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THE VALUATION OF EMPLOYEE STOCK OPTIONS: AN ANALYSIS OF THE ACCOUNTING FOR STOCK-BASED COMPENSATION

A Dissertation

Presented to

the Faculty of the School of Accountancy

University of Missouri-Columbia

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

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by
JOLENE I. HALLAM

Dr. Earl R. Wilson, Dissertation Supervisor

DECEMBER 1995

The undersigned, appointed by the Dean of the Graduate School, have examined the dissertation entitled:

THE VALUATION OF EMPLOYEE STOCK OPTIONS: AN ANALYSIS OF THE ACCOUNTING FOR STOCK-BASED COMPENSATION

presented by Jolene I. Hallam

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and hereby certify that in their opinion it is worthy of acceptance.

Earl R. Wilson, Dissertation Supervisor

Jere R. Francis

Inder K. Khurana

Bradford D. Jordan

Charles J. Corrado

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THE VALUATION OF EMPLOYEE STOCK OPTIONS:
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ABSTRACT

This research has four objectives. The first objective is to assess whether existing standards understate the economic value associated with the granting of ESOs. Findings suggest existing standards *do* understate the economic value of ESOs, and thus support the FASB's stated position concerning the non-zero value of fixed ESOs.

The second objective is to determine if the FASB's controversial Exposure Draft has sensitized the equity market to the view that ESOs are a form of compensation that should be recognized in firms' financial statements. The results imply that the market *has* been previously sensitized to the non-zero economic value of fixed ESOs, and that there is *no difference* in how the market is valuing ESOs across the three test periods.

The third objective is to examine whether the equity security market's assessment of ESO value is affected by firm-specific factors, such as managements' ownership interest and the potential dilution associated with outstanding ESOs. The findings indicate that firm-specific factors *do* appear to affect the equity security market's valuation of ESOs. The results concerning the effects of managerial ownership imply incentive effects strongly dominate any negative entrenchment effects when managerial ownership is less than 5 percent. These effects are partially mitigated in the 5-25 percent range, and fully offset in the over 25 percent range. Similar results

obtain when analyzing the potential effects of dilution from outstanding ESOs; however, as the dilution percentage increases, the incentive effects from ESOs are not fully offset by the negative effects associated with dilution of existing shareholders' interests. In addition, partitioning the data on year-end suggests that the market's assessment of ESO value is not consistent across firms.

Finally, the fourth objective is to assess which of the pricing alternatives used to value nonvested ESOs best reflects the equity security market's assessment of this cost. A comparison of the results across the five alternate measures used to value nonvested ESOs reveals that the minimum value procedures may best reflect the equity security market's assessment of ESO value.

In addition, although not a stated objective, results from this study provide preliminary evidence which suggests that the market interprets the nature of ESOs as equity, not debt, instruments.

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CHAPTER 1

1.0 Introduction

A recent article in the financial press reported that Michael Eisner, chief executive officer (CEO) of Walt Disney Company, earned $203.1 million during 1993; however, only $750,000 of this amount was attributed to salary and bonuses. The remaining $202.3 million was long-term compensation through the exercise of executive/employee stock options (ESOs) (*St. Louis Post-Dispatch* April 15, 1994).[1] Similar headlines appear frequently in the financial press, thus highlighting the importance of ESOs in compensating chief employees. In fact, it has been estimated that average executive option gains at the end of this decade will amount to $2.9 million per year (Crystal 1991). Coopers & Lybrand (1993) note that the favorable accounting treatment accorded ESOs granted at-the-money explains why stock-based compensation has overtaken fixed salary as the primary component of compensation for many executives.[2,3]

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[1]An ESO is a warrant granted by the employer to an employee giving the employee the right to purchase stock of the employer company at a predetermined price for a specified period of time. See section 2.1 for further discussion.

[2]Under current generally accepted accounting principles (GAAP), zero compensation expense is recognized when ESOs are granted at an exercise price equal to the current stock price ("at-the-money"), and greater than the current stock price ("out-of-the-money").

[3]A stock-based compensation plan is a compensation arrangement under which employees receive shares of stock, stock options, or other equity instruments, or the employer incurs liabilities to employees in amounts based on the price of the employer's stock (FASB 1993a, paragraph 1, footnote 1).

Since being added to the Financial Accounting Standards Board's (FASB) agenda in 1984 at the request of the American Institute of Certified Public Accountants (AICPA) and other constituents, accounting for stock-based compensation plans has been and continues to be a very controversial subject.[4] The project was initially placed on the agenda due to criticism of Accounting Principles Board Opinion No. 25 (hereafter APB-25), "Accounting for Stock Issued to Employees" (APB 1972), which is the primary source of GAAP on this issue. Specifically, the opinion was criticized for producing anomalous accounting results such as the recognition of compensation expense for performance-type options but usually not for fixed options, and for lacking a conceptual foundation that would assist users in implementation issues and in the accounting for new forms of stock option plans.[5]

The current debate centers on one key issue--Should the granting of stock options result in expense recognition?--and three related issues if the answer to the key

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[4]Results from the Financial Accounting Standards Advisory Council's (FASAC) 1993 and 1994 annual surveys of its members indicate that stock compensation is still considered to be a high priority topic on the FASB's current agenda (FASB 1993b, 1995a). Further, according to Rouse and Barton (1993), accounting for ESOs might be the single most controversial accounting issue at this time.

[5]Performance-type stock option plans fall into the category of variable stock option plans for which (1) the number of shares of stock that may be acquired by or awarded to an employee, or (2) the price, or (3) both, are not specified or determinable until after the date of grant (FASB Interpretation-28, paragraph 2). Performance criteria, such as increases in return on assets or equity, are used as the basis for awarding stock under performance-type plans. Under fixed stock option plans, the number of shares of stock involved and the option or purchase price to the employee are fixed at the date of grant (APB-25, paragraph 1). The date of grant is the date at which the employer and the employee agree to the terms of a stock-based compensation award (FASB 1993a).

issue is "yes": (1) How should the expense be recognized? (3) When should the expense be measured? and (3) How should the options be valued?

As a response, the FASB issued an Exposure Draft (ED) in June 1993, entitled "Accounting for Stock-based Compensation," which reexamines these as well as other issues related to the accounting for stock-based compensation plans. The ED concludes tentatively that the fair value of all stock options awarded to employees should be measured on the date the awards are granted. Further, fair values of options are to be measured using an option-pricing model, such as the Black-Scholes (1973) (hereafter BS) or the binomial option-pricing models (Cox, Ross, and Rubinstein 1979), adjusted for specific features of the options (such as nontransferability and forfeitability by the employee).

However, considerable controversy surrounds the FASB's conclusions.[6] Opponents contend that companies would suffer severe reductions in earnings as the standard is phased in.[7] Further, the standard could restrict or eliminate ESOs, resulting in a disadvantage for small, emerging companies by reducing their ability to compete against established companies for high caliber managerial talent (Kulatilaka and Marcus 1994). Finally, concern has been expressed that the valuation approaches

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[6]The Big Six public accounting firms, certain shareholder advocacy groups, some industry coalitions, various Clinton Administration officials, some members of the Securities and Exchange Commission (SEC), and certain members of Congress are all opposed to the FASB's proposals on this issue.

[7]Wallace and Smith (1991) demonstrate that depending on the algorithm applied to value firms' outstanding ESOs, 16 to 38 percent of their sample have valuations in excess of $10 million.

suggested in the ED would lead to estimates that are unrealistic (Melas-Kyriazi and Hatsopoulos 1994). These groups counter the FASB's recognition proposal by claiming that footnote disclosure of the terms of the stock option plans would be sufficient to meet investors' and other outside users' needs (FASB 1993a, paragraph 73). According to Rankin (1993, p. 33), Senator Phil Gramm claims, "Although I'm reluctant to have Congress enter into the setting of accounting standards, we would have no choice but to do so unless FASB withdraws its plan."

In light of the considerable controversy which has surrounded the ED, the FASB announced in March 1995 that the final standard, scheduled to be issued during the third quarter of 1995, will only *recommend* that companies account for stock-based compensation as outlined in the ED. Companies that choose *not* to recognize compensation expense associated with stock-based compensation are *required* to disclose in the footnotes the effect on net income as if the FASB guidelines had been followed (FASB 1995b).

1.1 Statement of Objectives

This research has four objectives. The primary reason for the FASB's issuance of the recent ED is the lack of guidance in existing standards on accounting for stock-based compensation. One of the central issues raised in the ED concerns whether the granting of stock options should result in compensation expense recognition (under current GAAP, zero compensation expense is usually recognized when fixed options

are granted). Thus, the first and primary objective is to assess whether existing standards understate the economic value associated with the granting of ESOs.

The second objective is to examine whether the equity market has become sensitized to compensation issues as a result of the FASB's controversial ED. Third, this study evaluates whether the equity security market's assessment of ESOs is affected by certain firm-specific factors; specifically, the amount of managements' equity ownership (stock and ESOs) and the extent of potential dilution of outside equity holdings if ESOs are exercised. Finally, conditional on ESOs being found to be value-relevant, the fourth objective is to assess which of the pricing alternatives used to measure stock-compensation expense best reflects the equity security market's assessment of this cost.

1.2 Overview of Research Design and Methodology

In contrast to the event study methodology used in prior studies (e.g., Larcker 1983; Brickley, Bhagat, and Lease 1985; Lambert and Larcker 1985; and DeFusco, Johnson, and Zorn 1990), this dissertation uses a valuation model approach based on previous research (Landsman 1986; Harris and Ohlson 1987; Beaver et al. 1989; Barth et al. 1991; Shevlin 1991; Barth and McNichols 1994; Barth 1991, 1994) to address the objectives outlined above.

Using a sample of firms drawn during 1988-1993, estimates of the value of the sampled firms' outstanding (and nonvested) ESOs obtained under three approaches with various inputs (a crude proxy, the minimum value procedure (FASB 1993a), and

the BS option-pricing model) are tested for equity-value relevance using cross-sectional ordinary least squares estimation (OLS) and a fixed effects model. Various iterations of the basic valuation model are performed to test for the effects of managerial ownership and dilution on the incentive effects of ESOs, and to assess if market sensitization to the FASB's ED has occurred. Finally, various specification checks are also performed on the basic model.

1.3 Motivation for the Research

Findings from this research will augment the existing literature on executive/employee compensation. To date, empirical studies in this stream of literature have relied on event study methodology. As pointed out by Lev and Ohlson (1982) and reiterated by Bernard (1989), there is a demand in accounting research for valuation studies which examine the association between levels of stock prices and fundamental accounting variables as opposed to studies which examine only the incremental effects of compensation schemes on stock price changes or returns. Thus, findings from this study will contribute to the literature by revealing whether the aggregate value of firms' ESOs affects the level of their equity security prices, as well as how firm-specific factors may affect the market assessment of ESOs.

Further, results from this research will have direct policy implications. Specifically, findings which indicate that the market price of firms' equity securities reflects a higher economic value for options than is reported as accrued compensation

cost under current GAAP would be consistent with the FASB's position that compensation cost should be recognized for the fair value of the options granted.

In addition, the results will shed crude evidence on whether the market interprets the nature of ESOs as equity, debt, or as having characteristics of both. Findings which suggest that ESOs are valued as debt would provide an empirical argument for classifying these instruments as liabilities, an approach not currently advocated by the FASB.

Finally, this research will provide evidence on which of the various estimates used to measure stock compensation expense best reflects the market's assessment of this cost.

The remainder of this dissertation is organized as follows. Chapter 2 describes the institutional background, including the current and proposed standards for recognition and disclosure of stock-based compensation plans. Chapter 3 presents a review of the literature relevant to the research. The development of the hypotheses is presented in Chapter 4, followed by a description of the research design in Chapter 5. Empirical results are presented in Chapter 6. Lastly, discussion of the results, including limitations and extensions of the research, are addressed in Chapter 7.

CHAPTER 2

2.0 Institutional Background

This chapter presents a review of the types and characteristics of plans used to compensate employees, current GAAP governing the accounting for stock-based compensation, and the FASB's recent ED.

2.1 Description of ESOs

APB Opinion No. 15, "Earnings Per Share" (APB 1969), defines a warrant as a security giving the holder the right to purchase shares of common stock in accordance with the terms of the instrument, usually upon payment of a specified amount within a stated period. Firms issue warrants for various reasons, including to compensate executives and employees.

Two common types of warrants arise when dealing with stock compensation plans: stock option plans (SOPs), and stock purchase plans (SPPs) (also called broad-based stock option plans). Loosely speaking, under an SOP, only selected employees are given the right to purchase common stock at a given price over an extended period of time. On the other hand, SPPs give all employees the opportunity to purchase common stock at a given price over a short period of time. Generally, SOPs are considered compensatory and SPPs noncompensatory; although the terms of the specific plan provide a better means for making this distinction (Accounting Research

Bulletin No. 43, Ch. 13B, hereafter ARB-43, paragraph 4). For purposes of this research, however, ESOs refer to SOPs only.

Although other compensatory plans exist, this study focuses only on fixed ESOs (incentive and nonqualified).[8] As mentioned earlier (see footnote 5), under fixed ESOs, the number of shares of employer company stock the employee has the option to purchase and the exercise price the employee must pay are fixed at the date of grant. In addition, transferability of the stock acquired by the employee is usually restricted, and the plan generally requires current and/or future service by the employee (APB-25, paragraph 24). Incentive ESOs (hereafter ISOs), where the option price is set greater than or equal to the market price, provide employees with a tax advantage; namely, employees can defer the taxes on the difference between the

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[8]Other compensatory stock plans include variable plans, such as performance-type plans and stock appreciation rights plans (SARs), stock bonus or award plans, shadow or phantom stock plans, tandem or alternate stock plans, and junior stock plans. The number of shares of stock that may be acquired, the price, or both are not determinable until after the date of grant for variable SOPs (FIN-28, paragraph 2). Performance-type plans use performance criteria as a basis for awarding stock. SARs entitle employees to receive cash, stock, or a combination of both in an amount equivalent to any excess of the market value of a stated number of shares of the employer's stock over a stated price on the date of exercise of the rights (FIN-28, paragraph 9). Under stock bonus plans, the employee usually makes little or no payment to receive the bonus/award of a fixed number of shares or a specified dollar amount which is payable in shares (APB-25, paragraph 26). Shadow stock plans specify that the employee receives cash, stock, or a combination of both, in an amount equal to a specified increase in the market price of the firm's stock or an amount equal to a specified increase in the dividend distributions of the employer corporation (APB-25, paragraph 32). Under a tandem plan, the employee is granted rights to more than one plan, or the right to select alternatives under one plan (APB-25, paragraph 34). Finally, junior stock plans allow employees to purchase shares of a separate class of stock, called junior stock, for a fraction of the price of the company's regular common stock. The junior stock is convertible into regular common stock if certain performance goals are met (FIN-38, paragraph 2).

market price of the stock and the option price on the date the stock is purchased until the stock is eventually sold. However, no tax deduction in the form of compensation expense may be taken by the issuing company (Nikolai and Bazley 1994, Chapter 15). Although seemingly a disadvantage from the company's perspective, the offering of ISOs continues to be a means for attracting and retaining key personnel, especially for newly emerging firms (Coopers & Lybrand 1993; Kulatilaka and Marcus 1994).

On the other hand, nonqualified ESOs[9] (hereafter NQSOs) are tax advantageous to the company and disadvantageous to the employee. Specifically, the company receives a deduction equal to the excess of the market price of the stock on the date of exercise over the option price, even if zero compensation expense has been recognized in the determination of net income (APB-25, paragraph 16). In comparison to ISOs, NQSOs do not allow tax deferral by the executives at the time the shares are purchased; hence, the executives would be required to pay taxes on the share price appreciation on the date the options are exercised (Nikolai and Bazley 1994, Chapter 15).

ESOs differ from traded stock options (TSOs) and warrants in several respects, including (Rubinstein 1994; Huddart 1994; Melas-Kyriazi and Hatsopoulos 1994):

(1) ESOs generally have a maturity of five or ten years, whereas TSOs usually mature within one year of the date of issue (although their

[9]With NQSOs, the employer grants an employee the right to purchase stock at a set price during a specified time. The terms of the plan, however, are not in accord with Section 422A of the Internal Revenue Code.

maturity date can be longer, warrants generally have a maturity of two years).[10]

(2) Due to vesting requirements, exercise of ESOs is usually not permitted during a specified period from the date of grant, usually three years.

(3) Unlike TSOs and some types of warrants, ESOs are non-transferable to third parties.

(4) Employees forfeit nonvested ESOs when they leave their jobs, and may be forced to exercise vested ESOs at that time.

(5) Similar to the exercise of warrants, but unlike TSOs, the exercise of ESOs is dilutive since the corporation must issue new shares of stock.

(6) Unlike TSOs, ESOs can be thought of as a hybrid option: it is European from the date of grant until the vesting date, and it is American from the vesting date through the maturity date.[11]

(7) Unlike TSOs, but as with the exercise of warrants, the exercise of ESOs requires payment of the strike price to the issuing firm.

Given the differences outlined above, naive application of warrant and/or TSO valuation procedures is problematic.

Foster et al. (1991) note that, irrespective of type, ESOs are typically granted with exercise prices equal to the market value of the granting firm's stock on the date of grant (i.e., at-the-money). The resulting favorable accounting treatment accorded ESOs granted at-the-money explains why stock-based compensation has overtaken

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[10]According to Melas-Kyriazi and Hatsopoulos (1994), there are approximately 350 long-term equity warrants trading in the U.S.: 60 are "LEAPS" listed on the New York Stock Exchange (NYSE) with the remaining 290 trading over-the-counter (OTC). LEAPS generally mature within two years; the terms of OTC warrants generally range from one to three years, however, several of them extend up to ten years.

[11]European stock options cannot be exercised prior to their maturity. American stock options, however, may be exercised anytime prior to and including the maturity date.

fixed salary as the primary component of compensation for many executives (Coopers & Lybrand 1993).

Coopers & Lybrand (1993) also report the prevalence of stock-based compensation by industry and by company size. Long-term incentive plans are most prevalent in the banking, financial services and manufacturing industries, with 81.8 percent of banking and financial services, and 64.1 percent of manufacturing firms using these plans in their compensation packages. In addition, more than 70 percent of companies with annual revenue over $1 billion provide stock-based incentives to executives; whereas 53 to 71 percent of companies with annual revenue less than $1 billion and greater than $100 million, and 40 percent of companies with annual revenue less than $100 million provide such plans. Coopers & Lybrand also note the most common types of stock-based compensation are ISOs and NQSOs. According to Huddart (1994), most options granted since 1986 are nonqualified.

2.2 Current GAAP

ARB-43, "Compensation Involved in Stock Option and Stock Purchase Plans" (Committee on Accounting Procedure 1953), and APB-25 are the primary sources of GAAP on accounting for stock issued to employees. ARB-43 established the principles and procedures for accounting for traditional SOPs, stock award plans, and SPPs that are really compensatory in nature. APB-25 narrowed the principles outlined in ARB-43 with respect to the measurement of option fair value associated with the granting of

traditional SOPs, and extended these principles and procedures to the accounting for non-fixed SOPs (such as variable plans).

Since this study focuses on valuation issues concerning fixed ESOs, the accounting issues presented here are addressed in the context of these option plans. The first issue concerns the determination of compensation cost. Once a plan is deemed compensatory, compensation cost is measured as the difference between the market price of the stock and the option price on the date of measurement.[12,13] Thus, if the option price is set equal to the stock price on the date of measurement, no compensation cost would be recognized (APB-25, paragraph 10).

The second issue concerns the period over which the compensation cost is to be allocated to compensation expense. APB-25 (paragraph 12) establishes that the total compensation cost is to be recognized as compensation expense over the period the employee performs the related services (called the service period). If this period is not stated in the terms of the option plan, a reasonable estimate must be made. If stock is

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[12]At least six dates can be considered in determining the date to be used to measure the cost of compensation: date of adoption of the option plan, date on which the option is granted to the employee, date on which the grantee has performed any conditions precedent to the exercise of the option, date on which the grantee may first exercise the option, date on which the option is exercised by the grantee, and date on which the grantee disposes of the stock acquired (ARB-43, paragraph 6).

[13]The measurement date is the first date on which the following are known (usually the date of grant): the number of shares an employee is entitled to receive, and the option or purchase price, if any. However, plans that have variable terms dependent on the outcome of events after the date of grant will have a measurement date later than the date of grant, which is usually the date of exercise (APB-25, paragraph 10b).

issued for past services, compensation cost must be charged to expense in the period the award is granted.

The final issue concerns the specific accounting for and disclosure of stock-based compensation plans. Ignoring income taxes, on the date of grant, compensation cost would be recorded through a debit to an unearned compensation account, such as deferred compensation, with a corresponding credit to a capital account, such as common stock option warrants (Nikolai and Bazley 1994, Chapter 15). The current practice is to disclose deferred compensation as a separate reduction of stockholders' equity (APB-25, paragraph 14), specifically, contra to the paid-in capital account, common stock option warrants. Subsequently, the balance in deferred compensation is amortized to compensation expense each year during the employee's service period.

Finally, the following footnote disclosures must also be made concerning the terms and status of firms' ESOs: (1) the number of shares covered by each option, (2) the exercise price, (3) the number of shares that are exercisable, (4) the number of shares exercised, and (5) the option price of the exercised shares (ARB-43, paragraph 15).

2.3 The Exposure Draft

During June 1993, the FASB issued a Proposed Statement of Financial Accounting Standards, "Accounting for Stock-based Compensation," which if passed, would supersede current GAAP governing the accounting for employee stock-based compensation plans. The main issues addressed in the ED concern the following: (1)

whether the granting of stock options to employees should result in the recognition of compensation cost, (2) whether the measurement date should be the date of grant or some other date (such as the vesting date or exercise date), and (3) what method should be used to value the options on the date of grant.

In the ED, the FASB concluded tentatively that the granting of stock options should result in the recognition of compensation cost to be amortized over the period that the related employee services are rendered, usually the period from the grant date to the vesting date[14] if for future services, or expensed in the current period if for services already rendered by the employee. In contrast to current GAAP, the compensation cost attributable to future services is to be recognized as an *asset*, prepaid compensation, rather than as a contra stockholders' equity item, such as deferred compensation (FASB 1993a, paragraph 20).

With respect to the measurement date, the FASB maintains that stock awarded as compensation in the form of restricted stock,[15] stock options, and other equity instruments should be measured based on the stock price at the *date an award is granted* (FASB 1993a, paragraph 15). In fact, the proposed Statement would require this same measurement date for *variable (performance-type) plans*.

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[14]An employee's award becomes vested at the date that the employee's right to receive or retain shares of stock or cash under the award is no longer contingent on remaining in the service of the employer (FASB 1993a, paragraph 21).

[15]Restricted stock represent shares of stock for which sale is contractually restricted for a given period of time. In addition, these shares, when granted as compensation, are usually subject to vesting requirements (FASB 1993a).

Finally, the ED would require compensation cost be measured on the date of grant based on the *fair value of the stock options granted* (FASB 1993a, paragraph 15). This requirement is in stark contrast to current rules, which allow zero compensation cost to be recognized if the option price is set greater than or equal to the stock price on the date of grant. Passage of the ED would require that the fair value of a stock option granted by a public entity[16] be estimated using a pricing model, such as the BS or binomial option-pricing models (Cox, Ross, and Rubinstein 1979), which takes into account the exercise price and expected life of the option; the current price, expected volatility, and expected dividend yield of the underlying stock; and the risk-free interest rate during the expected life of the option (FASB 1993a, paragraph 16). The ED would also require that the values obtained from the option pricing models be adjusted (reduced) to reflect the specific features of the options, such as nontransferability and forfeitability by the employee (FASB 1993a, paragraph 10). If it is not feasible to reasonably estimate the fair value of an option or other equity instrument at the grant date, the value at the exercise date shall be used as the final measure of compensation cost (FASB 1993a, paragraph 18). The recognition

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[16]A public entity is any entity (1) whose equity securities trade in a public market either on a stock exchange (domestic or foreign) or in the over-the-counter market, including securities quoted only locally or regionally, (2) that makes a filing with a regulatory agency in preparation for the sale of any class of equity securities in a public market, or (3) that is a subsidiary, corporate joint venture, or other entity controlled by an entity covered by (1) or (2) (FASB 1993a, paragraph 16, footnote 7). A nonpublic entity need not consider expected volatility when using a pricing model unless its stock is traded frequently to permit a reasonable estimate of expected volatility (FASB 1993a, paragraph 17).

provisions detailed in the ED would be effective for awards granted after December 31, 1996 (FASB 1993a, paragraph 34).

In light of the considerable controversy which has surrounded the ED, the FASB announced in March 1995 that the final standard, scheduled to be issued during the third quarter of 1995, will only *recommend* that companies account for stock-based compensation as outlined in the ED. Companies that choose *not* to recognize compensation expense associated with stock-based compensation are *required* to disclose in the footnotes the effect on net income as if the FASB guidelines had been followed. The disclosure requirements will be effective for fiscal-year 1996 financial statements; the pro forma requirements apply to ESO grants made in 1995, but may be presented in 1996 financials (FASB 1995b, 1995c).

CHAPTER 3

3.0 Literature Review

This chapter presents a review of the potential positive and negative effects that ESOs may have on shareholder wealth. In addition, prior research on the effects of the ED and ESO valuation is reviewed.

3.1 The Role of ESOs in Compensation Schemes

According to Watts and Zimmerman (1986), there is no theory that explains the *composition* of management compensation schemes. However, the literature does offer several hypotheses concerning the *role* of these schemes. The following hypotheses concerning the use of ESOs in compensation schemes are associated with positive shareholder wealth effects.

3.1.1 The Incentive Hypothesis

Due to the separation of ownership and control,[17] shareholders are assumed to be wealth maximizers; however, managers are often theorized to maximize a utility function that has arguments that include things such as compensation, power, security, and status (Galbraith 1967; Marris 1964; Williamson 1964). Lambert and Larcker (1991) claim that there are three primary conflicts addressed in the agency literature. First, managers may consume perquisites ("perks") at the shareholders' expense.[18]

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[17]The roots of agency theory can be traced back to Berle and Means (1932), who asserted the proposition that ownership and control had been separated in the large corporation, and its implications have been investigated in various studies (e.g., Baiman 1982, 1990; Watts and Zimmerman 1990). Jensen and Meckling (1976, p. 308) define an agency relationship as "a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent." Typical agency models assume a risk-neutral principal who employs a risk- and effort-averse agent. Under complete observability by the principal, the principal will pay the agent a flat wage if the agent takes the action the principal would have taken; else, the principal will impose a penalty on the agent if the agent shirks. However, if only the agent's output is jointly observable (and not the agent's effort nor the effects of random states of nature on the outcome), then the agent's compensation is more contingent on the output achieved. Thus, the agent has the incentive to expend more effort to achieve a higher level of output. As Watts and Zimmerman (1986) note, one implication of this literature is that compensation schemes will be designed so that the manager will share in the outcome.

[18]As Jensen and Meckling (1976) demonstrate, raising outside equity results in a divergence of interests between the owner-manager and external shareholders such that the manager has the incentive to consume perks beyond the level that would be optimal if the manager were the sole owner of the firm. In the latter case, the manager would bear the full cost of his or her perk consumption. When the manager sells a portion of his or her shares to external shareholders, however, the resulting cost to the manager of perk consumption would be less than 100 percent of the value of the perk. Hence, the manager's incentive for perk consumption increases with the level of diffuse outside equity ownership.

Second, managers are likely to be more risk-averse than shareholders[19] and may turn down risky projects that would benefit shareholders.[20] Finally, there is a potential conflict between the decision-making time horizons of shareholders and managers, which again could cause managers to turn down long-term profitable investment opportunities (especially if evaluation of managers is based on short-term performance measures).

Hence, under the incentive hypothesis, compensation plans are designed to provide managers with an incentive to maximize firm value, thereby aligning managers' interests with those of the firm's shareholders. Analytical research (e.g., Jensen and Meckling 1976; Haugen and Senbet 1981,1986; Eaton and Rosen 1983; Farmer and Winter 1986; Hemmer 1993), which models the composition of managerial compensation plans, suggests ESOs are efficient and effective vehicles for reducing the agency costs associated with raising capital externally. According to Lambert and

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[19]In contrast to shareholders, who can diversify their investment portfolios, managers may be considered to be more risk-averse since a large portion of their wealth (compensation, stock holdings, human capital) is tied to the success of the company.

[20]On the other hand, Jensen and Meckling (1976) show that when the manager is an equity holder, there is an incentive to engage in investments that may be perceived to be more risky than that which bondholders desire in an attempt to effect a wealth transfer from the bondholders to the shareholders. Initially observed by Black and Scholes (1973), shareholders (including the owner-manager) in a levered firm effectively hold a European call option to buy back the firm at an exercise price equal to the face amount of the debt. As such, the value of this "call" is an increasing function of the variance of the underlying asset (the firm's future cash flows), and the shareholders thus have an incentive to engage in high risk activities at the expense of the debtholders.

Larcker (1991), the primary function of long-term incentive compensation plans is best described by the incentive hypothesis.

3.1.2 The Tax Hypothesis

Miller and Scholes (1982) and Hite and Long (1982) suggest that according to the tax hypothesis, compensation packages are also designed in a manner so as to minimize jointly corporate and managerial taxes. Thus, prior studies of the effects of ESOs concede that the positive market reactions could be due to incentive effects as well as tax effects (e.g., Brickley, Bhagat, and Lease 1985).[21]

3.1.3 Other Hypotheses

Other reasons offered for the adoption of compensation plans are to signal good performance and to screen managers. Managements' willingness to accept ESOs in place of fixed compensation (salary and bonus) may provide an optimistic signal concerning the firm's future performance. Compensation plans may also exist to screen managers by forcing them to self-select on the basis of risk preference (Raviv 1985).

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[21]On the other hand, Johnson (1988) notes that according to the *pure* tax hypothesis, investors are likely to expect that the firm will adopt the most efficient method of compensation, without expecting real or financial effects as a consequence, and therefore concludes that the predicted effect on shareholder wealth under the pure tax hypothesis is zero.

3.2 Potential Detriments of ESOs

In contrast to the above hypotheses, the following hypotheses concerning the use of ESOs in compensation schemes are associated with negative shareholder wealth effects.

3.2.1 The Entrenchment Hypothesis

Demsetz (1983) and Fama and Jensen (1983) note that there are offsetting costs associated with increased share ownership by management. Namely, as managers' ownership interest increases, they may exercise sufficient voting power to guarantee their future employment and thus engage in non-value maximizing behavior. Hence, the entrenchment hypothesis predicts there is a negative relationship between managements' stockholdings and shareholder wealth.

3.2.2 The Dilution Hypothesis

Aside from the above hypothesis, which states that increased managerial share ownership affects managerial behavior negatively, ESO plans may harm existing shareholders simply by diluting their equity claims. Hence, the dilution hypothesis predicts that as equity dilution increases there is a negative effect on shareholder wealth.

3.3 Empirical Studies

This section reviews literature which has examined empirically the effects of ESOs. The majority of this research has concentrated primarily on the incentive effects. In addition, existing research which has studied the provisions outlined in the recent ED are reviewed.

3.3.1 Incentive Effects of ESOs

Some researchers have addressed the proposition that stronger links between compensation and firm performance should improve future performance (e.g., Masson 1971; Gerhart and Milkovich 1990). Findings from these studies suggest executive pay is statistically linked to firm performance, especially when pay is defined broadly to include changes in executive shareholdings and stock options, and firm performance is measured in terms of stock returns. Further, the inclusion of ESOs in compensation packages does appear to be associated with improved future firm performance.

Using event study methodology, others have investigated the capital market reaction to the adoption of, or changes in, the long-term incentive contracts offered to managers (e.g., Larcker 1983; Bhagat, Brickley, and Lease 1985; Brickley, Bhagat, and Lease 1985; Gaver, Gaver, and Battistel 1992; Kumar and Sopariwala 1992). General findings from this literature indicate that there is a positive stock market reaction to both events, which can be attributed to the incentive and tax effects of the incentive contracts, as well as to the signalling effects of managements' willingness to hold a larger equity share.

Finally, several researchers have examined whether long-term incentive plans are effective mechanisms in reducing agency costs associated with managers' investing and financing decisions.[22] The positive stock market reactions in these studies suggest ESOs and other long-term compensation devices are associated with managers making decisions which maximize shareholder value.

3.3.2 The Tax Hypothesis

Hite and Long (1982) develop the tax hypothesis to explain the timing of changes in managerial incentive compensation. Under the tax hypothesis, firms will structure their compensation packages in a manner so as to minimize jointly corporate and managerial taxes. Prior to 1969, firms used predominantly qualified stock options; however, after the Tax Reform Act of 1969, which gradually lowered the tax rate on compensation from 70% to 50%, firms switched to using nonqualified stock options. Hite and Long note the timing of the top 100 industrial firms' decisions to switch from qualified to nonqualified stock options, and find support for their tax hypothesis as a viable explanation for this phenomenon.

Scholes (1991) notes that although it was not tax advantageous for firms to fund employee deferred compensation programs with stock prior to the 1980s, many firms did choose to fund these programs with company stock or stock options. This

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[22]Research from this stream of literature includes Larcker (1983); Walkling and Long (1984); Lewellen, Loderer, and Rosenfeld (1985); Tehranian, Travlos, and Waegelein (1987); Agrawal and Mandelker (1987); Sant (1987); Lambert, Lanen, and Larcker (1989); DeFusco, Johnson, and Zorn (1990); DeFusco, Zorn, and Johnson (1991); and Mehran (1992).

finding suggests the incentive effects of using stock-based programs dominated the tax considerations associated with granting stock and options.

Long (1992) claims that although Hite and Long (1982) find that firms operate rationally with respect to current tax laws, they did not directly address whether executive stock options exist for tax or incentive reasons. Although Long finds strong support for the tax hypothesis as an explanation of the increased option usage following the Revenue Act of 1950 (which made restricted options extremely tax advantageous), the hypothesis fails to explain why an increase in option usage was not observed during an earlier period (1939-1945) of favorable tax treatment of options. Further, the use of restricted options exists today even though changes in personal tax rates during the 1970s eliminated their tax advantage. Hence, Long concludes other factors besides taxes influence the usage of stock options. Further, Venkateswar (1992) asserts that the 1986 Tax Reform Act negated the tax benefits associated with ESOs and that their existence can now be attributed solely to incentive effects.

3.3.3 The Signalling Hypothesis

In general, studies of the effects of ESOs will acknowledge that the positive market reactions could be due to incentive and tax effects, as well as signalling (e.g., Brickley, Bhagat, and Lease 1985). However, Bhagat, Brickley, and Lease (1985), in an examination of the stock market reaction to the adoption of equity-based compensation plans which Miller and Scholes (1982) argue are not adopted for tax

consequences, find the significant positive reaction is due to incentive effects beyond any signalling effects of the plans.

3.3.4 Ownership Effects

Agrawal and Mandelker (1987) find that increased managerial shareholdings (stock and options) are associated with investment and financing decisions being made in shareholders' interests, as evidenced by increased firm variance and leverage. Other researchers provide similar evidence that managerial shareholdings are effective at reducing agency costs (e.g., Walking and Long 1984; Sant 1987; DeFusco, Johnson, and Zorn 1990; DeFusco, Zorn, and Johnson 1991; Mehran 1992).

However, findings by Morck et al. (1988), and Bagnani et al. (1994) suggest that the incentive effects of stock options vary with the level of managerial shareholdings (stock and stock options). Morck et al. demonstrate that firm-value maximizing behavior is present up to 5 percent ownership as well as past 25 percent ownership; however, firm-value decreasing behavior seems associated with managerial ownership in the 5 to 25 percent range, which they conclude is due to entrenched management. Bagnani et al., on the other hand, find evidence which supports that when a manager's stockholdings exceeds 25 percent, the incentive effects are diminished and it appears managers act more like debtholders. The findings of Bagnani et al. are consistent with the notion that as the percent of compensation tied up in firm-specific wealth increases, a manager may become more risk-averse.

3.3.5 Dilution Effects

Venkateswar (1992) tests equity dilution as a possible variable that may be used to explain the market's differential reaction to long-term incentive plans which increase shareholder wealth from those that do not. Application of event study methodology suggests a significant positive market reaction surrounding the adoption of all types of long-term incentive plans in the sample. However, when this positive reaction is partitioned according to equity dilution, the findings convey that there is a threshold level beyond which the negative effect of equity dilution is greater than the incentive effects of the plans (the negative reaction appeared strongest in the 4 to 6 percent equity dilution range). Venkateswar notes that the effect of equity dilution on shareholder wealth is not linear, which could be attributed to size, industry, and other cross-sectional differences among firms.

3.3.6 Prior Research on the Effects of the Exposure Draft

Several researchers have investigated specifically the issues presented in the ED. In an extensive research monograph, Wallace and Smith (1991) test whether a change in the accounting for ESOs will have economic consequences. Wallace and Smith further identify six objectives of their study: (1) to conduct an event study of the FASB's deliberation process concerning the accounting for ESOs, (2) to examine the reactions by and characteristics of companies that have adopted ESOs without SARs compared to those that have adopted ESOs with SARs, (3) to quantify the extent of inconsistencies in proposed valuation approaches for ESOs, (4) to compare

the characteristics of firms that lobbied the FASB concerning the accounting for ESOs against those firms that did not, (5) to examine the nature of the comment letters in an attempt to characterize the strategies used by lobbiers to influence the FASB, and (6) to explore how the magnitude of outstanding options systematically relates to various company characteristics.

To control for size effects, the sample of firms was restricted to those which had sales greater than $400 million. Selected findings suggest a negative market reaction to the FASB's deliberation on the accounting for ESOs. Further, using an information arrival model, Wallace and Smith find more dummy variables (used to represent the dates of interest during the standard-setting process) are significant for firms with SARs compared to those firms with only ESOs. Wallace and Smith also assess the magnitude and consistency of the ESO estimates obtained under four valuation approaches. They find the magnitudes to be substantial and consistent among three of the four valuation approaches. In addition, their evidence suggests economic consequences increase a firm's propensity to lobby. Finally, Wallace and Smith find various relations between firm characteristics and option valuation; specifically, higher option values are associated with larger firms with lower debt/equity ratios, lower income levels, higher relative market performance, and a greater propensity to lobby.

Foster, Koogler, and Vickrey (1991) examine three research issues: (1) the impact of the FASB's proposal on firms' operating income, (2) the relationship between stock option compensation estimates under the BS continuous-dividend model

and the minimum-value procedure, and (3) compensation value estimates at the vesting date compared with those at the grant date.

Results suggest non-dividend paying firms would suffer greater income effects in comparison to dividend paying firms, regardless of the valuation model used. Also, material income effects would exist for both types of firms when short service periods (one to seven years) are used to amortize deferred compensation to compensation expense. In addition, they suggest the fair value method should be abandoned as a valuation approach if the grant date is decided to be the measurement date since the BS estimates were lower than the minimum value estimates for 92 of the 170 dividend-paying firms. Finally, Foster et al. demonstrate no significant differences in the compensation ratios (compensation expense divided by operating income) computed on the grant date compared to those computed on the vesting date. Thus, they contend the grant date should be the measurement date (rather than the vesting date, which was the FASB's current position at the time the study was published) since it is less costly, is consistent with option-pricing theory, and leads to no loss in information content.

Studies on the potential effects of the ED have also been conducted by members of the Big Six public accounting firms. A study released by Coopers & Lybrand (1993) suggests the following: mature companies (those whose stocks have traded for over ten years) would suffer reductions in earnings as the standard is phased in (3.4 percent to 22.3 percent); the proposed standard could eliminate employee SPPs, which would result in a disadvantage for small, emerging companies who would be

unable to compete against established companies in attracting high caliber managerial talent; and additional earnings charges would be present for those companies whose stock prices decline below the option exercise price, and whose options were unexercised.

Another field test of the ED was conducted by the FASB with the assistance of KPMG Peat Marwick (FASB 1994). The field test identifies three objectives: (1) to identify implementation issues, (2) to ascertain the understandability of the ED, and (3) to learn about the effects of the ED on individual companies. Twenty-five volunteer companies participated in the study, with 1992 revenues ranging from under $250 million to more than $15 billion.[23] The results highlight that more guidance is needed in implementing the ED's provisions.[24] In addition, although the effects of the ED did not change any firm from a net income to a net loss situation, the range may

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[23]Of the 25 companies, all granted fixed stock options during the three-year test period. The number of firms granting other types of plans is as follows: premium stock options, three; discounted stock options, four; reload options, three; repricings, one; performance shares, five; stock purchase plans, three.

[24]As an example, many participants requested that more guidance be included in any final Statement on which option-pricing model to use and how to select the necessary assumptions (mainly concerning the assumptions about expected volatility and expected term). Additional guidance is also requested concerning adjustments needed after the grant date, the handling of deferred taxes, and disclosures about multiple grants in a single year. Finally, the administrative costs of compliance can be expected to be high since several of the companies said that their current systems of tracking and reporting options were not designed to capture the information required by the ED.

be quite substantial. For 1992,[25] the percentage effect on net income ranged from less than one percent to over 70 percent for the smaller half of firms. The effect for the larger half of firms was less substantial, ranging from less than one to almost eight percent. The smaller company results obtain due to lower levels of income, higher volatility estimates, low or no dividends, and the extensive use of options.

3.4 Valuation of ESOs

Relatively few studies have dealt with the complex issues surrounding the valuation of ESOs prior to 1990. Boudreaux and Zeff (1976) suggest the Capital Asset Pricing Model (CAPM) could be used to estimate the firm's future stock price. Then, ESOs could be valued by discounting the difference between the firm's future stock price on the date of exercise of the ESOs and the strike price. Smith and Zimmerman (1976) criticize Boudreaux and Zeff's approach, claiming that the required parameters are unobservable, and that discounting by the expected stock return is an ad hoc procedure. Instead, they suggest a lower bound on the valuation of ESOs (called "minimum value"), which is the difference between the current stock price and the discounted exercise price. Smith and Zimmerman note their minimum value is a lower bound even when the employee is allowed to exercise prior to maturity, and can be adjusted for dilution and dividend-paying stocks.

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[25]The results from 1992, the third year during the test period, are expected to reflect more accurately the effect of applying the ED since its full effect would be phased in over several years (depending on the vesting schedules of the granted options).

Empirical studies prior to 1990 include Weygandt (1977) and Noreen and Wolfson (1981). Weygandt (1977) uses the stocks from two companies (which differ primarily in volatility) and tests three approaches to warrant pricing suggested by the finance and economics literatures (the models of Black and Scholes 1973, Van Horne 1969, and Shelton 1967) to value ESOs on the date of grant. He claims that the value of ESOs can be approximated with a high degree of confidence, and, for nonqualified options, the models provide reasonable answers. Noreen and Wolfson (1981) use a sample of 52 warrants which match closely the characteristics of ESOs to test the accuracy of two option pricing models in valuing ESOs. The two models tested are the BS, adjusted for continuous dividends and warrants' dilutive effect, and the square root diffusion model of Cox and Ross (1976). They claim either model may be used to value ESOs; however, they warn that the valuation may be overstated due to restrictions inherent with ESOs (i.e., ESOs are non-portable and non-transferable). Galai (1989), however, notes Noreen and Wolfson's approach causes warrant prices to be underestimated.[26]

More recently, Jennergren and Naslund (1993) (hereafter JN) counter that the fair value approach used by Foster et al. (1991), the BS call option pricing model with a constant, continuous dividend yield, fails to take into account that ESOs have stochastic lives. Hence, they derive a valuation model, contingent on quantifying the

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[26]Specifically, Galai notes two problems with Noreen and Wolfson's approach: (1) volatility, which is estimated from the times series of the stock's rate of return, is underestimated due to the effect of potential dilution of equity; and (2) the dilution adjustment is unnecessary since the stock price in a firm with warrants outstanding should reflect potential dilution.

rate at which executives leave their current jobs, which incorporates the stochastic life feature of ESOs. If the ESO can be exercised only at the expiration date, then their formulation reduces to the BS model multiplied by the termination rate. On the other hand, if the ESO can be exercised prior to the exercise date, then the value of the ESO can be calculated through use of a numerical procedure.

Foster, Koogler, and Vickrey (1993) respond to JN by investigating the materiality of compensation expense calculated using the numerical procedure and an estimate of executive turnover as suggested by JN. They find JN's procedure results in essentially the same number of firms having material compensation expense as is reported in Foster et al. (1991). Foster et al. (1993) thus question the practical applicability of the numerical procedure along with a turnover estimate when valuing ESOs for several reasons: (1) the turnover rate is difficult to estimate reliably; (2) the rate is unstable over time; (3) the FASB would have to make specific recommendations concerning the use of the numerical procedure since its results are very sensitive to variable choice; and (4) although the approach may yield more accurate ESO values, the additional cost does not seem worthwhile since compensation expense was not materially lower than the estimates obtained in Foster et al. (1991).

Cuny and Jorion (1993) (hereafter CJ) claim the proposed method of multiplying the BS value of granted options by the number of employees expected to stay would underestimate the value of ESOs due to the endogenous nature of the executive's departure decision. Specifically, they claim a correlation exists between executive departure decisions and the firm's stock price. Thus, ESO restrictions tend to

be relevant only when the stock price is low, so the cost of the restrictions must also be low. CJ note the assumption that the probability of the executive's departure is exogenous is a weakness in both JN (1993) and Foster et al. (1993). CJ conclude ESO values are much closer to BS prices that to the adjusted prices proposed by the FASB.

Others have also pointed out problems with using the FASB proposed methods for valuation. Rubinstein (1994) illustrates several deficiencies of the proposed approaches and highlights how differences in estimates used as inputs into these models can lead to substantially different values, thereby severely limiting comparability among firms.[27] Further, a FASB position paper by Melas-Kyriazi and Hatsopoulos (1994) of Thermo Electron presents empirical data on two classes of securities used as surrogates for long-term options (convertible debentures and long-term equity warrants) which suggest that option-pricing models should not be used to value ESOs because they produce results inconsistent with the empirical evidence in the financial markets. Instead, they recommend the value of ESOs be determined by a company's investment banker or other qualified valuation expert.

On the other hand, others concede there are problems with the FASB's recommended procedures for valuation of ESOs, and have offered alternatives for FASB to consider. For example, Kulatilaka and Marcus (1994) (hereafter KM) and Huddart (1994) take issue with the proposed adjustment of using expected life in option-pricing models and demonstrate how knowledge of an employee's exercise

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[27]Rubinstein also points to recent empirical work using index options which questions the validity of the BS and standard binomial model in markets where one would predict these models would work best.

policy should be used to value an ESO.[28] These papers are significant in that they highlight that the exercise decision is not just a function of time, but also of an employee's risk aversion, personal non-ESO wealth, and alternative investment opportunities.[29] Although theoretically appealing, KM conclude a model such as theirs could not be applied in practice (since inputs like employee risk aversion and non-ESO wealth would be hard to measure and/or observe). KM suggest ESOs be valued in a manner similar to that used for mortgage-backed securities. It is interesting to note both papers, as well as Rubinstein (1994), show or point out how Smith and Zimmerman's (1976) minimum value model is not the true lower bound of the cost of an ESO when the employee is risk-averse and the option is non-transferable.

3.5 Conclusion

The studies reviewed in this chapter demonstrate the potential shareholder wealth effects of ESOs: the positive effects consistent with the incentive, tax, signalling, and screening hypotheses; and the negative effects attributed to entrenchment and dilution. However, these effects have been investigated in event study contexts only, even though the call has been made for valuation studies that examine the association between levels of stock prices and fundamental accounting

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[28]Huddart also demonstrates that the ex post adjustment to the grant-date determined BS value to reflect actual life only exacerbates the problem.

[29]Others have considered these same factors in valuing ESOs from the employee's perspective (e.g., Lambert, Larcker, and Verrecchia 1991). The FASB currently maintains in the ED, however, that ESOs are to be valued from the firm's perspective.

variables (Lev and Ohlson 1982; Bernard 1989). Thus, this study, in using an equity-valuation model based on the accounting identity, should contribute to the existing literature on executive/employee compensation[30] by revealing whether ESOs affect the pricing of firms' equity securities and how firm-specific factors may affect the market assessment of ESOs.

In addition, in contrast to previous research into the effects of the ED, which has focused largely on the income effects of ESOs, this study questions the necessity and classification accuracy of the FASB's proposed accounting for ESOs. Findings reveal whether or not the market interprets the economic value of firms' fixed ESOs to be significantly different from zero, the value most often recorded under GAAP for these instruments. Further, the results suggest, although crudely, whether the equity market views the nature of ESOs to be consistent with equity or debt classification.

Finally, although ESOs differ from TSOs and listed warrants in several respects (e.g., ESOs have portability, transferability, and vesting restrictions, as well as longer maturities), the literature suggests the valuation of ESOs can benefit from the use of option-pricing models (Cheung 1991). As evidenced by the studies reviewed in this section, several methods have been suggested to value ESOs, including the minimum value procedure, and variations of the BS and binomial option-pricing models. Although the aim of this dissertation is not to identify which of the suggested methods

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[30]Pavlik, Scott and Tiessen (1993) presents a comprehensive review of the executive compensation literature.

should be used to value ESOs, this research identifies the ESO valuation approach which is most strongly associated with the market valuation of firms' equity.

CHAPTER 4

4.0 Hypotheses Development

This chapter presents the development of hypotheses concerning the equity-value relevance of ESOs, the possible market sensitization caused by the release of the ED, and the firm-specific effects of managerial ownership and dilution on the market's assessment of ESO value.

4.1 Equity-Value Relevance of ESOs

Although current GAAP implies otherwise, it is generally agreed that fixed, at-the-money and out-of-the-money ESOs have value on the date of grant. This can be inferred from the fact that firms' listed warrants, which are considered to be close surrogates of ESOs, have market values even when they are out-of-the-money. Of interest, then, is whether the equity market views unrecorded estimates of the value of outstanding ESOs to be relevant in the pricing of firms' common stock. The following null hypothesis and its alternatives are offered to test this proposition:

$H1_0$: The equity market assigns a zero value to firms' fixed, at-the-money and out-of-the money ESOs.[31]

[31]References made to "outstanding ESOs" in the context of valuation throughout the remainder of this dissertation are to be interpreted as "outstanding ESOs *which are nonvested.*" Clarification of this point is necessary since the ED requires the valuation, and resulting asset treatment, of nonvested ESOs.

$H1_{A1}$: The equity market assigns a positive value to firms' fixed, at-the-money and out-of-the-money ESOs, which increases the market value of firms' common equity.

$H1_{A2}$: The equity market assigns a positive value to firms' fixed, at-the-money and out-of-the-money ESOs, which decreases the market value of firms' common equity.

Rejection of the null hypothesis will occur if the market deems that the amount of reported compensation cost associated with the granting of ESOs understates the value of such cost in valuing firms' common equity securities.[32] Two possibilities emerge, represented by the alternate hypotheses, $H1_{A1}$ and $H1_{A2}$. First, given that the hypotheses concerning the shareholder wealth effects of ESOs are not mutually exclusive, the market may assess that firms' outstanding ESOs have positive shareholder wealth effects consistent with the incentive, tax, signalling and screening hypotheses which may dominate the negative shareholder wealth effects under the dilution and entrenchment hypotheses. This net effect would be captured by a positive coefficient on the estimated value of the ESOs (consistent with $H1_{A1}$). On the other hand, the negative shareholder wealth effects of granting ESOs may dominate the positive effects, as suggested by a negative coefficient on the estimated value of firms' outstanding ESOs (consistent with $H1_{A2}$).

Failure to reject $H1_0$ could result under three scenarios. First, consistent with current accounting procedures, the equity market may determine the economic cost of fixed, at-the-money and out-of-the-money ESOs to be zero. Second, the positive

[32]Alternatively, rejection of this and the remaining null hypotheses could occur if the significance observed on the test variable is due to correlated omitted variables.

shareholder wealth effects associated with the granting of ESOs may be confounded by the negative shareholder wealth effects associated with the potential dilution and/or entrenchment that may occur from granting ESOs. Finally, measurement error in the value of firms' outstanding ESOs could result in the failure to reject $H1_0$.

4.1.1 Nature of ESOs: Debt or Equity

Although the FASB currently maintains that ESOs are equity instruments, the issue of whether or not ESOs should be classified as equity or debt is complex and controversial. As part of its three-part financial instruments project initiated in 1986,[33] the FASB issued in 1990 a Discussion Memorandum (DM) entitled "Distinguishing between Liability and Equity Instruments with Characteristics of Both" (FASB 1990). Among other issues, the DM poses the question of whether or not an ESO is a liability or equity instrument. Although several groups claim equity treatment for ESOs is preferred since the granting of ESOs does not obligate the enterprise to transfer *assets* (FASB, American Accounting Association's Financial Accounting Standards Committee, Financial Executive Institute, various respondents to the DM), others claim the obligation necessitates liability treatment.

For example, Wiseman (1990) asserts ESOs are unlike residual equity and notes the following liability characteristics germane to ESOs: they are conditional obligations to pay out valuable securities; the obligations arise from past transactions;

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[33]The FASB's financial instruments project is divided into three phases: disclosure, recognition and measurement, and distinguishing between liabilities and equity. The later phase is driven by the FASB's stock compensation project, initiated in 1984.

the obligations would be concluded by future transactions that would pay out valuable securities; and, unlike equity, the obligations are closed-ended contracts. Wiseman concludes, however, that ESOs are neither equity nor debt; rather, they are in a class of securities distinct from debt and residual equity classification. Similarly, in a summary of respondents' views to the DM, Clarke (1991) notes a few respondents believe the conceptual framework should be amended to include ESOs as liabilities. These respondents claim ESOs are liabilities since issuing the underlying stock at less than market value dilutes the existing interests of preexisting shareholders. Finally, Clark (1993) uses finance-based research (i.e., research which suggests leverage is important to decision makers) to demonstrate that ESOs should be considered liabilities.

Thus, when testing $H1_0$ and its alternatives, the sign of the coefficient on the estimated value of firms' outstanding ESOs will provide some preliminary evidence concerning how the market interprets the nature of ESOs: as debt, equity, or both. A positive coefficient would be consistent with the currently maintained classification of ESOs as equity. On the other hand, a negative coefficient could imply the market interprets the net effect of ESOs as a liability. Finally, a coefficient which is insignificantly different from zero could be due to possible joint debt and equity characteristics of ESOs (the effects of which would be offsetting).

4.2 Market Sensitization

In addition to determining whether or not ESOs are equity-value relevant, this study also assesses whether or not the ED has sensitized the market to the view that ESOs are a form of compensation that should be recognized in firms' financial statements. Thus, the following null and alternate hypotheses are tested:

$H2_0$: There is no difference in the equity market's valuation of ESOs prior to the ED release compared to after the release.

$H2_A$: The equity market's valuation of ESOs is more significant after the ED release compared to before the release.

Failure to reject $H2_0$ may occur under two conditions. First, the equity market may assess the economic cost of ESOs to be zero both prior to and after the ED release. Thus, ESOs are not considered to be equity-value relevant in either period. On the other hand, the equity market may have been sensitized previously to the non-zero economic value of ESOs, yet there is no significant difference in the market's assessment of ESO value between the two periods. Since the issue of accounting for ESOs has been on the FASB's agenda since 1984, prior market sensitization seems possible.

It is also possible that the additional guidance provided by the ED has enhanced the market's assessment of this cost. Under this scenario, the market's assessment of ESO value may affect equity valuation more significantly in the period after the release of the ED than prior to its release, which would result in a rejection

of $H2_0$ in favor of the alternate hypothesis, $H2_A$. Two unrelated effects, however, may be confounding the results.

First, there may simply be an increase in the prevalence of stock options in managerial compensation contracts. A review of Table 4-1 provides evidence in support of this contention. The annual surveys on executive compensation conducted by the Conference Board (1989, 1994) convey that stock option usage as a percentage of firms surveyed ranges from 38 percent (utilities) to 84 percent (manufacturing) as of May 1989, and from 52 percent (utilities) to 85 percent (energy) as of May 1994.

Table 4-1. Prevalence of Stock Option Plans.

Industry	Surveyed companies with stock option plans - May 1989 (percent)	Surveyed companies with stock option plans - May 1994 (percent)
Energy	78	85
Manufacturing	84	83
Communications	83	69
Trade	77	84
Commercial banking	74	74
Insurance: stock	68	76
Diversified services	70	77
Utilities	38	52

In addition, survey findings reported in Table 4-2 suggest the median grant made to the five highest paid managers (median net gain for options exercised during the year)

ranges from 94 to 167 (21 to 117) percent of salary as of May 1989, and 101 to 232 (35 to 137) percent of salary as of May 1994.

Table 4-2. Median Grants and Option Gains.

	May 1989	May 1994
Median grant to 5 highest paid executives	94 - 167% of salary	101 - 232% of salary
Median net option gain for options exercised during year	21 - 117% of salary	35 - 137% of salary

Second, the SEC has also issued regulations governing the disclosure of executive compensation. Proposed amendments to the proxy disclosure rules issued in June 1992 were finalized in October 1992. The 1992 rules require that proxy statements issued after January 1, 1993, disclose potential stock option value, using either an option-pricing model or assumed stock price appreciation, for each of the firm's highest paid executive officers. Additional regulation was proposed by the SEC in August 1993 and finalized in November 1993. The 1993 disclosure rules apply to proxy statements filed after January 1, 1994, and are very similar to those proposed in the FASB's ED: registrants are required to disclose the option-pricing model used to value ESOs, the assumptions made in applying the model, and adjustments made to the model for non-transferability. Thus, although it is possible to control for the potential valuation effects associated with the SEC's 1992 disclosure rules, the potential valuation effects of the SEC's 1993 disclosure rules cannot be disentangled from any valuation effects associated with the ED (which was issued in June 1993).

4.3 Managerial Ownership: Incentives vs. Entrenchment

According to the incentive hypothesis, ESOs are granted to better align managerial interests with those of the shareholders; hence, managers will be more willing theoretically to undertake riskier firm investments, reduce perquisite consumption, and lengthen their decision time horizons.

Findings by Agrawal and Mandelker (1987), Morck et al. (1988), and Bagnani et al. (1994) suggest that the incentive effects of stock options vary with the level of managerial stockholdings (shares of stock and stock options). Morck et al. demonstrate that firm-value maximizing behavior is present up to 5 percent ownership as well as past 25 percent ownership; however, firm-value decreasing behavior seems associated with managerial ownership in the 5 to 25 percent range, which they conclude is due to entrenched management. Bagnani et al., on the other hand, find evidence which supports that when a manager's stockholdings exceeds 25 percent, the incentive effects are diminished and it appears managers act more like debtholders. The findings of Bagnani et al. are consistent with the notion that as the percent of compensation tied up in firm-specific wealth increases, a manager may become more risk-averse. Given these conflicting findings, directional hypotheses are not presented. However, the following null and alternate hypotheses are tested:

$H3_0$: Managerial stockholdings do not affect the market's assessment of ESO value.

$H3_A$: Managerial stockholdings do influence the market's assessment of ESO value.

4.4 Dilution vs. Incentives

Similar to the exercise of a warrant, the exercise of an ESO increases the number of outstanding shares of the firm and thus dilutes the equity of the firm's existing shareholders. Assuming perfect capital markets, and that the investment policy of the firm is given and is not being affected by its financial decisions, Galai and Schneller (1978) illustrate that the value of a share will decline with the dilution factor and the volatility of the firm's productive assets. This condition holds regardless if the warrant exercise proceeds are paid to the existing shareholders as a dividend, are used to repurchase shares of stock, or are reinvested in similar projects.

In addition, findings by Venkateswar (1992) suggest that beyond some point, the incentive effects are offset by the dilution effects of granting stock options such that shareholder wealth is reduced. Thus, the following null hypothesis and its alternatives are tested:

$H4_0$: As percentage of equity dilution increases, the dilution effects associated with granting ESOs do not outweigh the incentive effects.

$H4_{A1}$: The incentive effects of granting ESOs outweigh the dilution effects over low levels of equity dilution.

$H4_{A2}$: The incentive effects of granting ESOs are outweighed by the dilution effects over high levels of equity dilution.

$H4_{A3}$: Over some range of dilution, the incentive effects are exactly offset by the dilution effects of granting ESOs.

CHAPTER 5

5.0 Research Design

This chapter reviews the sample selection procedure, the approaches used to measure ESO value, and the models used to test the hypotheses presented in Chapter 4.

5.1 Sample Selection

The *Disclosure SEC Database* was used to identify a sample of New York Stock Exchange (NYSE) and American Stock Exchange (AMEX) firms each year during 1988-1993 that disclose fixed stock option plans in their annual reports.[34] To increase homogeneity, inclusion in the samples is limited to firms which only grant fixed, at-the-money or out-of-the-money ESOs. This requirement is not very restrictive as most firms grant only ISOs and/or NQSOs. By definition, ISOs must be granted at an exercise price no less than the market price of the stock on the date of grant, and most NQSOs are granted at-the-money. In addition, regulated firms (SIC codes 4000-4999 and 6000-6999) are excluded from the samples since previous research suggests regulated firms have systematically different compensation policies (Smith and Watts 1992; Bizjak, Brickley and Coles 1993). The footnotes of the firms that met the preceding screens were then printed offline for ease in applying the remaining screening criteria.

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[34]See Appendix A for a listing of the search terms used.

Firms are further excluded from the samples if the only ESOs they have outstanding are fully vested or are broad-based in nature.[35] These requirements are imposed since the ED requires the valuation of nonvested ESOs, and the hypotheses presented in Chapter 4 are more closely tied to managers' behavior. Table 5-1 presents the combined results of applying on a yearly basis over 1988-1993 the screening

Table 5-1. Results of Applying Sample Selection Criteria.

Number of firms on *Disclosure SEC Database* with stock option plans (1988-1993)	12,924
Exchange listing other than NYSE or AMEX	(2,797)
Regulated industry (SIC 4000-4999; 6000-6999)	(3,566)
Stock option plans include non-fixed plans	(3,156)
Foreign firms	(147)
Description of plan(s) in footnotes not clear enough to determine if plan(s) is (are) fixed	(1,585)
All of firms' fixed plans are fully vested or broad-based	(467)
Missing proxy statement data to supplement *Disclosure SEC Database* data on variable, "Officer and Director Shares"	(3)
Missing *Compustat PC Plus* data	(45)
Missing *CRSP* data	(191)
Final sample for testing crude proxy of ESO value	967

[35]A firm is not deleted if it had nonvested ESOs outstanding under at least one of its plans. Similarly, a firm is not deleted if at least one of its nonvested plans was granted to officers, directors, and key employees (i.e., management plans). Plans described as granted to "employees," "eligible employees," or "full-time employees," are treated as broad-based plans. If the grantee type is not specified in the footnotes, the plan is assumed to be granted to officers, directors, and key employees.

criteria to the firms listed on the *Disclosure SEC Database*. A total of 967 firm-years comprise the full sample for testing the hypotheses presented in Chapter 4 with the crude proxy of ESO value.

Data collection constraints[36] associated with the MV and BS valuation procedures necessitate the use of a subsample; thus, as a further refinement of the compensation policy screen used to generate the full sample,[37] and to ensure increased homogeneity, a subsample of firms is identified from the full sample by requiring these firms to be pension plan users.[38] For the combined period 1988-1993, this reduced the combined sample of 967 to 435.

5.2 ESO Valuation

This section outlines the three general approaches that are used to value the sampled firms' outstanding ESOs. The approaches include a crude proxy, the continuous-dividend version of the BS (1973) call option pricing formula, and the

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[36]Specifically, data collection associated with the BS and MV procedures is very costly due to the time-consuming nature of collecting the model inputs (such as time remaining on each option grant).

[37]To reiterate, regulated firms are excluded from the samples since previous research indicates that regulated firms have *systematically different compensation policies* (Smith and Watts 1992; Bizjak, Brickley and Coles 1993).

[38]One means of facilitating the data collection is to restrict the sample to either pension plan users or non-users since the compensation policies between these two groups may differ. Partitioning the full sample with respect to the presence of a pension plan yields approximately equal subsamples. Thus, to reduce the full sample size and to further increase homogeneity with respect to compensation plans, pension plan users were chosen to comprise the subsample. As a result, the subsample is identified by requiring non-missing data for the following two pension variables: fair value of pension plan assets and accumulated benefit obligation.

minimum value procedure. The crude proxy approach is applied to the full samples; due to data collection constraints, the other two approaches are applied to subsamples.

In addition, an approach similar to one used by Wallace and Smith (1991) is used on the subsamples to identify on a first-in first-out basis the composition of firms' outstanding ESOs. Specifically, information concerning the number of ESOs granted, and associated exercise prices and option terms, were gathered for the sample year, t, as well as for years, t-1 and t-2. Although firms usually disclose in their footnotes the preceding information for the most recent three years, missing data was supplemented with annual reports in the SEC Q-file at the University of Missouri-Columbia.

5.2.1 Crude Proxy

Albeit crude, outstanding ESOs are valued initially as 25 percent of their exercise price. According to Holthausen and Larcker (1993), simulation results reported in Lambert, Larcker and Verrecchia (1991) and in McConnell (1993) suggest sophisticated option-pricing models often produce stock option values within this range at the time of grant.

The sum of the results from applying this procedure to each of the firms' outstanding option plan(s), denoted as *PROXY*, proxies the value of a sample firm's outstanding ESOs (denoted as *COMP* in the following regressions). *COMP* is also measured under the following sophisticated approaches (however, only subsamples of the original samples are used for the calculations due to data constraints).

5.2.2 Black-Scholes Valuation Formula

The BS (1973) model values traded options based on the probability of future stock price appreciation, and incorporates the following assumptions:

(1) There are no margin requirements, taxes, or transaction costs.

(2) The risk-free rate, stock volatility, and dividend yield are constant over time.

(3) The stock price changes by very small amounts during short periods of time.

(4) The options have short lives.

Following Foster et al. (1991), a continuous-dividend version of the BS call option valuation formula was used to value firms' outstanding ESOs:

$$V = e^{-\ln(1+k)t} S\Phi(Z) - e^{-\ln(1+r)t} X\Phi(Z-\sigma\sqrt{t}) \qquad (1)$$

where

V = the value of each outstanding ESO grant
S = the market value of the optioned stock at fiscal year-end
X = the exercise price of each outstanding ESO grant
r = the risk-free interest rate
σ^2 = the variance of return on the optioned stock
t = time remaining of the life of each ESO grant
k = the per-share dividend yield
$\Phi(\cdot)$ = the cumulative normal density function
$Z \equiv [\ln(S/X) + (\ln(1+r) - \ln(1+k) + \sigma^2/2)t]/\sigma\sqrt{t}$

For ESOs on non-dividend paying stocks, the above formulation reduces to the unadjusted BS formula.[39]

5.2.3 Minimum Value Procedure

The minimum value model (hereafter MV) was proposed by the FASB to value ESOs granted by nonpublic firms and is stipulated to be the lower bound for any estimate obtained using a fair-value model. This model provides an ESO value based on the net present value of the funds to be used when exercising the option, and is equal to the value of the stock on the measurement date less the present value of both the expected future dividends to be paid on that stock and the exercise price. The MV model can be expressed as:

$$V=MAX[0,(S-PV(X)-PV(D))] \quad (2)$$

[39]Two adjustments are proposed by the FASB to the standard BS formula to take into account the specific features of ESOs. First, the expected life of the ESO rather than the time to maturity is to be used in the BS model to account for the nontransferability feature of ESOs. Second, firms are to estimate actuarially the number of options that are expected to vest and multiply this proportion by the estimates obtained under an option-pricing model. This adjustment accounts for the fact that the value of an ESO that does not vest is zero (i.e., the forfeitability feature of ESOs). Given the concern expressed by researchers on such issues as the necessity of the turnover adjustment and its marginal effects on the estimates (Foster et al. 1993; Cuny and Jorion 1994), as well as the appropriateness of using the expected life in place of term to maturity (e.g., Kulatilaka and Marcus 1994), this research does not adjust the estimate of ESO value for these features.

where

V = the value of each outstanding ESO grant
S = the market value of the optioned stock at the fiscal year-end
PV = the calculation of present value with daily compounding of the risk-free rate
X = the exercise price of each outstanding ESO grant
D = annual dividends per share

The above MV approach to valuing ESOs is not considered acceptable for public companies as this approach fails to consider the optioned stock's volatility.

5.2.4 Measures

This section presents a description of how inputs into the above valuation models are determined and/or calculated.

5.2.5.1 Stock and Exercise Prices

The stock price used in the valuation models of outstanding ESOs is the firm's stock price at fiscal year-end, mnemonic PRCCF on *Compustat PC Plus*. Under the crude proxy approach to ESO valuation, the midpoint of the generally disclosed range of exercise prices associated with firms' outstanding ESOs (from the *Disclosure SEC Database* printouts) is used as the exercise price, unless the actual exercise price of the nonvested ESOs could be determined. Under the BS and MV approaches, the exercise price of each ESO grant comprising the firms' outstanding ESOs was retrieved from the footnotes of the annual reports (either printed from the *Disclosure SEC Database* or retrieved manually from the SEC Q-file). If a range was given for

the grant year, the midpoint of this range is used as the exercise price. If no range is disclosed for the grants made in a particular year, the average price of the ESOs outstanding for that year is used.

5.2.5.2 Nonvested ESOs

The following assumptions are used in determining the number of nonvested ESOs for use in the crude proxy approach. First, *nonexercisable* ESOs were considered to be *nonvested.* Second, if a firm did not disclose the number of nonexercisable ESOs, but ESOs had been exercised in the current period, it is assumed that one half of the outstanding ESOs are nonvested. Firms' annual report footnotes (printed from the *Disclosure SEC Database*) are used to identify the number of ESOs which are outstanding and nonvested at fiscal year-end.

Under the BS and MV procedures, firms' annual report footnotes (printed from the *Disclosure SEC Database* and supplemented when needed with the SEC Q-file) are used to identify the composition of nonvested ESOs still outstanding at fiscal year-end. Unless a vesting schedule is presented which allows the determination of nonvested ESOs from each ESO grant, nonvested ESOs are assumed to relate to firms' most recent grants.

5.2.5.3 Term

The actual option term is obtained from firms' annual report footnotes (either from the *Disclosure SEC Database* or the SEC Q-file) in order to determine time

remaining on each option grant. If no term is specified, the term is assumed to be ten years.[40] In addition, grants are assumed to be made midyear unless specified otherwise.

5.2.5.4 Risk-free Interest Rate

In accordance with the ED, *The Wall Street Journal* is used to collect the yield on a zero-coupon U.S. Treasury security that matures closest in time to the remaining life of each ESO grant still outstanding.[41] These yields are then converted to effective yields, and proxy the risk-free interest rate in the MV valuation procedure. A continuous risk-free interest rate (FKV; Noreen and Wolfson 1981), calculated as the natural logarithm of (1 + effective yield) is used in the above BS valuation approach.

5.2.5.5 Dividend Yield

One- and five-year historical dividend yields were calculated for use in the MV and BS procedures. For the one-year yield, *Compustat PC Plus* mnemonic item DVYDF (Dividend Yield - Fiscal Year-End)[42] was used. For the five-year average yield, a simple average of $DVYDF_t$ through $DVYDF_{t-4}$ was calculated. Daily

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[40]It is customary for ESOs to carry a maturity of ten years.

[41]Since the yields on U.S. Stripped Treasuries are not available during fiscal 1988, the yield on an interest-bearing U.S. Treasury note or bond that matures closest in time to the maturity of each outstanding ESO grant is collected for the sample firms drawn from fiscal 1988.

[42]DYVDF is defined as the cash dividends per share for which the ex-dividend dates occurred during the reporting period, divided by the company's close price for the fiscal year. For use in the MV procedures, DYVDF is multiplied by the company's closing price at fiscal year-end.

compounding was used for the MV procedure. In the BS model, the natural logarithm of $(1 + k)$ proxied the continuous-dividend yield (FKV; Noreen and Wolfson 1981).

5.2.5.6 Volatility

As noted by FKV, prior literature suggests the bias in BS estimates can be reduced in two ways: by lengthening the time period over which returns are used to calculate volatility, and by using post-grant returns (Black and Scholes 1972; Latane and Rendleman 1976; Merton 1976; Boyle and Ananthanarayan 1977). Hence, similar to the approach used by Mercer, expected volatility is estimated using the daily stock prices over 250 trading days prior to the fiscal year-end for each sample firm. A second measure of expected volatility was also calculated, which uses the daily stock prices over 1250 trading days prior to each firm's fiscal year-end. These one-year and five-year average annualized volatility estimates were used in the BS model.

5.3 Hypothesis Testing

This section details the procedures used in testing the hypotheses outlined in Chapter 4. Table 5-2 presents a summary of variables, along with their associated definitions, that appear in subsequent regression equations. Table 5-3 summarizes the five alternate measures of *COMP* to be used in the full-sample and subsample regressions.

Table 5-2. Definition of Regression Variables.

Variable (Acronym)	Definition [*Compustat PC Plus* Data Item Number or Mnemonic]
Market Value of Equity (*MVE*)	Fiscal year-end market value of common stock [MKVALF]
Book Value of Total Assets (*BVASSETS*)	Fiscal year-end book value of total assets [6], including the fair value of pension plan assets [287 and/or 296][43]
Book Value of Total Liabilities *(BVLIABS)*	Fiscal year-end book value of total liabilities [181], including the accumulated pension benefit obligation [285 and/or 293] and preferred stock [130]
ESO Value *(COMP)*	The value of outstanding nonvested ESOs at fiscal year-end, estimated under five approaches: *PROXY, MV1, MV5, BS1, BS5* (described in Table 5-3)

5.3.1 Equity-Value Relevance of ESOs

To test whether the market views the non-zero estimated value of ESOs to be equity-value relevant, the empirical analogue of the following theoretical equity valuation model is used:

$$MVE=\alpha_1 MVASSETS+\alpha_2 MVLIABS+\alpha_3 COMP \qquad (3)$$

[43]Following Barth and McNichols (1994), *BVASSETS* and *BVLIABS* includes the fair value of pension plan assets and the accumulated pension benefit obligation, since both have been shown to be associated with share prices (e.g., Barth 1991). Firms may have underfunded and/or overfunded pension plans; hence, the "and/or" definition for the pension variables.

Table 5-3. Alternate Measures of ESO Value (*COMP*).

Measure of *COMP* (Acronym)	Definition [*Compustat PC Plus* Data Item Number of Mnemonic]
Crude Proxy of ESO Value (*PROXY*)	The value of outstanding nonvested ESOs at fiscal year-end, estimated for each option plan outstanding as: (25% * Strike Price) * (Number of Nonvested ESOs)
ESO Value Under Minimum Value Procedure Using One-Year Estimate (*MV1*)	The value of outstanding nonvested ESOs at fiscal year-end, calculated under the minimum value procedure, with dividends estimated based on the dividend yield over the past year [DVYDF*PRCCF]
ESO Value Under Minimum Value Procedure Using Five-Year Estimate (*MV5*)	The value of outstanding nonvested ESOs at fiscal year-end, calculated under the minimum value procedure, with dividends estimated based on the average dividend yield over the past five years [DVYDF*PRCCF calculated each year for the past five years, and then averaged]
ESO Value Under Black-Scholes Procedure Using One-Year Estimates (*BS1*)	The value of outstanding nonvested ESOs at fiscal year-end, calculated under the Black-Scholes option valuation procedure, with dividends (volatility) estimated as the dividend yield [DVYDY] (volatility) over the past year
ESO Value Under Black-Scholes Procedure Using Five-Year Estimates (*BS5*)	The value of outstanding nonvested ESOs at fiscal year-end, calculated under the Black-Scholes option valuation procedure, with dividends (volatility) estimated as the average dividend yield (volatility) over the past five years

where

MVE =	market value of the firm's equity
MVASSETS =	market value of the firm's non-ESO assets
MVLIABS =	market value of the firm's liabilities
COMP =	estimate of the value of the firm's outstanding nonvested ESOs

The above model is the market value version of the accounting identity for net assets, which holds exactly when the identity is expressed in book values and market values. As such, Landsman (1984) suggests the coefficients of *MVASSETS* and *MVLIABS* should be 1 and -1, respectively. The empirical version of the above model becomes:[44]

$$MVE_{it}=\alpha_0+\alpha_1 BVASSETS_{it}+\alpha_2 BVLIABS_{it}+\alpha_3 COMP_{it}+\epsilon_{it} \quad (4)$$

This basic multiple regression equation is estimated at the end of each year for the period 1988-1993 using the five measures of *COMP: PROXY, MV1, MV5, BS1* and *BS5*. To mitigate initially the effects of heteroscedasticity, all variables are deflated by the number of common shares outstanding at fiscal year-end adjusted for stock splits and dividends (Barth 1994). The samples are also pooled over time so that a fixed effects model could be estimated.

In this empirical valuation model, the intercept term should be close to zero (a significant coefficient would imply model misspecification). In addition, the model,

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[44]Ohlson (1993) notes the book value approach to valuation is an extreme approach, as is a valuation approach based solely on earnings, yet concedes both are good benchmark models.

which is similar to models used by other researchers (Landsman 1986; Harris and Ohlson 1987; Beaver et al. 1989; Barth et al. 1991; Shevlin 1991; Barth and McNichols 1993; Barth 1991, 1994) will indicate whether the market does indeed assign a value other than zero (for fixed stock options) to the stock options granted to managers (i.e., the estimate is equity-value relevant). The finding that $\alpha_3 > 0$ or $\alpha_3 < 0$, in any test period, would lead to the rejection of $H1_0$ in favor of $H1_{A1}$ or $H1_{A2}$, respectively.

5.3.2 Market Sensitization

To test $H2_0$, that is, whether the market values ESOs consistently with respect to the release of the FASB's ED, the following pooled regression is used:

$$MVE_{it}=\alpha_0+\alpha_1 BVASSETS_{it}+\alpha_2 BVLIABS_{it} +\alpha_3 D_{88\text{-}91}*COMP+\alpha_4 D_{92}*COMP_{it}+\alpha_5 D_{93}*COMP_{it}+\epsilon_{it} \quad (5)$$

where

$D_{88\text{-}91}$ = dummy variable which takes on the value of 1 if fiscal year-end is between 1988 and 1991; else it equals zero

D_{92} = dummy variable which takes on the value of 1 if fiscal year-end is 1992 (SEC group); else it equals 0

D_{93} = dummy variable equal to 1 if fiscal year-end is 1993 (post-ED group); else it equals 0

An F-test is used to test for a significant difference in the market's assessment of ESO value during the pre-ED period (1988-1991) compared to its assessment in the

subsequent periods (1992, the SEC control group; and 1993, the post-ED group).[45] Failure to reject the null allows for pooling the samples for the remaining tests. A rejection of the null, however, requires that the remaining tests be conducted individually on the three subperiod samples (pre-ED, 1992, and post-ED).

5.3.3 Managerial Ownership: Entrenchment vs. Incentives

Although findings conflict, the literature suggests that the incentive effects of stock options vary with the level of managerial stockholdings (Morck et al. 1988; Bagnani et al. 1994). As a test of H3, the effect of managerial stockholdings on the basic equity valuation equation is determined using the following regression:

$$MVE_{it}=\alpha_0+\alpha_1 BVASSETS_{it}+\alpha_2 BVLIABS_{it} +\alpha_3 D_{<5}*COMP_{it}+\alpha_4 D_{5-25}*COMP_{it}+\alpha_5 D_{>25}*COMP_{it}+\epsilon_{it} \quad (6)$$

where

$D_{<5}$ = dummy variable equal to 1 if year-end combined managerial stockholdings of firm i is less than 5 percent; else it equals 0

D_{5-25} = dummy variable equal to 1 if year-end combined managerial stockholdings of firm i is greater than or equal to 5 percent, but less than 25 percent; else it equals 0

$D_{>25}$ = dummy variable equal to 1 if year-end combined managerial stockholdings of firm i is greater than or equal to 25 percent; else it equals 0

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[45]Specifically, the null hypothesis is $\alpha_3 = \alpha_4 = \alpha_5$, which tests for no difference in the equity market's valuation of ESOs prior to the ED release compared to after the release.

Managerial stockholdings are proxied by the following formula:[46]

$$\frac{OD\ Shares + ODK\ Nonvested\ ESOs}{Common\ Shares\ Outstanding + ODK\ ESOs} \quad (7)$$

where

OD Shares = total number of shares of common stock held by Officers and Directors of the company as a group, as reported by the *Disclosure Sec Database*[47]

ODK Nonvested ESOs = total number of outstanding nonvested ESOs held by Officers, Directors, and Key Employees of the company as a group (gathered from footnotes printed from the *Disclosure Sec Database*)

Common Shares Outstanding = common shares outstanding at fiscal year-end (*Compustat PC Plus* item number 25)

ODK ESOs = total number of outstanding (vested and nonvested) ESOs held by Officers, Directors, and Key Employees of the company as a group (gathered from footnotes printed from the *Disclosure Sec Database*)

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[46]Previous research (e.g., Bagnani et al, 1994) calculates managements' ownership percentage using the following formula: (Officer and Director Shares + Officer and Director ESOs)/ (Common Shares Outstanding + Officer and Director ESOs), with the formula inputs gathered from firms' proxy statements. In order to assess whether a material difference exists between the above management ownership formula and this dissertation's proxy for managements' ownership presented in equation (7), the proxy statements for 45 firms from the 1993 *Disclosure SEC Database* sample are gathered and management ownership is calculated under both approaches. Results indicate no significant difference ($\alpha = 0.01$) between the calculation of management ownership percentage under the two approaches.

[47]The source of these disclosures is firms' proxy statements. As defined, this variable includes ESOs held by Officers and Directors which are currently exercisable (i.e. vested).

A rejection of the F-test of the null hypothesis, $\alpha_3 = \alpha_4 = \alpha_5$, leads to a rejection of $H3_0$ and the conclusion that managerial stockholdings do influence the market's assessment of ESO value.

5.3.4 Dilution vs. Incentives

Analytical and empirical research suggests that beyond some point, the incentive effects are offset by the dilution effects of granting stock options such that shareholder wealth is reduced (Galai and Schneller 1978; Venkateswar 1992). To study the effects of equity dilution on the incentive effects of ESOs, the following regression is used:

$$MVE_{it} = \alpha_0 + \alpha_1 BVASSETS_{it} + \alpha_2 BVLIABS_{it} + \alpha_3 D_{0-2} * COMP_{it} + \alpha_4 D_{2-4} * COMP_{it} + \alpha_5 D_{4-6} * COMP_{it} + \alpha_6 D_{>6} * COMP_{it} + \epsilon_{it} \quad (8)$$

where

D_{0-2} = dummy variable equal to 1 if percent of firm i's equity dilution is greater than or equal to 0 percent but less than 2 percent, where equity dilution is measured by the number of shares proposed to be issued through Officer, Director, and Key Employee ESOs (from *Disclosure SEC Database*) divided by outstanding common stock at year end (*Compustat PC Plus* item number 25); else equal to 0

D_{2-4} = 1 if equity dilution is greater than or equal to 2 percent but less than 4 percent; else equal to 0

D_{4-6} = 1 if equity dilution is greater than or equal 4 percent but less than 6 percent; else equal to 0

$D_{>6}$ = 1 if equity dilution is greater than or equal to 6 percent; else equal to 0

Similar to the above testing for managerial ownership effects on incentives, prior research suggests the incentive effects of ESOs change with dilution level turning points of 2, 4, and 6 percent (Venkateswar 1992). Rejection of $H4_0$ in favor of an alternate hypothesis occurs if F-test results suggest $\alpha_3 = \alpha_4 = \alpha_5 = \alpha_6$ cannot be accepted.

CHAPTER 6

6.0 Results

This chapter presents the results from applying the empirical procedures outlined in Chapter 5 to test the hypotheses developed in Chapter 4. Sample descriptive statistics appear first, followed by the results of testing H1 through H4. Sensitivity analyses and results of specification checks conclude the chapter.

6.1 Descriptive Statistics

Table 6-1 contains various statistics concerning selected regressors that appear in equations (4) through (6), and (8). The reported mean and standard deviation for each variable represents the mean and standard deviation of the individual years' means. The minimum and maximum reported for each variable is determined from pooling all observations from either the full sample or the subsample over the six-year period. In addition, all variables are presented in dollars per share. The mean (standard deviation) number of observations per year is 161.17 (26.37) for the full sample; 72.5 (6.26) for the subsample. In addition, Appendix B shows the industry classifications represented by the sampled firms.

As illustrated in Panel A of Table 6-1, the crude proxy of ESO value, *PROXY*, has a mean value of $0.10 per share. Panel B illustrates that the more sophisticated approaches used to measure ESO value yield averages of $0.22 per share (MV procedures) and $0.25 per share (BS procedures). The maximum ESO value ranges

from $1.36 per share (*PROXY*) to $3.70 per share (*MV5*). It is interesting to note that the maximum values obtained under the MV procedures exceed those reported under the BS procedures, a finding consistent with prior criticism of this approach to ESO valuation. In addition, for the full sample, mean (standard deviation) managerial stockholdings and potential dilution from ESOs are 0.25 (0.02) and 0.07 (0.01),

Table 6-1. Descriptive Statistics on Selected Regression Variables.
(All variables presented in dollars per share and defined in Tables 5-2 and 5-3. Panel A presents statistics for the full sample; panel B presents statistics for the subsample. Mean and standard deviation is the mean and standard deviation of the individual years' means. Minimum/maximum is determined from pooling observations over 1988-1993. Mean (standard deviation) observations per year is 161.17 (26.37) for full sample; 72.5 (6.26) for subsample.)

Variable	Mean	Std. Dev.	Minimum	Maximum
Panel A:				
MVE	19.35	1.46	0.02	114.50
BVASSETS	26.68	1.78	0.36	259.93
BVLIABS	16.43	1.31	0.08	225.71
PROXY	0.10	0.01	0.0001	1.36
Panel B:				
MVE	24.93	2.27	0.41	114.50
BVASSETS	36.35	2.96	1.18	226.22
BVLIABS	22.91	2.21	0.32	225.71
MV1	0.22	0.02	0	3.52
MV5	0.22	0.02	0	3.70
BS1	0.25	0.02	0.0002	3.37
BS5	0.25	0.02	0	3.36

respectively; and 0.21 (0.01) and 0.06 (0.004) for the subsample (not reported in Table 6-1).

Table 6-2 presents the Pearson Correlation Coefficients among the alternate measures of ESO value (i.e. *COMP*). The correlation of *PROXY* with the remaining measures exceeds 0.66, while the correlation among the MV and BS approaches exceeds 0.96. The high level of correlation observed between the more sophisticated approaches suggests the MV procedure may be a low cost alternative to costly option valuation procedures, such as BS.

Table 6-2. Pearson Correlation Coefficients Among Alternate ESO Measures (n=435). (Alternate measures of *COMP* are defined in Table 5-3.)

	PROXY	*MV1*	*MV5*	*BS1*	*BS5*
PROXY	1.00000 0.0	0.68062 0.0001	0.66926 0.0001	0.71803 0.0001	0.76689 0.0001
MV1		1.00000 0.0	0.99522 0.0001	0.98988 0.0001	0.97016 0.0001
MV5			1.00000 0.0	0.98227 0.0001	0.96605 0.0001
BS1				1.00000 0.0	0.98723 0.0001
BS5					1.00000 0.0

6.2 Equity-Value Relevance of ESOs

This section presents the results of testing whether the market views the non-zero estimated value of ESOs to be equity-value relevant (i.e., H1). Results from OLS

estimation of equation (4) are presented first, followed by the results from estimating the fixed effects model.

6.2.1 Ordinary Least Squares Estimation

The mean of the yearly regression results from applying OLS cross-sectionally from 1988-1993 are detailed in Table 6-3.[48] The crude measure of ESO value, *PROXY*, is used in the full sample regressions; the more sophisticated measures of ESO value (*MV1*, *MV5*, *BS1*, and *BS5*) are used in the subsample regressions. Initially, all variables are deflated by shares outstanding at fiscal year-end to mitigate the effects of heteroscedasticity. Results from applying procedures proposed by White (1980) to test for correct model specification and heteroscedasticity are rejected in four out of six years when *PROXY* is used to measure ESO value, and in only one year when *BS5* is used (see Appendix C). Thus, for consistency, all reported t-statistics are based on White standard errors.

The Z-statistic presented in Table 6-3 tests whether the time series mean t-statistic is significantly different from zero, and adjusts for the potential lack of independence caused by cross-sectional and serial correlation among the error terms (Barth and McNichols 1994).[49]

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[48]Yearly regression results are presented in Appendix C.

[49]Specifically, when n is the number of years, the statistic equals the following, which is distributed as a standard normal variate:

$$\bar{t}/(stddev(t)/(\sqrt{n-1}))$$

Table 6-3. Equity-Value Relevance of ESOs: Equation (4) Mean Regression Results. (Yearly regression results from regressing the dependent variable, *MVE*, on each of the listed independent variables, including the alternate measures of *COMP*, are averaged to yield mean regression results. *PROXY* is used in the full sample regressions; the other measures of *COMP* are used in the subsample regressions. All t-statistics and inferences are based on White (1980) standard errors. The Z-statistic tests whether the time-series mean t-statistic is significantly different from zero (Barth and McNichols 1994). All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Variable	Parameter Estimate (std dev)	t-Statistic (std dev)	Z-Statistic	Adjusted R-Square (std dev)	Model F (df)
INTERCEPT	4.39 (1.16)	***2.74 (0.92)	6.67	0.50 (0.05)	###54.3 (157.2)
BVASSETS	1.38 (0.18)	***6.76 (1.98)	7.61		
BVLIABS	-1.40 (0.19)	***-5.67 (1.91)	-6.65		
PROXY	11.52 (9.39)	0.91 (0.53)	3.84		
INTERCEPT	3.70 (1.08)	*1.68 (0.44)	8.58	0.61 (0.05)	###38.3 (68.5)
BVASSETS	1.28 (0.13)	***5.52 (1.36)	9.08		
BVLIABS	-1.31 (0.18)	***-4.56 (1.91)	-7.79		
MV1	21.07 (3.49)	***3.75 (1.95)	4.29		

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

Table 6-3 (continued). Equity-Value Relevance of ESOs: Equation (4) Mean Regression Results. (Yearly regression results from regressing the dependent variable, *MVE*, on each of the listed independent variables, including the alternate measures of *COMP*, are averaged to yield mean regression results. *PROXY* is used in the full sample regressions; the other measures of *COMP* are used in the subsample regressions. All t-statistics and inferences are based on White (1980) standard errors. The Z-statistic tests whether the time-series mean t-statistic is significantly different from zero (Barth and McNichols 1994). All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Variable	Parameter Estimate (std dev)	t-Statistic (std dev)	Z-Statistic	Adjusted R-Square (std dev)	Model F (df)
INTERCEPT	3.94 (1.09)	*1.75 (0.44)	8.97	0.60 (0.05)	###37.9 (68.5)
BVASSETS	1.28 (0.13)	***5.44 (1.31)	9.26		
BVLIABS	-1.30 (0.18)	***-4.49 (1.27)	-7.88		
MV5	20.29 (3.40)	***3.64 (2.04)	3.98		
INTERCEPT	3.34 (1.08)	1.43 (0.42)	7.59	0.59 (0.05)	###35.7 (68.5)
BVASSETS	1.31 (0.13)	***5.58 (1.35)	9.21		
BVLIABS	-1.34 (0.18)	***-4.63 (1.30)	-7.94		
BS1	19.35 (4.29)	***3.28 (1.58)	4.64		

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

Table 6-3 (continued). Equity-Value Relevance of ESOs: Equation (4) Mean Regression Results. (Yearly regression results from regressing the dependent variable, *MVE*, on each of the listed independent variables, including the alternate measures of *COMP*, are averaged to yield mean regression results. *PROXY* is used in the full sample regressions; the other measures of *COMP* are used in the subsample regressions. All t-statistics and inferences are based on White (1980) standard errors. The Z-statistic tests whether the time-series mean t-statistic is significantly different from zero (Barth and McNichols 1994). All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Variable	Parameter Estimate (std dev)	t-Statistic (std dev)	Z-Statistic	Adjusted R-Square (std dev)	Model F (df)
INTERCEPT	3.61 (1.16)	1.49 (0.44)	7.54	0.58 (0.05)	###34.5 (68.5)
BVASSETS	1.31 (0.13)	***5.52 (1.34)	9.20		
BVLIABS	-1.34 (0.17)	***-4.59 (1.30)	-7.86		
BS5	18.03 (4.87)	***2.98 (1.46)	4.58		

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

All of the models are highly significant as evidenced by the model F values and the adjusted R-squares. The mean model F values exceed 34, with corresponding p-values less than 0.0001. The mean adjusted R-squares range from 0.50 (using *PROXY*) to 0.61 (using *MV1*). Inspection of the various models reveals that ESO value calculated under the MV and BS procedures *is* equity-value relevant, as evidenced by the highly significant coefficients on *MV1*, *MV5*, *BS1*, and *BS5*.[50] Not only are the

[50]Subsample results using *PROXY* as the measure of *COMP* for these as well as the remaining tests yield results consistent with the full sample results.

coefficients on these alternate measures significantly different from zero, but they are also significantly different from their theoretical values of one, a finding which implies either measurement error in these values or omitted correlated variables. Also, the average coefficient on *PROXY* does not yield significant results, although for 1991 (see Appendix C), the coefficient was significantly different from zero at the 0.10 level of significance. Finally, all of the Z-statistics presented in Table 6-3 suggest the mean parameter estimates are significantly different from zero at the 0.01 level of significance.

Diagnostic procedures performed on equation (4) suggest two additional concerns. First, the presence of multicollinearity is tested through the use of variance inflation factors (VIFs), defined as the inverse of one minus the coefficient of multiple determination when an independent variable is regressed on the remaining independent variables in the model. A VIF value in excess of 10 is indicative that multicollinearity could be influencing the parameter estimates (Neter, Wasserman, and Kutner 1990). In every individual year regression (using each alternate measure of ESO value) the VIFs associated with *BVASSETS* and *BVLIABS* exceed 10; thus, to correct for the potential problems caused by multicollinearity among the regressors, equation (4) is estimated in net asset form.[51]

In addition, extreme observations are identified through the use of Cook's distance measure D, which assesses the influence of each observation on the regression

[51]In addition, the presence of multicollinearity is checked through the use of partial F-tests, where the full models include *COMP* and the reduced models omit *COMP*. The results from applying these procedures are consistent with those presented.

coefficients. Cook's D values in excess of 0.50 are considered to have a substantial impact on the fit of the regression line (Neter et al. 1990). Hence, equation (4) is also estimated after all observations with Cook's D values in excess of 0.50 have been deleted.[52]

The results obtained from estimating equation (4) with the omission of extreme observations, and also after estimating equation (4) in net asset form are similar to those already contained in Table 6-3; hence, they are not separately reported. In addition, results from applying these procedures to the remaining models will only be presented when they differ from those obtained under the original model.

6.2.2 Fixed Effects Model

An alternate procedure, which allows for structural change over the test period, is used to test the equity-value relevance of ESOs. Under the fixed effects model (Kmenta 1986), all observations within the full sample or subsample are pooled over the test periods, and the cross-sectional intercepts are allowed to change over time by introducing dummy variables for each of years 1988 through 1992 (the dummy variable for 1993 is omitted).[53] The use of this procedure is motivated on the basis that

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[52]The total number of outliers deleted over the combined six-year period is as follows: 5 (*PROXY*), 8 (MV procedures), and 7 (BS procedures).

[53]The intercept may also change over cross-section units; however, since only 26 firms in the full sample and 9 firms in the subsample have observations in each of the six years, firm-specific effects are not estimated. This limitation also prevents the use of seemingly unrelated regression, which requires equal observations of the same cross-sectional units over a test period.

failure to control for structural changes may lead to insignificant test statistics even when a significant association is present (Johnson et al. 1987). Table 6-4 documents the fixed effects model results of the basic model.

Results are very similar to those presented in Table 6-3, with one exception: *PROXY* is now significant in the basic model (p-value < 0.01). Thus, structural changes over the test period could have been confounding the test statistics associated with *PROXY* reported in Table 6-3.

Table 6-4. Equity-Value Relevance of ESOs: Results of Equation (4) Estimated with Fixed Effects. (Dependent variable, *MVE*, is regressed on each of the listed independent variables, including the alternate measures of *COMP*, and a (0,1) dummy variable for each of years 1988-1992 (1993 is omitted). *PROXY* is used in the full sample regressions; the other measures of *COMP* are used in the subsample regressions. All t-statistics and inferences are based on White (1980) standard errors. All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Variable	Parameter Estimate	t-Statistic	Adjusted R-Square	Model F (df)
INTERCEPT	6.91	***5.53	0.49	###115.6 (958)
BVASSETS	1.34	***14.37		
BVLIABS	-1.35	***-11.6		
PROXY	12.37	***2.64		

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

Table 6-4 (continued). Equity-Value Relevance of ESOs: Results of Equation (4) Estimated with Fixed Effects. (Dependent variable, *MVE*, is regressed on each of the listed independent variables, including the alternate measures of *COMP*, and a (0,1) dummy variable for each of years 1988-1992 (1993 is omitted). *PROXY* is used in the full sample regressions; the other measures of *COMP* are used in the subsample regressions. All t-statistics and inferences are based on White (1980) standard errors. All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Variable	Parameter Estimate	t-Statistic	Adjusted R-Square	Model F (df)
INTERCEPT	7.96	***4.19	0.60	###80.9 (426)
BVASSETS	1.24	***11.78		
BVLIABS	-1.27	***-9.31		
MV1	21.59	***8.01		
INTERCEPT	8.21	***4.32	0.59	###79.9 (429)
BVASSETS	1.24	***11.70		
BVLIABS	-1.26	***-9.25		
MV5	20.83	***7.67		
INTERCEPT	7.44	***3.81	0.58	###75.3 (426)
BVASSETS	1.27	***11.89		
BVLIABS	-1.29	***-9.38		
BS1	20.21	***7.33		
INTERCEPT	7.75	***3.92	0.57	###72.4 (426)
BVASSETS	1.27	***11.73		
BVLIABS	-1.29	***-9.27		
BS5	18.99	**2.02		

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

6.3 Market Sensitization

This section presents tests of H2; that is, whether or not the ED has sensitized the market to the view that ESOs are a form of compensation that should be recognized in firms' financial statements.

For convenience, equation (5) and accompanying variable definitions are reiterated below:

$$MVE_{it}=\alpha_0+\alpha_1 BVASSETS_{it}+\alpha_2 BVLIABS_{it} +\alpha_3 D_{88-91}*COMP+\alpha_4 D_{92}*COMP_{it}+\alpha_5 D_{93}*COMP_{it}+\epsilon_{it} \quad (5)$$

where

$D_{88\text{-}91}$ = dummy variable which takes on the value of 1 if fiscal year-end is between 1988 and 1991; else it equals zero

D_{92} = dummy variable which takes on the value of 1 if fiscal year-end is 1992 (SEC group); else it equals 0

D_{93} = dummy variable equal to 1 if fiscal year-end is 1993 (post-ED group); else it equals 0

Table 6-5 summarizes the results of estimating regression equation (5) under each of the alternate measures of ESO value (i.e. *COMP*). With the exception of *COMP* being measured as *PROXY*, *COMP* is significantly different from zero in each test period, thus highlighting that the market has been previously sensitized to the non-zero economic value of ESOs.

F-tests based on White (1980) standard errors are used to test whether the coefficients on $D_{88\text{-}91}$*COMP*, D_{92}*COMP*, and D_{93}*COMP* are statistically different from each other. Specifically, the null hypothesis is $\alpha_3 = \alpha_4 = \alpha_5$, which tests for no

Table 6-5. Market Sensitization from the Exposure Draft: Equation (5) Regression Results. (Dependent variable, *MVE*, is regressed on each of the listed independent variables, including the alternate measures of *COMP* multiplied by a (0,1) dummy variable corresponding to the three test periods: 1988-1991, 1992, and 1993. *PROXY* is used in the full sample regression; the other measures of *COMP* are used in the subsample regressions. Table cells contain parameter estimates and t-statistics based on White (1980) standard errors. All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Variable	Alternate Measures of *COMP*				
	PROXY	*MV1*	*MV5*	*BS1*	*BS5*
INTERCEPT	4.64 ***6.84	4.23 ***4.75	4.47 ***4.93	3.78 ***4.02	4.01 ***4.15
BVASSETS	1.35 ***14.27	1.23 ***11.81	1.23 ***11.75	1.26 ***11.93	1.26 ***11.76
BVLIABS	-1.36 ***-11.48	-1.26 ***-9.30	-1.25 ***-9.26	-1.29 ***-9.39	-1.29 ***-9.27
$D_{88\text{-}91}$*COMP	7.21 1.02	20.06 ***4.75	19.33 ***4.53	18.59 ***4.36	17.11 ***4.02
D_{92}*COMP	12.80 1.61	22.59 ***12.6	21.72 ***3.96	20.37 ***4.01	18.93 ***3.41
D_{93}*COMP	19.58 **2.55	24.80 ***9.85	23.93 ***9.20	24.25 ***10.16	23.57 ***9.77
Model F	###182.4	###125.2	###123.8	###117.2	###112.6
Adjusted R-Square	0.48	0.59	0.59	0.57	0.56

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

difference in the equity market's valuation of ESOs prior to the release of the ED compared to after the release. The results of the F-tests are presented in Table 6-6.[54]

[54]Since the F-tests are based on White (1980) standard errors, which makes the tests asymptotic, Chi-square test statistics are reported.

As evidenced by the large p-values reported in Table 6-6, the alternate ESO measures are *not* valued differently over the three periods involved (1988-1991, the pre-ED period; 1992, used to control for the valuation effects associated with the SEC's proxy statement disclosure rules issued in 1992; and 1993, the post-ED period). The results presented in Tables 6-5 and 6-6 are consistent with the interpretation that the equity market has been sensitized previously to the non-zero economic value of ESOs, and that there is no difference in the equity market's valuation of ESOs prior to the ED compared to after its release. Thus, the null hypothesis cannot be rejected.[55]

Table 6-6. Asymptotic F-test Results of Market Sensitization from the Exposure Draft. (H_0: $\alpha_3 = \alpha_4 = \alpha_5$; coefficients estimated from equation (5). *PROXY* is used for the full sample test; the other measures of *COMP* are used in the subsample tests. Alternate measures of *COMP* are defined in Table 5-3.)

COMP Measure	Chi-Square Value	P-value
PROXY	1.65	0.44
MV1	1.04	0.59
MV5	0.95	0.62
BS1	1.64	0.44
BS5	2.13	0.34

[55]To further test for prior market sensitization to the non-zero economic value of ESOs, equation (4) was estimated with the inclusion of *ED*, which equalled *COMP* if the fiscal year-end is 1993, and 0 otherwise. *ED* is nonsignificant under each measure of *COMP*; thus, results are consistent with those presented above.

6.4 Managerial Ownership Effects

This section reports on tests of H3, which investigate the possible managerial ownership effects on the valuation of ESOs. For convenience, equation (6) and accompanying variable definitions are reiterated below:

$$MVE_{it}=\alpha_0+\alpha_1 BVASSETS_{it}+\alpha_2 BVLIABS_{it} +\alpha_3 D_{<5}*COMP_{it}+\alpha_4 D_{5-25}*COMP_{it}+\alpha_5 D_{>25}*COMP_{it}+\epsilon_{it} \quad (6)$$

where

$D_{<5}$ = dummy variable equal to 1 if year-end combined managerial stockholdings[56] of firm i is less than 5 percent; else it equals 0

$D_{5\text{-}25}$ = dummy variable equal to 1 if year-end combined managerial stockholdings of firm i is greater than or equal to 5 percent, but less than 25 percent; else it equals 0

$D_{>25}$ = dummy variable equal to 1 if year-end combined managerial stockholdings of firm i is greater than or equal to 25 percent; else it equals 0

Table 6-7 summarizes the results of estimating regression equation (6) under each of the alternate measures of ESO value; Table 6-8 presents the estimation results after outliers have been deleted. Both tables provide evidence that the incentive effects of ESOs are strongest when managerial stockholdings are less than 5 percent. However, Table 6-7 suggests that these incentive effects are partially mitigated in the 5-25 percent and over 25 percent ranges; on the other hand, the insignificant parameter

[56]Managerial stockholdings are defined in equation (7).

estimates of $D_{>25}$*COMP reported in Table 6-8 imply that when managers' ownership rises above 25 percent, the incentive effects are fully offset by the negative effects possibly associated with entrenchment.

Table 6-7. Managerial Ownership Effects on the Valuation of ESOs: Equation (6) Regression Results. (Dependent variable, *MVE*, is regressed on each of the listed independent variables, including the alternate measures of *COMP* multiplied by a (0,1) dummy variable corresponding to the three levels of managerial shareholdings: 0-5%, 5-25%, and >25%. *PROXY* is used in the full sample regression; the other measures of *COMP* are used in the subsample regressions. Table cells contain parameter estimates and t-statistics based on White (1980) standard errors. All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Variable	Alternate Measures of *COMP*				
	PROXY n=967	*MV1* n=435	*MV5* n=435	*BS1* n=435	*BS5* n=435
INTERCEPT	5.50 ***8.32	4.95 ***5.56	5.23 ***5.75	4.58 ***4.72	4.84 ***4.78
BVASSETS	1.13 ***11.60	1.15 ***11.10	1.14 ***10.99	1.16 ***11.06	1.15 ***10.81
BVLIABS	-1.15 ***-9.57	-1.18 ***-8.70	-1.16 ***-8.63	-1.19 ***-8.68	-1.18 ***-8.52
$D_{<5}$*COMP	131.61 ***6.83	43.76 ***11.18	42.95 ***10.93	45.92 ***11.62	45.38 ***12.23
$D_{5\text{-}25}$*COMP	17.37 ***3.51	16.97 ***5.63	16.58 ***5.39	15.59 ***5.40	14.37 ***5.01
$D_{>25}$*COMP	4.37 0.82	17.52 ***4.44	17.10 ***4.78	16.11 ***3.15	16.29 ***3.21
Model F	###227.1	###147.1	###144.6	###142.5	###136.4
Adjusted R-Square	0.54	0.63	0.62	0.62	0.61

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

Table 6-8. Managerial Ownership Effects on the Valuation of ESOs: Equation (6) Regression Results with Outliers Deleted. (Dependent variable, *MVE*, is regressed on each of the listed independent variables, including the alternate measures of *COMP* multiplied by a (0,1) dummy variable corresponding to the three levels of managerial shareholdings: 0-5%, 5-25%, and >25%. *PROXY* is used in the full sample regression; the other measures of *COMP* are used in the subsample regressions. Table cells contain parameter estimates and t-statistics based on White (1980) standard errors. All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Variable	Alternate Measures of *COMP*				
	PROXY n=967	*MV1* n=434[57]	*MV5* n=434	*BS1* n=434	*BS5* n=434
INTERCEPT	5.50 ***8.32	5.64 ***6.02	5.87 ***6.09	5.59 ***5.64	5.85 ***5.64
BVASSETS	1.13 ***11.60	1.14 ***8.28	1.13 ***10.83	1.15 ***10.82	1.13 ***10.59
BVLIABS	-1.15 ***-9.57	-1.17 ***-8.50	-1.15 ***-8.44	-1.17 ***-8.41	-1.16 ***-8.27
$D_{<5}$*COMP	131.61 ***6.53	43.08 ***11.23	42.32 ***10.95	44.89 ***11.77	44.31 ***12.22
D_{5-25}*COMP	17.37 ***3.51	16.31 ***5.39	15.98 ***5.18	14.59 ***5.00	13.39 ***4.62
$D_{>25}$*COMP	4.37 0.82	7.26 1.17	7.40 1.21	4.01 0.67	4.29 0.73
Model F	###227.1	###141.2	###138.4	###138.6	###132.3
Adjusted R-Square	0.54	0.62	0.61	0.61	0.60

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

[57]The same firm-year, International Flavors and Fragrances (1993), is an outlier under the MV and BS measures of *COMP*.

F-tests based on White (1980) standard errors are used to test whether the coefficients on $D_{<5}$*COMP*, $D_{5\text{-}25}$*COMP*, and $D_{>25}$*COMP* are statistically different. Specifically, the null hypothesis is $\alpha_3 = \alpha_4 = \alpha_5$, which tests for no difference in the equity market's valuation of ESOs contingent on managerial ownership. The results of the asymptotic F-tests are presented in Table 6-9.

As summarized in Table 6-9, the small p-values suggest that there *is* a difference among the coefficients of the test variables. Thus, managerial stockholdings *do* influence the market's assessment of ESO value, and $H3_0$ is rejected in favor of $H3_A$.

Table 6-9. Asymptotic F-test Results of Managerial Ownership Effects on the Valuation of ESOs. (H_0: $\alpha_3 = \alpha_4 = \alpha_5$; coefficients estimated from equation (6). *PROXY* is used for the full sample test; the other measures of *COMP* are used in the subsample tests. Alternate measures of *COMP* are defined in Table 5-3).

COMP Measure	Chi-Square Value	P-value
PROXY	43.68	###0.00
MV1	35.03	###0.00
MV5	34.25	###0.00
BS1	43.75	###0.00
BS5	48.60	###0.00

#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

6.5 Dilution Effects

This section reports on the tests of H4, which investigate how and if the possible dilution caused by outstanding ESOs mitigates the positive incentive effects

associated with ESO usage. For convenience, equation (8) and accompanying variable definitions are reiterated below:

$$MVE_{it}=\alpha_0+\alpha_1 BVASSETS_{it}+\alpha_2 BVLIABS_{it}+\alpha_3 D_{0-2}*COMP_{it} +\alpha_4 D_{2-4}*COMP_{it}+\alpha_5 D_{4-6}*COMP_{it}+\alpha_6 D_{>6}*COMP_{it}+\epsilon_{it} \quad (8)$$

where

D_{0-2} = dummy variable equal to 1 if percent of firm i's equity dilution is greater than or equal to 0 percent but less than 2 percent, where equity dilution is measured by the number of shares proposed to be issued through Officer, Director, and Key Employee ESOs divided by outstanding common stock at year end; else equal to 0

D_{2-4} = 1 if equity dilution is greater than or equal to 2 percent but less than 4 percent; else equal to 0

D_{4-6} = 1 if equity dilution is greater than or equal 4 percent but less than 6 percent; else equal to 0

$D_{>6}$ = 1 if equity dilution is greater than or equal to 6 percent; else equal to 0

Table 6-10 summarizes the results of estimating regression equation (8) under each of the alternate measures of ESO value. A pattern of results similar to those presented in Table 6-8 is apparent: as equity dilution from ESOs increases, ESO incentive effects diminish (but are not completely offset).

F-tests based on White (1980) standard errors are used to test whether the coefficients on D_{0-2}*COMP, D_{2-4}*COMP, D_{4-6}*COMP, and $D_{>6}$*COMP are statistically different. Specifically, the null hypothesis is $\alpha_3 = \alpha_4 = \alpha_5 = \alpha_6$, which tests for no difference in the equity market's valuation of ESOs contingent on potential dilution

from outstanding ESOs. The results of the asymptotic F-tests are presented in Table 6-11.

Table 6-10. ESO Dilution Effects on the Valuation of ESOs: Equation (8) Regression Results. (Dependent variable, *MVE*, is regressed on each of the listed independent variables, including the alternate measures of *COMP* multiplied by a (0,1) dummy variable corresponding to the four levels of equity dilution from ESOs: 0-2%, 2-4%, 4-6%, and > 6%. *PROXY* is used in the full sample regression; the other measures of *COMP* are used in the subsample regressions. Table cells contain parameter estimates and t-statistics based on White (1980) standard errors. All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Variable	Alternate Measures of *COMP*				
	PROXY n=967	*MV1* n=435	*MV5* n=435	*BS1* n=435	*BS5* n=435
INTERCEPT	3.59 ***6.09	3.35 ***3.70	3.88 ***4.12	2.68 ***2.68	3.08 ***2.93
BVASSETS	1.07 ***11.59	1.07 ***11.07	1.05 ***10.75	1.10 ***11.19	1.07 ***10.71
BVLIABS	-1.07 ***-9.78	-1.09 ***-9.06	-1.07 ***-8.82	-1.11 ***-9.16	-1.09 ***-8.78
$D_{0\text{-}2}$*COMP	299.81 ***7.09	112.00 ***7.04	104.99 ***7.28	111.55 ***6.63	111.97 ***7.56
$D_{2\text{-}4}$*COMP	97.27 ***4.78	57.07 ***6.59	55.41 ***6.36	55.25 ***5.99	51.90 ***5.18
$D_{4\text{-}6}$*COMP	88.34 ***5.76	32.63 ***7.69	32.52 ***7.70	32.62 ***7.22	31.94 ***6.74
$D_{>6}$*COMP	13.25 ***3.32	16.62 ***4.83	15.96 ***4.77	15.59 ***4.18	14.71 ***3.81
Model F	###209.8	###138.6	###134.1	###130.5	###122.4
Adjusted R-Square	0.56	0.66	0.65	0.64	0.63

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

As summarized in Table 6-11, the small p-values suggest that there *is* a difference among the coefficients of the test variables. Thus, possible equity dilution caused by ESOs *does* affect the market's assessment of ESO value, and $H4_0$ is rejected.

Table 6-11. Asymptotic F-test Results of ESO Dilution Effects on the Valuation of ESOs. (H_0: $\alpha_3 = \alpha_4 = \alpha_5 = \alpha_6$; coefficients estimated from equation (8). *PROXY* is used for the full sample test; the other measures of *COMP* are used in the subsample tests. Alternate measures of *COMP* are defined in Table 5-3.)

COMP Measure	Chi-Square Value	P-value
PROXY	69.87	###0.00
MV1	53.44	###0.00
MV5	53.96	###0.00
BS1	49.05	###0.00
BS5	53.91	###0.00

#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

6.6 Specification and Sensitivity Analyses

The results are further tested for sensitivity to changes in the original specification. First, market value of equity measured three months after firms' fiscal year-ends is used in place of market value of equity measured at fiscal year-ends "to ensure financial statement disclosures are in the public domain" (Barth 1994, p. 15). Results and inferences are consistent with those already reported.

In addition, the models are tested in nondeflated form since deflation may not reduce heteroscedasticity (it may actually increase estimation inefficiency) and it can

lead to coefficient bias (Barth and Kallapur 1994). Again, results and inferences are consistent with those already mentioned.

Third, several industry- and firm-specific variables have been identified with higher incidence of ESO usage (Lewellen et al. 1987; Morck et al. 1988; Gerhart and Milkovich 1990; Clinch 1991; Gaver 1992; Smith and Watts 1992; Gaver and Gaver 1993; Coopers & Lybrand 1993; and Matsunaga 1995). Specifically, higher usage of ESOs are noted for firms in high technology industries. Other firm-specific factors associated with increased use of ESOs include larger size, higher growth opportunities, lower dividend yields and systematic risk, higher executive compensation levels, information asymmetry, and R&D, and greater benefits to be derived from reporting higher income levels. Findings are mixed, however, concerning the relation between leverage and executive age to ESO use.

Smith and Pourciau (1988) present evidence which suggests that there are systematic differences in the financial characteristics and industry affiliations of December year-end firms compared to non-December year-end firms. Specifically, they find December year-end firms are larger and have smaller betas compared to non-December year-end firms. In addition, December year-end firms are concentrated in regulated and recently deregulated industries (such as banking, insurance, and transportation), whereas non-December year-end firms are concentrated in retail sales. Since increased ESO usage has been shown to be a function of the firm-specific factors identified above, including size and lower riskiness, partitioning the samples according to firms' year-ends is a crude means to profile firms which are more likely

to use ESOs in compensation packages and thus test whether the results are robust across the sample firms.[58] Equation (9) presents the form of this specification check:

$$MVE_{it}=\alpha_0+\alpha_1 BVASSETS_{it}+\alpha_2 BVLIABS_{it}+\alpha_3 COMP_{it}+\alpha_4 YEAREND_{it}+\epsilon_{it} \quad (9)$$

where

YEAREND = *COMP* if firm has a non-December year-end; else equal to 0

If α_4 is significantly different from zero, the results obtained under the previously described testing are not considered robust across the sample firms.

Partitioning on firms' year-ends provides evidence suggesting that the market's non-zero economic valuation of ESOs is *not* consistent across firms. Marginal results obtain from the individual year regressions of equation (9): significant slope differences exist between the two groups of firms in 1991 only (using *PROXY* and *BS1*), indicating higher valuation effects for December year-end firms (see Appendix D). The mean regression results are presented in Table 6-12.

Although the mean t-statistics associated with *YEAREND* (see Table 6-12) indicate insignificant slope differences between the two groups, the Z-statistics suggest significant differences do exist. Further, Table 6-13 highlights that under the fixed effects model significant slope differences exist between December and non-December year-end firms under all valuation approaches except the MV procedures.

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[58]Regulated firms, which have been shown to be associated with lower ESO usage (Smith and Watts 1992) are eliminated during the sample selection process due to the facto that these firms have systematically different compensation policies.

Table 6-12. Mean Regression Results from Testing the Equity-Value Relevance of ESOs with Partitioning on Year-End: Equation (9) Regression Results. (Yearly regression results from regressing the dependent variable, *MVE*, on each of the listed independent variables, including the alternate measures of *COMP*, and a dummy variable (*YEAREND*), which equals zero for December fiscal year-end firms and equals *COMP* for non-December year-end firms, are averaged to yield mean regression results. *PROXY* is used in the full sample regressions; the other measures of *COMP* are used in the subsample regressions. All t-statistics and inferences are based on White (1980) standard errors. The Z-statistic tests whether the time-series mean t-statistic is significantly different from zero (Barth and McNichols 1994). All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Variable	Parameter Estimate (std dev)	t-Statistic (std dev)	Z-Statistic	Adjusted R-Square	Model F (df)
INTERCEPT	4.63 (1.13)	***2.97 (0.80)	8.30	0.50 (0.05)	###41.2 (156.2)
BVASSETS	1.37 (0.18)	***6.77 (1.92)	7.86		
BVLIABS	-1.39 (0.19)	***-5.62 (1.90)	-6.63		
PROXY	17.40 (13.04)	1.12 (0.57)	4.35		
YEAREND	-15.25 (12.16)	-0.84 (0.57)	-3.26		

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

Table 6-12 (continued). Mean Regression Results from Testing the Equity-Value Relevance of ESOs with Partitioning on Year-End: Equation (9) Regression Results. (Yearly regression results from regressing the dependent variable, *MVE*, on each of the listed independent variables, including the alternate measures of *COMP*, and a dummy variable (*YEAREND*), which equals zero for December fiscal year-end firms and equals *COMP* for non-December year-end firms, are averaged to yield mean regression results. *PROXY* is used in the full sample regressions; the other measures of *COMP* are used in the subsample regressions. All t-statistics and inferences are based on White (1980) standard errors. The Z-statistic tests whether the time-series mean t-statistic is significantly different from zero (Barth and McNichols 1994). All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Variable	Parameter Estimate (std dev)	t-Statistic (std dev)	Z-Statistic	Adjusted R-Square	Model F (df)
INTERCEPT	4.11 (1.42)	*1.82 (0.58)	7.05	0.61	###29.0 (67.5)
BVASSETS	1.28 (0.15)	***5.27 (1.27)	9.26		
BVLIABS	-1.31 (0.19)	***-4.34 (1.23)	-7.88		
MVI	21.71 (4.66)	***3.62 (1.93)	4.20		
YEAREND	-9.13 (9.56)	-0.64 (0.87)	-1.66		

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

Table 6-12 (continued). Mean Regression Results from Testing the Equity-Value Relevance of ESOs with Partitioning on Year-End: Equation (9) Regression Results. (Yearly regression results from regressing the dependent variable, *MVE*, on each of the listed independent variables, including the alternate measures of *COMP*, and a dummy variable (*YEAREND*), which equals zero for December fiscal year-end firms and equals *COMP* for non-December year-end firms, are averaged to yield mean regression results. *PROXY* is used in the full sample regressions; the other measures of *COMP* are used in the subsample regressions. All t-statistics and inferences are based on White (1980) standard errors. The Z-statistic tests whether the time-series mean t-statistic is significantly different from zero (Barth and McNichols 1994). All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Variable	Parameter Estimate (std dev)	t-Statistic (std dev)	Z-Statistic	Adjusted R-Square	Model F (df)
INTERCEPT	4.30 (1.41)	*1.87 (0.57)	7.27	0.63 (0.05)	###41.6 (67.5)
BVASSETS	1.27 (0.15)	***5.23 (1.27)	9.24		
BVLIABS	-1.30 (0.20)	***-4.31 (1.24)	-7.77		
MVS	20.79 (4.66)	***3.51 (1.99)	3.94		
YEAREND	-8.30 (9.87)	-0.56 (0.91)	-1.38		

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

Table 6-12 (continued). Mean Regression Results from Testing the Equity-Value Relevance of ESOs with Partitioning on Year-End: Equation (9) Regression Results. (Yearly regression results from regressing the dependent variable, *MVE*, on each of the listed independent variables, including the alternate measures of *COMP*, and a dummy variable (*YEAREND*), which equals zero for December fiscal year-end firms and equals *COMP* for non-December year-end firms, are averaged to yield mean regression results. *PROXY* is used in the full sample regressions; the other measures of *COMP* are used in the subsample regressions. All t-statistics and inferences are based on White (1980) standard errors. The Z-statistic tests whether the time-series mean t-statistic is significantly different from zero (Barth and McNichols 1994). All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Variable	Parameter Estimate (std dev)	t-Statistic (std dev)	Z-Statistic	Adjusted R-Square	Model F (df)
INTERCEPT	3.94 (1.42)	*1.65 (0.54)	6.81	0.59 (0.05)	###27.2 (67.5)
BVASSETS	1.30 (0.15)	***5.31 (1.23)	9.61		
BVLIABS	-1.33 (0.20)	***-4.37 (1.21)	-8.09		
BSI	20.29 (5.46)	***3.26 (1.64)	4.43		
YEAREND	-10.70 (10.16)	-0.85 (0.91)	-2.07		

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

Table 6-12 (continued). Mean Regression Results from Testing the Equity-Value Relevance of ESOs with Partitioning on Year-End: Equation (9) Regression Results. (Yearly regression results from regressing the dependent variable, *MVE*, on each of the listed independent variables, including the alternate measures of *COMP*, and a dummy variable (*YEAREND*), which equals zero for December fiscal year-end firms and equals *COMP* for non-December year-end firms, are averaged to yield mean regression results. *PROXY* is used in the full sample regressions; the other measures of *COMP* are used in the subsample regressions. All t-statistics and inferences are based on White (1980) standard errors. The Z-statistic tests whether the time-series mean t-statistic is significantly different from zero (Barth and McNichols 1994). All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Variable	Parameter Estimate (std dev)	t-Statistic (std dev)	Z-Statistic	Adjusted R-Square	Model F (df)
INTERCEPT	4.17 (1.44)	*1.68 (0.53)	7.06	0.58 (0.05)	###26.2 (67.5)
BVASSETS	1.30 (0.15)	***5.26 (1.24)	9.46		
BVLIABS	-1.33 (0.20)	***-4.35 (1.24)	-7.87		
BS5	18.88 (5.89)	***2.97 (1.59)	4.17		
YEAREND	-9.61 (9.80)	-0.76 (0.92)	-1.86		

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

Table 6-13. Fixed Effects Results from Testing the Equity-Value Relevance of ESOs With Partitioning on Year-End: Equation (9) Regression Results.
(Dependent variable, *MVE*, is regressed on each of the listed independent variables, including the alternate measures of *COMP*, a dummy variable (*YEAREND*), which equals zero for December fiscal year-end firms and equals *COMP* for non-December year-end firms, and a (0,1) dummy variable for each of years 1988-1992 (1993 is omitted). *PROXY* is used in the full sample regression; the other measures of *COMP* are used in the subsample regressions. All t-statistics and inferences are based on White (1980) standard errors. All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Variable	Parameter Estimate	t-Statistic	Adjusted R-Square	Model F (df)
INTERCEPT	7.10	***5.74	0.49	###104.0 (957)
BVASSETS	1.33	***14.33		
BVLIABS	-1.34	***-11.48		
PROXY	17.95	***2.70		
YEAREND	-14.89	**-2.11		
INTERCEPT	8.18	***4.32	0.60	###72.4 (425)
BVASSETS	1.23	***11.61		
BVLIABS	-1.25	***-9.13		
MV1	22.22	***7.71		
YEAREND	-7.81	-1.60		
INTERCEPT	8.41	***4.45	0.59	###71.4 (425)
BVASSETS	1.23	***11.55		
BVLIABS	-1.25	***-9.09		
MV5	21.39	***7.38		
YEAREND	-7.25	-1.45		

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

Table 6-13 (continued). Fixed Effects Results from Testing the Equity-Value Relevance of ESOs With Partitioning on Year-End: Equation (9) Regression Results. (Dependent variable, *MVE*, is regressed on each of the listed independent variables, including the alternate measures of *COMP*, a dummy variable (*YEAREND*), which equals zero for December fiscal year-end firms and equals *COMP* for non-December year-end firms, and a (0,1) dummy variable for each of years 1988-1992 (1993 is omitted). *PROXY* is used in the full sample regression; the other measures of *COMP* are used in the subsample regressions. All t-statistics and inferences are based on White (1980) standard errors. All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Variable	Parameter Estimate	t-Statistic	Adjusted R-Square	Model F (df)
INTERCEPT	7.82	***4.04	0.58	###67.8 (425)
BVASSETS	1.25	***11.66		
BVLIABS	-1.27	***-9.15		
BS1	21.06	***7.23		
YEAREND	-9.64	**-2.09		
INTERCEPT	8.11	***4.14	0.57	###65.1 (425)
BVASSETS	1.25	***11.51		
BVLIABS	-1.27	***-9.06		
BS5	19.80	***6.47		
YEAREND	-8.86	*-1.93		

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

CHAPTER 7

7.0 Remarks

This chapter presents a discussion and summary of the empirical findings presented in Chapter 6. Limitations and extensions of the research conclude the chapter.

7.1 Discussion

To summarize, this research has four objectives. The first objective is to assess whether existing standards understate the economic value associated with the granting of ESOs. The second objective is to determine if the FASB's controversial ED has sensitized the equity market to the view that ESOs are a form of compensation that should be recognized in firms' financial statements. The third objective is to examine whether the equity security market's assessment of ESO value is affected by firm-specific factors, such as managements' ownership interest and the potential dilution associated with outstanding ESOs. Finally, the fourth objective is to assess which of the pricing alternatives used to value nonvested ESOs best reflects the equity security market's assessment of this cost. In addition, although not a stated objective, results from this study provide preliminary evidence concerning whether the market interprets the nature of ESOs as equity, debt, or as some combination of both.

First and foremost, the findings from this research suggest existing standards *do* understate the economic value of ESOs. Using OLS and a fixed-effects model, results

(which are robust across the alternate measures of *COMP*) indicate that the equity market assigns a positive value to firms' fixed, at-the-money and out-of-the-money nonvested ESOs, which increases the market value of firms' common equity. Hence, $H1_0$ is rejected in favor of $H1_{A1}$. These results are in stark contrast to current GAAP, which allows zero compensation cost to be measured in connection with the granting of these ESOs, and support the FASB's stated position in the ED concerning the non-zero value of fixed at-the-money ESOs.

With respect to market sensitization due to the release of the ED, the results imply that the market *has* been previously sensitized to the non-zero economic value of fixed ESOs, and that there is *no difference* in how the market is valuing ESOs across the three test periods (1988-1991, the pre-ED period; 1992, the period used to control for the effects associated with SEC-issued proxy statement rules governing the disclosure of executive compensation; and 1993, the ED period). Thus, $H2_0$ cannot be rejected. Prior market sensitization is plausible since accounting for ESOs has been a recurring topic on the FASB's agenda since 1984.

Third, firm-specific factors, such as managements' ownership interest and the potential dilution associated with outstanding ESOs, *do* appear to affect the equity security market's valuation of ESOs. With outliers deleted, the results concerning the effects of managerial ownership on the valuation of ESOs imply incentive effects strongly dominate any negative entrenchment effects when managerial ownership is less than 5 percent. These effects are partially mitigated in the 5-25 percent range, and fully offset in the over 25 percent range. Thus, $H3_0$ is rejected in favor of $H3_A$. Similar

results obtain when analyzing the potential effects of dilution from outstanding ESOs on the market's valuation of ESOs, however, as the dilution percentage increases, the incentive effects from ESOs are not fully offset by the negative effects associated with dilution of existing shareholders' interests. Hence, $H4_0$ is rejected, but not in favor of one of the three originally posed alternate hypotheses. Instead, the results suggest that as potential dilution from outstanding ESOs increases, the positive incentive effects associated with ESOs are increasingly mitigated, but not fully eliminated.

To further identify how firm-specific factors might affect the market's assessment of ESO value, the samples are partitioned according to year-end in an attempt to test the robustness of the results. December year-end firms have been shown to be larger and less riskier (both firm attributes are also identified with higher ESO usage); thus, fiscal year-end serves as a proxy to profile high ESO users. Findings from these procedures indicate that the market's assessment of ESO value is not consistent across the sample firms; rather, higher valuations appear associated with December year-end firms.

Fourth, a comparison of the results across the five alternate measures used to value nonvested ESOs reveals that the MV procedures may best reflect the equity security market's assessment of ESO value. Model F values, adjusted R-squares, parameter estimates, and t-statistics are generally highest for the MV procedures (with *MV1* being superior to *MV5*), followed by the BS procedures (with *BS1* being superior to *BS5*), with the crude measure of ESO value, *PROXY*, placing last. The findings

provide preliminary evidence concerning the benefit of using a low-cost alternative of ESO valuation (such as MV) in contrast to the more costly approaches (such as BS).

Finally, the results provide preliminary support that the equity market views nonvested ESOs as an unrecorded *asset*, as evidenced by the consistently obtained positive coefficients on the various measures of *COMP*. These findings support the FASB's previously maintained position that recorded estimates of unexpired ESO value warrant equity classification, and are not to be construed as a liability.

7.2 Limitations

An obvious limitation of this research is the fact that no one method exists to value the inherent characteristics of ESOs. Although the literature suggests the valuation of ESOs can benefit from the use of conventional option-pricing models, naive application of these procedures is problematic.

In addition, this study fails to discriminate among competing hypotheses that have consistent shareholder wealth effects. The positive shareholder wealth effects under the incentive, tax, signalling, and screening hypotheses are not mutually exclusive; nor are the negative effects under the dilution and entrenchment hypotheses.

Also, the finding that the market does not value ESOs consistently across the sample firms may indicate that *COMP* is endogenous. Given that the application of OLS in the presence of endogenous independent variables may yield coefficient estimates which are biased and inconsistent, care must be taken in interpreting the results of this study.

Further, the sequential approach used to test the hypotheses outlined in Chapter 4 might lead to overstated findings as testing ensues. Strong results obtain, however, from testing the first set of hypotheses. Thus, this concern may not be warranted.

Finally, data collection constraints were present with respect to the MV and BS option-valuation approaches, which restricts samples to more manageable sizes.

7.3 Extensions

The valuation analysis could be extended through use of a debt valuation model. Specifically, the impact of firms' outstanding ESOs on the pricing of firms' long-term liabilities would suggest if ESOs are debt-value relevant and could further suggest whether or not the market prices ESOs as debt instruments.

In addition, equity valuation results presented in the current study could be compared to debt valuation results described above to assess the effect of ESOs on overall firm value. Event study results presented in DeFusco et al. (1990) support the notion of a wealth transfer from the bondholders to the shareholders upon approval of ESO plans through the observance of positive (negative) abnormal returns to the shareholders (bondholders) surrounding the announcement of the plan approval and through increased firm variance following the announcement. However, granting ESOs to managers could make them more risk averse since more of their personal wealth is tied to the performance of the firm. In this case, managers could engage in less risky firm behavior, which effects a wealth transfer from the shareholders to the bondholders.

On the other hand, the granting of ESOs could result in an overall increase in firm value (as suggested by Galai and Schneller 1978). Thus, it would be of interest to determine if a firm-value analysis using a valuation framework would support currently existing event-study results, which suggest a wealth transfer effect of ESOs from bondholders to shareholders, or if the net effect is an increase in firm value.

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APPENDIX A: *Disclosure SEC Database* Search Terms

S1 STOCK/FT(W)OPTION?/FT
S2 S1 NOT EX=(NDQ OR NMS OR OTH)
S3 S2 NOT SC=4000:4999
S4 S3 NOT SC=6000:6999
S5 S4 NOT (PERFORMANCE/FT(W)SHARE?/FT OR
PERFORMANCE/FT(W)UNIT?/FT OR PERFORMANCE/FT(W)PLAN?/FT
OR JUNIOR/FT(W)STOCK?/FT OR PERFORMANCE/FT(W)AWARD?/FT
OR JUNIOR/FT(W)SHARE?/FT OR VARIABLE/FT(2W)PLAN?/FT OR
PHANTOM/FT(W)STOCK?/FT OR CASH/FT(W)APPRECIATION?/FT OR
APPRECIATION/FT(W)SHARE?/FT OR TANDEM/FT(W)STOCK?/FT OR
STOCK/FT(W)BONUS/FT OR BOOK/FT(W)VALUE/FT(W)SHARE?/FT OR
BOOK/FT(W)VALUE/FT(W)PLAN?/FT OR ALTERNATE/FT(W)STOCK?/FT
OR RESTRICTED/FT(W)STOCK?/FT OR
STOCK/FT(W)AWARD/FT(W)PLAN?/FT OR
RESTRICTED/FT(W)SHARE?/FT OR APPRECIATION/FT(W)RIGHT?/FT)
S6 5/$

APPENDIX B: Industry Classifications Represented by Sampled Firms

Industry Description	Two-Digit SIC	Full Sample n=967 (percentage of sample)	Subsample n=435 (percentage of sample)
Mining & Extraction	10 - 14	35 (0.04)	21 (0.05)
Construction	15-17	15 (0.02)	9 (0.02)
Manufacturing:			
Food	20	32 (0.03)	14 (0.03)
Paper	26	8 (0.01)	5 (0.01)
Printing & Publishing	27	28 (0.03)	8 (0.02)
Chemicals	28	95 (0.10)	51 (0.12)
Petroleum Refining	29	10 (0.01)	4 (0.01)
Rubber & Plastics	30	23 (0.02)	7 (0.02)
Stone, Glass & Clay	32	13 (0.01)	10 (0.03)
Primary Metals	33	34 (0.04)	18 (0.04)
Fabricated Metals	34	33 (0.03)	29 (0.07)
Industrial Machinery	35	81 (0.08)	38 (0.09)
Electrical Equipment	36	110 (0.11)	48 (0.11)
Transportation Equipment	37	41 (0.04)	20 (0.05)
Instruments	38	38 (0.04)	16 (0.04)
Toys	39	26 (0.03)	15 (0.03)
Other Manufacturing	22 - 25, 31	61 (0.06)	31 (0.07)
Wholesale Trade	50 - 51	66 (0.07)	32 (0.07)
Retail Trade	52 - 59	105 (0.11)	26 (0.06)
Services	70 - 95	113 (0.12)	33 (0.08)

APPENDIX C: Yearly Regression Results from Testing the Equity-Value Relevance of ESOs

Table C-1. Yearly Regression Results from Testing the Equity-Value Relevance of ESOs Using *PROXY*. (For the full sample, dependent variable, *MVE*, is regressed on each of the listed independent variables, including *PROXY* as the measure of *COMP*. Table cells contain parameter estimates and t-statistics based on White (1980) standard errors. All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Period	1988 n=110	1989 n=161	1990 n=163	1991 n=172	1992 n=199	1993 n=162
INTERCEPT	4.27 **2.39	6.83 ***4.42	4.12 ***3.26	3.27 *1.95	4.34 ***2.77	3.49 1.64
BVASSETS	1.37 ***10.58	1.17 ***5.20	1.21 ***7.85	1.48 ***6.31	1.36 ***5.96	1.70 ***4.62
BVLIABS	-1.47 ***-9.34	-1.16 ***-3.97	-1.21 ***-6.78	-1.57 ***-5.15	-1.30 ***-5.01	-1.69 ***-3.78
PROXY	11.24 0.60	2.71 0.28	7.40 0.69	31.63 *1.89	6.35 0.71	9.82 1.30
Model F	###58.9	###49.1	###51.4	###56.6	###64.4	###45.3
Adjusted R-Square	0.61	0.47	0.48	0.49	0.49	0.45
White's χ^2	12.6	14.2	###32.9	#16.4	###22.0	##21.4

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

Table C-2. Yearly Regression Results from Testing the Equity-Value Relevance of ESOs Using *MVI*. (For the subsample, dependent variable, *MVE*, is regressed on each of the listed independent variables, including *MVI* as the measure of *COMP*. Table cells contain parameter estimates and t-statistics based on White (1980) standard errors. All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Period	1988 n=62	1989 n=74	1990 n=68	1991 n=76	1992 n=82	1993 n=73
INTERCEPT	2.14 1.27	3.65 1.53	2.73 1.41	5.18 **2.33	4.91 **2.25	3.60 1.29
BVASSETS	1.29 ***6.40	1.49 ***6.93	1.12 ***6.79	1.26 ***5.19	1.16 ***4.72	1.38 ***3.08
BVLIABS	-1.40 ***-5.52	-1.62 ***-6.00	-1.15 ***-5.58	-1.37 ***-4.13	-1.08 ***-3.96	-1.25 **-2.17
MVI	20.63 **2.25	15.11 **1.99	25.30 ***3.69	25.19 ***3.42	19.66 ***3.24	20.50 ***7.90
Model F	###49.5	###38.4	###37.6	###38.7	###33.0	###32.6
Adjusted R^2-Square	0.70	0.61	0.62	0.60	0.54	0.57
White's χ^2	12.9	11.1	#14.8	11.0	12.1	11.4

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

Table C-3. Yearly Regression Results from Testing the Equity-Value Relevance of ESOs Using *MV5*. (For the subsample, dependent variable, *MVE*, is regressed on each of the listed independent variables, including *MV5* as the measure of *COMP*. Table cells contain parameter estimates and t-statistics based on White (1980) standard errors. All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Period	1988 n=62	1989 n=74	1990 n=68	1991 n=76	1992 n=82	1993 n=73
INTERCEPT	2.22 1.37	4.04 1.58	3.14 1.51	5.46 **2.43	5.04 **2.28	3.77 1.34
BVASSETS	1.28 *** 6.21	1.49 ***6.88	1.11 ***6.60	1.26 ***5.16	1.16 ***4.71	1.37 ***3.05
BVLIABS	-1.38 ***-5.31	-1.62 ***-5.96	-1.13 ***-5.46	-1.36 ***-4.11	-1.08 ***-3.96	-1.22 **-2.14
MV5	20.48 **2.36	14.10 *1.81	23.88 ***3.22	24.34 ***3.22	18.99 ***2.99	19.94 ***8.04
Model F	###50.7	###37.6	###37.7	###37.7	###32.8	###32.9
Adjusted R-Square	0.71	0.60	0.60	0.60	0.54	0.57
White's χ^2	13.4	9.9	11.5	10.4	12.1	11.3

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

Table C-4. Yearly Regression Results from Testing the Equity-Value Relevance of ESOs Using *BSI*. (For the subsample, dependent variable, *MVE*, is regressed on each of the listed independent variables, including *BSI* as the measure of *COMP*. Table cells contain parameter estimates and t-statistics based on White (1980) standard errors. All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Period	1988 n=62	1989 n=74	1990 n=68	1991 n=76	1992 n=82	1993 n=73
INTERCEPT	1.64 0.86	4.03 1.62	2.42 1.20	4.26 *1.83	4.69 **2.03	3.02 1.07
BVASSETS	1.32 *** 6.52	1.52 ***6.96	1.16 ***6.82	1.27 ***5.30	1.19 ***4.70	1.43 ***3.17
BVLIABS	-1.44 ***-5.67	-1.65 ***-6.04	-1.18 ***-5.61	-1.37 ***-4.20	-1.11 ***-3.96	-1.31 **-2.28
BSI	20.46 **1.99	11.57 1.62	22.10 ***3.29	25.25 ***3.53	16.90 ***2.77	19.84 ***6.49
Model F	###46.6	###36.0	###33.0	###36.9	###30.8	###31.0
Adjusted R-Square	0.69	0.59	0.59	0.59	0.54	0.56
White's χ^2	12.5	11.8	13.6	11.9	13.2	11.4

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

Table C-5. Yearly Regression Results from Testing the Equity-Value Relevance of ESOs Using *BS5*. (For the subsample, dependent variable, *MVE*, is regressed on each of the listed independent variables, including *BS5* as the measure of *COMP*. Table cells contain parameter estimates and t-statistics based on White (1980) standard errors. All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Period	1988 n=62	1989 n=74	1990 n=68	1991 n=76	1992 n=82	1993 n=73
INTERCEPT	1.69 0.85	4.58 *1.75	2.83 1.29	4.63 *1.95	4.86 **2.01	3.08 1.08
BVASSETS	1.32 *** 6.47	1.52 ***6.93	1.13 ***6.65	1.27 ***5.25	1.21 ***4.72	1.43 ***3.09
BVLIABS	-1.43 ***-5.64	-1.65 ***-6.03	-1.16 ***-5.48	-1.37 ***-4.17	-1.13 ***-3.99	-1.32 **-2.20
BS5	18.92 *1.85	9.15 1.42	21.05 ***3.12	24.66 ***3.31	15.17 ***2.32	19.24 ***5.89
Model F	###45.2	###35.0	###31.7	###35.6	###29.7	###30.0
Adjusted R-Square	0.69	0.58	0.58	0.58	0.52	0.55
White's χ^2	12.4	11.7	8.1	11.7	#15.4	11.3

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

APPENDIX D: Yearly Regression Results from Testing the Equity-Value Relevance of ESOs With Partitioning on Year-End

Table D-1. Yearly Regression Results from Testing the Equity-Value Relevance of ESOs Using *PROXY* with Partitioning on Year-End. (For the full sample, dependent variable, *MVE*, is regressed on each of the listed independent variables, including *PROXY* as the measure of *COMP*, and a dummy variable (*YEAREND*), which equals zero for December fiscal year-end firms and equals *COMP* for non-December year-end firms. Table cells contain parameter estimates and t-statistics based on White (1980) standard errors. All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Period	1988 n=109	1989 n=160	1990 n=162	1991 n=171	1992 n=198	1993 n=161
INTERCEPT	4.37 **2.54	7.01 ***4.40	4.19 ***3.40	3.87 **2.50	4.77 ***3.11	3.56 *1.88
BVASSETS	1.35 ***10.48	1.16 ***5.17	1.21 ***7.81	1.47 ***6.32	1.35 ***6.02	1.7067 ***4.78
BVLIABS	-1.45 ***-9.28	-1.15 ***-3.95	-1.21 ***-6.73	-1.58 ***-5.02	-1.29 ***-4.99	-1.69 ***-3.76
PROXY	16.82 0.66	5.90 0.52	9.49 0.64	45.35 **2.11	15.87 1.20	10.96 1.55
YEAREND	-11.01 -0.47	-10.26 -0.69	-5.25 -0.34	-38.15 *-1.66	-23.78 -1.59	-3.09 -0.26
Model F	###44.1	###36.8	###33.4	###44.6	###49.3	###33.8
Adjusted R-Square	0.61	0.47	0.48	0.50	0.49	0.45
White's χ^2	17.7	15.4	###32.0	18.7	##27.4	###32.0

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

Table D-2. Yearly Regression Results from Testing the Equity-Value Relevance of ESOs Using *MV1* with Partitioning on Year-End. (For the subsample, dependent variable, *MVE*, is regressed on each of the listed independent variables, including *MV1* as the measure of *COMP*, and a dummy variable (*YEAREND*), which equals zero for December fiscal year-end firms and equals *COMP* for non-December year-end firms. Table cells contain parameter estimates and t-statistics based on White (1980) standard errors. All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Period	1988 n=59	1989 n=73	1990 n=67	1991 n=74	1992 n=81	1993 n=72
INTERCEPT	2.54 1.47	2.94 1.17	3.28 1.64	6.34 **2.72	5.69 ***2.51	3.86 1.44
BVASSETS	1.25 ***5.48	1.54 ***6.83	1.11 ***6.51	1.24 ***5.11	1.15 ***4.72	1.41 ***2.95
BVLIABS	-1.35 ***-4.75	-1.67 ***-5.97	-1.13 ***-5.32	-1.33 ***-3.96	-1.07 ***-3.92	-1.28 ***-2.11
MV1	23.68 **2.33	12.95 *1.65	26.94 ***3.49	26.00 ***3.33	20.23 ***3.21	20.45 ***7.68
YEAREND	-9.10 -0.64	11.37 1.20	-10.34 -0.86	-15.58 -1.48	-14.46 -1.19	-16.69 -0.88
Model F	###37.5	###29.1	###28.4	###29.7	###25.0	###24.5
Adjusted R-Square	0.71	0.61	0.62	0.61	0.54	0.57
White's χ^2	17.0	11.5	18.5	15.3	12.7	17.8

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

Table D-3. Yearly Regression Results from Testing the Equity-Value Relevance of ESOs Using *MV5* with Partitioning on Year-End. (For the subsample, dependent variable, *MVE*, is regressed on each of the listed independent variables, including *MV5* as the measure of *COMP*, and a dummy variable (*YEAREND*), which equals zero for December fiscal year-end firms and equals *COMP* for non-December year-end firms. Table cells contain parameter estimates and t-statistics based on White (1980) standard errors. All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Period	1988 n=59	1989 n=73	1990 n=67	1991 n=74	1992 n=81	1993 n=72
INTERCEPT	2.57 1.53	3.22 1.19	3.69 1.71	6.57 ***2.76	5.77 **2.53	4.00 1.48
BVASSETS	1.24 ***5.44	1.54 ***6.89	1.09 ***6.34	1.23 ***5.10	1.15 ***4.72	1.40 ***2.92
BVLIABS	-1.34 ***-4.67	-1.68 ***-6.04	-1.12 ***-5.21	-1.33 ***-3.96	-1.07 ***-3.93	-1.26 **-2.07
MV5	23.09 ***2.41	11.73 1.52	25.50 ***3.24	25.06 ***3.14	19.47 ***2.96	19.89 ***7.76
YEAREND	-8.02 -0.57	12.91 1.39	-10.14 -0.85	-15.44 -1.41	-13.54 -1.10	-15.59 -0.82
Model F	###38.2	###28.7	###26.8	###28.9	###24.7	###24.63
Adjusted R-Square	0.71	0.60	0.61	0.60	0.54	0.57
White's χ^2	15.5	11.0	13.7	14.5	13.0	15.1

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

Table D-4. Yearly Regression Results from Testing the Equity-Value Relevance of ESOs Using *BSI* with Partitioning on Year-End. (For the subsample, dependent variable, *MVE*, is regressed on each of the listed independent variables, including *BSI* as the measure of *COMP*, and a dummy variable (*YEAREND*), which equals zero for December fiscal year-end firms and equals *COMP* for non-December year-end firms. Table cells contain parameter estimates and t-statistics based on White (1980) standard errors. All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Period	1988 n=61	1989 n=73	1990 n=67	1991 n=75	1992 n=81	1993 n=73
INTERCEPT	2.04 1.09	3.28 1.23	3.06 1.46	5.78 **2.36	5.88 **2.45	3.58 1.33
BVASSETS	1.28 ***5.52	1.56 ***6.89	1.13 ***6.45	1.24 ***5.17	1.17 ***4.71	1.44 ***3.10
BVLIABS	-1.38 ***-4.82	-1.70 ***-6.03	-1.15 ***-5.27	-1.33 ***-3.99	-1.09 ***-3.91	-1.32 ***-2.22
BSI	23.40 **2.01	9.90 1.40	24.61 ***3.30	26.25 ***3.47	17.69 ***2.81	19.88 ***6.57
YEAREND	-8.41 -0.59	10.26 1.05	-11.59 -1.12	-16.70 *-1.69	-17.48 -1.47	-20.27 -1.27
Model F	###35.0	###27.2	###25.2	###28.6	###23.6	###23.6
Adjusted R-Square	0.69	0.59	0.59	0.60	0.53	0.56
White's χ^2	14.8	11.1	17.7	17.5	13.8	##26.5

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

Table D-5. Yearly Regression Results from Testing the Equity-Value Relevance of ESOs Using *BS5* with Partitioning on Year-End. (For the subsample, dependent variable, *MVE*, is regressed on each of the listed independent variables, including *BS5* as the measure of *COMP*, and a dummy variable (*YEAREND*), which equals zero for December fiscal year-end firms and equals *COMP* for non-December year-end firms. Table cells contain parameter estimates and t-statistics based on White (1980) standard errors. All variables are deflated by shares outstanding at fiscal year-end, and are defined in Tables 5-2 and 5-3.)

Period	1988 n=61	1989 n=73	1990 n=67	1991 n=75	1992 n=81	1993 n=73
INTERCEPT	2.05 1.07	3.76 1.33	3.46 1.52	6.12 **2.44	5.95 **2.38	3.66 1.34
BVASSETS	1.27 ***5.39	1.56 ***6.97	1.11 ***6.31	1.24 ***5.14	1.19 ***4.73	1.43 ***3.04
BVLIABS	-1.38 ***-4.74	-1.71 ***-6.12	-1.14 ***-5.18	-1.33 ***-3.96	-1.11 ***-3.94	-1.31 **-2.15
BS5	21.74 *1.78	7.52 1.22	22.97 ***3.06	25.63 ***3.24	15.98 **2.34	19.44 ***6.17
YEAREND	-7.18 -0.52	10.52 1.15	-10.17 -0.99	-16.66 -1.60	-15.72 -1.35	-18.42 -1.27
Model F	###33.9	###26.5	###24.0	###27.6	###22.7	###22.8
Adjusted R-Square	0.68	0.58	0.58	0.59	0.52	0.55
White's χ^2	14.2	9.4	12.5	17.0	17.6	##26.5

*Two-sided p-value < 0.10; ** < 0.05; *** < 0.01
#One-sided p-value < 0.10; ## < 0.05; ### < 0.01

VITA

Jolene I. Koch was born April 28, 1964, in Bloomington, Illinois, to James A. and Joan M. Koch. She married James B. Hallam of Normal, Illinois, on October 1, 1988.

Jolene is a 1982 graduate of Normal Community High School, Normal, Illinois, and has received subsequently the following degrees: Bachelor of Science in Accounting from Illinois State University (1986); Master of Science in Accounting from Illinois State University (1987); and Doctor of Philosophy in Accountancy from the University of Missouri-Columbia (1995).