1 The Effect of the Portfolio of Accounting Choices on CEO Compensation

If the existence of implicit or explicit accounting-based compensation leads managers to believe they can increase their compensation merely by increasing reported income, the incentive to adopt income-increasing accounting policies exists. This incentive increases with the strength of the linkage between income and compensation. Assuming bonus parameters are fixed, the manager has greater incentive when the coefficient applied to reported income is higher.¹⁸ This leads to the prediction that, *ceteris paribus*, firms with the strongest linkage between income and compensation adopt the most income-increasing accounting policies.

Alternatively, the compensation committee consists of sophisticated individuals with the ability to look beyond the reported accounting numbers in setting compensation.¹⁹ The compensation they set is based on the economic activity behind the reported numbers, *i.e.*, they adjust for accounting manipulation. While the compensation committee may adjust for

¹⁸ Without countervailing incentives, anytime there is the possibility of linkage between income and compensation, managers are expected to maximize income (ignoring the possibility of a nonlinear linkage, for example bonus plans with upper bounds). There are disincentives to maximizing income. Maximizing income requires the depletion of accounting slack which makes it harder for management to show a smooth stream of steadily increasing earnings. It also raises the firm's political visibility and costs.

¹⁹ See Chapter 4 for a discussion of the incentives of the compensation committee.

management discretion in reporting accounting income, the adjustment may not be 100%, leaving management with some incentive to manipulate income. This happens when information asymmetry exists, in that the compensation committee cannot distinguish perfectly between income caused by real economic activity or by accounting manipulation.

The above paragraphs lead to contradictory predictions about the relationship between compensation and income. The first implies that compensation contracts differ across firms, and predicts that the association between compensation and income is higher for firms adopting income-increasing accounting methods. The second does not predict ex-ante parameters, but implies that compensation is based on economic rather than reported income. This alternative requires compensation be adjusted to reflect differences in accounting methods. Thus, the association between CEO compensation and income, is lower for firms using income-increasing accounting methods.²⁰ Stating the two alternatives:

H8a: The association between CEO compensation and accounting income, increases with the selection of income-increasing accounting methods.

²⁰ Five ways of classifying the accounting policies of firms (the portfolio of accounting methods, accruals, timing differences, the earnings response coefficient, and the price-earnings ratio) are discussed in Appendix C.

H8b: The association between CEO compensation and accounting income, decreases with the selection of income-increasing accounting methods.

3.1a Methodology

The above hypotheses are examined explicitly and implicitly. Explicitly, differences in bonus plan parameters are examined to see if they lead to differences in observed accounting choices. The lack of data on bonus plans (Defeo, Lambert and Larcker (1989) find plan parameters for only 42% of their sample), and lack of information on the allocation of bonus pools among executives, precludes total reliance on actual plan parameters. Thus, regression analysis of the relation between CEO compensation and income is used to test the hypotheses. Before discussing the formal equations, the relation between CEO compensation and firm performance is examined, and the choice of dependent and independent variables explained.

Contemporaneous versus Lagged Association

Most previous studies assume a contemporaneous association between compensation and firm performance.²¹ Alternatively, compensation could lag performance if salary is set at the

²¹ Two exceptions are Masson (1971) and Jensen and Murphy (1990a & b). In addition, Healy, Kang and Palepu (1987, fn. 8) tested, but did not find salary plus bonus related to lagged earnings.

beginning of the year, before performance for the year is known, and/or bonuses are paid only after year end (thus the bonus paid in year 't' relates to performance for year 't-1').

Finkelstein and Hambrick (1989, p. 122) state that "since salaries are set at the beginning of the fiscal year, they will have no necessary relationship to performance for that period."

A large number of proxy statements were examined. Many indicated that compensation paid in year t included performance based compensation for year t. Others noted that compensation paid in year t included performance based compensation for year t-1. A regression of compensation on contemporaneous and lagged income found both significantly related to compensation. Thus, all regressions include both contemporaneous and lagged income as independent variables.

Dependent Variable - Measure of Compensation

The regressions in this chapter, and in chapter 4, investigate the association between CEO compensation and firm performance. As dependent variable most previous studies have used cash compensation (Abdel-Khalik (1985), Abdel-Khalik, Chi and Ghicas (1987), Healy, Kang and Palepu (1987)), although some have used total compensation (Lewellen (1968), Murphy (1985)), and others, the change in managerial wealth (Masson (1971), Antle and Smith (1985)). The appropriate dependent variable is conditional on the choice of independent variable, and the

hypothesized relationship between the dependent and independent variables. The relationship hypothesized is not a causal relationship, rather the association between a proxy for firm performance and a proxy for CEO compensation. The dependent variable should be the best available estimate of the total reward resulting from that performance. For that reason, cash plus stock compensation probably is the appropriate dependent variable. However cash compensation is easier to obtain and is used in the prior studies in the accounting literature (Abdel-Khalik (1985), Abdel-Khalik, Chi and Ghicas (1987), Healy, Kang and Palepu (1987)) that this study directly extends. The possibility also exists that cash compensation is tied to accounting performance, while stock compensation is determined by some other factor. As a compromise the tests are conducted using cash compensation as the dependent variable, and in the future will be replicated on a smaller sample using cash plus stock compensation as the dependent variable. Finally as discussed in chapter 2, disclosure differs across firms. Some firms report bonuses separately, while others combine it with salary. For firms that separately disclose bonus payments, there is a direct link between firm performance and bonus. In the future the tests will be replicated using bonus as the dependent variable.

Independent Variable - Measure of Performance

Using market or accounting return as the independent variable could produce a negative association between CEO compensation and firm performance. This occurs because small firms have higher returns (small firm effect-see Banz (1981)), while CEOs in large firms have higher compensation. Murphy (1985) found this negative association when regressing compensation on returns (when he later added size as an independent variable, the association became positive). Income is used as the independent variable because unlike return on equity or earnings per share, on average it increases with the size of the firm, and compensation has been found to increase with firm size. Income rather than change in firm value is used because the hypotheses in this chapter are based on the use of accounting income in setting compensation.

Empirical Model

The effect of the portfolio of accounting procedures on compensation is examined using a two-step procedure. First the correlation between compensation and (current and lagged) reported income (hereafter the compensation response coefficient or CRC) is estimated using the following firm-specific time-series regressions:^{22,23}

²² Abdel-Khalik (1985), Murphy (1985), and Healy, Kang and Palepu (1987) use log transformations. Healy, Kang and Palepu (p. 15) state "power transformations perform better than linear regressions in estimating relations between

$$\ln(C_t) = a_0 + a_1 \ln(INC_t) + a_2 \ln(INC_{t-1}) \quad (3.1)$$

where C is compensation and INC is reported earnings

Then, the correlation between the CRC ($a_1 + a_2$) and five proxies for the conservatism of the firm's accounting policies - accounting methods, accruals, timing differences, the earnings response coefficient, and the price-earnings ratio - is examined. The proxies used and their association with conservatism can be explained as follows:²⁴ In growing (in nominal terms) firms straight-line depreciation, FIFO inventory costing, flow-through accounting for the investment tax credit, and the full cost method of accounting for oil and gas properties lead to higher income than accelerated depreciation, LIFO inventory costing, the deferral method of accounting for the investment tax credit, and the successful efforts method of accounting for oil and gas properties. Thus accelerated depreciation, LIFO inventory costing, the deferral method of accounting for the investment tax credit, and the successful efforts method of accounting for oil and gas properties are considered to be the more conservative accounting methods. Similarly, the higher the assumed rate of return on pension plan assets, the lower pension expense and

compensation and measures of performance."

²³ As in Healy, Kang and Palepu (1987, fn. 7) if earnings are negative, their log value is set to zero.

²⁴ A more thorough discussion of the proxies for conservatism can be found in Appendix C.

the higher net income. Thus a lower assumed rate of return is assumed to be more conservative. Reported income is equal to cashflows plus accruals. Holding cashflows constant, the higher accruals the higher reported income. Consequently lower accruals are associated with more conservative accounting practices. Financial accounting income equals taxable income plus or minus permanent and timing differences. While managers would like to increase their financial accounting income, they also want to minimize taxable income because of the resulting tax payments. If they are successful in increasing financial accounting income while holding taxable income constant, timing differences increase. Thus, the lower timing differences the more conservative the firms accounting practices. The last two proxies, the earnings response coefficient, and the price-earnings ratio, are market-based measures. If the market is efficient, prices, on average, reflect all of the information used (including accounting choices) to determine accounting earnings. For a given cashflow, a more conservative set of accounting policies yields lower reported earnings. These earnings translate into the same future cashflows, so that the valuation assigned per dollar of earnings, as reflected in the earnings response coefficient, and the price-earnings ratio, should be higher for firms using more conservative accounting policies.

The null hypothesis asserts the relation between CEO compensation and income (the CRC) is not affected by the choice of accounting methods. There are two alternative

hypotheses as discussed above. H8a predicts the relation between CEO compensation and income directly affects the choice of accounting methods. It leads to the prediction that firms using income-increasing (liberal) accounting methods have a higher CRC. H8b asserts that firms using income-increasing accounting methods have a lower CRC. Note that both the null hypothesis and the first alternative are consistent with the bonus hypothesis, while the second alternative is consistent with the rationality of compensation hypothesis put forth by Abdel-Khalik, Chi & Ghicas (1987).

3.1b Sample Selection and Data Sources

The empirical tests use all firms in the Forbes compensation surveys that meet the sample selection criteria (i.e., compensation data available for at least ten years). Table 3.2 (p. 72) presents information on how the sample is selected. All firms included in at least one of the 1976-1990 Forbes compensation surveys (because compensation is reported after year end, these surveys report compensation for the years 1975-1989) are examined for inclusion on the 1990 Compustat tapes. This procedure yielded a preliminary sample size of 1,111 firms. Firms with a change in fiscal year during the 1975-1989 period or with a fiscal year ending in January or February are dropped. The latter requirement is inserted because the Forbes surveys, which are published in May, do not clearly state whether compensation is for the current or prior fiscal year. For fiscal years ending March

through December the delay in the issuance of proxy statements makes it likely that the amount included in the survey is for the previous fiscal year. These requirements reduced the sample size to 644. To ensure sufficient data for the time-series regressions firms with less than ten years compensation data are dropped from the sample yielding a final sample of 408 firms.

CEO (cash) compensation for the years 1975-1989 is obtained from the Forbes surveys. Accounting income, as well as the variables necessary to compute the proxies for the conservatism of the firm's accounting policies are obtained from Compustat.

3.1c Empirical Results - The effect of the portfolio of accounting procedures on compensation.

H8 is tested using a two-step process. In the first step the association between CEO compensation (as reported in Forbes) and accounting income over the 1975-1989 period is estimated (see equation (3.1)). The firm-specific regressions are estimated using current year income as the only independent variable, and reestimated using current and lagged income as independent variables. These regressions are also estimated using both scalar and logged values for compensation and income. Results are comparable across the four sets of regressions (scalar X current year income, scalar X current

and lagged income, log X current year income, log X current year income and lagged income). The equations and average coefficients (in parentheses) are presented below:

$$\ln(C_t) = a_0 + a_1 \ln(INC_t) + a_2 \ln(INC_{t-1}) \quad (1a)$$

(0.78) (0.10)

$$\ln(C_t) = a_0 + a \ln(INC_t) \quad (1b)$$

(0.80)

$$C_t = b_0 + b_1 INC_t + b_2 INC_{t-1} \quad (1c)$$

(1.76) (1.06)
(1.76) (1.06)

$$C_t = b_0 + b INC_t \quad (1d)$$

(2.33)

In the second step the correlation of these coefficients [a, a1+a2, b, b1+b2] with five proxies for the conservatism of the firms accounting policies is estimated. The proxies are (1) accounting methods (methods used for depreciation (DEP), inventory (INV), investment tax credit (ITC), and oil & gas properties (O&G), and pension rate of return assumption (PEN)), (2) the ratio of total accruals to total assets (ACC), (3) the ratio of tax timing differences to total assets (DIT), (4) the earnings response coefficient (ERC), and (5) the price-earnings ratio (PE). Rather than arbitrarily combine the above accounting methods into a one proxy for conservatism, each is considered individually through correlations with the CRC and jointly using multiple regressions. The earnings response coefficient is estimated by a regression using data from 1975-1989, while the price-earnings ratio, ratio of total accruals to total assets, and ratio of tax timing differences to total assets represent averages for the same 15 year period.

Tables 3.3 through 3.6 present the results of the second step. Table 3.3 (p. 73) presents the results of the multiple regressions, while tables 3.4 through 3.6 (pp. 74-76) presents the results using correlations. While both the regressions and correlations are run for each of the above CRCs, results are only presented for those using a_1+a_2 , as the results are robust to the choice of CRC. The three regressions presented in Table 3.3 are insignificant. Of the individual variables, the method of accounting for the investment tax credit is significant in one regression. While the results in Table 3.3 are discouraging, those presented in Tables 3.4 through 3.6 provide strong support for H8b.

Table 3.4 presents the Spearman²⁵ correlation coefficient between the CRC and the proxies for conservatism. The correlations between the CRC and DEP, PEN, ACC, DIT and ERC are significant at the 1%, 5%, 5%, 1%, and 1% level respectively. While the coefficients on DEP, PEN, ACC and ERC indicate that a higher CRC is associated with more conservative accounting policies, the coefficient on DIT indicates just the opposite. These correlations are recalculated (Table 3.5) after adjusting the CRC, ERC, PE, ACC and DIT for industry (one-digit SIC codes) averages. The results are even stronger, as PE is significant at the 10%

²⁵ Both Spearman and Pearson correlation coefficients were computed, with the results being similar. Only the Spearman coefficient is presented because the variables are not normally distributed, violating an assumption of the Pearson coefficient.

level, while ACC, DIT and ERC remained significant at the 1%, 1%, and 5% level respectively. Once again however, while ACC, ERC and PE support the hypothesis that more conservative accounting methods are associated with higher CRCs, the results for DIT contradict this. The correlations are recalculated a second time (Table 3.6) after removing known influences from ERC and PE. Again the results improved, as both ERC and PE are significant at the 1% level.

The above tests indirectly examine whether an adjustment is made for accounting choices when determining compensation by examining the effect of accounting choices on the CRC.²⁶ The test is a joint test, in that the proxy variable chosen measures accounting conservatism, and that an adjustment is made for accounting choices when determining conservatism. If either the proxy is incorrect or no adjustment is made, any correlation observed will be spurious. To avoid basing conclusions on spurious results, two types of correlations (Pearson, Spearman) are calculated, four alternative definitions of the CRC are used, and five alternative proxies for conservatism are used. In general the results are consistent across type of correlation, and definition of the CRC. However the results differed by proxy for conservatism.

²⁶ Additionally, as also noted by Healy, Kang and Palepu (1987, p. 15), the tests assume the adjustment is made in either salary or short-term bonus. If an adjustment is made, but in another component of the compensation package, this test will erroneously be concluded that no adjustment is made. In the future this possibility will be tested by replicating the tests using total compensation.

To begin with, recall that five proxies are used because of the absence of a well defined proxy for accounting conservatism in the literature. Weaknesses in using the portfolio of accounting procedures, ACC, and DIT as proxies for conservatism are discussed in Appendix C. Using the ERC or PE to proxy for conservatism is problematic because they include many other items. To mitigate one weakness in using accounting methods to proxy for conservatism, i.e.: the question of how to combine them into one portfolio, the methods are considered individually (Table 3.4) and jointly through a multiple regression of accounting choices on the CRC (Table 3.3). Except for the choice of depreciation method (the choice of accelerated depreciation is associated with a higher CRC) and pension rate of return (the higher the assumed rate of return the lower the CRC), the results do not show accounting methods associated with the CRC. A major weakness in using total accruals to proxy for conservatism is the lack of a model to predict unadulterated accruals (see Kaplan (1985)). To some extent this is controlled for in Table 3.5, which implicitly assumes accruals in the absence of manipulation is equal to average standardized accruals (total accruals deflated by total assets) for the industry. The results for accruals, which strongly suggest that the CRC is higher for firms with lower accruals (i.e.: more conservative), are robust to whether total accruals or accruals less industry average are used. The results for timing differences are most puzzling and contradict the other findings in Tables 3.4 through 3.6. These correlations

indicate a higher CRC is associated with greater timing differences (i.e.: for firms using less conservative accounting procedures). Finally, consider the two price based proxies, ERC and PE. The ERC is positively and significantly associated with CRC both before and after other known influences are removed. PE is positively and significantly associated with CRC after industry and other influences are removed.

To directly examine the affect of bonus plans on accounting choices, for a subset of 36 firms for which bonus plan parameters are available, the correlation of the bonus plan coefficient (applied to income) with the CRC and four of the proxies for conservatism, ERC, PE, ACC and DIT is estimated. The association between bonus plan parameters and the CRC is expected to be positive, while the association between bonus plan parameters and the proxies for conservatism (H8a) is expected to be negative. The results presented in Table 3.7 (p. 77) do not show that bonus plan parameters have the predicted effect on the CRC or the accounting choices made. A possible explanation for this result is that most bonus plans define the maximum payout available to a group of executives, while the CRC is estimated on the CEO alone. Alternatively, insignificant results could be caused by the small sample size.

To summarize the results of this section, most, but not all, of the evidence indicates that accounting methods influence

the relationship between compensation and accounting income, and that the relationship is stronger (CRC higher) for firms using more conservative accounting methods - consistent with H8b.

Table 3.2
Sample

Intersection of firms included in 1976-1990 Forbes Compensation Surveys and 1990 Compustat Tapes	1,111
Firms deleted because fiscal year ended in January or February, or because fiscal year changed during period	467
Firms deleted because less than ten years of compensation data is available	<u>236</u>
Sample for Hypothesis 1	<u>408</u>

Table 3.3

Results of Regression of Compensation Response Coefficient
on Accounting Methods*

Model : $CRC = c_0 + c_1*DEP + c_2*INV + c_3*ITC + c_4*O\&G + c_5*PEN + e$
 (predictions in parentheses) (+) (+) (+) (+) (-)

Coefficients (significance in parentheses)

c_1	c_2	c_3	c_4	c_5	No. of Observations	Model
0.57 (0.78)	-0.36 (0.34)	-1.48 (0.02)	0.13 (0.75)	-0.05 (0.42)	38	0.1430
0.39 (0.13)	-0.03 (0.85)	-0.06 (0.80)		-0.02 (0.31)	214	0.4937
0.39 (0.13)	-0.04 (0.79)	-0.06 (0.80)			214	0.5062

* where

DEP = 1 if accelerated methods are used
 0.5 if accelerated and straight-line is used
 0 if straight-line is used
 INV = 1 if LIFO is primary inventory method
 0 otherwise
 ITC = 1 if Tax Credits are amortized
 0 otherwise
 O&G = 1 if Successful Efforts is used
 0 otherwise
 PEN = assumed rate of return

Table 3.4

Spearman Correlation Coefficients between Compensation
Response Coefficient and Proxies for Conservatism^a
(predictions in parentheses)

DEP	(+)	0.19***
INV	(+)	0.05
ITC	(+)	-0.03
O&G	(+)	-0.12
PEN	(-)	-0.12**
ACC	(-)	-0.16**
DIT	(-)	0.22***
ERC	(+)	0.22***
PE	(+)	0.05

^a where

DEP =	1	if accelerated methods are used
	0.5	if accelerated and straight-line are used
	0	if straight-line is used
INV =	1	if LIFO is primary inventory method
	0	otherwise
ITC =	1	if Tax Credits are amortized
	0	otherwise
O&G =	1	if Successful Efforts is used
	0	otherwise
PEN =		assumed rate of return
ACC =		1975-1989 average of total accruals/assets
DIT =		1975-1989 average of timing differences/assets
ERC =		the earnings response coefficient estimated over the 1975-1989 period
PE =		1975-1989 average price-earnings ratio

* significant at the 10% level
 ** significant at the 5% level
 *** significant at the 1% level

Table 3.5

Spearman Correlation Coefficients between Compensation Response Coefficient and Proxies for Conservatism after removing industry averages^a (predictions in parentheses)

ACC	(-)	-0.19**
DIT	(-)	0.18***
ERC	(+)	0.22***
PE	(+)	0.08*

^a where

ACC = 1975-1989 average of total accruals/assets
 DIT = 1975-1989 average of timing differences/assets
 ERC = the earnings response coefficient estimated over the 1975-1989 period
 PE = 1975-1989 average price-earnings ratio

* significant at the 10% level
 ** significant at the 5% level
 *** significant at the 1% level

Table 3.6

Spearman Correlation Coefficients between Compensation Response Coefficient and Proxies for Conservatism^a after removing other known influences⁺ from proxies (predictions in parentheses)

ERC (+)	0.17 ^{***}
PE (+)	0.17 ^{***}

^a where

ERC= the earnings response coefficient estimated over the 1975-1989 period

PE = 1975-1989 average price-earnings ratio

⁺ these influences are Beta (proxy for risk), the ratio of market to book value of equity (proxy for growth), dividend payout, market value of common stock (proxy for size), and variance of accounting earnings (proxy for noise).

* significant at the 10% level
 ** significant at the 5% level
 *** significant at the 1% level

Table 3.7

Spearman Correlation Coefficients between Bonus Plan Parameters and Compensation Response Coefficient and Proxies for Conservatism (predictions in parentheses)

CRC	(+)	0.21
ACC	(+)	-0.15
DIT	(+)	-0.01
ERC	(-)	0.19
PE	(-)	0.29*

^a where

ACC= 1975-1989 average of total accruals/assets
 DIT= 1975-1989 average of timing differences/assets
 ERC= the earnings response coefficient estimated over the 1975-1989 period
 PE = 1975-1989 average price-earnings ratio

* significant at the 10% level
 ** significant at the 5% level
 *** significant at the 1% level

3.2 The Effect of Mandated Accounting Changes and Writeoffs on CEO Compensation

Certain events affect accounting income, even though they may not affect firm value, and/or may be caused by events out of management's control. Two of these events, mandatory accounting changes and writeoffs are examined here, although similar hypotheses could be derived for other unusual events such as extraordinary items or asset dispositions. As discussed above, to provide motivation compensation should only be based on events under management control. Similarly, management should only be rewarded for events that increase firm value. For both of the above items, management may have the ability to determine recognition, the time of recognition, and the amount recognized. If management is penalized for recognizing events that decrease income, such as writeoffs, it discourages them from recognizing those events. Similarly, if management benefits from recognizing nonoperating gains, they may repeatedly do so, even though the actions that lead to them are not in the shareholders best interests.

The underlying hypothesis to be tested in this section, is that the Board is interested in properly motivating management, and thus only compensates them for items under their control and only if the item increases firm value. This hypothesis is tested by examining whether compensation is based on income before or after the effect of the mandatory change or writeoff. In examining the effects of these events

on compensation, materiality must be considered. The possibility exists that the compensation committee only reacts if the income effect exceeds a certain threshold. It is also possible that the amounts involved are too small to be observed in an empirical test. To some extent, these concerns are mitigated, because only material events are disclosed in the financial statements.

3.2a Mandatory Accounting Changes

A mandatory accounting change occurs when the Financial Accounting Standards Board prescribes a new method of accounting. Examples include SFAS No. 87, Accounting for Pensions and SFAS, No. 96 Accounting for Income Taxes. Management, while not having a choice of method, has flexibility as to time of adoption, and at times, the choice to recognize the effects of the change currently or retroactively (see SFAS No. 96). Thus, even though the change is mandatory, the income effect of the change is, to some extent, under management control. The question of interest is whether the compensation committee adjusts for the income effect of these changes.

The theory outlined above suggests two conditions that should be met for an item to be included in the CEO's performance measure. First, the item should be under CEO control. Second, it should affect firm value. Further, if CEO compensation is to be based on accounting income, the event

should affect accounting income and firm value in a similar manner. As discussed in the prior paragraph, mandated accounting changes, while required by the FASB, leave management with a good deal of discretion with respect to implementation. However, other than the indirect effects of the standard on the firm's contracting costs, the mandated accounting change, while affecting accounting income, does not affect firm value. Since both conditions are not met, CEO compensation should be based on income before the mandated accounting change.

H9: Compensation is based on income before mandatory accounting changes.

3.2b Writeoffs

Under Generally Accepted Accounting Principles, a permanent impairment in value should be recognized by a writedown or writeoff of the asset, with a corresponding charge to income. While the impairment may have been out of the CEOs control, he has significant discretion as to both the timing and amount of the writeoff. If CEO compensation is based on income after the effect of the writeoff, or if the writeoff adversely affects the CEO's reputation (Kanodia, Bushman, and Dickhaut (1989)), he has the incentive to avoid the writeoff for as long as possible. Alternatively, if compensation is based on income before the writeoff, management has the incentive to

writeoff assets in the current period, because it lowers future expenses and raises future income.

According to Elliot and Shaw (1988), writeoffs can either recognize past impairments or planned future transactions (i.e., reserves for future reorganizations and/or disposals). These writeoffs are, to some extent, under CEO control, and can affect firm value, for example, if there are tax ramifications. If there are tax savings associated with a writeoff (Strong and Meyer (1987)), the writeoff can increase firm value, while decreasing accounting income. To avoid penalizing the CEO for taking an action (the writeoff) to recognize an event out of his control (the impairment of value), and that increases firm value, compensation should be based on income before the writeoff.

The charge that is examined in this study is the provision made by banks beginning in 1987 for loans to lesser developed countries (LDCs). These charges, which preceded writeoffs, reduced income, yet were favorably looked upon by the market. Because these provisions were usually soon followed by writeoffs, they had favorable tax consequences. Since, the provisions and writeoffs are the result of decisions (loans) made years earlier, current management should not be penalized for them. However, given the political structure of the corporation, it may be hard for the Board to reward management with bonuses when a loss is reported and thus compensation may decline in the year of the provision.

H10: Compensation is based on income before writeoffs.

3.2c Income Smoothing

Management can choose the timing of a mandatory change or writeoff to smooth a transitory change in income. Hand (1989) found early-debt-redemptions, and Haw, Jung and Lilien (1989) found pension terminations were used to smooth income. While the Board of Directors may adjust for the income effect of a mandatory change or writeoff by basing compensation on adjusted rather than reported income, it may be less likely to do so if the change merely smooths the earnings trend. For this subset of firms, if compensation is based on reported income, the change not only smooths income, it also smooths compensation. If the change in income is transitory, and is caused by factors out of management control, the compensation committee will not want to penalize management and will want to smooth compensation.

H11: CEO compensation is more likely to be based on reported income when the mandatory accounting change or writeoff has a smoothing effect on income.

3.2d Methodology

The effect of mandatory accounting changes and writeoffs on CEO compensation are examined using time-series regressions

similar to that used by Healy, Kang and Palepu (1987).²⁷ To test the hypotheses that CEO compensation is determined by income before the effects of mandatory changes and writeoffs, the following equation (which is similar to equation (2) in Healy, Kang and Palepu (1987)) is used:

$$\ln(C_t) = a_0 + a_1 \ln(PCE_t) + a_2 \ln(INC_t/PCE_t) + a_3 \ln(PCE_{t-1}) + a_4 \ln(INC_{t-1}/PCE_{t-1}) \quad (3.2)$$

where PCE is earnings prior to change or writeoff and the other variables are defined above.

If compensation is based on reported earnings, the regression coefficients on reported earnings a_2 and a_4 will be significantly different from zero. The above regression is run using all mandatory accounting changes as a group and then for selected individual changes. In addition the equation is modified to test if adjustments are made for the cumulative effect of the change, but not the current year effect.

²⁷ Although similar methodology is used there are differences between this study and that of Healy, Kang and Palepu. First, they require five years of data both before and after the change, and for the post-change period estimate income as if the change did not occur (see Healy, Kang and Palepu, p. 12-13 for a description of how they calculate adjusted earnings). In contrast this study does not require a minimum period either before or after the change, and only calculates adjusted income in the year of the change (implicitly it assumes the change has no effect on future earnings). This is because, except for the year of the change, sufficient information is not available to estimate income in the absence of the change. Second, they analyze the effect of one change on accounting earnings. In contrast this study analyzes the effect of all mandatory accounting changes affecting the selected firms over the years 1975-1989.

Similar to Healy, Kang and Palepu (1987) an additional test is run to examine the effect of the mandated change or writeoff on actual compensation. The parameters of equation (3.2) are estimated excluding the year of the change or writeoff. Expected compensation in the year of change is then calculated based on pre and post-change earnings as follows:

$$E(C_{t-PCE}) = a_0 + a_1 \ln(PCE_t) + a_2 \ln(PCE_{t-1}) \quad (3.3a)$$

$$E(C_{t-INC}) = a_0 + a_1 \ln(INC_t) + a_2 \ln(INC_{t-1}) \quad (3.3b)$$

The potential compensation effect of the change or writeoff is then defined as:

$$PEFF = (E(C_{t-INC}) - E(C_{t-PCE}))/C_t \quad (3.4)$$

Which is then compared to the actual difference between actual and expected compensation:

$$DIFF_{PCE} = (C_t - E(C_{t-PCE}))/C_t \quad (3.5a)$$

$$DIFF_{INC} = (C_t - E(C_{t-INC}))/C_t \quad (3.5b)$$

Assuming the average CRC is positive the sign of PEFF should be in the same direction as the income effect of the change or writeoff. If the parameters of the compensation equation are unchanged and compensation is based on prechange earnings (reported earnings) then $DIFF_{PCE}$ ($DIFF_{INC}$) will not differ significantly from zero. It is possible however that the parameters have changed and thus observing that $DIFF_{INC}$ ($DIFF_{PCE}$) is different from zero is not conclusive evidence

that the change affects compensation. For that reason the correlation between PEFF and DIFF_{PCE} is calculated. If DIFF_{PCE} is significantly different from zero and is positively correlated with the potential compensation effect of the change, it provides evidence that the change did effect compensation.

3.2e Sample Selection and Data Sources

As in section 3.1 above, the empirical tests use all firms in the Forbes compensation surveys that meet the sample selection criteria. In addition to the above criteria, which result in a sample of 408 firms, the income effects of mandated changes and provisions for loan losses were required to test H9 through H11. The income effects of mandated accounting changes for firms included in the 1981 Fortune 500 list was collected (from annual reports) for a separate paper (see Balsam, Haw and Lilien (1991)). Of the firms meeting the above selection criteria, 185 were included in this data base.²⁸ The identity of banks that increased their loan loss provisions for third world debt during the years 1987-1989 was obtained by searching the Dow Jones News Service, with the amount of the provision being obtained from the bank's annual report. This procedure yielded a sample of 34 banks meeting all other selection criteria. Summary statistics on the

²⁸ The number of firms used for the statistical tests may be less than that specified in the text because of the data required to calculate the Z-statistic. See Healy, Kang and Palepu (1987, p. 17) for details.

income effects of the mandated changes and loan loss provisions can be found in Table 3.3.

3.2f Empirical Results - The effect of Mandatory Accounting Changes on Compensation.

H9 is tested using equation (3.2) above. For each company the log of cash compensation (as reported by Forbes) is regressed on the log of income before the change and the log of the ratio of reported to adjusted income. The results are then cross-sectionally aggregated using the formula suggested by Healy, Kang & Palepu (1987). The results, reported in Table 3.9 (p. 93), indicate that compensation is based on reported income, i.e.: income including the effect of the mandatory accounting change. These conclusions are based upon medians rather than means, which are influenced by outliers. A binomial test confirms that the proportion (of estimated regression coefficients) greater than zero is significantly greater than chance for three of the four independent variables in Table 3.9.

Next, the potential compensation effect of the change is computed, as well as the difference between actual compensation and expected compensation based on prechange and reported earnings. These results are presented in table 3.10

(p. 94).²⁹ $DIFF_{PCE}$ is 4.31% and is positive 56% of the time. A binomial test finds the proportion greater than zero is significant at the 1% level. $DIFF_{INC}$ is 1.35%, and is positive 53% of the time. A binomial test finds the proportion greater than zero to be insignificantly different from that expected by chance. The correlation between $PEFF$ and $DIFF_{PCE}$ is 0.07, insignificant at conventional levels. Thus while the results indicate that there is a significant difference between actual compensation and expected compensation based on prechange earnings, that difference is not significantly associated with the potential compensation effect of the change.

These tests are then run on a single accounting change SFAS No.96.³⁰ The results presented in Table 3.11 (p. 95) are strikingly similar to those reported in Table 3.9, indicating that compensation is based on reported income. They indicate that compensation is based on reported income, that actual compensation is greater than expectations based on adjusted earnings, and that there is no association between that difference and the calculated potential effect of the change on compensation.

²⁹ As noted earlier, the data is not normally distributed. Because of this, the numbers presented are medians and conclusions drawn are based on binomial tests.

³⁰ It was originally intended that the cumulative and current year income effects of SFAS No. 96 would be examined separately to see if adjustments are more or less likely to be made for cumulative or current year effects. However there were too few observations for this.

The results of this section while finding compensation tied to reported income, do not show mandatory changes directly affecting compensation. While actual compensation exceeds expected compensation based on prechange earnings, the difference is not correlated with the calculated potential effect of the change on compensation.

3.2g Empirical Results - The effect of writeoffs on compensation.

As in the previous section, equation (3.2) is used to estimate the relation between compensation, income before the provision, and reported income. The results, reported in Table 3.13 (p. 97), indicate that compensation is based on reported income, i.e.: income after the effect of the provision. A binomial test confirms that the proportion (of estimated regression coefficients) greater than zero is significantly greater than chance for three of the four independent variables in Table 3.13.

As above, the potential compensation effect of the provision is computed, as well as the difference between actual compensation and expected compensation based on preprovision and reported earnings. These results are presented in table 3.14 (p. 98). $DIFF_{PCE}$ is 8.21%, and is positive 62% of the time. $DIFF_{INC}$ is 62.83%, and is positive 88% of the time. A binomial test confirms that both proportions are greater than

change at the 1% level. The correlation between PEFF and DIFF_{PCE} is 0.47, significant at the 1% level.

The results of this section found compensation tied to reported income, and found a significant correlation between the potential effect of the provision on compensation and the difference between actual and expected compensation given preprovision earnings. This provides evidence that compensation is based on reported income and that provisions have an effect on compensation.

3.2h Empirical Results - The effect of income smoothing on compensation

In order to test whether the results in the previous two subsections are driven by income and consequently, compensation smoothing, or whether they apply to all changes, mandatory accounting changes are divided into those that smooth income and those that do not.³¹ This division is accomplished by examining whether the absolute value of the change in earnings (from the previous year) is greater before or after the change. These two subsamples are then tested using equation (3.2). The income smoothing subsample included 117 firms with at least one mandatory accounting change that smoothed income (the income effect of non-smoothing changes are set equal to zero). The non-income smoothing subsample

³¹ This was not done for the writeoffs sample because of its small size.

included 124 firms with at least one mandatory change that increased the deviation between current and prior year income (the income effect of changes that smoothed income are set equal to zero). Some firms had both smoothing and non-smoothing accounting changes which explains why the total of firms (117+124) exceeds the number of firms in the mandatory change sample (185).³² The results, reported in Tables 3.15 (p. 99) and 3.16 (p. 100), indicate that compensation is based on reported income, regardless of whether the change had a smoothing effect on income. A binomial test confirms that the proportion (of estimated regression coefficients) greater than zero is significantly greater than chance for three of the four independent variables in Tables 3.15 and 3.16.

As above, the potential compensation effect of the provision is computed, as well as the difference between actual compensation and expected compensation based on preprovision and reported earnings. These results are presented in tables 3.17 (p. 101) and 3.18 (p. 102). $DIFF_{PCE}$ is 1.94% for the smoothing subsample and 5.07% for the nonsmothers. The proportions greater than zero are 55% for the smoothing subsample and 57% for nonsmothers, the former being significant at the 10% level and the latter at 5%. $DIFF_{INC}$ is 1.91% for the smoothing subsample and 2.64% for nonsmothers. The proportions greater than zero are 53% for the smoothing

³² Tests were replicated using firms with only smoothing or non-smoothing changes, i.e., deleting firms with both. The results were virtually identical.

subsample and 54% for nonsmootherers, both insignificant at conventional levels. The correlation between $PEFF$ and $DIFF_{PCE}$ is 0.15, significant at the 10% level for income smoothers and -0.07, insignificant for nonsmootherers.

The results of this section do not show that mandated changes have differential affects on the compensation of income smoothers versus nonsmootherers. The only difference between the two groups is the correlation between $PEFF$ and $DIFF_{PCE}$ which is positive and significant at the 10% level for the smoothing subsample, and negative and insignificant for the nonsmootherers. Overall the results in this section do not show that the results for H9 and H10 are driven by income smoothing.

Table 3.8
Descriptive Statistics:
Mandatory Accounting Changes and Provisions

Panel A - Income Effect of Accounting Changes

	#	#	Income Effects			
			-----%-----	-----%-----	-----\$-----	-----\$-----
Standard changes	positive	positive	Mean	Median	Mean	Median
5	9	7	2.41*	1.18**	4.6*	2.9*
8	50	42	3.00***	2.81***	10.1**	1.8***
9	4	0	-4.84**	-4.32	-13.6	-5.9
12	1	0	-1.21	-1.21	-7.5	-7.5
13	8	1	-0.76*	-0.36**	-1.4*	-0.7**
19	10	8	2.83*	1.94*	15.2*	2.1
34	107	107	3.97***	2.54***	7.3***	3.7***
43	11	0	-2.52***	-1.26***	-3.7*	-1.1***
44	2	0	-5.18	-5.18	-9.8	-9.8
52	59	58	14.25**	9.71***	19.5***	9.0***
87	140	135	12.35**	5.00***	20.7***	7.5***
96	38	34	152.79*	15.50***	80.2***	20.1***
Total	441	392	20.32***	3.86***	19.2***	5.4***

Panel B - Income effect of Provisions

Year	#	Income Effects			
		-----%-----	-----%-----	-----\$-----	-----\$-----
provisions	provisions	Mean	Median	Mean	Median
87	42	153.32***	81.82***	263.8***	78.5***
88	1	21.60	21.60	200.0	200.0
89	7	605.83	237.11**	930.9***	1000.0**
Total	50	214.04***	86.93***	355.9***	100.0***

% =

Income Effect of Change or Provision
Income before Effect of Change or Provision

\$ are in millions

* = 10% Significance
** = 5% Significance
*** = 1% Significance

Table 3.9

Regression of Compensation on Contemporaneous and Lagged, Adjusted (for Mandatory Accounting Changes) and Reported Earnings

$$\ln(C_t) = a_0 + a_1 \ln(PCE_t) + a_2 \ln(INC_t/PCE_t) + a_3 \ln(PCE_{t-1}) + a_4 \ln(INC_{t-1}/PCE_{t-1})^a$$

	a_1	a_2	a_3	a_4
Mean	0.33	-3.94	0.03	-0.78
Median	0.20	0.80	0.03	0.39
Z-statistic	25.49***	5.19***	3.91***	2.85***
% Positive	83 ***	60 ***	61 ***	55
n=166				

^a where

C_t = salary + bonus as reported in Forbes for year t
 PCE_t = earnings before the effect of the mandatory change
 INC_t = reported earnings for year t

* significant at the 10% level
 ** significant at the 5% level
 *** significant at the 1% level

Table 3.10

Comparison of Predicted with Actual Compensation
Mandatory Change Sample

Panel A: Potential Effect of Mandatory Accounting Change on Compensation and Difference between Actual Compensation and Expected Compensation based on Prechange and Reported Income^a

	Median	% Positive
PEFF	0.46 ^{***}	
DIFF _{PCE}	4.31 ^{***}	56 ^{***}
DIFF _{INC}	1.35	53

n=314

Panel B: Spearman Correlation Coefficient between PEFF and DIFF_{PCE}

0.07

^a where

$$\begin{aligned} \text{PEFF} &= (E(C_{t-\text{PCE}}) - E(C_{t-\text{INC}}))/C_t \\ \text{DIFF}_{\text{PCE}} &= (C_t - E(C_{t-\text{PCE}}))/C_t \\ \text{DIFF}_{\text{INC}} &= (C_t - E(C_{t-\text{INC}}))/C_t \end{aligned}$$

* significant at the 10% level
 ** significant at the 5% level
 *** significant at the 1% level

Table 3.11

Regression of Compensation on Adjusted and Reported Earnings
(SFAS No.96 only)

$$\ln(C_t) = a_0 + a_1 \ln(PCE_t) + a_2 \ln(INC_t/PCE_t) + a_3 \ln(PCE_{t-1}) + a_4 \ln(INC_{t-1}/PCE_{t-1})^a$$

	a_1	a_2	a_3	a_4
Mean	0.30	4.63	0.06	6.11
Median	0.06	1.35	0.03	2.42
Z-statistic	8.68***	3.24***	1.88**	2.99***
% Positive	61	72 *	61	72 *
n=18				

^a where

C_t = salary + bonus as reported in Forbes for year t
 PCE_t = earnings before the effect of the mandatory change
 INC_t = reported earnings for year t

* significant at the 10% level
 ** significant at the 5% level
 *** significant at the 1% level

Table 3.12

Comparison of Predicted with Actual Compensation
SFAS No.96

Panel A: Potential Effect of SFAS No.96 on Compensation and Difference between Actual Compensation and Expected Compensation based on Prechange and Reported Income^a

	Median	% Positive
PEFF	5.03 ^{***}	
DIFF _{PCE}	28.59 ^{***}	83 ^{***}
DIFF _{INC}	11.15 ^{**}	60

n=30

Panel B: Spearman Correlation Coefficient between PEFF and DIFF_{PCE}

0.00

^a where

$$\begin{aligned} \text{PEFF} &= (E(C_{t-\text{PCE}}) - E(C_{t-\text{INC}}))/C_t \\ \text{DIFF}_{\text{PCE}} &= (C_t - E(C_{t-\text{PCE}}))/C_t \\ \text{DIFF}_{\text{INC}} &= (C_t - E(C_{t-\text{INC}}))/C_t \end{aligned}$$

* significant at the 10% level
 ** significant at the 5% level
 *** significant at the 1% level

Table 3.13

Regression of Compensation on Contemporaneous and Lagged,
Adjusted (for Loan Loss Provision) and Reported Earnings

$$\ln(C_t) = a_0 + a_1 \ln(PCE_t) + a_2 \ln(INC_t/PCE_t) \\ + a_3 \ln(PCE_{t-1}) + a_4 \ln(INC_{t-1}/PCE_{t-1})^a$$

	a_1	a_2	a_3	a_4
Mean	0.64	1.20	0.15	0.17
Median	0.68	0.30	0.04	0.05
Z-statistic	22.69***	6.00***	3.81***	-1.64*
% Positive	96 ***	67 *	70 **	52
n=27				

^a where

C_t = salary + bonus as reported in Forbes for year t
 PCE_t = earnings before the effect of the loan loss
provision
 INC_t = reported earnings for year t

* significant at the 10% level
** significant at the 5% level
*** significant at the 1% level

Table 3.14

Comparison of Predicted with Actual Compensation
Writeoff (Provision) Sample

Panel A: Potential Effect of Provision on Compensation and Difference between Actual Compensation and Expected Compensation based on PreProvision and Reported Income^a

	Median	% Positive
PEFF	-33.30***	
DIFF _{PCE}	8.21	62***
DIFF _{INC}	62.83**	88***
n=42		

Panel B: Spearman Correlation Coefficient between PEFF and DIFF_{PCE}

0.47***

^a where

$$\begin{aligned} \text{PEFF} &= (E(C_{t-\text{PCE}}) - E(C_{t-\text{INC}}))/C_t \\ \text{DIFF}_{\text{PCE}} &= (C_t - E(C_{t-\text{PCE}}))/C_t \\ \text{DIFF}_{\text{INC}} &= (C_t - E(C_{t-\text{INC}}))/C_t \end{aligned}$$

* significant at the 10% level

** significant at the 5% level

*** significant at the 1% level

Table 3.15

Regression of Compensation on Adjusted
(for Mandatory Accounting Changes) and Reported Earnings
- Income Smoothing Subsample

$$\ln(C_t) = a_0 + a_1 \ln(PCE_t) + a_2 \ln(INC_t/PCE_t) + a_3 \ln(PCE_{t-1}) + a_4 \ln(INC_{t-1}/PCE_{t-1})^a$$

	a_1	a_2	a_3	a_4
Mean	0.34	-3.67	0.02	-9.59
Median	0.21	0.75	0.03	0.07
Z-statistic	24.34***	3.29***	3.48***	1.66**
% Positive	86***	61***	63***	51
n=117				

^a where

C_t = salary + bonus as reported in Forbes for year t
 PCE_t = earnings before the effect of the loan loss provision
 INC_t = reported earnings for year t

* significant at the 10% level
 ** significant at the 5% level
 *** significant at the 1% level

Table 3.16

Regression of Compensation on Adjusted
(for Mandatory Accounting Changes) and Reported Earnings
- Non-Income Smoothing Subsample

$$\ln(C_t) = a_0 + a_1 \ln(PCE_t) + a_2 \ln(INC_t/PCE_t) + a_3 \ln(PCE_{t-1}) + a_4 \ln(INC_{t-1}/PCE_{t-1})^a$$

	a_1	a_2	a_3	a_4
Mean	0.32	-6.07	0.04	7.99
Median	0.21	0.85	0.03	0.47
Z-statistic	22.22***	4.71***	4.95***	3.65**
% Positive	79 ***	59 **	65 ***	56
n=124				

^a where

C_t = salary + bonus as reported in Forbes for year t
 PCE_t = earnings before the effect of the loan loss provision
 INC_t = reported earnings for year t

* significant at the 10% level
 ** significant at the 5% level
 *** significant at the 1% level

Table 3.17

Comparison of Predicted with Actual Compensation
Income Smoothing Subsample

Panel A: Potential Effect of Provision on Compensation and Difference between Actual Compensation and Expected Compensation based on PreProvision and Reported Income^a

	Median	% Positive
PEFF	0.50***	
DIFF _{PCE}	1.94	55*
DIFF _{INC}	1.91	53
n=168		

Panel B: Spearman Correlation Coefficient between PEFF and DIFF_{PCE}

0.15*

^a where

$$\begin{aligned} \text{PEFF} &= (E(C_{t-\text{PCE}}) - E(C_{t-\text{INC}}))/C_t \\ \text{DIFF}_{\text{PCE}} &= (C_t - E(C_{t-\text{PCE}}))/C_t \\ \text{DIFF}_{\text{INC}} &= (C_t - E(C_{t-\text{INC}}))/C_t \end{aligned}$$

* significant at the 10% level
 ** significant at the 5% level
 *** significant at the 1% level

Table 3.18

Comparison of Predicted with Actual Compensation
Non-Income Smoothing Subsample

Panel A: Potential Effect of Provision on Compensation and Difference between Actual Compensation and Expected Compensation based on PreProvision and Reported Income^a

	Median	% Positive
PEFF	0.53***	
DIFF _{PCE}	5.07	57**
DIFF _{INC}	2.64	54
n=182		

Panel B: Spearman Correlation Coefficient between PEFF and DIFF_{PCE}

-0.07

^a where

$$\begin{aligned} \text{PEFF} &= (E(C_{t-\text{PCE}}) - E(C_{t-\text{INC}}))/C_t \\ \text{DIFF}_{\text{PCE}} &= (C_t - E(C_{t-\text{PCE}}))/C_t \\ \text{DIFF}_{\text{INC}} &= (C_t - E(C_{t-\text{INC}}))/C_t \end{aligned}$$

* significant at the 10% level
** significant at the 5% level
*** significant at the 1% level

3.3 Summary

The tests in this chapter provide information on the use of accounting numbers in determining CEO compensation. The results for H8 generally support the proposition that accounting policies are considered when setting compensation, and that firms using more conservative accounting policies have a higher compensation response coefficient. Of course "as long as contracting and monitoring is costly not all managerial accounting manipulation will be eliminated. It may be too costly for the board of directors' compensation committee to eliminate all manipulation" (Watts and Zimmerman (1986), p. 205). Costly contractly, as this phenomenon is known, may explain the results for H9 through H11. The results for H9 and H10 indicate that in the case of shocks to the income stream (mandatory accounting changes, provisions for loan losses) compensation is based on reported income including the effect of the shock, counter to the predictions developed based on economic theory. These results hold (H11) regardless of whether the change had a smoothing effect on the earnings stream. Table 3.19 (p. 104) summarizes the results of this chapter.

Table 3.19
Summary of Results

Panel A - The Effect of the Portfolio of Accounting Choices on CEO Compensation.

Hypothesis H8: The association between CEO compensation and accounting income is affected by choice of accounting methods.

Method - Estimate the association between compensation and accounting income using the following equation:

$$\ln(C_t) = a_0 + a_1 \ln(INC_t) + a_2 \ln(INC_{t-1}) \quad (3.1)$$

where C is compensation, INC is reported earnings, and ln indicates logarithm.

Determine whether the association, as measured by the CRC ($a_1 + a_2$), varies with proxies for accounting conservatism.

Results - Most of the evidence indicates that the relation between compensation and accounting income is stronger for firms using conservative accounting methods.

Panel B - The Effect of Mandated Accounting Changes and Writeoffs on CEO Compensation

Hypotheses

H9: Compensation is based on income before mandatory accounting changes.

H10: Compensation is based on income before writeoffs.

H11: CEO compensation is more likely to be based on reported income when the mandatory accounting change or writeoff has a smoothing effect on income.

Method - Estimate the association between compensation and accounting income using the following equation:

$$\ln(C_t) = a_0 + a_1 \ln(PCE_t) + a_2 \ln(INC_t/PCE_t) + a_3 \ln(PCE_{t-1}) + a_4 \ln(INC_{t-1}/PCE_{t-1}) \quad (3.2)$$

where C is compensation, PCE is earnings prior to change or writeoff, INC is reported earnings, and ln indicates logarithm.

Determine whether compensation is based on prechange or reported income by analyzing a_2 and a_4 . If they are significantly different from zero, then compensation is based on reported income.

Results - Compensation is based on reported income in all cases.

4. Cross-sectional Variation in the Association between CEO Compensation and Firm Performance

This chapter examines how differences in ownership of the firm, composition of the board of directors, and the susceptibility of the firm to takeover, lead to cross-sectional variation in the level³³ of CEO compensation, the association between CEO compensation and firm performance, and the composition of the compensation package. Hypotheses are developed showing how CEO ownership (hypothesis 12), ownership of other inside and outside directors (hypotheses 13 and 14), large shareholders (hypothesis 15), percentage of outside directors on board (hypothesis 16), percentage of compensation committee appointed by current CEO (hypothesis 17), and probability of takeover (hypothesis 18), affect CEO compensation.

Figure 4.1 (p. 145) illustrates the levels of corporate control. The power to hire and fire managers, as well as compensate them, lies with the Board of Directors. As discussed in Chapter 3 the Board, while elected by shareholders to represent their interests, is not independent of the managers who they are supposed to supervise. Directors can be divided into two broad categories, inside directors and outside directors. Inside directors are

³³ The level of compensation is alternatively defined as the amount of salary plus bonus, or total compensation received by the CEO.

managers of the corporation, while outside directors are those whose primary employment is not with the corporation, but who, in many cases have current or past business relationships with the corporation and its management. If the Board fails to effectively monitor management, the shareholders have the option to replace the directors. For reasons mentioned later, this rarely happens. A final control over management is the market for corporate control, whereby an investor buys some or all of the stock of the corporation and with it the ability to replace the board and current management. These techniques can be either substitute or complementary means of controlling management and providing it with the incentive to maximize firm value. This chapter extends prior studies by integrating these techniques of management control in examining their effect on CEO compensation. More specifically it extends prior research by:

1. Developing a theoretical framework to predict the effect of monitoring on
 - A) the level of compensation,
 - B) the association between compensation and a proxy for firm performance, accounting income, and
 - C) the composition of the compensation package (cash vs stock).
2. Decomposing Board Ownership into 3 components,
 - A) CEO (hypothesis 12),
 - B) other inside directors (hypothesis 13), and
 - C) outside directors (hypothesis 14).

3. Investigating CEO power over the Board and the Compensation setting process using two measures:

- A) percentage of outside directors (hypothesis 16),
- B) percentage of compensation committee appointed by the current CEO (hypothesis 17).

4. Integrating the market for corporate control into analysis by including a proxy for the corporations susceptibility to takeover (hypothesis 18).

This introductory section is followed by section 4.1 which develops the theoretical framework linking monitoring to compensation. Section 4.2 applies that framework to develop hypotheses. Section 4.3 discusses the methodology to be used, while section 4.4 discusses the data. Sections 4.5 and 4.6 contain the empirical results and summary, respectively.

4.1 Theoretical Framework: The Effect of Monitoring on Compensation

This section develops a theoretical framework to predict the effect of monitoring on the level of compensation, the association between compensation and accounting income, and the composition of the compensation package.

4.1a Effect of Monitoring on the Level of Compensation

Alternative theories exist to explain the effect of increased monitoring on the level of compensation. Demsetz (1983)

develops a model under which there is an equilibrium (fixed) level of compensation, which consists of remuneration plus on the job perquisites. As monitoring increases, the amount of perquisites consumed declines and remuneration increases. Alternatively, as monitoring decreases, management power and compensation increases (Allen (1981), Dyl (1988)). While it is unclear which of these theories holds, the hypotheses developed below assume (and thus test) the model put forth by Demsetz (1983) is correct and that explicit compensation increases with monitoring.

4.1b Effect of Monitoring on the Association between Compensation and Accounting Income

Increased monitoring is assumed to lead to a stronger correlation between CEO compensation and firm performance. This is consistent with the theories of Gomez-Mejia, Tosi, and Hinkin (1987), and Finkelstein and Hambrick (1989). Alternatively, increased monitoring could lead to the CEO being rewarded for actions taken, rather than results. If actions are less than perfectly correlated with accounting income, the regression coefficient relating CEO compensation and income, could decrease with increases in monitoring. While plausible in theory, this type of monitoring is unlikely, because it requires (1) a large time investment by the monitor, who must (2) possess a high level of expertise, and (3) there must be a minimum of asymmetric information

between the agent and monitor. Jensen and Murphy (1990b, p. 251) write:

The hypothesis that corporate boards directly monitor managerial input is consistent with the data but inconsistent with generally held beliefs in the business and financial community. Outside members of corporate boards have only limited contact with the CEO—at most 1 or 2 days a month—and the meetings that do occur are typically held in the CEO's office with agendas and information controlled by him. More important, the hypothesis that "forcing contracts" can be written when managerial actions are observable hinges crucially on the assumption that shareholders or boards know what actions should be taken. Managers often have better information than shareholders and boards in identifying investment opportunities and assessing the profitability of potential projects; indeed, the expectation that managers will make superior investment decisions explains why shareholders relinquish decision rights over their assets by purchasing common stock. Basing compensation on observed managerial actions cannot provide CEOs with incentives to engage in value-increasing activities when the expected wealth consequences of alternative actions are unknown to shareholders and board members.

4.1c Effect of Monitoring on the Composition of the Compensation Package

The compensation package can be used to align the interests of shareholders and management. Compensation can be based on contemporaneous measures of performance (e.g.: bonuses), or the value of compensation can be dependent on future performance (e.g.: stock compensation). When the ability and/or incentive to monitor management is low, stock-based compensation is the only way to motivate management. Increased monitoring could lead to increased use of explicit measures of performance (accounting-based bonuses), and less

reliance on stock-based compensation to motivate management.³⁴

4.2 Development of Hypotheses

This chapter examines how ownership, board composition, and the market for corporate control influence CEO compensation. Each of the variables specified in this section are hypothesized to affect the level of monitoring faced by management in general, and the CEO in particular.

4.2a CEO Ownership

Derivation of Hypothesis

Jensen and Meckling (1976) show that while a 100% owner-manager acts to maximize firm value, as his shareholdings drop, he bears less of the cost of shirking and thus, reduces his effort and increases his consumption of on the job perks. To reduce these agency costs, contracts are written using performance-based compensation to tie managerial to shareholder wealth.³⁵ Performance-based compensation becomes

³⁴ An alternative theory for the existence of stock compensation is tax deferral. This theory is not mutually exclusive with the one outlined above. However, if options and restricted stock solely exist for purposes of tax deferral they will not vary with the variables specified in the text.

³⁵ In the Jensen-Meckling world these contracts are negotiated by the owner-manager prior to selling off part of the firm. He does so to maximize the proceeds from selling part (or all) of the firm to outsiders.

more important as managerial ownership decreases, because a low level of ownership does not provide the necessary motivation to maximize firm value.³⁶ Since agency costs increase with decreases in managerial ownership, these contracts, either explicit or implicit, become more important and more likely as managerial ownership decreases. This leads to the prediction that the association between CEO compensation and firm performance becomes stronger as CEO ownership decreases.³⁷

If incentive compensation decreases as ownership increases, the CEO has less incentive to engage in cosmetic actions to increase accounting income. Hunt (1985) states:

In the case of substantial ownership, owner-managers may be more sensitive to the real economic performance of the firm and less concerned about external evaluations of their performance. In contrast, managers with little or no ownership interest seem to exhibit more sensitivity to potential measures of managerial performance, such as current stock price and earnings trends.

There is evidence that ownership affects the choice of accounting methods. Smith (1976) finds manager-controlled firms are more likely to make accounting decisions that smooth income. Dhaliwal, Salamon and Smith (1982) find manager-

³⁶ A manager's percentage shareholdings need not be large for his interests to be aligned with those of shareholder's, because a small percentage shareholding can represent a large percentage of the manager's portfolio. In those cases the change in wealth due to changes in stock price could be a multiple of compensation, thereby providing the necessary incentives (see Benston (1985)).

³⁷ An alternative explanation leading to the same empirical prediction is that the CEO's power increases with his ownership share and thus he becomes less accountable for performance.

controlled firms more likely to use straight-line depreciation. Hunt (1985) finds (contrary to expectations) that LIFO adopters have lower levels of managerial ownership. Niehaus (1989), using a regression that allows for a non-linear relationship between manager ownership and the probability of LIFO, finds that at low levels of managerial ownership, increases in managerial ownership are associated with a decreased likelihood of LIFO, while at high levels, increases in managerial ownership are associated with an increased likelihood of LIFO. He also finds the probability of LIFO increases with the concentration of outside ownership.

If the noise in accounting income decreases as ownership increases, it becomes a better signal of performance, and leads to the prediction that the regression coefficient measuring the correlation between CEO compensation and firm performance increases with ownership (see Park (1989) and Rao (1988) for similar predictions in different circumstances).

The above paragraphs lead to differing predictions on the correlation between CEO compensation and firm performance. On the one hand, as CEO ownership increases, the need for conditional compensation decreases, and thus, the correlation between CEO compensation and firm performance is hypothesized to drop. On the other hand, as the use of conditional compensation decreases, the CEO has less need to engage in cosmetic transactions to increase accounting income. This results in accounting income becoming a better signal of

performance (less noise), and causes the regression coefficient to increase. The net affect of these two contradictory predictions is uncertain and is an empirical question. If they offset one another, the possibility exists that no relation will be observed between CEO ownership and the correlation between CEO compensation and firm performance.

Because contracting and monitoring are costly, contracts are unlikely to reduce agency costs as well as ownership. Since (according to Demsetz (1983)) in equilibrium the manager bears those costs through a reduction in compensation, the level of compensation is predicted to increase with CEO ownership.

Lastly, as CEO ownership increases, for incentive purposes there is less need for stock-based compensation. Thus, the proportion of CEO compensation that is stock-based, should decrease with CEO ownership.

Prior Research

Finkelstein and Hambrick (1989), and Jensen and Murphy (1990a & b) examined the affect of CEO stockholdings on CEO compensation. Finkelstein and Hambrick (1989) hypothesized that executives with large stockholdings are likely to control the Board and "essentially set their own compensation." Thus the level of CEO compensation (salary + bonus) should increase with CEO ownership. However they also point out the possibility, that as CEO holdings increase, compensation may decrease, due to preference for capital gains, or to set lower

standards for subordinates. In their regression they include both percentage CEO shareholdings and percentage CEO shareholdings squared as independent variables. They find a nonlinear association, with the coefficient on percentage CEO shareholdings being positive and the coefficient on squared CEO squared being negative. Jensen and Murphy (1990a & b) hypothesize (but do not find) that the sensitivity of pay (including options) to performance is inversely related to CEO ownership.

Current Study

Like Finkelstein and Hambrick (1989) this paper hypothesizes that CEO ownership positively affects the level of CEO compensation. Similarly, like Jensen and Murphy (1990a & b) it hypothesizes that the sensitivity of pay to performance is inversely related to CEO ownership. This paper differs from theirs as it looks at both the level of compensation and the sensitivity of pay to performance, and in addition, examines the effect of CEO ownership on the composition of the pay package.

H12: The level of CEO compensation, the correlation between CEO compensation and accounting income, and the composition of the CEO pay package are related to the percentage of the firm owned by the CEO.

4.2b Ownership of Inside Directors

Derivation of Hypothesis

Directors of a company have a fiduciary duty to monitor management, to ensure that it acts in the interests of shareholders. As part of their oversight role they determine the components of, and total compensation paid to the CEO. Inside directors, because they are officers of the firm, have a vested interest in the management compensation process, i.e., their compensation is tied to that of the CEO (Lewellen (1968), Simon (1957)). Because they are risk averse, inside directors prefer compensation be fixed rather than variable. As their shareholdings increase, their priorities change from those of managers to those of shareholders. They then increase their monitoring of the CEO, which reduces agency costs and increases the level of compensation. They are also more likely to tie current compensation to firm performance. Since they are more likely to monitor the CEO, they are less likely to use stock-based compensation.

H13: The level of CEO compensation, the correlation between CEO compensation and accounting income, and the composition of the CEO pay package are related to the percentage of the firm owned by Inside Directors other than the CEO.

4.2c Ownership of Outside Directors

Derivation of Hypothesis

Outside directors do not face this conflict of interest. Rather, at times they lack the incentive to monitor management. When their shareholdings are low, they have no vested interest in the firm, and may resign rather than conflict with management (see Mace 1986). As their shareholdings rise, they are more likely to monitor management, which reduces agency costs and increases the level of compensation. They are also more likely to tie current compensation to firm performance. Furthermore they are able and willing to monitor the CEO, they are less likely to use stock-based compensation.

Prior Research

Finkelstein and Hambrick (1989) also hypothesize that a relationship exists between CEO compensation and outside director ownership. They predict the level of CEO compensation declines, and the link with performance increases with the ownership of outside directors. They do not find any association between CEO compensation and the ownership of outside directors, but do find a relationship between CEO bonus and the variable representing the interaction of ownership of outside directors and return on equity. However, the coefficient on the variable is negative, contrary to their prediction, suggesting that Board ownership weakens, rather than strengthens the association between pay and performance.

Current Study

Contrary to Finkelstein and Hambrick (1989) this paper predicts the level of compensation increases with the ownership of outside directors. Like Finkelstein and Hambrick (1989), it hypothesizes that increases in the ownership of outside directors strengthens the correlation between CEO compensation and firm performance. While their findings were contrary to their hypothesis, it is hoped that differences in (1) sample (they used firms from a single industry ('leisure'), while this study uses a diverse set of firms), (2) independent variable (they used return on equity as their measure of performance, while this study uses accounting income - this choice was explained in section 3.1a), and (3) dependent variable (they include only salary and bonus in their dependent variable, while this study also includes stock-based compensation). Finally, this paper also examines whether outside directors with substantial share ownership are less likely to use stock-based compensation.

H14: The level of CEO compensation, the correlation between CEO compensation and accounting income, and the composition of the CEO pay package are related to the percentage of the firm owned by Outside Directors.

4.2d Large Shareholders

Derivation of Hypothesis

Small shareholders have little incentive to monitor management. They have little power to influence or control management, and even if they did, the costs are likely to exceed the increase in the value of their shares. While small shareholders as a group have the ability to control management, the cost of coalescing is high and the free rider problem can never be eliminated.³⁸ Large shareholders internalize both the costs of coalescing and the free rider problem. Furthermore, if their holdings are large enough, they have both the incentive and ability to control management.

The identity of the large shareholder also influences the amount of monitoring. The CEO faces different monitoring depending on whether an individual (e.g., Carl Icahn) or institution (e.g., Employee Savings or Stock Ownership Plan) owns the shares. An individual owner has more incentive to monitor management because he directly benefits from any increase in stock price, while the manager of an institutional investor does not. Furthermore the identity of the institutional investor influences the level of monitoring. The trustee of a related institution such as the company's

³⁸ While each shareholder benefits from the efforts of the coalition, each is best off when it acts without him. He is better off because the monitoring costs him nothing. Thus without an enforcement mechanism the coalition will fail.

Employee Stock Ownership Plan is appointed by management and is less likely to monitor management than the trustee of an independent institution like the California Public Employees Retirement System (CALPERS).

Because of increased monitoring, the level of compensation and the association between CEO compensation and firm performance should increase, and the use of stock-based compensation should decrease with ownership concentration. The results are expected to be strongest when the large shareholders are individuals, and weakest when they are related institutions.

Prior Research

Several studies, Allen (1981), Gomez-Mejia, Tosi, and Hinkin (1987), Dyl (1988) and Finkelstein and Hambrick (1989), have examined the effect of large shareholdings on CEO compensation. Allen (1981), Gomez-Mejia, Tosi, and Hinkin (1987), and Finkelstein and Hambrick (1989), used discrete variables to proxy for firm control, while Dyl (1988) used a continuous variable - the percentage of the firm owned by the top five shareholders. Allen (1981) hypothesized the CEO's remuneration is related to his power within the firm, and that power would be greater if there were no large shareholders. He found CEOs of management-controlled firms (no shareholder owning 5% or more of firm) received higher compensation, and found CEOs of family controlled firms (CEO principal shareholder) receiving lower compensation. Gomez-Mejia, Tosi, and Hinkin (1987) hypothesized that owners (owner-controlled

firms) reward executives for performance, while CEOs (management-controlled firms) being risk averse, tie compensation to something less variable, for example, size. They found CEO compensation more responsive to firm performance in owner-controlled firms (at least one shareholder holds 5% or more of the firm). To be more precise, performance was only significant in explaining compensation for the sample of owner-controlled firms. They also hypothesized, but did not find, bonuses and long-term income comprising a larger portion of total compensation in owner-controlled firms. Finkelstein and Hambrick (1989), consider three classes of firms, owner-managed, external-controlled, and manager-controlled. They hypothesize CEO compensation is most tightly linked to profitability in externally-controlled firms, and least tightly in manager-controlled firms. In contrast to their expectations and the findings of Gomez-Mejia, Tosi, and Hinkin (1987), they found performance only significant in explaining CEO compensation in management-controlled firms. Dyl (1988) hypothesizes shareholders in closely-held corporations monitor management closely, whereas in widely held corporations no individual shareholder has the incentive to do so. This results in higher CEO compensation in widely held corporations. Consistent with his hypothesis, Dyl (1988) finds CEO compensation decreases with increases in the percentage of the firm held by the top five stockholders.

Current Study

Contrary to Allen (1981) and Dyl (1988) this study predicts the level of compensation increases with ownership concentration. Like Gomez-Mejia, Tosi, and Hinkin (1987), and Finkelstein and Hambrick (1989), it hypothesizes that the link between CEO compensation and firm performance is stronger for owner-controlled firms. Finally it also investigates whether large shareholders are less likely to use stock-compensation. This study uses both continuous and discrete variables to proxy for firm control. An advantage of using continuous variables to proxy for firm control is that it does not require the researcher to set an arbitrary cutoff. In addition transforming continuous into discrete variables causes the loss of information. Unfortunately, the requirements set by the SEC only require the disclosure of 5% shareholdings, therefore using the amounts disclosed would not be a true continuous variable. For that reason both continuous and discrete variables are used to proxy for firm control.

H15: The level of CEO compensation, the correlation between CEO compensation and accounting income, and the composition of the CEO pay package are related to the percentage of the firm owned by large shareholders.

4.2e Composition of Board of Directors

Derivation of Hypothesis

Neither inside nor outside directors are independent of the CEO, who may have appointed the director to the Board because of a social or business relationship (see Herman (1981)). Still, the outside director is probably more objective for two reasons. First, while the outsider obtains prestige and other benefits from his position on the Board, to the insider his position with the firm is his primary source of income and wealth. Were he to conflict with the CEO it would jeopardize his entire career. Second, as stated above, inside directors fearing the same linkage will be applied to their own compensation package are less willing to hold the CEO responsible for firm performance. If outsiders are more objective, they are more likely to monitor management, increasing the level of compensation and the correlation between CEO compensation and firm performance, and decreasing the use of stock-based compensation.

Prior Research

Williamson (1963) hypothesized that as insider representation on the Board increases, managerial interests tend to take precedence over shareholder interests. He regressed CEO compensation cross-sectionally on a set of independent variables that included Board composition, finding compensation increasing with insider representation on the

Board.³⁹ O'Reilly, Wade and Chandratat (1990) also investigated the effect of Board composition on the level of compensation, predicting that compensation increases with outsider representation. The results of their regression, while in the predicted direction, were not significant.

H16: The level of CEO compensation, the correlation between CEO compensation and accounting income, and the composition of the CEO pay package are related to the percentage of outsiders on the board of directors.

It should be noted that ownership of the firm and control of the Board of Directors work together, e.g.: outside directors only monitor management and tie CEO compensation to firm performance when (1) their shareholdings provide them with the necessary incentives and (2) they have power to do so, as represented by the proportion of outside directors. This joint effect is tested using the interaction of the two variables.

4.2f Composition of the Compensation Committee

Derivation of Hypothesis

The compensation committee is composed of outside directors who theoretically are objective in setting CEO compensation.

³⁹ In a related paper, Weisbach (1988) examined the effect of Board composition on CEO turnover, finding the association between CEO turnover and firm performance greater for outsider dominated boards.

However, the CEO has a large role in selecting outside directors and determining who sits on the compensation committee.⁴⁰ It is unclear what incentive these directors have to limit CEO compensation, or tie it to firm performance, actions that could incur the wrath of the person who appointed/nominated them to the Board in the first place. These incentives do not arise from their shareholdings, which in most cases are minimal. Other than Fama (1980), who argues that the director's reputation capital is at stake, little theory exists. Still empirical evidence shows both CEO compensation (see section 3) and turnover (see Coughlin and Schmidt (1985), Gibbons and Murphy (1990), Jensen and Murphy (1990a & b), Warner, Watts and Wruck (1988), Weisbach (1988)) related to performance.

The compensation committee should be more objective when the CEO has not selected the outside directors who sit on the compensation committee. These directors should be more willing to monitor management, which is hypothesized to increase the level of compensation and the correlation between compensation and performance, and reduce the use of stock-based compensation.

Since it is impossible to determine the role of the CEO in appointing directors and assigning them to committees, a rule

⁴⁰ A conflict of interest arises when CEO's sit on each other's compensation committees, thereby setting compensation for each other (see Fierman (1990) for some examples of this).

of thumb - date of appointment - is used. This rule seems consistent with Alderfer (1986) who wrote:

"CEOs are likely to have more influence with boards later rather than earlier in their careers. Early on, CEOs have little influence in shaping the board's membership. Moreover, the board is likely to be especially vigilant in overseeing the chief executive's performance. Later in the CEO's career, particularly if the corporation has done well, directors are likely to be more confident and relaxed about the CEO. By that time, the CEO will have selected-or helped select-a large number of the directors, and these people will be predisposed toward the person who brought them on the board.

and with Singh and Harianto (1989) who wrote:

"CEO tenure vis-a-vis board members' tenures appeared to be a good proxy for CEO influence."

Prior Research

Finkelstein and Hambrick (1989) use CEO tenure to proxy for the CEO's power. They recognize that over time the CEO appoints his own Board and predict that CEO compensation increases with tenure. While they predict a linear relation between tenure and compensation, they do not find one. They then include tenure squared as an independent variable. Using this second formulation they find compensation positively associated with tenure, and negatively associated with tenure squared. O'Reilly, Wade and Chandratat (1990) also investigate the effect of the CEOs tenure on compensation, using two variables, tenure of CEO relative to Board and tenure of CEO relative to chairman of compensation committee, expecting CEO compensation to increase with relative tenure. They find CEO compensation increases with both tenure variables.

While this study investigates the same hypothesis as Finkelstein and Hambrick (1989) and O'Reilly, Wade and Chandratat (1990) the tests differ in several ways. First, while the above studies predict a positive relationship between CEO tenure and the level of compensation, this study examines the effect of CEO power on the level of compensation, the association between CEO compensation and firm performance, and the use of stock-based compensation. Second, the proxy variable for CEO power is different. Finkelstein and Hambrick (1989) use CEO tenure, while O'Reilly, Wade and Chandratat (1990) use tenure relative to the Board, and tenure relative to the Chairman of the Compensation Committee. The proxy used in this study is the proportion of the compensation committee appointed by the current CEO.

H17: The level of CEO compensation, the correlation between CEO compensation and accounting income, and the composition of the CEO pay package are related to the percentage of the compensation committee the current CEO has appointed to the Board of Directors.

4.2g Market for Corporate Control

Derivation of Hypothesis

The market for corporate control causes management to maximize firm value (see McEachern (1975)). The threat of takeover and subsequent displacement (Comment (1985) and Walsh (1988)

provide evidence that management turnover increases subsequent to takeover). causes management to maximize firm value even in the absence of conditional compensation and managerial ownership.⁴¹ The stronger the threat of takeover the less the need for other forms of monitoring or means of aligning the interests of management and shareholders. This leads to the prediction that the level of compensation increases (because of reduced agency costs), while the association between CEO compensation and firm performance, and the use of stock-based compensation decrease with the probability of takeover. This probability can be calculated using a takeover prediction model similar to those developed by Palepu (1986) and Mittelstaedt (1989).

H18: The level of CEO compensation, the correlation between CEO compensation and accounting income, and the composition of the CEO pay package are related to the probability of takeover.

⁴¹ Theoretically, the ability of the Board to replace management should provide management with the incentive to maximize firm value. However Jensen and Murphy (1990b, p. 227), "suggest that dismissals are not an important source of managerial incentives since the increases in dismissal probability due to poor performance and the penalties associated with dismissal are both small."

4.3 Methodology⁴²

The association between CEO compensation and firm performance is determined through a cross-sectional regression of CEO compensation on contemporaneous and lagged accounting income, and the proxies suggested by the above hypotheses: percentage CEO ownership, percentage ownership of other inside and outside directors, percentage of firm owned by large shareholders, percentage of outside directors on board, percentage of compensation committee appointed by current CEO, and probability of takeover. Because the hypotheses predict that each variable affects both the level of compensation, and the correlation between CEO compensation and firm performance, each variable is included in the analysis three times, by itself and as the product of itself with income and lagged income. The regression model to be estimated is:⁴³

$$\begin{aligned}
 C = & a_0 + a_1*CO + a_2*IO + a_3*DO + a_4*OO + a_5*PO + a_6*PA + a_7*PT \\
 & + a_8*E + a_9*E*CO + a_{10}*E*IO + a_{11}*E*DO + a_{12}*E*OO \\
 & + a_{13}*E*PO + a_{14}*E*PA + a_{15}*E*PT + e
 \end{aligned}
 \tag{4.1}$$

where:

C = CEO compensation
 E = Accounting Income
 CO = Percentage of firm owned by CEO
 IO = Percentage of firm owned by other inside directors
 DO = Percentage of firm owned by outside directors

⁴² The discussion in section 3.1a on the relation between CEO compensation and performance, dependent and independent variables, and size, also apply to this section.

⁴³ Lagged income is ignored for expositional purposes, both here and in the discussion of results. Its inclusion does not change any of the results.

OO = Percentage of firm owned by 5 largest shareholders,
 who are neither officers nor directors
 PO = Percentage of the board of directors not employed
 by firm
 PA = Percentage of directors on Compensation Committee
 not appointed by current CEO
 PT = Estimated probability of takeover
 and a_i , $i = 0,15$, are regression coefficients

The above formulation results in a large number of independent variables, with the ensuing loss of degrees of freedom. An issue is the functional form of the regression equation. Dyl (1988) and Finkelstein and Hambrick (1989) use logarithms to reduce heteroscedasticity in the data, O'Reilly, Wade and Chandratat (1990) use logarithms so that the extreme values would be less prone to bias results, and Abdel-Kahlik (1985) uses logarithms to reduce skewness.⁴⁴ Healy, Kang and Palepu (1987) state that "there is some evidence that power transformations perform better than linear regressions in estimating relations between compensation and measures of performance." For these reasons this study uses logarithms.

Another issue is whether the variables should enter the model in linear form. Finkelstein and Hambrick (1989) use both the linear and squared versions of CEO ownership and CEO tenure. Morck, Shleifer and Vishney (1988), in examining the affect of management ownership on market valuation, use a "piecewise" linear regression (p. 293). They hypothesize that at low levels of ownership (0 to 5%), increases in ownership causes

⁴⁴ Abdel-Kahlik, while using logarithms to reduce skewness in the raw data, corrects for heteroscedasticity by deflating all variables by the logarithm of income.

managers to maximize firm value, at intermediate levels (5 to 25%), managers become entrenched and act to maximize their own welfare, and at high levels (over 25%) they again act like owners. Others [Abdel-Khalik (1985), Allen (1981), Dhaliwal, Salamon and Smith (1982), Gomez-Mejia, Tosi and Hinkin (1987), Smith (1976)] have used discrete variables to proxy for management versus owner control. The correct functional form of the independent variables is uncertain, but depends on the hypothesized relation with CEO compensation. Since there is little theoretical reason to do otherwise, this study uses the linear version of most variables, although as specified above both continuous and discrete proxies are used for large shareholder ownership. Future tests will examine whether using non-linear variables improve the model.

The determinants of the proportion of stock compensation in the CEO's compensation package is tested using the following cross-sectional model:

$$SC = a_0 + a_1 * CO + a_2 * IO + a_3 * DO + a_4 * OO + a_5 * PO + a_6 * PA + a_7 * PT \quad (4.2)$$

where

SC = Percentage of Stock Compensation,
and the other variables are as defined above.

The sensitivity of the results to choice of dependent variable (salary plus short-term bonus versus total compensation) was examined.⁴⁵ Cook's D was used to delete observations that

⁴⁵ The sensitivity of the results to the inclusion of size and lagged salary was examined. Those regressions are not presented because the inclusion of either size or lagged salary did not improve the results.

unduly influenced the regressions. This resulted in the deletion of no more than two or three of the 129 observations from each regression.

4.4 Data

The tests in this section use 129 firms selected (see Chapter 2 for a description of the sample selection procedure) from the approximately 800 firms contained in the Forbes compensation surveys. Data on compensation, ownership of the firm, and control of the Board of Directors is obtained from proxy statements filed with the Securities and Exchange Commission. The proxy provides compensation data for the five most highly paid executives, including cash compensation earned and options and restricted stock granted during the prior fiscal year. It lists ownership data, including holdings by officers and directors, as well as other large (5% or more) shareholders. The proxy also details the primary employment of the director, the date first elected to board, and committee memberships. Accounting performance variables are obtained from Compustat.

4.5 Empirical Results

The large number of correlated (see Table 4.2, p. 148) independent variables lead to difficulties in interpreting the results of the multiple regressions. To aid in the interpretation of the results, tests of the effect of each

independent variable are presented first. For example, to test the effect of CEO ownership on CEO Salary plus Bonus the following regressions are run:

$$\begin{aligned} \text{A) } \log(\text{Salary} + \text{Bonus}) &= a_0 + a_1 * \log(\% \text{ CEO Ownership}) \\ &+ a_3 * \log(\text{Income}) \end{aligned}$$

$$\begin{aligned} \text{B) } \log(\text{Salary} + \text{Bonus}) &= a_0 \\ &+ a_2 * \{\log(\text{Income}) * \log(\% \text{ CEO Ownership})\} + a_3 * \log(\text{Income}) \end{aligned}$$

$$\begin{aligned} \text{C) } \log(\text{Salary} + \text{Bonus}) &= a_0 + a_1 * \log(\% \text{ CEO Ownership}) \\ &+ a_2 * \{\log(\text{Income}) * \log(\% \text{ CEO Ownership})\} + a_3 * \log(\text{Income}) \end{aligned}$$

The coefficients a_1 and a_2 are then analyzed to ascertain the effect of CEO ownership on the level of CEO Salary plus Bonus, and its association with reported accounting income. Since there is no theory to predict whether the independent variable (in this case CEO ownership) affects CEO Salary plus bonus through the intercept (coefficient a_1) or through an interaction with accounting income (coefficient a_2), the discussion that follows concentrates on equation C. Tables 4.1 (p. 146) and 4.1a (p. 147) presents some descriptive statistics on the characteristics of the sample firms, table 4.2 (p. 148) presents correlations between the independent variables, tables 4.3 through 4.13 (pp. 149-162) present the regression results using individual variables, and tables 4.14 through 4.16 (pp. 163-165) present the results using all variables.

4.5.1 Tests of Individual Variables

4.5.1a CEO Ownership

Table 4.3 (p. 149) shows the effect of CEO shareholdings on Salary plus (Short-Term) Bonus, Total Compensation (Salary plus Short-Term Bonus plus Long-Term Bonus plus Stock Compensation), and the Percentage of Stock Compensation. The effect of CEO ownership is insignificant for all three dependent variables. This result holds regardless of whether T-tests are used on the individual coefficients (a_1 and a_2) or F-tests are used to test their joint explanatory power.

4.5.1b Ownership of Other Inside Directors

Table 4.4 (p. 150) shows the effect of ownership by other Inside Directors on CEO compensation. When either Salary plus Bonus or Total Compensation is used as dependent variable the coefficient on percentage ownership is negative and the coefficient on the interaction between percentage ownership and income is positive, both coefficients being significant. An F-test finds the variables to be jointly significant using either dependent variable. When Percentage Stock Compensation is used as dependent variable the coefficient on inside director ownership is insignificant. These results indicate that the link between compensation and income becomes stronger as the Ownership of Inside Directors increases. The effect on the level of CEO compensation is less clear: the coefficients

a_1 and a_2 have opposing signs. When income is less than \$563 (\$330) million CEO salary plus bonus (total compensation) decreases with the Ownership of Inside Directors. However when income is above that level CEO compensation increases with the Ownership of Inside Directors. Given that the median net income (see Table 4.1) for this sample is \$269 million, it appears that for most firms, increases in insider ownership are associated with decreases in the level of CEO compensation. The results in table 4.4 are consistent with the hypothesis that increases in insider ownership increase the level of monitoring of the CEO, thereby tying compensation more closely to performance.

4.5.1c Ownership of Outside Directors

Table 4.5 (p. 151) shows the effect of ownership by Outside Directors on CEO compensation. The effect of Outside Director ownership is insignificant for all three dependent variables. This result holds regardless of whether T-tests are used on the individual coefficients (a_1 and a_2) or F-tests are used to test their joint explanatory power.

4.5.1d Large Shareholders

As indicated in section 4.1.3 large shareholders can influence CEO compensation. However their ability and desire to use it depends on their identity. For example large shareholders that are related to the firm (i.e.: ESOPs) may actually be

controlled by management. On the other hand an individual or unrelated institution is independent and may use their clout to control management. To allow for differences in incentives, large shareholders are considered as a group, and then considered in three separate categories - individuals, related institutions, and unrelated institutions. Table 4.6 (pp. 156-157) shows the effect of large individual shareholders on CEO compensation, table 4.7 (pp. 158-159) the effect of unrelated institutions, and table 4.8 (pp. 160-161) the effect of related institutions.

In table 4.6 when either Salary plus Bonus or Total Compensation is used as dependent variable the coefficient on Percentage Owned by Individuals is negative and the coefficient on the interaction between percentage ownership and income is positive. The coefficients are highly significant when Total Compensation is used as a dependent variable and marginally insignificant when Salary plus Bonus is used. Consistent with these results the F-test for the joint significance of the variables is only significant when Total Compensation is used as dependent variable. When Percentage Stock Compensation is used as dependent variable the coefficient on large individual ownership is insignificant. These regressions indicate that the link between compensation and income becomes stronger as individual ownership increases. The effect on the level of CEO compensation is less clear: the coefficients a_1 and a_2 in equations 2 and 2a have opposing signs. When income is less

than \$174 (\$171-equation 2a) million CEO total compensation decreases with the Ownership of Individual Large Shareholders. However when income is above that level CEO total compensation increases with the Ownership of Individual Large Shareholders. Given that the median net income (see Table 4.1) for this sample is \$269 million, it appears that for most firms, increases in the ownership of individual large shareholders are associated with increases in the level of CEO compensation. The results in table 4.6 are consistent with the hypothesis that increases in individual ownership increase the level of monitoring of the CEO, thereby tying compensation more closely to performance.

Table 4.7 shows the effect of ownership by Related Institutions on CEO compensation. The effect of Related Institution ownership on compensation is insignificant for all three dependent variables, a result that holds regardless of whether T-tests are used on the individual coefficients (a_1 and a_2) or F-tests are used to test their joint explanatory power.

Table 4.8 shows the effect of ownership by unrelated institutions on CEO compensation. When Salary plus Bonus is used as dependent variable the coefficient on unrelated institution ownership is negative, as is the coefficient on the interaction between unrelated institution ownership and income. While these coefficients are individually insignificant, the F-test for the joint significance of the

variables is statistically significant. When Total Compensation or Percentage Stock Compensation is used as dependent variable both the individual T-statistics and the F-statistics are insignificant. The results for Salary plus Bonus indicate that the link between compensation and income weakens as the ownership of unrelated institutions increases. The level of CEO salary plus bonus also decreases with the ownership of unrelated institutions. The results are consistent with monitoring by unrelated institutions restraining CEO compensation, but inconsistent with the hypothesis that increased monitoring leads to a stronger association between compensation and accounting income. It is unclear why the results differ when Total Compensation is used as dependent variable. Perhaps when unrelated institutions own large blocks of stock the CEO elects to take compensation in the form of long-term and stock compensation. However if that were true, the coefficient on ownership of unrelated institutions in the third equation in table 4.8 would be positive.

The results in this subsection are indifferent to the use of continuous or discrete variables to proxy for the ownership of large shareholders. When the tests in this subsection are replicated using ownership by all large (5% or greater) shareholders as the test variable the results are insignificant.

4.5.1e Composition of Board

In table 4.9 (p. 158) when either Salary plus Bonus or Total Compensation is used as dependent variable the coefficient on Percentage of Outsiders on Board is positive and the coefficient on the interaction between percentage outsiders and income is negative. The coefficients are highly significant, as are the F-tests for the joint significance of the variables. When Percentage Stock Compensation is used as dependent variable the coefficient on Percentage of Outsiders on Board is negative and insignificant. These results indicate (contrary to expectations) that the link between compensation and income becomes weaker as the percentage of outsiders on the board increases. The effect of board composition on the level of CEO compensation is less clear: the coefficients a_1 and a_2 have opposing signs. When income is less than \$11 (\$278) million CEO salary plus bonus (total compensation) increases with the percentage of outside directors. However when income is above that level CEO total compensation decreases with the percentage of outside directors. Given that the median net income (see Table 4.1) for this sample is \$269 million, it appears that for most firms, increases in the percentage of outside directors are associated with decreases in the level of CEO salary plus bonus but increases the level of total compensation. The results in table 4.9 are contrary to the hypothesis that increases in the percentage of outsiders on the board increase

the association between CEO compensation and accounting income.

Table 4.10 (p. 159) shows the interactive effect of ownership by Outside Directors and Board Composition on CEO compensation. The effect is insignificant for all three dependent variables. This result holds regardless of whether T-tests are used on the individual coefficients (a_1 and a_2) or F-tests are used to test their joint explanatory power.

4.5.1f Composition of Compensation Committee

In table 4.11 (p. 160) when either Salary plus Bonus or Total Compensation is used as dependent variable the coefficient on Percentage of Compensation Committee Appointed by CEO is positive and the coefficient on the interaction between percentage appointed and income is negative. The coefficients are highly significant, as are the F-tests for the joint significance of the variables. When Percentage Stock Compensation is used as dependent variable the coefficient on Percentage of Compensation Committee Appointed by CEO is positive and significant. These results indicate that the link between compensation and income becomes weaker as the percentage appointed by CEO increases. The effect on the level of CEO compensation is less clear: the coefficients a_1 and a_2 have opposing signs. When income is less than \$403 (\$22,026) million CEO salary plus bonus (total compensation) increases with the percentage of compensation committee

appointed by CEO. However when income is above that level CEO total compensation decreases with the percentage of compensation committee appointed by CEO. Given that the median net income (see Table 4.1) for this sample is \$269 million, it appears that for most firms, increases in the percentage of compensation committee appointed by CEO are associated with increases in the level of CEO compensation. The results in table 4.11 are consistent with the hypothesis that increases in the percentage of the Compensation Committee appointed by the CEO decrease the level of monitoring, thereby weakening the link between compensation and performance. The positive effect on Percentage Stock Compensation is consistent with members appointed by the CEO electing to passively tie CEO compensation to firm value rather than actively monitor him.

4.5.1g Market for Corporate Control

Table 4.12 (p. 161) shows the effect of the probability of takeover on CEO compensation. In table 4.12 when Salary plus Bonus is used as dependent variable the coefficient on Probability of Takeover is negative as is the coefficient on the interaction between Probability of Takeover and income. While these coefficients are individually insignificant, the F-test for the joint significance of the variables is statistically significant. When Total Compensation or Percentage Stock Compensation is used as dependent variable both the individual T-statistics and the F-statistics are

insignificant. The results for Salary plus Bonus indicate that the link between compensation and income becomes weaker as the probability of takeover becomes higher. The level of CEO salary plus bonus also decreases with the probability of takeover. The results are consistent with the market for corporate control motivating management to maximize firm value, even in the absence of other incentives, and thus lessening the need to tie pay to performance. It is unclear why the results differ when Total Compensation is used as dependent variable. Perhaps when the probability of takeover becomes more likely the CEO elects to take compensation in the form of long-term and stock compensation. However if that were true, the coefficient on probability of takeover in the third equation in table 4.12 would be positive.

4.5.1h Summary

To summarize the results of the above tests (see Table 4.13, p. 162), some evidence is found that the percentage ownership of inside directors (other than the CEO), the percentage ownership of unrelated institutions, the percentage of outside directors, the percentage of compensation committee appointed by the CEO, and the probability of takeover influence Salary plus Bonus. When Total Compensation is used as dependent variable the results change slightly, as the percentage ownership of unrelated institutions and the probability of takeover lose significance, while the percentage of stock owned by large individual shareholders becomes significant.

When Percentage of Stock Compensation is used as dependent variable only percentage of compensation committee appointed by the CEO is significant. In total there are significant results for five of the seven hypotheses for at least one of the dependent variables. An analysis of these results indicates that with the exception of percentage ownership of unrelated institutions and the percentage of outside directors, variables hypothesized to lead to increased monitoring are associated with a stronger link between CEO compensation and accounting income.

4.5.2 Joint Test of Hypotheses

Tables 4.14 through 4.16 present the results of regressions using all of the above variables. Table 4.14 (p. 163) presents the results using Salary plus Bonus as dependent variable, while table 4.15 (p. 164) uses Total Compensation and table 4.16 (p. 165) used Percentage Stock Compensation. The equations used are equations 4.1 and 4.2 altered to allow for three types of large shareholders - individual, related institution, and unrelated institution. As mentioned above, and shown in table 4.2 significant correlations between several of the variables (i.e., CEO and Inside Ownership) lead to difficulties in interpreting the coefficients (e.g.: income in table 4.15 has a negative coefficient).

In tables 4.14 and 4.15 the variables jointly have significant explanatory power above that of income in explaining Salary

plus Bonus and Total Compensation. Table 4.14 indicates that the interaction of income and the ownership of CEO, inside directors, outside directors, and unrelated institutions, and percentage of outside directors and compensation committee appointed by CEO are significantly associated with CEO Salary plus Bonus. The coefficients on CEO (+) and inside director ownership (+), percentage of outside directors (+) and compensation committee appointed by the CEO (-) are consistent with variables hypothesized to lead to increased monitoring being associated with a stronger link between CEO compensation and accounting income. The coefficients on outside director (-) and unrelated institution ownership (-) contradict these results. Table 4.15 indicates individual ownership and percentage of compensation committee appointed by the CEO are significantly associated with total compensation. The coefficient on percentage of compensation committee appointed by the CEO (-) is consistent with increased monitoring being associated with a stronger link between CEO compensation and accounting income, while the coefficient on individual ownership (-) contradicts this. In table 4.16 the F-statistic indicates the variables jointly are insignificant.

4.5.3 Other Findings

In tables 4.3 through 4.16 R^2 is higher when Salary plus Bonus is used as dependent variable, than when Total Compensation is used. This finding is consistent with the fact that bonuses are tied to accounting income, while stock compensation is

not. R^2 is nearly zero when Percentage Stock Compensation is used as dependent variable. This indicates that the hypothesized variables have no effect on the Percentage Stock Compensation.

4.6 Summary

Overall the results of the individual tests indicate that the variables hypothesized to lead to increased monitoring are associated with a stronger link between CEO compensation and accounting income. The joint tests provide contradictory results, possibly because of the forewarned multicollinearity. Varying the dependent variable provided some interesting insights. The hypothesized variables had the most explanatory power when Salary plus Bonus was used as dependent variable, and had virtually no explanatory power when Percentage of Stock Compensation was used as dependent variable.

Figure 4.1
Corporate Control Structure

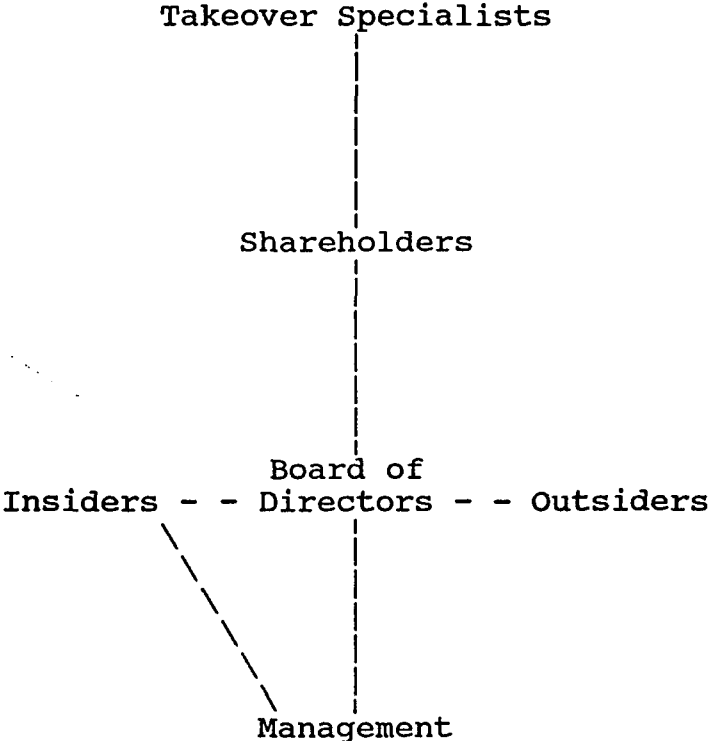


Table 4.1
Sample Characteristics
n=129

	Mean	Median
Salary plus Bonus	\$1,076,040	\$1,038,000
Total Compensation	\$3,128,470	\$1,777,000
Percentage Stock	37.32%	40.28%
Net Income	\$596 million	\$269 million
Sales	\$11.1 billion	\$6.1 billion
Assets	\$14.9 billion	\$5.9 billion
Percentage Ownership		
CEO	0.81	0.05
Inside		
Directors	0.74	0.04
CEO+Inside		
Directors	1.55	0.12
Outside		
Directors	1.56	0.07
All		
Directors	3.10	0.27
Large (>5%) Shareholders (Number of firms in Parentheses)		
Individuals(6)	0.38	0.00
Related		
Institutions(27)	3.38	0.00
Unrelated		
Institutions(47)	5.89	0.00
All Large		
Shareholders(65)	9.65	5.28
Board Composition		
Percentage		
Outsiders	0.76	0.80
Percentage of Compensation Committee Appointed by CEO		
	0.38	0.33

Table 4.1a
Subsample Characteristics
Firms with Large Shareholders

Number of Firms	Medians		
	Individuals 6	Institutional Related 27	Institutional Unrelated 47
Salary plus Bonus	\$ 767,000	\$ 977,000	\$ 900,000
Total Compensation	\$1,166,000	\$1,798,000	\$1,346,000
Percentage Stock	25.05%	31.49%	41.46%
Net Income	\$159 million	\$255 million	\$178 million
Sales	\$1.3 billion	\$5.9 billion	\$5.0 billion
Assets	\$2.5 billion	\$5.6 billion	\$4.8 billion
Percentage Ownership			
CEO	0.22	0.08	0.06
Inside			
Directors	0.09	0.08	0.07
CEO+Inside			
Directors	0.43	0.20	0.22
Outside			
Directors	0.92	0.10	0.10
All			
Directors	9.79	0.39	0.58
Large (>5%) Shareholders			
Individuals	6.14	0.00	0.00
Related			
Institutions	0.00	13.17	0.00
Unrelated			
Institutions	18.54	0.00	10.95
All Large			
Shareholders	34.45	16.81	16.74
Board Composition			
Percentage			
Outsiders	0.80	0.80	0.80
Percentage of			
Compensation Committee			
Appointed by CEO	0.41	0.20	0.40

Table 4.2
Pearson Correlations Coefficients
(Significance in Parentheses)

	V ₁	V ₂	V ₃	V ₄	V ₅	V ₆	V ₇	V ₈	V ₉
V ₁	1.00 (0.00)	0.18 (0.05)	-0.02 (0.85)	0.41 (0.01)	0.05 (0.61)	-0.04 (0.69)	-0.14 (0.10)	0.22 (0.01)	0.21 (0.04)
V ₂	0.18 (0.05)	1.00 (0.00)	-0.01 (0.88)	-0.02 (0.79)	0.05 (0.60)	-0.04 (0.67)	-0.26 (0.01)	-0.15 (0.10)	0.21 (0.05)
V ₃	-0.02 (0.85)	-0.01 (0.88)	1.00 (0.00)	0.18 (0.04)	-0.06 (0.49)	0.04 (0.69)	0.13 (0.15)	0.09 (0.32)	0.06 (0.57)
V ₄	0.41 (0.01)	-0.02 (0.79)	0.18 (0.04)	1.00 (0.00)	0.07 (0.43)	0.14 (0.10)	-0.03 (0.73)	0.13 (0.14)	0.07 (0.50)
V ₅	0.05 (0.61)	0.05 (0.60)	-0.06 (0.49)	0.07 (0.43)	1.00 (0.00)	-0.05 (0.59)	0.04 (0.68)	-0.06 (0.52)	-0.04 (0.67)
V ₆	-0.04 (0.69)	-0.04 (0.67)	0.04 (0.69)	0.14 (0.10)	-0.05 (0.59)	1.00 (0.00)	-0.04 (0.69)	-0.08 (0.36)	0.09 (0.41)
V ₇	-0.14 (0.10)	-0.26 (0.01)	0.13 (0.15)	-0.03 (0.73)	0.04 (0.68)	-0.04 (0.69)	1.00 (0.00)	0.09 (0.29)	-0.10 (0.33)
V ₈	0.22 (0.01)	-0.15 (0.10)	0.09 (0.32)	0.13 (0.14)	-0.06 (0.52)	-0.08 (0.36)	0.09 (0.29)	1.00 (0.00)	0.21 (0.04)
V ₉	0.21 (0.04)	0.21 (0.05)	0.06 (0.57)	0.07 (0.50)	-0.04 (0.67)	0.09 (0.41)	-0.10 (0.33)	0.21 (0.04)	1.00 (0.00)

where

V₁ = Percentage CEO ownership

V₂ = Percentage ownership of other Inside Directors

V₃ = Percentage ownership of Outside Directors

V₄ = Percentage of firm owned by Large Individual
Shareholders

V₅ = Percentage of firm owned by Related Institutions

V₆ = Percentage of firm owned by Unrelated Institutions

V₇ = Percentage of Outsiders on Board of Directors

V₈ = Percentage of Compensation Committee Appointed by CEO

V₉ = Probability of Takeover

Table 4.3^a
Effect of CEO Ownership on CEO Compensation

Equation (1)

$$\log(\text{Salary} + \text{Bonus}) = a_0 + a_1 \cdot \log(\% \text{ CEO Ownership}) + a_2 \cdot \log(\text{Income}) \cdot \log(\% \text{ CEO Ownership}) + a_3 \cdot \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.51***	0.00		0.07***	0.22	
B)	6.48***		0.00	0.09***	0.22	
C)	5.89***	-0.08	0.02	0.19***	0.23	0.97

Equation (2)

$$\log(\text{Total Compensation}) = a_0 + a_1 \cdot \log(\% \text{ CEO Ownership}) + a_2 \cdot \log(\text{Income}) \cdot \log(\% \text{ CEO Ownership}) + a_3 \cdot \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.59***	-0.06		0.10***	0.14	
B)	7.03**		-0.01	0.02	0.14	
C)	6.81***	-0.03	-0.01	0.06	0.13	1.05

Equation (3)

$$\log(\text{Stock Compensation}/\text{Total Compensation}) = a_0 + a_1 \cdot \log(\% \text{ CEO Ownership})$$

a_0	a_1	adj R^2
-4.59 (-3.63)	-0.23 (-1.39)	.01

^aIn all regressions compensation is in the thousands, while income is in the millions. The magnitude of the coefficients should be interpreted accordingly.

- * significant at the 10% level
- ** significant at the 5% level
- *** significant at the 1% level

Table 4.4^a
Effect of Inside Director Ownership on CEO Compensation

Equation (1)

$$\log(\text{Salary} + \text{Bonus}) = a_0 + a_1 \cdot \log(\% \text{ Inside Ownership}) + a_2 \cdot \log(\text{Income}) \cdot \log(\% \text{ Inside Ownership}) + a_3 \cdot \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.34***	-0.02		0.07***	0.23	
B)	6.48***		0.00	0.09***	0.22	
C)	4.97***	-0.19***	0.03***	0.34***	0.29	6.88***

Equation (2)

$$\log(\text{Total Compensation}) = a_0 + a_1 \cdot \log(\% \text{ Inside Ownership}) + a_2 \cdot \log(\text{Income}) \cdot \log(\% \text{ Inside Ownership}) + a_3 \cdot \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.69***	-0.04		0.10***	0.13	
B)	7.00***		0.00	0.11*	0.12	
C)	4.72***	-0.29***	0.05**	0.48***	0.17	3.88***

Equation (3)

$$\log(\text{Stock Compensation}/\text{Total Compensation}) = a_0 + a_1 \cdot \log(\% \text{ Inside Ownership})$$

a_0	a_1	adj R^2
-3.99	-0.15	.00
(-3.00)	(-0.85)	

^aIn all regressions compensation is in the thousands, while income is in the millions. The magnitude of the coefficients should be interpreted accordingly.

- * significant at the 10% level
- ** significant at the 5% level
- *** significant at the 1% level

Table 4.5^a
Effect of Outside Director Ownership on CEO Compensation

Equation (1)

$$\log(\text{Salary} + \text{Bonus}) = a_0 + a_1 \cdot \log(\% \text{ Outside Ownership}) + a_2 \cdot \log(\text{Income}) \cdot \log(\% \text{ Outside Ownership}) + a_3 \cdot \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.44***	-0.00		0.07***	0.22	
B)	6.49***		-0.00	0.07**	0.22	
C)	6.37***	-0.02	0.00	0.19	0.22	0.10

Equation (2)

$$\log(\text{Total Compensation}) = a_0 + a_1 \cdot \log(\% \text{ Outside Ownership}) + a_2 \cdot \log(\text{Income}) \cdot \log(\% \text{ Outside Ownership}) + a_3 \cdot \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.68***	-0.05		0.10***	0.14	
B)	7.02***		-0.01	0.04	0.14	
C)	6.90***	-0.02	-0.01	0.06	0.13	1.07

Equation (3)

$$\log(\text{Stock Compensation}/\text{Total Compensation}) = a_0 + a_1 \cdot \log(\% \text{ Outside Ownership})$$

a_0	a_1	adj R^2
-3.94	-0.15	.00
(-3.76)	(-1.05)	

^aIn all regressions compensation is in the thousands, while income is in the millions. The magnitude of the coefficients should be interpreted accordingly.

- * significant at the 10% level
- ** significant at the 5% level
- *** significant at the 1% level

Table 4.6^a
Effect of Individual Large Shareholder on CEO Compensation

Equation (1)

$$\log(\text{Salary} + \text{Bonus}) = a_0 + a_1 \log(\% \text{ Individual Ownership}) + a_2 \log(\text{Income}) \log(\% \text{ Individual Ownership}) + a_3 \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.33***	-0.02		0.07***	0.22	
B)	6.49***		-0.00	0.06	0.22	
C)	3.88**	-0.28	0.05	0.53*	0.23	1.20

Equation (1a) - Indicator Variable taking the value of 1 when an individual owns more than 5% of the firm

$$\log(\text{Salary} + \text{Bonus}) = a_0 + a_1 D + a_2 \log(\text{Income}) D + a_3 \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.49***	-0.12		0.07***	0.22	
B)	6.49***		-0.01	0.07***	0.22	
C)	6.50**	-1.93	0.34	0.07***	0.23	1.20

Equation (2)

$$\log(\text{Total Compensation}) = a_0 + a_1 \log(\% \text{ Individual Ownership}) + a_2 \log(\text{Income}) \log(\% \text{ Individual Ownership}) + a_3 \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.83***	-0.02		0.10***	0.12	
B)	7.01***		0.00	0.10	0.12	
C)	-8.18	-1.65***	0.32***	3.07***	0.17	4.43**

Equation (2a) - Indicator Variable taking the value of 1 when an individual owns more than 5% of the firm

$$\log(\text{Total Compensation}) = a_0 + a_1 D + a_2 \log(\text{Income}) D + a_3 \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	7.01***	-0.11		0.10***	0.12	
B)	7.00***		0.01	0.10***	0.12	
C)	7.02***	-10.74***	2.09***	0.10***	0.18	4.46**

-continued

Equation (3)

$$\log(\text{Stock Compensation/Total Compensation}) = a_0 + a_1 \cdot \log(\% \text{ Individual Ownership})$$

a_0	a_1	adj R^2
-2.28	0.07	.00
(-1.09)	(0.30)	

^aIn all regressions compensation is in the thousands, while income is in the millions. The magnitude of the coefficients should be interpreted accordingly.

- * significant at the 10% level
- ** significant at the 5% level
- *** significant at the 1% level

Table 4.7^a
Effect of Related Institution Shareholdings on CEO
Compensation

Equation (1)

$$\log(\text{Salary} + \text{Bonus}) = a_0 + a_1 \cdot \log(\% \text{ Related Institution}) + a_2 \cdot \log(\text{Income}) \cdot \log(\% \text{ Related Institution}) + a_3 \cdot \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.41***	-0.01		0.07***	0.23	
B)	6.49***		-0.00	0.07**	0.22	
C)	6.02***	-0.05	0.01	0.15*	0.23	0.74

Equation (1a) - Indicator Variable taking the value of 1 when a related institution owns more than 5% of the firm

$$\log(\text{Salary} + \text{Bonus}) = a_0 + a_1 \cdot D + a_2 \cdot \log(\text{Income}) \cdot D + a_3 \cdot \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.50***	-0.05		0.07***	0.22	
B)	6.49***		-0.00	0.07***	0.22	
C)	6.51***	-0.35	0.06	0.07***	0.22	0.59

Equation (2)

$$\log(\text{Total Compensation}) = a_0 + a_1 \cdot \log(\% \text{ Related Institution}) + a_2 \cdot \log(\text{Income}) \cdot \log(\% \text{ Related Institution}) + a_3 \cdot \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.79***	-0.03		0.10***	0.13	
B)	7.02***		-0.00	0.07	0.13	
C)	6.04***	-0.11	0.02	0.25*	0.13	1.00

Equation (2a) - Indicator Variable taking the value of 1 when a related institution owns more than 5% of the firm

$$\log(\text{Total Compensation}) = a_0 + a_1 \cdot D + a_2 \cdot \log(\text{Income}) \cdot D + a_3 \cdot \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	7.04***	-0.18		0.10***	0.13	
B)	7.02***		-0.02	0.10***	0.13	
C)	7.06***	-0.77	0.11	0.10***	0.13	0.90

-continued

Equation (3)

$$\log(\text{Stock Compensation/Total Compensation}) = a_0 + a_1 \log(\% \text{ Related Institution})$$

a_0	a_1	adj R^2
-3.47	-0.07	.00
(-3.81)	(-0.67)	

^aIn all regressions compensation is in the thousands, while income is in the millions. The magnitude of the coefficients should be interpreted accordingly.

- * significant at the 10% level
- ** significant at the 5% level
- *** significant at the 1% level

Table 4.8^a
Effect of Unrelated Institution Shareholdings on
CEO Compensation

Equation (1)

$$\log(\text{Salary} + \text{Bonus}) = a_0 + a_1 \cdot \log(\% \text{ Unrelated Institution}) + a_2 \cdot \log(\text{Income}) \cdot \log(\% \text{ Unrelated Institution}) + a_3 \cdot \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.33***	-0.03**		0.07***	0.25	
B)	6.50***		-0.00*	0.04**	0.25	
C)	6.34***	-0.02	-0.00	0.07**	0.25	2.57*

Equation (1a) - Indicator Variable taking the value of 1 when an unrelated institution owns more than 5% of the firm

$$\log(\text{Salary} + \text{Bonus}) = a_0 + a_1 \cdot D + a_2 \cdot \log(\text{Income}) \cdot D + a_3 \cdot \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.57***	-0.18**		0.07***	0.25	
B)	6.50***		-0.03*	0.08***	0.24	
C)	6.56***	-0.15	-0.01	0.07***	0.25	2.40*

Equation (2)

$$\log(\text{Total Compensation}) = a_0 + a_1 \cdot \log(\% \text{ Unrelated Institution}) + a_2 \cdot \log(\text{Income}) \cdot \log(\% \text{ Unrelated Institution}) + a_3 \cdot \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.80***	-0.03		0.10***	0.14	
B)	7.02***		-0.00	0.07*	0.13	
C)	6.78***	-0.04	0.00	0.10*	0.13	1.15

Equation (2a) - Indicator Variable taking the value of 1 when an unrelated institution owns more than 5% of the firm

$$\log(\text{Total Compensation}) = a_0 + a_1 \cdot D + a_2 \cdot \log(\text{Income}) \cdot D + a_3 \cdot \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	7.15***	-0.26		0.10***	0.14	
B)	7.02***		-0.04	0.11***	0.14	
C)	7.12***	-0.27	0.00	0.10***	0.13	1.26

-continued

Equation (3)

$$\log(\text{Stock Compensation/Total Compensation}) = a_0 + a_1 \cdot \log(\% \text{ Unrelated Institution})$$

a_0	a_1	adj R ²
-2.52	0.06	.00
(-3.59)	(0.60)	

^aIn all regressions compensation is in the thousands, while income is in the millions. The magnitude of the coefficients should be interpreted accordingly.

- * significant at the 10% level
- ** significant at the 5% level
- *** significant at the 1% level

Table 4.9^a
Effect of Board Composition on CEO Compensation

Equation (1)

$$\log(\text{Salary} + \text{Bonus}) = a_0 + a_1 \log(\% \text{ Outside Directors}) + a_2 \log(\text{Income}) \log(\% \text{ Outside Directors}) + a_3 \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.48***	-0.07		0.07***	0.19	
B)	6.49***		-0.04	0.06***	0.20	
C)	6.92***	1.94**	-0.32***	0.00	0.23	4.03**

Equation (2)

$$\log(\text{Total Compensation}) = a_0 + a_1 \log(\% \text{ Outside Directors}) + a_2 \log(\text{Income}) \log(\% \text{ Outside Directors}) + a_3 \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.89***	-0.60		0.09***	0.11	
B)	7.01***		-0.15**	0.06*	0.14	
C)	7.94***	4.22***	-0.75***	-0.07	0.19	7.51***

Equation (3)

$$\log(\text{Stock Compensation}/\text{Total Compensation}) = a_0 + a_1 \log(\% \text{ Outside Directors})$$

a_0	a_1	adj R^2
-3.21	-1.09	.00
(-5.53)	(-0.65)	

^aIn all regressions compensation is in the thousands, while income is in the millions. The magnitude of the coefficients should be interpreted accordingly.

- * significant at the 10% level
- ** significant at the 5% level
- *** significant at the 1% level

Table 4.10^a
 Joint Effect of Board Ownership and Composition on
 CEO Compensation

Equation (1)

$$\begin{aligned} \log(\text{Salary} + \text{Bonus}) = & a_0 \\ & + a_1 \cdot \log(\text{Outside Director Ownership} * \% \text{ Outside Directors}) \\ & + a_2 \cdot \log(\text{Income}) \cdot \log(\text{Outside Director Ownership} \\ & \quad * \% \text{ Outside Directors}) + a_3 \cdot \log(\text{Income}) \end{aligned}$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.44***	-0.01		0.07***	0.22	
B)	6.49***		-0.00	0.07**	0.22	
C)	6.44***	-0.01	-0.00	0.07	0.22	0.09

Equation (2)

$$\begin{aligned} \log(\text{Total Compensation}) = & a_0 \\ & + a_1 \cdot \log(\text{Outside Director Ownership} * \% \text{ Outside Directors}) \\ & + a_2 \cdot \log(\text{Income}) \cdot \log(\text{Outside Director Ownership} \\ & \quad * \% \text{ Outside Directors}) + a_3 \cdot \log(\text{Income}) \end{aligned}$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.65***	-0.05		0.10***	0.14	
B)	7.02***		-0.01*	0.03	0.14	
C)	7.08***	0.01	-0.01	0.02	0.14	1.35

Equation (3)

$$\begin{aligned} \log(\text{Stock Compensation/Total Compensation}) = \\ a_0 + a_1 \cdot \log(\text{Outside Director Ownership} * \% \text{ Outside Directors}) \end{aligned}$$

	a_0	a_1	adj R^2
	-3.99	-0.15	.00
	(-3.75)	(-1.08)	

^aIn all regressions compensation is in the thousands, while income is in the millions. The magnitude of the coefficients should be interpreted accordingly.

- * significant at the 10% level
- ** significant at the 5% level
- *** significant at the 1% level

Table 4.11^a
Effect of Compensation Committee on CEO Compensation

Equation (1)

$$\log(\text{Salary} + \text{Bonus}) = a_0 + a_1 \cdot \log(\% \text{ Appointed by CEO}) + a_2 \cdot \log(\text{Income}) \cdot \log(\% \text{ Appointed by CEO}) + a_3 \cdot \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	6.55***	0.03**		0.08***	0.23	
B)	6.51***		0.00	0.08***	0.20	
C)	6.67***	0.12***	-0.02***	0.06***	0.27	6.75***

Equation (2)

$$\log(\text{Total Compensation}) = a_0 + a_1 \cdot \log(\% \text{ Appointed by CEO}) + a_2 \cdot \log(\text{Income}) \cdot \log(\% \text{ Appointed by CEO}) + a_3 \cdot \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R^2	F(a_1 & a_2)
A)	7.14***	0.06***		0.12***	0.17	
B)	7.04***		0.01**	0.12***	0.14	
C)	7.31***	0.20***	-0.02**	0.08***	0.19	6.64***

Equation (3)

$$\log(\text{Stock Compensation/Total Compensation}) = a_0 + a_1 \cdot \log(\% \text{ Appointed by CEO})$$

a_0	a_1	adj R^2
-2.32	0.18	.03
(-5.63)	(2.22)	

^aIn all regressions compensation is in the thousands, while income is in the millions. The magnitude of the coefficients should be interpreted accordingly.

- * significant at the 10% level
- ** significant at the 5% level
- *** significant at the 1% level

Table 4.12^a
Effect of Probability of Takeover on CEO Compensation

Equation (1)

$$\log(\text{Salary} + \text{Bonus}) = a_0 + a_1 \cdot \log(\text{Probability of Takeover}) + a_2 \cdot \log(\text{Income}) \cdot \log(\text{Probability of Takeover}) + a_3 \cdot \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R ²	F(a_1 & a_2)
A)	6.38***	-0.35***		0.05***	0.24	
B)	6.49***		-0.05***	0.04**	0.24	
C)	6.43***	-0.18	-0.03	0.04**	0.24	4.39**

Equation (2)

$$\log(\text{Total Compensation}) = a_0 + a_1 \cdot \log(\text{Probability of Takeover}) + a_2 \cdot \log(\text{Income}) \cdot \log(\text{Probability of Takeover}) + a_3 \cdot \log(\text{Income})$$

	a_0	a_1	a_2	a_3	adj R ²	F(a_1 & a_2)
A)	6.86***	-0.36		0.09***	0.13	
B)	6.92***		-0.06*	0.08**	0.14	
C)	7.06***	0.64	-0.14	0.07*	0.14	1.79

Equation (3)

$$\log(\text{Stock Compensation}/\text{Total Compensation}) = a_0 + a_1 \cdot \log(\text{Probability of Takeover})$$

a_0	a_1	adj R ²
-3.28 (-5.11)	-0.59 (-0.64)	.00

^aIn all regressions compensation is in the thousands, while income is in the millions. The magnitude of the coefficients should be interpreted accordingly.

- * significant at the 10% level
- ** significant at the 5% level
- *** significant at the 1% level

Table 4.13
Summary of Significant Results*

Independent Variable /Effect on	Intercept	Slope	Joint Effect
<u>Ownership</u>			
CEO			
Other Inside Directors	-	+	✓
Outside Directors			
<u>Large Shareholders</u>			
Individuals ¹	-	+	✓
Related Institutions			
Unrelated Institutions ²			✓
<u>Board Composition</u>			
Percentage Outside Directors	+	-	✓
Percentage Outside Directors * Outside Director Ownership			
Percentage of Compensation Committee Appointed by Current CEO	+	-	✓
<u>Probability of Takeover³</u>			✓

* This table summarizes the results shown in tables 4.3 through 4.12 (equations 1c and 2c) when Salary plus Bonus and Total Compensation are the dependent variables (using Percentage of Stock Compensation as dependent variable the only significant (+) results were obtained when Percentage of Compensation Committee appointed by CEO was used as independent variable).

¹ Only significant when total compensation is used as the dependent variable.

² Only significant when salary plus bonus is used as dependent variable.

³ Only significant when salary plus bonus is used as dependent variable.

Table 4.14^a
Effect of All Variables on CEO Salary plus Bonus

Intercept	6.54***	6.32***	2.91
log(% CEO Ownership)	0.04		-0.24**
log(% Inside Ownership)	-0.03		-0.23**
log(% Outside Ownership)	0.04		0.17**
log(% Individual Ownership)	0.02		-0.04
log(% Related Institution)	0.01		0.01
log(% Unrelated Institution)	-0.03*		0.08**
log(% Outside Directors)	-0.36		-3.70***
log(% Appointed by CEO)	0.03**		0.21***
log(Probability of Takeover)	-0.40***		-0.01
log(Income)*log(% CEO Ownership)		0.01	0.05***
log(Income)*log(% Inside Ownership)		0.00	0.05**
log(Income)*log(% Outside Ownership)		0.01	-0.03***
log(Income)*log(% Individual Ownership)		0.00	0.01
log(Income)*log(% Related Institution)		0.00	-0.00
log(Income)*log(% Unrelated Institution)		-0.01**	-0.02***
log(Income)*log(% Outside Directors)		-0.01	0.62***
log(Income)*log(% Appointed by CEO)		0.00	-0.03***
log(Income)*log(Probability of Takeover)		-0.07***	-0.03
log(Income)	0.08**	0.17**	0.81*
Adjusted R ²	0.56		
F-Statistic	4.31***		

^a In all regressions compensation is in the thousands, while income is in the millions. The magnitude of the coefficients should be interpreted accordingly.

- * significant at the 10% level
- ** significant at the 5% level
- *** significant at the 1% level

Table 4.15^a
Effect of All Variables on CEO Total Compensation

Intercept	7.34***	7.06***	41.29**
log(% CEO Ownership)	-0.03		0.18
log(% Inside Ownership)	-0.09		0.09
log(% Outside Ownership)	-0.01		-0.05
log(% Individual Ownership)	0.17*		3.56*
log(% Related Institution)	0.01		-0.04
log(% Unrelated Institution)	-0.02		-0.02
log(% Outside Directors)	-1.23*		-0.53
log(% Appointed by CEO)	0.08**		0.44***
log(Probability of Takeover)	0.05		-0.26
log(Income)*log(% CEO Ownership)		-0.01	-0.04
log(Income)*log(% Inside Ownership)		-0.02	-0.02
log(Income)*log(% Outside Ownership)		0.00	0.01
log(Income)*log(% Individual Ownership)		0.03*	-0.53
log(Income)*log(% Related Institution)		0.00	0.01
log(Income)*log(% Unrelated Institution)		-0.00	-0.00
log(Income)*log(% Outside Directors)		-0.23**	-0.04
log(Income)*log(% Appointed by CEO)		0.01**	-0.06***
log(Income)*log(Probability of Takeover)		0.01	0.06
log(Income)	0.13***	0.13	-5.13*
Adjusted R ²	0.32		
F-Statistic	2.23**		

^a In all regressions compensation is in the thousands, while income is in the millions. The magnitude of the coefficients should be interpreted accordingly.

* significant at the 10% level
 ** significant at the 5% level
 *** significant at the 1% level

Table 4.16^a
Effect of All Variables on Percentage Stock Compensation

Intercept	-2.22
log(% CEO Ownership)	-0.48*
log(% Inside Ownership)	0.17
log(% Outside Ownership)	0.06
log(% Individual Ownership)	0.21
log(% Related Institution)	0.03
log(% Unrelated Institution)	0.09
log(% Outside Directors)	-1.84
log(% Appointed by CEO)	0.31***
log(Probability of Takeover)	-1.16
Adjusted R ²	0.01
F-Statistic	1.11

^a In all regressions compensation is in the thousands, while income is in the millions. The magnitude of the coefficients should be interpreted accordingly.

* significant at the 10% level
 ** significant at the 5% level
 *** significant at the 1% level

5. Conclusions and Extensions

The modern corporation is characterized by the separation of ownership from control. This separation leads to conflicts of interests between managers and shareholders. These conflicts include the level of effort provided by management and the division of income between management and shareholders. The compensation package has a role in resolving these conflicts. If designed properly it encourages management to provide the optimal level of effort, at a minimum cost to shareholders.

This study examined three broad questions relating to compensation. First it examined whether compensation packages were altered in response to exogenous events that affected the relative costliness of the components of the package. Second it examined the effect of accounting choices on compensation and the association between compensation and reported accounting income. Third it examined whether monitoring has an effect compensation and the association between compensation and reported accounting income.

This study found several interesting results. The Tax Reform Act of 1986 led to changes in the composition of the compensation package in ways consistent with maximization of firm value. Evidence was found indicating that accounting methods are considered in determining CEO compensation. Support was also found for the hypothesis that increased monitoring of management leads to a greater association between compensation and reported

income. Taken together this evidence is consistent with directors setting compensation in a way that maximizes firm value. Still there are many issues that remain unresolved and others that require clarification. To resolve those issues the following extensions are being considered:

Chapter 2

- 1) Examining deferred compensation plans in detail, especially the interest rates offered and forfeiture provisions.
- 2) Retesting H2 and H5 after developing a better proxy for the marginal tax rate. Currently under consideration is how to treat firms paying the alternative minimum tax.
- 3) Examining the percentage of stock compensation prior to 1985 to see if the results found for H3 were in fact caused by the Tax Reform Act of 1986 or were merely the continuation of a prior trend.
- 4) Examining the steps taken by firms to disqualify their Incentive Stock Options after the Tax Reform Act of 1986.

Chapter 3

- 1) Examining if results differ when stock compensation is included in dependent variable.
- 2) Examining if results differ when bonus is used as dependent variable.

Chapter 4

- 1) Retesting hypotheses using nonlinear formulations (see Finkelstein and Hambrick (1989) and Morck, Shleifer, and Vishney (1988)).
- 2) Investigating methods of controlling for the interactions between the independent variables.

Appendix A - Types of Compensation

This appendix, describes the major types of accounting and stock-based compensation. It also points out the advantages of each, as well as their tax and accounting ramifications, and provides examples from plans of the Fortune 100.

A.1 Accounting-Based Compensation

A.1.1 Short-Term Plans

The standard short-term bonus plan ties managerial bonuses to some measure of accounting performance, usually over a one year period. In many cases the formula provided does not determine the actual bonus, but is the maximum amount available for bonuses. Within that constraint the compensation committee has discretion over individual and aggregate awards. In some cases if the maximum is not awarded it may be carried over and awarded in future periods. As an example consider Exxon's 1988 Incentive Program (1988 Proxy pp. 29-30):

"... a bonus ceiling established by the Board Compensation Committee on the aggregate amount of bonuses that can be granted shall not exceed the sum of (1) 3 percent of the amount by which the net income of the Consolidated Group for that year exceeds an amount equal to 6 percent of the capital investment of the Consolidated Group for that year and (2) the aggregate amount pursuant to clause XIII (1) above for each prior year under this Program but which was not so awarded."

Although basing a bonus on current net income motivates management to act in the interests of shareholders, it creates incentives to maximize short-term profits at the expense of

long-term value. This problem could be mitigated by including long-term measures of performance in the compensation package, or alternatively forcing the executive to defer all or part of his/her bonus. In general bonuses may be paid in cash, stock, or a form of deferred compensation. Using Exxon as an example, the company adopted a long-term incentive plan at the same time it adopted the short-term plan above, and allows the board to pay short-term bonuses in cash, stock, and earnings bonus units. The latter two forms of bonus tie the executives wealth to the long-term performance of the firm. The following excerpt from the 1989 Exxon Proxy Statement (p. 14) explains the earnings bonus unit:

"The 1988 awards in earnings bonus units are to be settled on the fifth anniversary of the date of the award, or earlier upon the maximum settlement value of \$7.50 per unit being achieved. In respect of each unit, at the time of settlement an amount will be payable in cash equivalent to the cumulative net income per share as announced quarterly commencing with the first full quarter following the date of award up to a cumulative maximum of \$7.50 per unit."

For tax purposes the executive realizes income and the corporation a deduction when the bonus is paid. For accounting purposes the corporation recognizes an expense in the year the bonus is earned. In the above example Exxon did not recognize any expense for the earnings bonus units in 1988.⁴⁶ Instead its 1988 annual report stated:

"Grants in cash and shares of the corporation's stock are charged to earnings in the year of grant. Amounts earned under earnings bonus units are accrued as they occur."

⁴⁶ Approximately half the stated bonuses of \$31,000,000 paid by Exxon in 1988 took the form of earnings bonus units.

A.1.2 Long-Term Plans

Performance Unit Plan

In a performance unit plan each executive is awarded a number of units at the beginning of the performance period, with the ultimate value of those units or the number of units earned determined by financial performance over the performance period. Performance units, like all forms of long-term compensation (both accounting and stock based) have two advantages over short-term plans. First, they encourage managers to take a long-term perspective when making decisions affecting firm value. Second, they provide incentives for employees to remain with the corporation, as the employee would forfeit the units by leaving before the performance period is over. As an example consider Amoco's Performance Unit Plan (1989 proxy, p. 6):

"Grants of performance units are made contingent upon the Corporation's performance over a specified performance period.

The plan permits any performance period of three years or more. The performance measures relate to Amoco's return on capital employed during the performance period, and the value per unit will range between \$0 and \$125, depending upon attainment of the performance measure. Grants are generally stated in terms of units having a dollar value, but the plan also provides for grants stated in terms of units of Amoco common stock."

For tax purpose the executive recognizes ordinary income and the corporation a deduction when payment is made. For accounting purposes the expense recognized is the amount paid,

which must be accrued on a pro rata basis over the period covered by the plan.

Performance Share Plan

In a performance share plan each executive is awarded a number of shares at the beginning of the performance period, with the ultimate value of those shares or the number of shares earned determined by financial performance over the performance period. It differs from a performance unit plan in that the value of the shares is dependent on market prices, thus adding uncertainty to the ultimate payout. As an example consider the Phillips Petroleum Strategic Incentive Plan (1989 Proxy p. 13):

"For each of these Performance Periods, participants have target awards which are stated in shares of the Company's common stock. At the completion of each Performance Period, the Compensation Committee will evaluate the Company's performance to determine the extent to which the target awards have been earned. The Company's performance will be evaluated relative to increases in stockholder value, return on equity, return on assets (these three indicators being compared with the performance of other major oil companies under these measures) and performance against specific internal long-range goals. ... Depending on the Company's performance, awards can be earned which range from zero to 150 percent of target awards and individual performance adjustments may be made to any participant's award."

The tax and accounting treatment are similar to that for performance units, except that the expense recognized and deduction taken are based on the market price at the end of the period, which complicates interim accounting estimates.

A.2 Stock-Based Compensation

There are added complications that exist for stock compensation that do not exist for cash compensation. First, form S-8 may have to be filed with the Securities and Exchange Commission to register the stock issued to employees. Second, insider trading restrictions of section 16(b) of the SEC act of 1934 may require the executive wait 6 months before selling the stock received. However if the plan is approved by shareholders and the award otherwise meets the requirements of rule 16b-3 the stock issued under the plan is exempt from section 16(b). Third, either state corporate law, federal securities laws, exchange listing requirements and/or income tax laws (for Incentive Stock Options) may require shareholder approval for plans that issue stock.

Incentive Stock Options (ISOs)

An Incentive or Qualified Stock Option is one that meets the following requirements:

The Plan

-the employer must have a written option plan that sets forth the maximum number of shares that may be issued under the plan, as well as the class of employees eligible to receive options.

-the plan must be approved by stockholders within 12 months of its adoption by the board of directors.

-the plan must provide that the aggregate value of stock with respect to which ISOs are first exercisable by the optionee in any calendar year cannot exceed \$100,000 (based upon the fair market value of the stock when the options are issued).

The Grant

-The option exercise price must be no less than the fair market value of the shares on the date of grant.

-The option must be granted within ten years of adoption of the plan.

-The option, by its terms, cannot be exercisable for a period longer than ten years after the date of the grant.

-The option may be granted only to a person who is an employee of the company (or its parent or subsidiary) on the date of grant.

-The option must be exercised by the employee no later than three months after termination of employment (except in the case of death or disability, after which an ISO can be exercised for up to one year).

-The option, by its terms, cannot be transferrable (other than by will or laws of descent) and can only be exercised during the employee's lifetime by the employee.

-If an option is granted to a more-than-10% shareholder of the company (or its parent or subsidiary), the exercise price can be no less than 110% of the fair market value at the date of grant and the option cannot be exercised for a period longer than five years after the date of grant.

Under an ISO the employee receives certain tax advantages. He does not recognize income at either the grant or exercise date, and if he meets the holding requirements (shares must be held one year from the date of exercise and two years from the date the option is granted) treats the gain upon sale as a capital gain. The employer receives no deduction if the employee meets the holding requirements.

Nonqualified Stock Options (NQSOs)

NQSOs are options that do not meet the above requirements for favorable tax treatment (for employees). With a NQSO the employee realizes ordinary income upon exercise for the difference between the purchase price and fair market value of the stock, and a capital gain upon sale for the difference between the sales price and the fair market value at exercise. The employer realizes as a deduction the difference between the purchase price and fair market value of the stock. NQSOs are more flexible than ISOs, for example NQSOs are not subject to the ten year limit on exercisability, and may be issued at prices less than current market value.

Most plans allow for the issuance of both ISOs and NQSOs, with the committee designating its status upon grant. The following example is from the Chrysler Corporation Stock Option Plan:

"The Committee shall designate each option granted ... as either an Incentive Stock Option or a Nonqualified Stock Option."

There is no charge to earnings for either ISOs or NQSOs if the exercise price exceeds the fair market value of the stock at the time of issue.⁴⁷ If the exercise price is less than the fair market value the difference (multiplied by the number of options granted) is recognized as an expense over the periods benefitted. However this is infrequent as most plans require the exercise price be at least equal to fair market value at the date of grant.⁴⁸ Thus for accounting purposes, stock options are less expensive than cash or other forms of stock-based compensation for which expense recognition is required.⁴⁹

Stock Appreciation Rights (SARs)

SARs are options stripped of the need to pay the exercise price. They allow the executive to benefit from the appreciation, if any, in the company's stock price over a specified period of time without actually purchasing the

⁴⁷ Recall that for options to be qualified (ISOs) the exercise price must not be less than fair market value at the date of grant. Thus under no circumstance would a firm recognize any expense in association with the issuance of an ISO.

⁴⁸ The IBM 1989 Long-Term Performance Plan states:

"Stock Option-A grant of a right to purchase a specified number of shares of Capital Stock at not less than 100% of Fair Market Value on the date of grant..."

⁴⁹ Some option plans allow executives to pay the exercise price by delivering previously owned shares. If the shares have not been held for some minimum time period the option will be treated as a stock appreciation right, resulting in expense recognition. For details see FASB Emerging Issue Task Force issue 84-18.

stock. Upon exercise the corporation simply pays him the appreciation in either cash or the company's stock. SARs are advantageous from an executives viewpoint as no investment is required. In many circumstances the SAR is tied to an option (either ISO or NQSO), whereby the exercise of one eliminates the other. Consider the following from the 1989 proxy statement of W. R. Grace & Co. (p. 28):

"The 1989 Plan authorizes the Company to cancel an option to the extent it is exercisable and either (1) pay the holder of the option in cash an amount equal to the excess of the fair market value of the shares over their purchase price (the "incentive profit") on the date of exercise, (2) transfer to the holder Common Stock with a fair market value equal to the incentive profit or (3) pay the incentive profit partly in cash and partly in Common Stock. This right ... is referred to as a "stock appreciation right" or "SAR"."

The tax treatment of a SAR is identical to that of a NQSO with ordinary income being recognized by the executive upon exercise, and a corresponding deduction taken by the firm.⁵⁰ Unlike options, SARs always result in compensation expense for accounting purposes (if a SAR is issued in combination with an option, for accounting purposes it is assumed the SAR and not the option will be exercised). The amount recognized as expense is the difference between the market price and exercise price at the date of exercise. This amount must be allocated on a pro rata basis over the period the SAR is outstanding, requiring estimates in the earlier periods.

Restricted Stock

⁵⁰ This is true even if the SAR was issued in conjunction with an ISO.

Restricted Stock is stock issued (either given or sold) to executives, who do not have full ownership rights until the restriction period expires. Until that time the executive has voting and dividend rights, but cannot sell the stock and the stock is subject to forfeiture if certain conditions (e.g.: continued employment) are not met. Restricted stock encourages executives to remain with the firm⁵¹ and is less risky than options (some payoff is guaranteed as long as the firm is not bankrupt). For accounting purposes compensation expense is recognized as the excess of fair market value over the purchase price of the shares at the date of grant. This expense is recognized over the restriction period. Ordinary income is normally recognized by the executive and a deduction recognized by the firm when the restrictions expire, for the excess of fair market value over the purchase price at that time. Alternatively, the executive may make a Section 83 (b) election to have the difference between the fair market value and purchase price at date of grant taxed as ordinary income at the time of grant, in order that further appreciation qualify for capital gains treatment (and only upon sale). Dividends paid during the restriction period are treated as compensation income (deduction) unless the Section 83 (b) election is made.

⁵¹ Note that other forms of compensation, e.g.: options that are not immediately exercisable or other long-term plans where forfeiture is possible, can be structured to have the same effect.

Appendix B - Valuation of Compensation Packages

The variable of interest in this study is the compensation paid to executives, not their change in wealth. Compensation is under the control of the board of directors, while wealth changes relating to management stock and option holdings are beyond board control. Compensation as defined in this study includes the before-tax value of salary, short and long-term bonuses, and grants of options and shares of stock. Pensions, are ignored because they are more likely to be based on set formulas, and thus be less responsive to changes in performance, and because of the difficulties involved in estimating the current income equivalent of the pension.⁵² For the same reasons fringe benefits such as insurance and savings plans are ignored. Compensation thus equals:

Salary + Short-Term Bonus + Value of Performance Units &
 Shares Earned during Year + Value of Stock Options,
 Appreciation Rights, & Shares Granted during Year (B1)

Salary

Amount earned during fiscal year, whether paid or deferred.

Annual Bonus

Amount earned during fiscal year, whether paid or deferred.

⁵² Murphy (1985) also ignored pensions.

Performance Unit & Performance Share Plans

The amount counted as compensation in the current year should theoretically include a pro rata share of amounts earned over all performance periods that include the current fiscal year. For example if the plan is based on performance over a three-year period, performance units are awarded each year and payment is made in the year following completion of the performance period, then the compensation allocated to year t 's performance would be one-third of the performance bonuses paid in years $t+1$, $t+2$, and $t+3$. Unfortunately, when the amount of the long-term bonus is not presented separately in the proxy statement but included in cash compensation, no such allocation is possible and amounts earned in years t , $t+1$ and $t+2$ will be included in compensation of year $t+3$. Even if amounts are disclosed separately a problem arises in calculating compensation for year t if years $t+1$, $t+2$ or $t+3$ have not yet been completed.

Stock Options & Appreciation Rights

Valued as of the date of grant as long as they are not conditioned on future performance. Thus, options and appreciation rights are included in compensation in the year of grant even if the award is conditioned on continued employment. The formula suggested by Smith and Zimmerman (1976) is used to value the options and appreciation rights:

Value = Current Stock Price less Present Value of Exercise Price

Other alternatives considered were the Black-Scholes formula, which was used by Antle and Smith (1986) or simply multiplying the exercise price by the number of shares issued, a formula used by Arreglado and Peck (1989). The former was not used because of its complexity and because its tenets do not necessarily hold (see Murphy (1985) for a discussion), for example there is no external market for executive stock options. The latter was not used because, by ignoring the exercise price, it overvalues the options.

In some cases the proxy statement does not disclose the amount of options granted in the prior fiscal year, but discloses the number of options granted over a prior period, usually three or five years. In those cases the methodology developed by Jung (1990) is used to estimate the number awarded in each year.

Restricted Stock

Similar to options, restricted stock is valued (using the current stock price) as of the date of grant as long as they are not conditioned on future performance.

For testing purposes compensation is divided into the following categories:

- Salary plus Bonus - as reported in cash compensation table and used by most compensation surveys and most prior studies.

- Cash compensation - includes salary plus bonus reported in cash compensation table, plus any long-term compensation not included in table.

- Stock compensation - value of stock options, appreciation rights and shares granted in current fiscal year, as well as any bonuses paid in stock.

- Accounting-Based Compensation - accounting-based bonuses, regardless of method of payment.

Appendix C - Classification of Firms based on Accounting Policies

The objective of hypothesis 8 is to determine if the association between CEO compensation and income differs depending on how income is calculated. This comparison requires one or more methods to classify firms based on accounting policies. This appendix describes and discusses five potential methods of classification, the portfolio of accounting methods, accruals, timing differences, the earnings response coefficient, and the price-earnings ratio.

Management can influence income by virtue of its ability to choose accounting methods and estimates, and to determine the timing of certain discretionary transactions (i.e.: sale of appreciated assets, replacement of LIFO inventory). No one accounting variable subsumes all discretion available to management. The first potential approach is to classify firms according to their portfolio of accounting methods, in a manner similar to Zmijewski and Hagerman (1981). A problem with this approach is that little diversity exists in the choice of accounting methods (for example, approximately 90% of the firms on the Compustat tape use straight-line depreciation), and what little diversity exists disappears after controlling for industry. In addition using accounting methods to classify firms ignores other potential choices (estimates, timing of transactions) that can have a large impact on reported income. Two measures that encompass at

least some of the income effect of these discretionary accounting choices are total accruals and timing differences.

Total accruals includes the choice of accounting methods and estimates, but do not take into account the timing of transactions. To illustrate this, consider the effect of a liquidation of inventory accounted for under LIFO, which increases income but decreases accruals.⁵³ Timing differences reflect the different choices made for tax and financial accounting purposes, but are unaffected by discretionary decisions (sale of appreciated asset(s)) that affect both tax and financial income.

If the market is efficient, the price of a stock will (on average) reflect all of the information used to determine

⁵³ There are other problems in using total accruals to proxy for accounting manipulation. First, examining accruals ignores other ways to manage income such as deferring maintenance costs. Second, certain transactions (i.e.: LIFO liquidations) have opposing effects on income and accruals. Third, using total accruals to proxy for discretionary accruals, implicitly assumes nondiscretionary accruals are zero, which need not hold [see Kaplan (1985)].

Attempts have been made to derive a better proxy for discretionary accruals [see DeAngelo (1986, 1988a) and McNichols and Wilson (1988)]. DeAngelo's approach, which is to assume nondiscretionary accruals are equal to the prior year's accruals is justified in certain unusual situations (leveraged buyouts, proxy fights) but is not appropriate here.

Similarly DeAngelo (1988b) concludes that the approach (isolating manipulation in one accrual - bad debt expense) adopted by McNichols and Wilson is not necessarily superior to using total accruals.

accounting earnings.⁵⁴ Furthermore, the market will distinguish between true earnings and accounting manipulation. Consider the following valuation model:⁵⁵

$$P_t = \sum E_t(CF_T)/(1+r)^T \quad (\text{i})$$

let the function B_T map the reported income of period t onto the cashflow of period T , as follows:

$$E_t(CF_T) = B_T E_t \quad (\text{ii})$$

substituting (ii) into (i) yields

$$P_t = \sum B_T E_t/(1+r)^T \quad (\text{iii})$$

For simplification purposes assume that B and r are intertemporal constants. The equation then reduces to:

$$P_t = B/r * E_t \quad (\text{iv})$$

where B/r becomes the price-earnings (hereafter P/E) ratio

⁵⁴ There is evidence that the market places differential valuation on the components of earnings. For details see Bowen, Burgstahler and Daley (1987), Hoskin, Hughes and Ricks (1986), Lipe (1986) and Wilson (1986,1987).

⁵⁵ This valuation model implicitly assumes:

- 1) all cashflows are either paid out as dividends or reinvested in zero net present value projects
- 2) the relationship between income and cashflow is linear, and
- 3) r is risk adjusted.

The first assumption causes the growth term to drop out of the model as follows:

$$P_t = D_t/(r-g) \quad (\text{a})$$

$$D_t = a * CF_t \quad (\text{b})$$

where $0 < a < 1$

$$CF_{t+1} = [CF_t - D_t]r + CF_t \quad (\text{c})$$

$$g = [r*(CF_t - D_t)]/CF_t \quad (\text{d})$$

$$\begin{aligned} P_t &= D_t/[r - r*(CF_t - D_t)/CF_t] \\ &= CF_t/r \quad (\text{e}) \end{aligned}$$

$$P_t/E_t = B/r \quad (v)$$

or in returns form where B/r becomes the earnings response coefficient (hereafter ERC)⁵⁶

$$\Delta P_{t,t-1} = B/r * \Delta E_{t,t-1} \quad (vi)$$

It seems reasonable to assume that the market considers how reported income is calculated in setting B. For a given cashflow, a more conservative set of accounting policies reports lower earnings. These earnings map into the same future cashflow, so that the valuation assigned per dollar of earnings, ' B/r ', should be higher for firms with more conservative accounting policies.⁵⁷

This assumption is consistent with the findings of prior empirical research. Beaver and Dukes (1973) find the P/E ratio of firms using accelerated depreciation (the more conservative method) is greater than that of firms using straight-line depreciation (all firms used accelerated depreciation for tax purposes). Furthermore, when the earnings of firms using straight-line depreciation are

⁵⁶ The ERC as used in this study is a measure of the association between reported earnings and price, not the market reaction to unexpected earnings.

⁵⁷ Independent of accounting policies earnings may have differential effects on B if they are thought to be more or less transitory. This does not affect my ability to test the null hypothesis, i.e.: that the compensation committee mechanically applies a formula to reported earnings, although the conclusions that can be drawn from its rejection are less direct, i.e.: the compensation committee adjusts for the accounting policies used to calculate reported earnings or the expected persistence of those earnings.

recalculated using accelerated depreciation, their P/E ratios do not differ from that of firms using accelerated depreciation. Similarly, Craig, Johnson and Joy (1987) find the accounting methods used for inventory and the investment tax credit (but not depreciation) are significantly associated with the P/E ratio, with companies using LIFO and choosing to defer the investment tax credit (the more conservative methods) having higher price-earnings ratios than firms using FIFO and the flow-through method. Harris and Ohlson (1987) find the relationship between the market and book value of oil and gas reserves is related to the method used to calculate the book value of those reserves. They find the regression coefficient for firms using successful efforts (the more conservative method) is significantly greater than that for firms using full cost accounting. Finally, Imhoff (1989) finds the ERC positively related to "accounting quality", which Imhoff and Thomas (1989) find to be positively associated with conservatism.

Accounting choices are not the only determinant of the P/E ratio or the ERC. Litzenberger and Rao (1971) develop a valuation model that includes risk and growth, while Craig, Johnson and Joy (1987) add proxies for dividend payout and firm size in examining the cross-sectional variation in the P/E ratio. Similarly, prior research has shown the ERC to be influenced by noise (Holthausen and Verrechia (1988)), firm size, growth, persistence, risk and the risk-free rate (Collins and Kothari (1989)). In isolating the effect of

accounting conservatism, these known variables should be removed from the proxy. The residual from the following equations will contain the effect of accounting choices as well as all other unknown influences on the P/E and ERC, and will be orthogonal to all known influences.

$$P_t/E_t = a + b_1 * \text{Risk} + b_2 * \text{Growth} + b_3 * \text{Dividend Payout} + b_4 * \text{Size} + e$$

and

$$\text{ERC}^{58} = a + b_1 * \text{Risk} + b_2 * \text{Growth} + b_3 * \text{Persistence} + b_4 * \text{Size} + b_5 * \text{Noise} + e$$

where the ERC is estimated using the following equation:

$$\Delta P_{t,t-1} = a + b * \Delta E_{t,t-1}$$

and both the change in price and reported income are measured on a fiscal year basis, and b is the estimate of the ERC (B/r) derived above.

The residual from these equations is used to classify firms. These residuals represent the effect of accounting choices and other unknown influences on the P/E and ERC after the effect of all known variables are removed. It is true that there are still other variables (all variables excluded from the first stage regression) other than accounting choices that influence 'e', but they are unknown. If these unknown variables are constant over time the change model (ERC) better controls for the omitted variables problem [see Landsman and Magliolo (1988)].

⁵⁸ The risk-free rate need not be included as an independent variable because it affects all firms equally in a cross-sectional regression.

Both the P/E ratio and ERC have their advantages and disadvantages. Using the P/E ratio to classify firms requires fewer assumptions, but only uses one period of data. A measurement problem may arise if earnings are low or negative.^{59,60}

Using the ERC requires more assumptions and data. First, it assumes that the expected rate of return does not change. Even though it is assumed that $E_{t-1}(r_{t+s})$ equals the constant r for all $s > 0$ it is possible that $E_t(r_{t+s})$ equal r^0 . In that case equation (vi) becomes:

$$\Delta P_{t,t-1} = B * [(E_{t-1} + \Delta E_{t,t-1}) / (r_{t-1} + \Delta r_{t,t-1}) - E_{t-1} / r_{t-1}] \quad (\text{vii})$$

if $\Delta r_{t,t-1} > r_{t-1} * (\Delta E_{t,t-1} / E_{t-1})$ the sign of the change in price and change in reported earnings will differ. Under these conditions the estimate of 'b' obtained from regressing the change in price on the change in reported earnings could be greater for the income-increaser, contrary to the theory above.

A second problem arises in the estimation of 'b'. The estimate equals the covariance of the change in price and the

⁵⁹ This is a data problem that also arises in using earnings to predict compensation. It is probable that the bonus or conditional compensation is not negative. Thus the regression to estimate compensation should take the form $C_t = a + b * E_t$ only when $E_t > 0$ and $C_t = a$ otherwise.

⁶⁰ Litzemberger and Rao (1971) and Craig, Johnson and Joy (1987) control for this by using E/P as their dependent variable.

change in reported earnings divided by the variance of the change in reported earnings [$\text{cov}(\Delta P, \Delta E) / \text{var}(\Delta E)$]. From the theoretical model above there is no reason to believe either differs systematically across firms. Differing assumptions on the effect of income-increasing (income-decreasing) policies lead to differing predictions for the estimated ERC. In the following scenarios, assume the income-decreaser reports true income, and the income-increaser reports some larger amount each period. First, assume that reported earnings for the income-increaser are proportional to true earnings, i.e.: $E = a * T$ where $a > 1$. If this scenario held, the ERC will be lower for income-increaser. Now assume that reported earnings for the income-increaser are equal to true earnings plus a constant, i.e.: $E = T + K$ where $K > 0$. Under this scenario, income-increasers and income-decreasers have the same ERC. Finally, assume that reported earnings for the income-increaser are equal to true income plus the inverse of true income (a smoothing technique), i.e.: $E = T + 1/T$ where $T > 1$. In this case, the income-increaser will have the higher ERC, because the variance of the change in reported earnings will be lower. Which of these scenarios holds cannot be predicted.⁶¹

⁶¹ Simulations confirmed these results.

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