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THE CREDIT MARKET PERCEPTION OF EMPLOYEE STOCK OPTIONS

By

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ABSTRACT

THE CREDIT MARKET PERCEPTION OF EMPLOYEE STOCK OPTIONS

By

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This study empirically examines whether the credit market perceives outstanding employee stock options (ESOs) as a liability-like or equity-like obligation when assessing the credit risk of the issuing company. ESOs create a potential obligation for a company to transfer its own shares at a price lower than the prevailing market price in the future. Since this obligation is settled with equity but not the company's assets or services, ESOs do not meet the definition of liabilities under the FASB's current conceptual framework. Critics argue that the settlement of ESOs involves a sacrifice of economic benefits and propose that ESOs be accounted for as a liability. Using a sample 913 firm-years covering 338 firms for the period 2001-2003 and a sample of 309 new bonds issued by 195 firms from January 2001 to October 2004, I find that a higher value of outstanding ESOs is associated with a higher cost of debt, as proxied by the firm's credit rating and yield spread. The positive relationship between outstanding ESOs and the cost of debt is robust to controls of information risk, operating risk, various corporate governance mechanisms and known determinants of corporate credit risk. In addition, the adverse impact of outstanding ESOs on credit quality is more pronounced for firms that maintain a policy of expending cash to repurchase shares in response to ESO exercise. Overall, these results are consistent with the notion that credit market participants perceive outstanding ESOs as having a liability-like impact on the company's credit risk and thus demand a higher risk premium to compensate for the added risk associated with ESOs.

Dedicated to my loving and supportive family.

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CHAPTER 1: INTRODUCTION

This study empirically examines whether credit market participants perceive outstanding employee stock options (ESOs) as a liability-like or equity-like claim when assessing the credit risk of the issuing company. This investigation is motivated by the long-standing controversy over whether employee stock option grants are a liability or equity of the company.[1] This distinction is important because it not only determines the timing and magnitude of the ESO expense (FASB 1990; AAA FASC 1993; AAA FASC 2004) but also provides a foundation for assessing the appropriateness of mark-to-market accounting for outstanding ESOs. Despite the crucial implications it has for many ESO measurement decisions, the liability versus equity classification of employee stock options has received relatively little attention in the extant empirical literature.

ESOs are financial contracts that give employees the right to purchase the company's own shares at a pre-determined price and at a date of the employees' choosing. While there is no doubt that ESOs create equity claims upon exercise, it is less clear whether during the interim period before ESOs are exercised, the company's continuing obligations to deliver shares at employees' request represent a liability or equity of the company. Because ESOs will only be exercised when the prevailing market price of the underlying stock exceeds the exercise price of the options, advocates of the "options-as-liability" view argue that this price difference represents an outflow of

[1] For example, in paragraph 14 of the Financial Accounting Standards Board's (FASB) 1990 Discussion Memorandum entitled *"Distinguishing between Liability and Equity Instruments and Accounting for Instruments with Characteristics of Both"*, the FASB states that: "...the Board decided that it could not resolve accounting for stock compensation without first considering the more fundamental issues in the broader project on distinguishing between liabilities and equity...". For other examples, see AAA FASC (1993), Balsam (1994), Rubinstein (1995), Penman (2003), Kirschenheiter, Mathur and Thomas (2004), AAA FASC (2004) and Penman and Ohlson (2005).

economic benefits and therefore should be recognized as a liability (AAA FASC 2004). However, under the FASB's current conceptual framework, liabilities are defined as "*probable future sacrifices of economic benefits arising from present obligations of a particular entity to transfer assets or provide services to other entities in the future as a result of past transactions or events*" (Statement of Financial Accounting Concepts (SFAC) No. 6, paragraph 35, emphasis added). Since ESOs are settled in the company's own shares but not the assets or services of the company, they lack an essential characteristic of a liability and can only be classified as equity under the current dichotomous classification framework within the balance sheet.[2]

This dissertation adopts an information users' perspective to shed light on the liability versus equity controversy of outstanding ESOs. Specifically, I investigate which of the two views, the "options-as-equity" or "options-as-liability" view, is more descriptive of credit market participants' perception of outstanding ESOs when assessing the credit risk of the issuing company. I hypothesize that outstanding ESOs are likely to be viewed by the credit market as having characteristics of both liabilities and equity. This is because on the one hand, ESOs are commitments to create future equity equal to the amount of the option exercise price if ESOs are exercised. This aspect of ESO contracts suggests that they could have an equity-like impact on the issuers' credit quality.

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[2] SFAS 150, *Accounting for Certain Financial Instruments with Characteristics of both Liabilities and Equity*, mandates that certain obligations that require the company to convey to the holder of the financial instrument a fixed monetary amount of value known at inception to be accounted for as liabilities because such obligations do not establish an ownership relationship. An example given in SFAS 150 is "*a financial instrument that requires settlement by issuance of $100,000 worth of equity shares establishes something more akin to a debtor-creditor relationship than to an ownership relationship, because it requires that the issuer convey a fixed amount of value to the holder that does not vary with the issuer's equity shares*" (SFAS 150, paragraph B13). This requirement conflicts with the definition of liabilities under SFAC No. 6. To resolve this conflict, the FASB has agreed to amend SFAC No. 6. In phase two of its liabilities and equity project, the FASB proposes to distinguish liabilities from equity using a settlement and an ownership criterion. ESOs will still fall under the category of equity under the FASB's proposal.

On the other hand, however, the settlement of ESO obligations typically involves a real cash outflow in the form of share repurchases in order to make shares available to fulfill ESO obligations. In addition, the additional shares issued upon ESO exercise trigger the need for the company to manage outstanding shares in order to meet its leverage or earnings per share (EPS) targets. Since the exercise of ESOs is associated with potential future cash outflows, outstanding ESOs are likely to be viewed as a contingent liability in substance if not in form.

The empirical tests of this study are motivated by a debt-equity continuum framework used by credit rating agencies to assess a debt-equity hybrid security's impact on the issuers' capital structure as well as creditworthiness. This framework predicts that if creditors consider outstanding ESOs liability-like (equity-like) obligations of the issuing company, one would expect an adverse (favorable) effect of outstanding ESOs on the company's perceived credit risk, as reflected in the required rate of return for the company's debt securities (i.e., the cost of debt). In other words, this framework suggests that the essential characteristic that creditors use to distinguish liabilities from equity is whether a financial contract results in a negative impact on the company's debt service ability.

In this study, two proxies are used to capture the company's cost of debt. The first proxy is the issuing company's credit rating, which represents the credit rating agency's opinion about the issuer's overall creditworthiness. Keenan et al. (2000) and Czarnitzki and Kraft (2004) document that credit ratings are an important predictor of the bond default probability. As a result, it is not surprising that credit ratings are the most important determinant of the corporate bond pricing (Gabbi and Sironi 2002) and are

commonly used as an ex ante measure of the cost of debt. The credit ratings literature, however, also documents that credit rating agencies do not appear to incorporate all pricing-relevant information in their rating decisions. Several studies have shown that public accounting information exhibits incremental explanatory power beyond credit ratings in explaining bond yields (e.g., Ziebart and Reiter 1992; Khurana and Raman 2003; Czarnitzki and Kraft 2004). As a result, it is likely that credit market investors hold a different view on the nature of outstanding ESOs than credit rating agencies. To investigate this possibility, I use the yield spread as my second proxy for the firm's cost of debt. The yield spread is the difference in yield between the corporate bond and the risk free Treasury bond of approximately the same maturity. This spread is the actual risk premium demanded by the credit market investors to compensate for the corporate bond's default risk.[3]

My empirical results based on a sample of 913 firm-year observations representing 290 S&P 500 Industrial firms and 48 non-S&P 500 firms that are potential heavy option users for the years 2001-2003 and a sample of 309 new bonds issued by 195 firms over the period January 2001 to October 2004 are consistent with the "options-as-liability" hypothesis. Specifically, I find that the credit ratings assigned by Standard and Poor's are negatively associated with the fair value of outstanding ESOs after controlling for information risk, operating risk, firm performance and other known factors that affect corporate credit ratings. This relationship holds in both the "levels" and "change" specifications, is robust to controls of various corporate governance mechanisms, and is more pronounced for firms that are more likely to buy back shares in response to ESO

[3] Using credit-default swap and corporate bond data, Longstaff et al. (2004) find that the default risk component accounts for the majority of the corporate-Treasury yield spreads across all credit ratings.

exercise. The results from yield spread tests corroborate those from credit rating analyses and suggest that firms with higher values of outstanding ESOs incur higher costs of financing in the form of a wider yield spread at new bond issuance. Further analyses reveal that the adverse impact of ESOs on yield spreads is driven by a subsample of bonds that have a maturity longer than outstanding ESOs' expected life and are issued by firms with a propensity to repurchase shares around ESO exercise. This last finding suggests that creditors are concerned about ESOs' liability-like impact only when the cash outflow associated with the settlement of the ESO obligations is expected to take place before their loans mature.

Partitioning the value of the outstanding ESOs into the component held by top-five executives and that held by non-executive employees, I find that non-executive ESOs continue to explain credit ratings while executive ESOs do not.[4] This finding suggests that the negative impact of outstanding ESOs on credit ratings is not driven by the credit market's potential aversion to large executive ESO programs. As further evidence on the direction of causality, I document that the change in outstanding ESOs helps to predict the one-year-ahead change in credit ratings while the change in credit ratings does not predict the one-year-ahead change in outstanding ESOs. Finally, I provide evidence that the change in fair value subsequent to the grant date explains credit ratings and yield spreads above and beyond the grant date fair value of outstanding ESOs, which lends support to the view that credit market participants find mark-to-market information useful when making credit risk assessments.

[4] For the purpose of this dissertation, top-five executives are defined as the five highest-paid executives and non-executive employees are those other than the five highest-paid executives.

This study contributes to the ESO literature by demonstrating that the fair value of outstanding ESOs provides value relevant information to credit market participants. Prior studies indicate that managers have incentives to manipulate Black-Scholes assumptions in order to underreport the value of the pro forma ESO expense (Aboody et al. 2004b; Bartov et al. 2004; Hodder et al. 2004; Johnston-Wilson 2004). The existing literature also documents, however, that the disclosed ESO information is sufficiently reliable to be reflected in the firm's stock price (Aboody 1996; Aboody et al. 2004a; Bell et al. 2002; Li 2002). This study extends equity market research on the value relevance of ESOs to the credit market setting and demonstrates that credit market participants factor the fair value of outstanding ESOs into their credit risk and bond pricing decisions.

The finding that the credit market considers outstanding ESOs a liability-like claim that affects the issuing firm's creditworthiness implies that the credit market looks beyond the corporate obligation's contractual settlement method and looks into the cash flow consequences of these transactions. This implication should be of interest to standard setters since the FASB has been criticized for placing too much weight on the contractual provisions rather than economic substance of accounting transactions (e.g., AAA FASC 2001 and 2004). Moreover, under the Statement of Financial Accounting Standards No. 123R (SFAS 123R), *Share-Based Payment*, which took effect for most public companies for the fiscal year beginning on or after June 15, 2005, companies are not required to disclose the fair value of outstanding ESOs. To the extent that the credit market participants regard ESOs as imposing an increased credit risk on the issuing company and incorporate the fair value of ESOs in their credit risk assessments, SFAS 123R's current disclosure requirements may not provide the most decision-useful

information to financial statement users. Although evidence presented in this study does not provide and is not intended to provide a definitive answer to the "ESOs-as-liability-or-equity" controversy, it nevertheless complements the conceptual approach undertaken by the FASB in determining whether a financial instrument should be classified as a liability or equity. In addition, evidence provided by this study also has implications for how well the standard setters' conceptual classification of financial instruments connects to information users' perspective on accounting information.

The rest of the dissertation proceeds as follows. Chapter 2 provides institutional background regarding current ESO measurement debates and describes why the debt versus equity classification is crucial to these debates. Chapter 3 reviews the related literature and develops my main hypotheses. Chapter 4 presents the empirical research design. Chapter 5 describes the sample selection and provides descriptive statistics. Chapter 6 discusses the empirical findings and robustness tests. Chapter 7 concludes this dissertation.

CHAPTER 2: MEASUREMENT ISSUES AND DEBT VERSUS EQUITY CLASSIFICATION OF EMPLOYEE STOCK OPTIONS

2.1 Measurement Date Debate and Mark-to-Market Accounting Controversy

The Financial Accounting Standards Board (FASB) has recently revisited accounting for ESOs as part of its effort toward international convergence.[5] On December 16, 2004, the FASB issued SFAS 123R, which is a revision of SFAS 123, *Accounting for Stock-Based Compensation,* and supersedes APB No. 25, *Accounting for Stock Issued to Employees.* Under FASB's SFAS 123R, the amount of ESO compensation expense is determined at the grant date using an option pricing model with model inputs that are appropriate for the conditions of the option grants (grant-date measurement). The ESO compensation is recognized as an expense over the option's vesting period and is matched by a corresponding increase in stockholders' equity. There is almost no ex-post adjustment of expenses over time. The only exception is the adjustment for differences in the expected and realized options forfeited during the vesting period.

Critics are generally concerned about the emphasis that grant-date measurement places on the reliability of managers' grant-date estimates. Since estimation errors introduced at the grant date under grant-date measurement are not updated as time goes

[5] The existing accounting rules governing ESOs are established by the Accounting Principles Board Opinion No. 25 (APB 25) and the Statement of Financial Accounting Standards No. 123 (SFAS 123). Under APB 25, the accounting charge for ESOs equals the intrinsic value, defined as the difference between the fair market value of the underlying stock and the exercise price of the stock option, at the date when both the number of shares and the exercise price are determinable or "fixed". As a result, no expense is recognized for options granted with an exercise price equal to the grant-date market price (i.e., intrinsic value equals zero). In 1995, the FASB issued SFAS 123, which recommends that options be expensed at the "fair market value" but also allows firms to continue reporting under APB 25, provided that additional information about the value of the options granted is disclosed in a footnote to the financial statements.

by, both unintentional and intentional bias will accumulate in retained earnings and never reverse in a future period. In light of the concern that estimate manipulation will go undetected due to a lack of ex-post adjustments, analysts and academic researchers (e.g., Balsam 1994; Rubinstein 1995; AAA FASC 2004, Kirschenheiter et al. 2004; Wei 2004; Nellans 2004) have called for an exercise-date measurement approach. Under this approach, options would still be expensed when granted but the value of the options would be recorded as a liability. This ESO liability and therefore the ESO compensation expense will be remeasured (i.e., marked to market) at each reporting date up until the exercise or final settlement date. Advocates of exercise-date measurement accounting argue that this measurement approach minimizes the information damage created by inaccurate valuation during the life of the options.

2.2 Liability Versus Equity Classification and the Measurement of ESO-Related Expense

The liability-versus-equity classification of ESOs has implications for the measurement date controversy as well as the determination of ESO-related expenses because under the FASB's Concepts Statement No. 6, comprehensive income is defined as the change in equity of a business enterprise during a period from transactions from nonowner sources. If one regards ESOs as equity of the company, the ownership relationship between employees and the company is established at the date of grant. Since a company cannot profit from transacting with its owners, ESO expense should be measured at the grant date and any value change subsequent to the grant date should not result in a performance statement effect. If, on the other hand, one considers ESOs a liability that obligates the company to transfer economic resources because of the current compensation transaction, employees are not considered owners of the company until

options are exercised. Therefore, the final amount of ESO-related expense should be determined at the exercise date and all changes in the value of ESOs between the grant date and exercise date should be marked to market and flow through the income statement each period. Consequently, fundamental ESO measurement questions such as whether ESO compensation should be measured at the grant date or exercise date and whether outstanding ESOs should be marked to market to reflect post-grant-date price fluctuations depend on whether outstanding ESOs are treated as a liability or equity of the company.

CHAPTER 3: RELATED LITERATURE AND HYPOTHESIS DEVELOPMENT

3.1 Related Literature

This study is closely related to a stream of research that examines the liability classification of different corporate claims. Most of the liability-equivalence studies, however, adopt a systematic risk analysis, which focuses on how a particular corporate claim affects the equity market's assessments of the firm's systematic risk (i.e., equity beta). The reason for this focus is that finance theory has established the link between debt-like obligations and equity beta. Under the assumptions of perfect markets, riskless debt and no taxes, several studies show that debt-like obligations affect systematic equity risk through financial leverage (Hamada 1972; Rubenstein 1973; Bowman 1979; Mandelker and Rhee 1984). Using the systematic risk framework, Bowman (1980) and Dhaliwal (1986) demonstrate that unrecorded capital lease commitments and unfunded pension liabilities are debt equivalents by showing that these two off-balance-sheet items explain systematic equity risk. In a similar vein, Kimmel and Warfield (1995) and Cheng et al. (2003) report that redeemable preferred stock does not have a debt-like impact on the firm's systematic risk. Cheng et al. (2003) further demonstrate that non-redeemable preferred stock and minority interests are viewed as debt-like and equity-like claims, respectively. More recently, Cheng et al. (2003) and Linsmeier et al. (2004) employ an equity valuation analysis that links security prices with various financing instruments with attributes of both liabilities and equity to investigate the equity market's perceptions of the liability/equity classifications of these instruments. These studies conclude that whether equity market investors view financing instruments as liabilities or equity

depends on the issuing firm's characteristics such as size, profitability and insolvency risk.

This study differs from the above-cited literature in that I take a credit market's perspective to examine the liability versus equity debate in the ESO setting. Adopting a credit market as opposed to an equity market approach has the advantage of providing insights into ESOs' claim against the issuing company rather than their claim against pre-existing common equity holders. As analytically demonstrated by Galai and Schneller (1978), ESOs dilute common shareholders' ownership interest by selling employees stock for a price less than its fair market value, which results in a transfer of economic value from current shareholders to potential future shareholders. Therefore, ESOs represent an economic claim or "liability" *against pre-existing common equity holders.* Consistent with Galai and Schneller's (1978) analysis, Aboody (1996) and Li (2002) find that equity market investors place a negative valuation multiple on outstanding ESOs in an empirical model that regresses the market value of equity on the book value of equity, net income (or residual income) and outstanding ESOs.

While ESOs represent a future claim on common equity holders, it is less clear whether creditors, another important group of financial information users identified by the FASB, perceive outstanding ESOs as equity-like or a liability-like claim *against the company.*[6] This is because the wealth transfer between current and future shareholders might not reduce total economic resources available to outside stakeholders at the firm level. In fact, the existence of ESOs suggests that the firm will have at least as much equity cushion and in some states will have more when ESOs are exercised.

[6] Paragraph 34 of Concepts Statement No. 1 contends that equity investors and creditors are primary users of financial statements.

In addition, understanding the credit market's perception of outstanding ESOs is important in itself because the credit market provides substantially more funds to companies than does the equity market. In 2002, U.S. corporations raised more than $1.2 trillion in the bond market compared to $102 billion in the equity market. Even in days when most equity securities were considered overvalued, debt issuance was still much larger than equity issuance.[7] Given the essential role that the corporate credit market plays in the U.S. economy, regulators, standard setters as well as corporate managers may want to know whether outstanding ESOs affect the credit market's evaluation of the company's debt service ability.

This study also relates to the research on the value relevance of ESO disclosures. This strand of research has shown that although not formally recognized in the financial statements, the pro forma ESO expense disclosed in the SFAS 123 footnote is inversely related to the stock price, suggesting that investors consider ESO compensation as a corporate expense that is measured with sufficient reliability (Aboody et al. 2004a; Li 2002). In addition, Aboody (1996) and Li (2002) both find a negative association between the stock price and the value of outstanding ESOs. Li (2002) theoretically demonstrates that this negative relationship is a reflection of the fact that current option holders have a claim on the company's future earnings, which reduces the value of current equity holders' residual interest. This study extends this line of literature by demonstrating that the credit market also incorporates the fair value of outstanding ESOs in their credit risk assessments even though the fair value of outstanding ESOs is not currently disclosed in footnotes. Hence, while prior literature suggests that the

[7] In 2000, corporate debt issuance amounted to more than $1.2 trillion while equity issuance was less than $200 billion. (Speech by SEC Staff: Remarks at the Bond Market Association, Corporate Credit Markets. Available at http://www.sec.gov/news/speech/spch041003alb.htm)

information contained in outstanding ESOs is relevant for equity valuation, the findings in the current study indicate that this information is also relevant for default risk assessments by creditors.

Research on the consequences of the balance sheet classification suggests that the debt-equity distinction affects financial statement users' as well as prepares' behaviors. For example, Hopkins (1996) experimentally demonstrates that the accounting classification of mandatorily redeemable preferred stock (MRPS) on the balance sheet affects buy-side analysts' stock valuation judgments. Specifically, he finds that analysts presented a balance sheet with mandatorily redeemable preferred stock classified as a liability (equity) made common stock price judgments as if the firm had issued debt (equity). He also documents that analysts appear to incorporate more attribute-type and less category-type information in stock price judgments when MRPS are classified in a mezzanine zone. Existing research also demonstrates that financial statement preparers incur a significant cost in order to avoid the liability-classification on the balance sheet. Engel et al. (1999) examine trust preferred stock, which is treated as preferred stock for financial reporting purposes and as debt for tax purposes, and is thus a tax-equivalent source of capital to regular debt. They find that firms are willing to pay between $10 and $43 million to replace debt with trust preferred stock in order to reduce their reported leverage ratio by approximately 12.8 percent, on average.

Finally, extant research also seeks to identify the accounting treatment that best depicts the economic reality of employee stock options. Kirschenheiter et al. (2004) and Ohlson and Penman (2005) argue that an accounting method that treats ESOs as a liability at the grant date and continuously marks the options liability to market produces

accounting measures that are more reflective of the fundamental firm performance and common equity value. Landsman et al. (2004) theoretically and empirically substantiate that the aforementioned accounting treatment reflects ESOs' dilution effect on existing shareholders' value more faithfully than the accounting treatments prescribed by the APB 25, SFAS 123 and SFAS 123R.

3.2 Hypothesis Development

To investigate whether credit market participants perceive outstanding ESOs as a liability-like or equity-like claim, I rely on credit rating agencies' debt-equity-continuum framework to formulate empirical predictions. When assessing a debt-equity hybrid security's impact on the issuer's capital structure, credit rating agencies (e.g., Standard & Poor's, Moody's, Fitch and A.M. Best) typically adopt a framework, which places the financial contract on a debt-equity continuum based on the contract's cash flow flexibility relative to straight debt and common stock. Credit rating agencies argue that common equity enhances the firm's creditworthiness because it affords the issuer the highest possible level of cash flow flexibility in terms of delaying periodic and principal payments and providing a protective cushion in the event of bankruptcy (S&P Corporate Ratings Criteria and Moody's Fundamental Rating Methodologies). Consistent with the rating agencies' argument, Elliott et al. (2004) find that bondholders experience positive abnormal returns on the announcements of seasoned equity offerings. The abnormal bond returns are larger for bonds with longer maturities and poorer bond ratings, consistent with the notion that bondholders benefit from the reduction in credit risk through an increase in common equity. Therefore, if credit market participants regard a financial

contract as equity of the issuing company, one would expect the contract to have a favorable impact on the company's credit profile. In contrast, from the creditors' perspective, straight debt is the least preferred source of corporate financing because it calls for fixed interest payments and requires repayment at maturity. The need to fund these payments with cash flows creates a liquidity risk and thus has a negative impact on the issuers' creditworthiness. With straight debt and common stock as two extremes of the debt-equity continuum, the location of a financial contract on the continuum summarizes credit rating agencies' opinion about how debt-like (equity-like) a financial contract is. The closer a financial contract gets to the equity (debt) end, the more (less) "equity credit" it receives and the more (less) favorable impact it has on the company's credit quality. Given that ESOs may carry characteristics of both liabilities and equity, the debt-equity continuum provides a useful framework to examine whether the debt-like or equity-like attributes of ESOs dominate in credit market participants' credit risk decisions.

The issuance of ESOs can also be thought of as selling future equity to employees. The issuing company collects the first installment of the transaction price (i.e., the premium or fair value of the options) in the form of employee service. If employees decide to pay the second installment of the transaction price in cash equal to the amount of the option exercise price, new shares are issued. Even if employees decide not to pay the second installment, the company still retains the benefit of the employee services without having to expend cash.[8] As a result, ESOs can be viewed as part of the new equity that will potentially be created in the future, which suggests that outstanding ESOs

[8] Alternatively, one can think of the issuance of ESOs as a means of financing compensation expenses by selling promises to create equity in the future. Firms with outstanding ESOs should have more cash to service debt than they would otherwise do if they had chosen pay employees in cash.

are likely to be perceived as equity-like contracts of the company. If credit market participants consider outstanding ESOs equity-like in their credit risk assessments, the fair value of ESOs at the grant date, which represents the premium of the options paid for by employees in service or the amount of "equity" contributed by employees with service in installments, should have a favorable effect on the company's credit profile.

Unlike the case of common equity, however, the existence of outstanding ESOs does not have an unequivocal credit-enhancing effect on the company's financial position because firms are obligated to deliver shares to employees upon the exercise of ESOs. These obligations resemble the repayment requirement of the straight debt and the need to fund ESO 'maturity" imposes an increased credit risk on issuers. Companies typically have two means of satisfying ESO exercise. They can either distribute pre-existing shares acquired from the open market or issue new shares directly to employees. For firms that repurchase shares to redeem ESOs, the settlement of ESO obligations clearly involves a cash outflow, which reduces net assets available for debt service and thereby directly increases firms' credit risk. For firms that choose to issue new shares to employees, the settlement of the ESO obligations could still have an indirect impact on their credit risk. Graham and Harvey's (2001) survey evidence suggests that firms typically have a target capital structure and are concerned about the EPS dilution when issuing equity. The issuance of common stock as a result of ESO exercise increases the number of shares outstanding and moves the capital structure and EPS number away from the firm's targets. Therefore, companies have the incentive to launch share repurchases to achieve target capital structure or to offset the dilutive effect of ESO exercise. Consistent with above survey findings, anecdotal (e.g., Standard and Poor's 2005) as well as empirical

evidence suggests that the use of ESOs is often accompanied by ongoing share repurchase programs. Weisbenner (2000) provides evidence that firm's outstanding ESOs are a strong predictor of subsequent share repurchases. He also demonstrates that firms engage in ongoing repurchases to undo much of the dilution to earnings per share (EPS) resulting from past stock option grants. Kahle (2002) finds that firms are more likely to announce a share repurchase program when total exercisable options are high and when many options have recently been exercised. Bens et al. (2003) document that firms increase repurchase intensity when ESOs' impact on EPS is more dilutive. Moreover, Bens et al. (2002) find that firms divert cash from R&D and capital expenditures to fund share repurchase programs in order to mitigate EPS dilution from large ESO exercise.

To the extent that companies repurchase shares in response to option exercise, the settlement of ESOs involves future cash outflows equal to the excess of the cost of reacquiring shares over the proceeds from option exercise. These net cash outflows can be approximated by the intrinsic value of the ESOs at the exercise date.[9] Since the exercise-date intrinsic value depends on unknown future stock price, the fair value of an stock option, which is computed as the present value of the probability-weighted exercise-date intrinsic value, serves as a reasonable estimate of the potential cash outflows associated with the settlement of the existing ESO obligations at any point in time (see Appendix A for the intuition behind the fair value of a call option). Ideally, creditors will treat outstanding ESOs as an economic liability only when the company chooses to repurchase shares in response to option exercise. In reality, creditors do not have the perfect foresight as to whether ESO-related repurchases will take place in the

[9] An employee stock option is in fact a call option issued by a company that gives the holder the right but not obligation to purchase the underlying stock. The intrinsic value of a call option is defined as the maximum of zero and the difference between option exercise price and the share market value.

future. Given creditors' tendency to focus more on the lower end of cash flows,[10] outstanding ESOs are likely to be viewed as a contingent liability, which could trigger a call on future cash flows and impair the company's debt service ability.

As a result of the above discussion, my first hypothesis is as follows, stated in alternative form:

> *H1: Ceteris paribus, the fair value of the outstanding employee stock options is negatively (positively) associated with the issuing company's perceived credit risk if the credit market perceives outstanding employee stock options as equity-like (liability-like) obligations of the issuing company.*

If creditors are unsure about whether a firm will engage in ESO-related repurchases in the future, they are likely to price ESO obligations based on their belief about the likelihood that future repurchases will occur. Companies that historically repurchase shares around option exercise are more likely to continue the practice in the future. As a result, ESOs issued by firms with a propensity to repurchase shares in response to option exercise are more likely to be regarded as liability-like obligations by credit market participants. This leads to my second hypothesis as follows, stated in alternative form:

> *H2: Outstanding employee stock options have a more adverse impact on the perceived credit risk when the issuing company maintains a policy of repurchasing shares in response to ESO exercise.*

[10] Creditors care more about the firm's downside risk than upside potential because when the firm's cash flows are sufficient to cover the loan, creditors only received promised interest and principal payments and do not participant in further firm success. However, when the firm is unable to generate sufficient cash flow to cover the loan, creditors lose the entire contracted amount (Watts 2003).

CHPATER 4: RESEARCH DESIGN

To test my first set of hypotheses on the credit rating sample, I estimate the following ordered probit model to assess the impact of outstanding ESOs on credit ratings. An ordered probit model is selected over an ordinary least square (OLS) model because the former takes into account the discrete and ordinal nature in the dependent variable. My credit rating model is constructed as follows:

$$RATING_{i,t} = \alpha_1 OPTIONS_{i,t} + \alpha_2 ACCQUALITY_{i,t} + \alpha_3 STDROA_{i,t} + \alpha_4 STDCFO_{i,t}$$
$$+\alpha_5 STDRET_{i,t} + \alpha_6 ROA_{i,t} + \alpha_7 CASHFLOWS_{i,t} + \alpha_8 LEVERAGE_{i,t} + \alpha_9 SIZE_{i,t}$$
$$+\alpha_{10} BETA_{i,t} + \alpha_{11} CAP\_INTEN_{i,t} + \alpha_{12} INT\_COV_{i,t} + \alpha_{13} B2M + \varepsilon_{i,t}$$

where i, t are firm and year indexes, respectively. (*Credit Rating Model*)

RATING is the long-term issuer credit rating assigned by Standard & Poor's six months after the fiscal year end. I allow a six-month lag between the close of the fiscal year and the production of credit ratings to ensure that rating agencies have sufficient time to incorporate the stock option information in their credit rating decisions.[11] Following Ashbaugh et al. (2004), I recode the credit ratings data (Compustat Quarterly data *SPDRC*) to remove unassigned codes and collapse the ratings into seven categories, with a higher value of *RATING* indicating a better credit rating. Appendix B provides the numerical transformation of credit ratings.

OPTIONS is the fair value of outstanding ESOs as of the end of the fiscal year scaled by total assets. Following Core and Guay (2002) and Li (2002), I value a firm's outstanding ESOs using the Black-Scholes option valuation model and assume that they

[11] My results are not sensitive to the use of a three-month lag instead of a six-month lag between the end of the fiscal year and the production of the credit ratings in my empirical analyses.

were a single option grant (see Appendix C for more details about the measurement of *OPTIONS*). If credit rating agencies view outstanding options as a liability-like claim, I expect α_1 to be negative, which suggests that, other things being equal, a higher level of outstanding ESOs is associated with a lower credit rating.

A growing body of literature documents that stock-based compensation, particularly ESOs, creates perverse incentives for managers to misrepresent true financial performance. For example, Bartov and Mohanram (2004) demonstrate that top executives inflate reported earnings to boost short-term stock price in order to increase the cash payout of ESO exercise. Cheng and Warfield (2005) find that managers with more equity incentives are more likely to smooth earnings to meet or just beat analysts' forecasts. Erickson et al. (2004) document that firms granting more executive stock-based compensation are more likely to commit accounting frauds. Efendi et al. (2004) report that Chief Executive Officers' (CEO) stock option compensation is a strong predictor of accounting restatements. Collectively, this line of literature suggests that higher levels of executive stock-based compensation are associated with poorer accounting reporting quality. To the extent that executive option holdings are positively correlated with outstanding ESOs, the positive correlation between outstanding ESOs and the cost of debt could reflect the risk premium charged by the credit market for the higher information risk associated with poorer financial reporting quality (i.e., Sengupta 1998; Francis et al. 2005).

To control for this alternative explanation, I include in the credit rating model the firm's accrual quality, *ACCQUALTY*, to proxy for the information risk derived from the firm's financial reporting quality. Francis et al. (2005) demonstrate that accrual quality is

priced by the debt and equity markets and therefore is a valid proxy for information risk that cannot be diversified away. Following Francis et al. (2005), *ACCQUALITY* is measured based on the standard deviation of the residuals from the cross-sectional Dechow-Dichev (2002) regression and modified by McNichols (2002) as follows:

$$\frac{TCA_{i,t}}{Assets_{i,t}} = \phi_0 + \phi_1 \frac{CFO_{i,t-1}}{Assets_{i,t}} + \phi_2 \frac{CFO_{i,t}}{Assets_{i,t}} + \phi_3 \frac{CFO_{i,t+1}}{Assets_{i,t}} + \phi_4 \frac{\Delta REV_{i,t}}{Assets_{i,t}} + \phi_5 \frac{PPE_{i,t}}{Assets_{i,t}} + \varepsilon_{i,t} \quad (1)$$

where $TCA_{i,t}$ = firm i's total current accruals in year t, defined as ($\Delta CA_{i,t}$-$\Delta CL_{i,t}$ -$\Delta Cash_{i,t}$ +$\Delta STDEBT_{i,t}$),

$\Delta CA_{i,t}$ = firm i's change in current assets (Compustat #4) between year t-1 and year t,

$\Delta CL_{i,t}$ = firm i's change in current liabilities (Compustat #5) between year t-1 and year t,

$\Delta Cash_{i,t}$ = firm i's change in cash (Compustat #1) between year t-1 and year t,

$\Delta STDEBT_{i,t}$ = firm i's change in debt in current liabilities (Compustat #34) between year t-1 and year t,

$CFO_{i,t} = NIBE_{i,t} - TA_{i,t}$ = firm i's cash flows from operations in year t,

$NIBE_{i,t}$ = firm i's net income before extraordinary items (Compustat #18) in year t,

$TA_{i,t}$ = firm i's total accruals in year t, defined as ($\Delta CA_{i,t}$-$\Delta CL_{i,t}$ -$\Delta Cash_{i,t}$ +$\Delta STDEBT_{i,t}$-$DEPR_{i,t}$),

$DEPR_{i,t}$ = firm i's depreciation and amortization expense (Compustat #14) between year t-1 and year t,

$Assets_{i,t}$ = firm j's total assets at the end of year t,

$\Delta REV_{i,t}$ = firm i's change in revenues (Compustat #12) between year t-1 and year t,

$PPE_{i,t}$ =firm i's gross value of property, plant and equipment (compustat #7).

Equation (1) is estimated cross-sectionally for each two-digit SIC industry group with at least 15 firms for each year.[12] Since a larger standard deviation indicates poorer accrual quality, *ACCQUALITY* is therefore measured as the negative of the standard deviation of the resulting firm- and year-specific residuals, calculated over year t-4 through t. Consistent with Francis et al.'s (2005) finding that better accrual quality is associated with a higher credit rating, I expect the coefficient on *ACCQUALITY* to be positive.[13]

My next set of explanatory variables controls for the operating risk associated with ESO programs. Because the value of ESOs increases in stock price volatility, several studies have hypothesized and found that the use of ESOs is associated with greater management risk-taking behaviors. Rajgopal and Shevlin (2002), Li (2004) and Coles et al. (2003) document that ESO incentives are positively correlated with the possibility that firms choose riskier projects. Consistent with the notion that ESOs induce risk-taking, the extant research also documents that CEOs' ESO incentives are positively correlated with contemporaneous return volatility (Guay 1999; Cohen et al. 2000), future return volatility (Coles et al. 2003; Hanlon et al. 2004), future cash flow volatility (Rajgopal and Shevlin 2002) and future earnings volatility (Hanlon et al. 2004). Since higher operating risk may increase the probability that the firm's cash flow realizations at any given period will fall below the required debt service level (Minton and Schrand

[12] Firms that are excluded from my final sample because of insufficient observations in their two-digit SIC industries to estimate the Dechow and Dichev (2002) regression do not appear to concentrate in any particular industry. Industries that drop out of the Dechow and Dichev (2002) regression include mining, construction, tobacco, retail lumber and person services.

[13] As a robustness check, I also include the option sensitivity measure described in Core and Guay (1999) to proxy for managers' earnings management incentives since Cheng and Warfield (2005) show that this measure is associated with managers' tendency to smooth earning to meet or beat analysts' earnings forecast. Option sensitivity is defined as the expected change in top-five executives' option wealth from a one percent change in stock price. The coefficient on the option incentive measure is insignificant and none of my results is affected by including this incentive measure in credit rating and yield spread models.

1999), creditors are unlikely to favor the increased operating risk associated with ESO programs. Consistent with the above discussion, DeFusco et al. (1990) find that announcements of new management ESO plans are associated with negative abnormal bond returns. The authors also document an increase in stock return variance after the approval of executive option plans. Consequently, the positive correlation between outstanding ESOs and the perceived credit risk could be a manifestation of creditors' aversion to operating risk. To control for this possibility, I include three operating risk proxies in the credit rating model: (i) the standard deviation of stock returns (*STDRET*); (ii) the standard deviation of income before extraordinary items deflated by total assets (*STDROA*); and (iii) the standard deviation of operating cash flows deflated by total assets (*STDCFO*), all calculated over the five-year-period between t-4 and t.[14] The signs for these operating risk proxies are expected to be negative.

One of the most commonly cited reasons to compensate employees with ESOs is that stock options encourage employees to think like owners and thus mitigate agency problems (Ittner et al. 2003). Consistent with this argument, Hanlon et al. (2003) document that the use of executive stock options is associated with better future operating performance. Therefore, I include in the credit rating model firm profitability (*ROA*) and cash flows from operating activities (*CASHFLOWS*) to control for the realized

[14] I also estimate credit rating and yield spread models including the measure of CEOs' ESO risk-taking incentives used in Guay (1999), Rajgopal and Shevlin (2002), Coles et al. (2003), and Hanlon et al. (2004). Specifically, CEO's ESO risk-taking incentives are calculated as the Black-Scholes partial derivative of option value with respect to a one percent change in stock-return volatility and then weighted by the number of options held by the CEO. The inclusion of this variable does not change the direction and significance of the coefficient on OPTIONS and the coefficient on ESO risk-taking incentives is insignificant in the credit rating and yield spread models. In addition, including R&D expenditures as an additional proxy for the operating risk (Shi 2003) does not alter my results.

motivational benefits of ESOs.[15] In addition, I also control for other firm characteristics that have been identified by prior research as determinants of corporate credit ratings (e.g., Kaplan and Urwitz 1979, Ziebart and Rieter 1992, Bhojraj and Sengupta 2003, Ashbaugh et al. 2004). These firm characteristics include leverage ratio (*LEVERAGE*); firm size (*SIZE*); systematic equity risk (*BETA*); capital intensity (*CAP_INTEN*); interest coverage ratio (*INT_COV*) and book to market ratio (*B2M*). See Appendix C for the measurement of these control variables. The expected signs for these firm characteristics based on prior literature are presented in Table 4 through Table 6.

The yield spread model is similar to the credit rating model with two exceptions. First, the yield spread model is estimated using the OLS regression because the dependent variable, yield spread, is now a continuous variable. Second, aside from the issuers' characteristics identified in the credit rating model, I also controlled for four issue-specific characteristics that have been demonstrated by prior studies to affect yield spreads of new bond issues (Sengupta 1998; Khurana and Raman 2003). My yield spread model is estimated as follows:

$$SPREAD_{i,t} = \alpha_0 + \alpha_1 OPTIONS_{i,t} + \alpha_2 ACCQUALITY_{i,t} + \alpha_3 STDROA_{i,t} + \alpha_4 STDCFO_{i,t}$$
$$+\alpha_5 STDRET_{i,t} + \alpha_6 ROA_{i,t} + \alpha_7 CASHFLOWS_{i,t} + \alpha_8 LEVERAGE_{i,t} + \alpha_9 SIZE_{i,t}$$
$$+\alpha_{10} BETA_{i,t} + \alpha_{11} CAP\_INTEN_{i,t} + \alpha_{12} INT\_COV_{i,t} + \alpha_{13} B2M + \alpha_{14} MATYRS_{i,t}$$
$$+\alpha_{15} ISSUESIZE_{i,t} + \alpha_{16} CALLABLE_{i,t} + \alpha_{17} SUBORD_{i,t} + \varepsilon_{i,t}$$

(*Yield Spread Model*)

[15] My empirical results are unaffected by the inclusion of Tobin's Q and analysts' long-term growth forecasts as proxies of the *expected* incentive benefits of ESOs. In addition, my results are robust to the inclusion of the pro forma ESO expense in the credit rating and yield spread models. This latter finding ensures that outstanding ESOs do not simply serve as a proxy for the ESO expense in credit market participants' credit risk assessments.

SPREAD is the difference between the yield to maturity on newly issued corporate bonds and the yield to maturity on U.S. Treasury bonds of approximately the same maturity at the issue date.[16] This spread captures the default risk premium charged by bondholders and comprises the largest component of the firm's cost of debt (Sengupta 1998). I examine new bond issues because many seasoned corporate bonds are not actively traded. Therefore, the prices for these bonds are established based on the matrix pricing methodology, which estimates the bond's value by comparing the bond to other bonds with similar provisions that are traded at about the same time, and may not fully reflect the credit market's actual beliefs toward the issuers. In addition, since new bond issues are typically preceded by intensive data acquisition and analyses by the credit market, the use of new issues ensures that offering yields impound the most up-to-date information so that the usual concern about bond price inefficiency (Katz 1974) is mitigated. In order to allow the credit market investors enough time to process financial reporting information, I match yield spread data of bonds issued in year t+1 with the issuer's year t financial and stock options information.[17] I expect α_1 to be positive, suggesting that higher levels of ESOs are associated with a wider yield spread and therefore a higher cost of debt.

The four bond issue characteristics included in the yield spread model are: (1) years to maturity (*MATYRS)*; (2) the log of the issue size in million dollars (*ISSUESIZE*); (3) whether the issue is callable (*CALLABLE*); and (4) whether the bond is a subordinated

[16] Yield to maturity is the discount rate necessary to make the present value of the bond's principal and interest payments equal to the issue price. As a result, a higher yield to maturity translates into a lower issue price and thus a higher cost of debt.

[17] Since firms are not required to disclose detailed information about ESO plans such as the number and the weighted average exercise price of outstanding ESOs in quarterly financial reports, I am unable to match new bond data with quarterly ESO information.

debt (*SUBORD*). I expect a positive sign for *MATYRS* because the yield curve is generally upward sloping during the 2001-2003 period.[18] As argued by Khurana and Raman (2003), the sign for *ISSUESIZE* is ambiguous because on the one hand, large bond issues could lower the transaction costs due to the economies of scale in the underwriting process. On the other hand, the large issue size might result in the difficulty in placing the bond issue and therefore increase the borrowing cost. Given these two conflicting effects, I make no prediction on the sign for *ISSUESIZE*. The sign for *CALLABLE* is expected to be positive since the bondholders will demand a premium for giving the company an option to redeem the debt prior to maturity. I also expect the sign for *SUBORD* to be positive because subordinated debts have substantially less protection in the event of bankruptcy.

To test H2 that outstanding ESOs have a more adverse impact on the perceived credit risk when the company maintains a policy of repurchasing shares in response to option exercise, I augment the credit rating and yield spread models by introducing an indicator variable, *REPUR*, and an interactive term, *REPUR*OPTIONS*. *REPUR* is set equal to one if the firm has a tendency to repurchase shares surrounding the exercise of ESOs and zero otherwise. Identifying companies with such a tendency, however, is no easy task because companies can buy back shares for various reasons, from signaling undervaluation to fending off unwanted takeovers, from distributing excess free cash flows to maintaining target leverage ratios. Moreover, companies are under no obligation to disclose their intentions behind repurchase programs, which makes it harder to extrapolate the likelihood of future ESO-related cash outflows from historical repurchase

[18] Data source: U.S. Treasury. Available at: http://www.treasury.gov/offices/domestic-finance/debt-management/interest-rate/yield-hist.html.

behaviors. To better identify firms that engage in ESO-related repurchases, I estimate the following Tobit model for each firm using data from 1992 to 2003. The sample period starts in 1992 because it is the first year for when ExecuComp data is available.

$$REP_{i,t} = \beta_0 + \beta_1 EXER_{i,t} + \varsigma_{i,t} \quad (2)$$

where *REP* is the dollar amount of repurchases, computed as Compustat reported purchase of common and preferred stock for year t (Compustat #115) reduced by the decrease in preferred stock (Compustat #130) from year t-1 to year t.[19] *EXER* is the total value of ESOs exercised (ExecuComp *SOPTEXER*) in years t and t+1 summing across top five executives.[20] The rationale behind this Tobit model is that if a firm repurchases shares in response to current and upcoming ESO exercises, its contemporaneous and one-year ahead ESO exercises should exhibit some predictive power about the dollar amount it spends on common share repurchases. Therefore, *REPUR* is coded one if β_1 is significantly positive at the 5% level and zero otherwise. I expect a negative (positive) coefficient on *REPUR*OPTIONS* in the credit rating (yield spread) model because the potential cash outflows as a result of the settlement of ESO obligations are more likely to occur when the firm has a propensity to buy back shares around option exercise.

[19] Stephens and Weisbach (1998) point out that Compustat #115 includes the purchases of treasury stock, the conversions of preferred stock into common stock, the conversions of class A, B and special stock into common stock, and the retirement and redemption of both common stock and preferred stock. Since this dissertation is interested only in the dollar amount spent on repurchasing common stock, adjusting for the decrease in preferred stock removes some noise contained in Compustat #115 (Dittmar 2000).

[20] Ideally, I would like to use the value of ESOs exercised by all employees as the predictor of the dollar amount spent on repurchasing. This variable, however, requires costly manual data collection for an extended period of time necessary to estimate firm-specific regressions. As a result, I use the value of ESOs exercised by top five executives as a proxy for the value of ESOs exercised at the firm-wide level.

CHAPTER 5: SAMPLE SELECTION AND DESCRIPTIVE STATISTICS

Panel A of Table 1 summarizes the sample selection process for my credit rating sample. The initial sample begins with 497 S&P 500 firms from the ESO database maintained by Jack Ciesielski of R.G. Associates, Inc. and 139 non-S&P 500 firms that are potential heavy option users from the ExecuComp database. This sample is chosen to ensure that sample firms have substantial outstanding ESOs, which reduces the possibility that immaterial ESO obligations obscure creditors' assessment of the ESO's impact on firms' creditworthiness.[21] The sample period is limited to the three-year period 2001-2003 because detailed stock option information has to be manually collected from companies' 10-K filings for non-S&P 500 firms. I also hand collect additional stock option information necessary for my empirical analyses that is not available in R.G. Associates' ESO database for S&P 500 firms.

To identify the non-S&P 500 heavy option users, I divide the number of individual executive option grants (ExecuComp data *NUMSECUR*) by the percentage of total option grants in a given year represented by the executive option grants (ExecuComp data *PCTTOTOP*) to obtain the number of total option grants for the year at a firm-wide level. An option usage ratio is calculated by dividing the number of total option grants by outstanding common shares at the end of the year and averaging over the three-year period between 2001 and 2003.[22] All non-S&P 500 firms are ranked within their S&P index groups (i.e., S&P MidCap, S&P SmallCap and Non-S&P 1500 firms) by

[21] To assess whether my credit rating results are driven by heavy option users, I re-estimate the credit rating model using only S&P 500 companies. The tenor of my results remains qualitatively similar.

[22] To be included in my sample, firms must have executive compensation data for year 2003 in ExecuComp. ExecuComp is updated four times each year in January, April, July and October. The data used in this study are extracted from ExecuComp after the July 2004 update.

the option usage ratio. I retain firms that are ranked in the top 80 within their S&P index groups and exclude from this sample firms that do not have at least five years of data on Compustat and ExecuComp because some of my variables are measured over the past five years. These procedures reduce my non-S&P 500 sample to 139 firms.

I exclude firms in the utilities (SIC=4900-4999) and financial services (SIC=6000–6999) sectors because of their unique industry and risk characteristics. My credit rating analyses further require firms to have credit rating information on Compustat and all other necessary data on Compustat, CRSP and ExecuComp for my credit rating model. Finally, I eliminate firm-years that have voluntarily chosen to report ESOs on financial statements following SFAS 123's fair value method to ensure that the equity labeling of ESOs on the balance sheet mandated by SFAS 123 does not confound creditors' perception of outstanding ESOs.[23] These procedures yield a final sample of 913 firm-years, representing 338 firms. S&P 500 firm-years constitute 86.4% of the credit rating sample, followed by S&P MidCap, Non-S&P, and S&P SmallCap firm-years, which makes up 6.4%, 4.8% and 2.4% of the sample, respectively. There is some industry concentration in my credit sample with durable manufacturers, computers and retail industries making up over 50% of the sample. As discussed later in the dissertation, the empirical results in this dissertation are robust to the inclusion of industry controls. See Panel B of Table 1 for the industry and S&P membership distributions for the credit rating sample.

[23] Recall that Hopkins (1996) shows that buy-side analysts price a firm's common stock as if the firm had issued a debt (equity) security when the security is classified as a liability (equity) on the balance sheet. This finding suggests the need to exclude firm-years that voluntarily report under the SFAS 123's fair value method because information users' responses to outstanding ESOs are likely to be influenced by the equity classification on the balance sheet mandated by SFAS 123.

Panel C of Table 1 summarizes the sample selection procedures for my yield spread sample. My initial sample starts with 1039 straight (nonconvertible), fixed (nonfloating) rate bonds issued by U.S. industrial companies from January 2001 to October 2004. Data pertaining to new bond issues are drawn from the Securities Data Company (SDC). If the company has more than one bond issue in a particular year, I retain only the bond with the largest principal. After excluding bond issues without all necessary data for the yield spread model and those that voluntarily adopt the fair value method under SFAS 123, my final yield spread sample comprises 309 new bonds issued by 195 firms, 78%, 14%, 3% and 5% of which are issued by S&P 500, S&P MidCap, S&P SmallCap and Non S&P firms, respectively. The industry distribution in Panel D of Table 1 indicates that durable manufacturers and retail industries are two of the most representative industries in the yield-spread sample.

For each of my sample firm-years, I obtain stock option data from either R.G. Associates' ESO database or the firm's SFAS 123 footnote from its 2000 to 2003 10-K filings. These data items include the number and weighted average exercise price for outstanding stock options at the end of the year, the maximum contractual life of the options, the weighted average remaining contractual life of outstanding stock options, and inputs to the option valuation model (i.e., expected price volatility, expected option life, risk-free interest rate and dividend yield).

Panel A of Table 2 reports descriptive statistics for my credit rating sample. As with Ashbaugh et al. (2004), this study classifies the credit ratings into investment and speculative (BB+ or worse) grades to facilitate univariate analyses and allow more intuitive interpretation of the economic significance of my empirical results. The median

investment- (speculative-) grade firm-year has a credit rating of about 5 (3), corresponding to the S&P letter grade between A- and A+ (BB- and BB+). The fair value of outstanding stock options as a percentage of total assets, *OPTIONS*, is significantly higher for firm-years that receive a speculative-grade rating than those that receive an investment-grade rating, with a mean (median) value of 9.0% (3.2%) and 4.2% (2.5%), respectively. This difference is significant at the 1% level both in terms of mean and median. Partitioning *OPTIONS* into the component held by top-five executives, *MGTESO*, and that held by non-executive employees, *NONMGTESO*, I find that the mean *MGTESO* and *NONMGTESO* are both higher for speculative-grade than for investment-grade firm-years although the median *NONMGTESO* is not significantly different across these two rating groups. Investment-grade firm-years have significantly better mean and median accrual quality than speculative grade firm-years. The mean (median) firm with a speculative grade has significantly higher volatility in terms of its accounting income, cash flows, and stock returns, which are consistent with the notion that credit rating agencies dislike operating uncertainties. Consistent with prior research, firms receiving better credit ratings are those with lower financial leverage, higher profitability, more abundant operating cash flows, lower systematic equity risk, higher levels of capital intensity, greater growth opportunities, higher interest coverage ratios and are larger in size. About 21.3% (15.7%) of the investment- (speculative-) grade firm-years are classified as having a tendency to repurchase shares in response to ESO exercise (*REPUR*).

Panel B of Table 2 reports summary statistics for selected variables in my yield spread sample. Similar to Panel A of Table 2, I split the entire sample in half based on

yield spreads to facilitate univariate comparisons. Firm-years having above (below) the sample median yield spread are labeled as high (low) spread firm-years in Panel B of Table 2. Turning first to the bond issue characteristics, the mean yield to maturity for the high- (low-) spread bonds is 267.6 (89.9) basis points above the yield on U.S. Treasury bonds of similar maturity at the time of bond issuance, with a median of 232.0 (90.5) basis points. As expected, low-spread bonds are substantially more likely to have an investment grade rating than high-spread bonds.[24] The mean (median) time to maturity for the high- and low-spread bonds is 8.5 (10) and 7.7 (7) years, respectively, with the high spread bonds having a slightly longer maturity. High-spread bonds are more likely to be subordinated and callable bonds. The size of the bond, however, does not differ across high- and low-spread subsamples.

Inconsistent with the result from the credit rating sample, the high spread sample has a smaller *OPTIONS* than the low-spread sample and this difference is significant for both the mean and the median. For the mean high- (low-) spread sample, the fair value of outstanding ESOs is about 3.1% (4.3%) of total assets, with a median of 1.9% (2.5%). There is no significant difference in the value of executive ESOs scaled by total assets across high- and low- spread firm-years. Consistent with Panel A of Table 2, low spread firm-years have better accrual quality and lower operating risk. Univariate tests on other control variables are generally consistent with prior studies. Specifically, the issuing firms are generally profitable and have positive operating cash flows. The low-spread firm-years have lower *LEVERAGE*, higher *ROA*, higher *CASHFLOWS*, higher *INT*_COV, and are larger in size. The percentage of firm-years exhibiting a tendency to

[24] Firms in the new bond sample enjoy higher issuer credit ratings than firms in the credit ratings sample. On average, firms in the credit ratings (yield spread) sample has a credit rating of BBB+ (A-).

repurchase shares around ESO exercise does not differ across high- and low-spread firm years.

Panel A of Table 3 reports pairwise correlations among variables used in my credit rating model. Pearson product-moment (Spearman rank-order) correlations are presented in the upper right (lower left) triangle. *OPTIONS* is negatively correlated with *RATING* in terms of the Pearson correlation at the 1% level but the Spearman correlation between these two variables is insignificant. *ACCQUALITY* is positively correlated with *RATING*, which is consistent with Francis et al.'s (2005) finding that higher accrual quality is associated with a better credit rating. Consistent with Panel A of Table 2 and the prior literature, I find that *ROA*, *CASHFLOWS*, *SIZE*, *CAP_INTEN*, and *INT_COV* are positively associated with credit ratings while *STDRET*, *STDROA*, *STDCFO*, *BETA*, *LEVERAGE* and *B2M* are negatively correlated with credit ratings. *OPTIONS* is positively correlated with operating risk measures, consistent with the notion that stock options give employees risk-taking incentives and/or firms that are more volatile in nature use stock options to attract less risk-averse employees. The correlation between *LEVERAGE* and *OPTIONS* is negative and significant, which suggests that firms with lower financial leverage tend to use more ESOs to compensate their employees. Interestingly, *OPTIONS* is positively correlated with *CASHFLOWS*, which is inconsistent with the conventional wisdom that cash-constrained firms are more likely to use ESOs to substitute for cash compensation.

The correlation matrix for the yield spread sample presented in Panel B of Table 3 is generally consistent with the results from univariate tests in Panel B of Table 2. Specifically, the Pearson and Spearman correlation coefficients between *OPTIONS* and

SPREAD are negative and significant at the 1% level, which is inconsistent with the finding from the credit rating sample. Consistent with prior literature, *SPREAD* is positively correlated with *LEVERAGE*, *BETA*, *B2M*, and all operating risk proxies and negatively correlated with *ROA*, *CASHFLOWS*, *SIZE* and *INT_COV*. All of these correlations are significant at the conventional levels in terms of the Pearson and Spearman correlation coefficients. Better accrual quality is associated with a lower yield spread although this relationship is significant only in terms of the Spearman correlation coefficient.

CHAPTER 6: EMPIRICAL RESUTLS

6.1 Credit Rating Analyses

In this section, I examine whether the fair value of outstanding ESOs is associated with a higher or lower perceived credit risk after controlling for information risk, operating risk and firm characteristics that have been shown to affect rating agencies' credit rating decisions. Before proceeding to the empirical analyses, I first test for endogeneity of *OPTIONS* in the credit rating model because of the concern over the direction of causality between *RATING* and *OPTIONS*. This study hypothesizes that a higher level of outstanding ESOs leads to a poor credit rating. It is likely, however, that the causality also runs in the opposite direction. Because granting ESOs requires no cash outlay, firms facing liquidity problems are likely to use options in lieu of cash compensation to conserve cash. Although this prediction has not been documented consistently in the literature[25] and researchers have questioned the economic justification and efficiency of such a practice (Hall and Murphy 2003; Oyer and Schaefer 2005)[26], one cannot rule out the possibility that firms with poor credit ratings use employees to

[25] Yermack (1995) and Core and Guay (2001) document that firms award more ESOs when facing liquidity constraints. However, Matsunaga (1995), Ittner et al. (2003) and Kroumova and Sesil (2003) do not find such a relationship. In addition, Rebeiz's (2003) survey evidence shows that a majority of the compensation committee members he surveyed do not agree that ESOs are necessarily a cheap source of capital. Moreover, contrary to the prediction that firms grant ESOs to conserve cash, Ittner et al. (2003) find that new economy firms with greater cash flows use employee stock options more extensively.

[26] While some people argue that compensating employees with ESOs helps firms conserve cash to finance future growth, researchers note that this argument, while intuitively appealing, lacks a clear economic justification (Hall and Murphy 2003; Oyer and Schaefer 2005). Hall and Murphy (2003) point out that substituting options for cash compensation is essentially borrowing from employees the amount that otherwise would have been paid in cash. The existing literature has demonstrated that options are worth less to employees than their economic cost to the issuing company because employees are risk averse and poorly diversified (Lambert et al. 1991; Meulbroek 2001; Hall and Murphy 2002). This begs the question of whether risk-averse and undiversified employees are an efficient source of financing, compared to banks and other private capital providers such as venture capitalists who are better at managing risk (Hall and Murphy 2003; Oyer and Schaefer 2005).

help finance the firms because these firms face a higher cost of accessing the public debt market. As discussed in greater detail in Appendix D, results from the Rivers-Vuong (1988) test procedure provide little evidence that *OPTIONS* is endogenous in the credit rating model. As a result, the empirical analyses in this subsection are based on regular ordered probit models.[27] I provide further evidence on the direction of causality in Chapter 6.3.1.

Panel A of Table 4 presents the test results of the first hypothesis – whether credit market participants perceive ESOs as a liability-like or equity-like obligations in their credit risk assessments – for the credit rating sample. The third column in Panel A of Table 4 reports the analysis using all available firm-year observations. Since each of the sample firms can appear in the regression model up to three times as long as it has no missing data for all of the sample years, the serial correlation in residual terms could potentially obscure statistical inferences. However, given that the state of the art econometric techniques are unable to estimate a fixed effect ordered probit model (Wooldridge 2002, P. 484), the pooled cross-sectional results are supplemented with a year-by-year analysis.

Overall, the credit rating model correctly classifies over 60% of observations into the seven levels of credit ratings, suggesting that the credit rating model is reasonably specified. Consistent with the "options-as-liability" hypothesis, the coefficient on

[27] Another reason this dissertation chooses to use the regular ordered probit (OLS) to estimate the credit rating (yield spread) model is the difficulty in selecting appropriate instruments that are correlated with *OPTIONS* but are exogenous in the credit rating (yield spread) model. There are reasons to believe that the determinants of option granting behaviors proposed by prior research such as monitoring difficulty, growth opportunities, cash flow availability and firm performance also affect credit risk assessments. Larcker and Rusticus (2005) demonstrate that instrumental variable estimation with weak and/or endogenous instruments invites more statistical inference problems than it solves. After evaluating the quality of potential instruments for *OPTIONS*, I choose to retain the regular ordered probit and OLS regressions for the credit rating and yield spread models, respectively. See Appendix D for more discussion.

OPTIONS is negative and significant at the 5% level or better in the pooled cross-sectional as well as year-by-year models. The information risk proxy, *ACCQUALITY*, does not appear to affect credit ratings in the multivariate framework despite its significant pairwise correlation with *RATING* in Panel A of Table 3. Two of the three operating risk proxies, *STDROA* and *STDRET*, are negative and significant, indicating that operating uncertainties have an unfavorable impact on the firm's credit profile. The coefficients on most of the control variables are significant and in the predicted direction except for capital intensity (*CAP_INTEN*). Ashbaugh et al. (2004) find a positive association between *CAP_INTEN* and credit ratings (*RATING*). While I also find a positive and significant pairwise correlation between these two variables in Table 3, the positive correlation turns negative after controlling for other variables in the credit rating model.

Panel B of Table 4 displays the results from the test of H2. The coefficient on *REPUR*OPTIONS* is negative and significant as predicted across all regressions. This finding is consistent with H2 that outstanding ESOs have a more negative effect on credit ratings when firms have a proclivity toward buying back shares surrounding the exercises of ESOs. Since *OPTIONS* is interacted with *REPUR* in Panel B of Table 4, a negative coefficient on *OPTIONS* indicates that ESOs have an adverse impact on credit ratings even for firms that do not exhibit a historical tendency to engage in ESO-related repurchases.[28] All other variables behave similarly across Panel A and Panel B of Table 4.

Given that the marginal effects of independent variables in an ordered probit model are not easy to interpret (Long 1997), I follow Ashbaugh et al. (2004) and partition

[28] This finding is consistent with the notion that creditors believe that past repurchase behaviors do not guarantee future ESO settlement methods and there is always the possibility that companies will incur real cash outflows to redeem outstanding ESOs regardless of historical policies.

the seven levels of credit ratings into two classes – investment grade and speculative grade – and assess the economic significance of the impact of *OPTIONS* on credit ratings through an examination of the marginal effect from the probit model. The marginal effect is measured as the change in the probability of receiving an investment-grade rating for a change in the independent variable from the 25th percentile to the 75th percentile of the variable in the sample, holding all other independent variables at their mean values. Panel C of Table 4 details the results from the economic significance analysis. The dependent variable in Panel C of Table 4 is *INVGRADE*, which takes on the value of one if credit rating is BBB- or above, and zero otherwise. To facilitate the interpretation and comparison of the economic impact across independent variables, the marginal effect analyses are estimated based on the baseline credit rating model without the *REPUR* interaction term. The probit model results are similar to those of the ordered probit model in Panel A of Table 4. The marginal effect of *OPTIONS* is -0.036, indicating that when the value of outstanding ESOs increases from the 25th percentile to the 75th percentile in the sample, the probability of receiving an investment-grade rating decreases only by 3.6%. This result suggests that outstanding ESOs do not have an economically significant influence on the probability that the firm receives an investment-grade rating, especially when compared to other firm characteristics such as return volatility and firm size. A change in return volatility (firm size) from the 25th percentile to the 75th percentile decreases (increases) the probability of receiving an investment-grade rating by 21.8% (20.7%). Interestingly, the marginal effect of the firm's on-balance-sheet debt, *LEVERAGE*, is -0.030, a magnitude similar to that of *OPTIONS*.

6.2 Yield Spread Analyses

Table 5 presents the results for the yield spread sample. Model 1 of Table 5 presents the test results of the first set of hypotheses. Consistent with the "options-as-liability" hypothesis, the coefficient on *OPTIONS* is significantly positive, indicating that credit market investors charge a higher risk premium for firms with a higher level of ESOs. The coefficients on *STDCFO* and *STDRET* are significantly positive, which again demonstrates that operating volatilities have unfavorable implications for the perceived credit risk. Inconsistent with my predictions, the coefficients on maturity and subordination status of the bond are not significantly different zero.[29] Note, however, that only about 3% of the sample bonds are subordinated debt. Thus, the lack of variation in the *SUBORD* variable might explain its insignificant coefficient. To determine whether outstanding ESOs and balance sheet debt have comparable impacts on yield spreads, I multiply the coefficients from Model (1) of Table 5 by the interquartile range of *OPTIONS* (0.0360) and *LEVERAGE* (0.1620). The results show that an increase from the 25th percentile to the 75th percentile in *OPTIONS* and *LEVERAGE* increase the yield spread by about 12.8 and 14.1 basis points, respectively. This finding, in conjunction with the results in the previous section, suggest that outstanding ESOs have a negative impact on the firm's perceived credit risk similar to that of the recorded balance sheet debt. To provide perspective on the economic significance of *OPTIONS*, I multiply the 12.8 basis point difference by the median bond issue size, which is 300 million in my yield spread sample. The yield spread difference translates into a higher financing cost of $384,000 ($300 M*0.128%) for firms in the 75th percentile of *OPTIONS* compared to firms in the

[29] Following prior literature, I include only the level of the bond's maturity in the yield spread model. However, because the shape of the yield curve is generally nonlinear, I also include the squared term of maturity in the yield spread model as a robustness check. Neither the level nor the squared term of maturity is significant when I include both terms in the model and the coefficients on other variables are virtually the same as those reported in Table 5.

25th percentile of *OPITONS*. Given that the median total interest expense (interest expense on newly issued bonds)[30] is $172 ($18) million for my sample firm-years, the economic magnitude of this financing cost difference is arguably modest.

Model (2) of Table 5 displays the test results of H2. Inconsistent with H2 that *OPTIONS* has a more negative impact on the perceived credit risk for firms that repurchase shares in response to the settlement of the ESO obligations, the coefficient on *REPUR*OPTIONS* is not significantly different from zero. Recall that while *RATING* is credit rating agencies' opinion about the company's *overall debt service ability*, the bond yield spread is the credit market's assessment of the firm's capacity to meet *a particular bond obligation*. Therefore, the impact of outstanding ESOs on yield spread should be a function of not only the likelihood of ESO-related repurchases but also the expected life of ESOs in relation to the maturity of a specific bond. The existence of ESO obligations should not have a negative impact on bondholders' chance of receiving guaranteed principal and interest payments if the company does not repurchase shares in response to ESO exercise or if the bond has been repaid before ESO obligations become due. Put differently, outstanding ESOs would adversely affect the yield spread of a particular bond only when the company engages in ESO-related repurchases and when the maturity of the bond is longer than the expected life of outstanding ESOs. To test this conjecture, I construct an indicator variable, *LONG*, which takes on the value of one if the maturity of the bond is longer than the expected life of outstanding ESOs at issuance, and zero otherwise.[31] Following Li (2002), I measure the expected life of outstanding ESOs as the

[30] Interest expense on newly issued bonds is estimated as the amount of proceeds multiplied by the offer yield to maturity.

[31] Since the weighted average maturity of a company's total outstanding debt is not publicly available, I am unable to introduce the *LONG* variable to my credit rating model.

expected life of the new ESO grants minus the age of outstanding ESOs, which is calculated as the difference between the maximum contractual life and the remaining contractual life of outstanding ESOs. Model (3) presents the results when the impact of *OPTIONS* on the credit risk is conditioned on the bond's maturity relative to the expected life of ESOs. The coefficient on *LONG*OPTIONS* is not significant, indicating that *OPTIONS* does not have an increased adverse impact on the cost of debt for bonds with a maturity longer than ESOs' expected life. However, as reported in Model (4) of Table 5, when the impact of *OPTIONS* is conditioned on both the issuers' ESO-related repurchase propensity and the bond's maturity in relation to the expected life of outstanding ESOs, the coefficient on *REPUR*LONG*OPTIONS* is significant and positive at the 10% level while other interaction terms remain insignificant. This finding suggests that outstanding ESOs impair the company's debt service ability only when the issuing company is prone to repurchasing shares around ESO exercise and when the cash outflows associated with ESO exercise take place before bondholders received their guaranteed payments under the bond contract.

6.3 Additional Analyses and Robustness Checks

6.3.1 Change Specification

To further enhance the robustness of the credit rating results, I also estimate the credit rating model using a "change" specification to examine whether a change in the firm's outstanding ESOs is positively associated with a change in the firm's credit ratings. This test controls for firm-specific factors that are constant over time and thus mitigates the concern over the autocorrelation in residual terms. Since the "change" specification requires all variables in the credit rating model to be first differenced, I lose

one year of observations for year 2001. The results of the "change" analyses are presented in Model (1) in Panel A of Table 6. The dependent variable, *DOWNGRADE*, is an ordinal variable that measures the change in credit ratings from year t-1 to year t. *DOWNGRADE* is coded 1 (-1) when the firm's credit rating is downgraded (upgraded) and coded zero when the firm's credit rating remains the same. Of the 566 firm-year observations that have sufficient data for the "change" model, 82 (45) firm-years receive a downgraded (upgraded) rating and 439 firm-years experience no change in their credit ratings. Consistent with the results in Table 4 and the "options-as-liability" hypothesis, the coefficient on the first difference of *OPTIONS* (*DIFF_OPTIONS)* is positive and significant at the 1% level, suggesting that the tenor of my main results in Table 4 is unaffected by the "change" specification.[32]

To provide further evidence on the direction of causality, I also examine whether the change in outstanding ESOs explains the one-year-ahead change in credit ratings. The one-year-ahead "change" model further limits my analysis to observations with necessary differenced variables in year 2002. This is because I lose year 2001 data in the process of first differencing and the one-year-ahead change in credit ratings for year 2003 was not available when empirical analyses were conducted. The results of the one-year-ahead-change analysis are displayed in Model (2) in Panel A of Table 6. The coefficient on *DIFF_OPTIONS* remains positive and significant at the 1% level.

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[32] In addition, I also perform several other sensitivity checks to ensure the robustness of my results. In my primary analyses, I convert Standard & Poor's credit ratings using Ashbaugh et al.'s (2004) coding scheme, which collapses all letter grade ratings into seven categories. To examine whether my results are sensitive to the rating conversion process, I recode the credit ratings following Klock et al. (2004) to allow credit ratings to range from 1 (D ratings) to 22 (AAA ratings). See Appendix A for the conversion schedule. The negative relationship between *RATING* and *OPTIONS* is robust to this alternative rating conversion. In addition, to mitigate the concern that the results in this dissertation are driven by extreme outliers or industry-specific risk factors, I winsorize all independent variables at the 1% and 99% levels and include industry controls in the credit rating and yield spread models. The results are qualitatively similar to those reported in Table 4 and Table 5.

In addition, I also examine whether the change in *RATINGS* predicts concurrent and one-year ahead change in *OPTIONS*. For the purpose of this analysis, the level of *OPTIONS* is modeled as a function of monitoring cost, cash flow availability and firm performance as described in Appendix D. I take the first difference of all variables in the *OPTIONS* model and include the change in credit ratings (*DIFF_RATING*) as an additional predictor in the "change" specification. Results from Panel B of Table 6 show that the change in credit ratings does not predict either contemporaneous or one-year-ahead change in *OPTIONS*. Taken together, findings from this subsection suggest that the direction of causality appears to run from *OPTIONS* to *RATINGS* as hypothesized but not the other way around.

6.3.2 Executive Versus Non-Executive Stock Options

By tying executive remuneration to firm performance, ESO programs are designed to align management's interests with those of shareholders. However, if executives' personal wealth ties too closely to the firm's stock price, managers might have opportunistic incentives to maintain or inflate the short-term stock price at the expense of the company's long-term economic success. If creditors, like many critics, believe that the cost of the perverse incentive from executive ESO compensation outweighs the incentive alignment benefit, they may be more wary of firms with large executive ESO programs and price protect themselves against potential value-destroying behaviors in these firms. To the extent that the value of executive option holdings is positively correlated with the value of total outstanding ESOs, *OPTIONS* could simply be a proxy for the size of the executive ESO program.

To investigate this possibility, I partition the value of outstanding ESOs into the part that accrues to top-five executives, *MGTESO*, and the part that belongs to non-executive employees, *NONMGTESO*. For the median firm-year in the credit rating (yield spread) sample, *NONMGTESO* is about 4.7 (5.2) times larger than *MGTESO*, suggesting that top-five executives hold about 17.5% (16.1%) of the value of outstanding ESOs. If creditors are opposed to the adverse incentive effect of executive stock option programs rather than the liability-like impact of total outstanding ESOs, we should expect a negative (positive) coefficient on *MGTESO* but not a significant negative (positive) coefficient on *NONMGTESO* in the credit ratings (yield spread) model. Panel C of Table 6 reports the results from this partition. Interestingly, the coefficient on *MGTESO* is not statistically different from zero in both the credit rating and yield spread regressions while the coefficient on *NONMGTESO* continues to be significant in the predicted direction. These results indicate that the negative relationship between *OPTIONS* and the cost of debt is not driven by credit market participants' potential aversion to large executive ESO programs.

6.3.3 The Cost of Debt and Corporate Governance

Although the existing empirical research has not established the link between governance structure and the size of the firm-wide ESO program (Oyer and Schaefer 2005), the popular press and researchers have generally contended that the excessive use of ESOs is a symptom of poor corporate governance. Jensen and Murphy (2004) argue that corporate governance and compensation policies are highly inter-related. Inefficient pay practices can generally be traced to weak corporate governance. Hall and Murphy (2003) posit that firms face growing pressure to push stock options down throughout the

organization as grants for top executives increase. As a result, the size of the ESO program could also be proxying for the strength of the firm's governance structure. Since prior studies have documented that the firm's governance strength is inversely related to its cost of debt (Ashbaugh et al. 2004; Bhojraj and Sengupta 2003; Anderson et al. 2004), the positive relationship between *OPTIONS* and firms' credit risk might be driven by the link between governance strength and the cost of debt. To rule out this possibility, I re-estimate both my credit rating and yield spread models including proxies for corporate governance structure. Because a firm's corporate governance process tends to be sticky over adjacent years, a pooled cross-sectional analysis could inflate the significance of governance variables. As a result, the credit rating analyses in this subsection are based on year-by-year regressions.[33]

My first set of governance proxies are the corporate governance mechanisms identified by Ashbaugh et al. (2004) as being associated with the cost of debt. As with Ashbaugh et al. (2004), I use the Board Analysts database as my primary source of corporate governance variables. I use Board Analysts data from the 2003 proxy season, which represents the governance structure for fiscal 2002, and assume that the governance variables for 2002 serve as reasonable proxies for the governance structure for 2001 and 2003. Therefore, I use the same set of governance variables in all three year-by-year regressions. As reported in Panel D of Table 6, the coefficient on *OPTIONS* continues to be significant at the 1% level and none of the governance mechanisms

[33] If one believes that governance structure is sticky over a short period of time, the "change" model specification also helps to alleviate the concern that the adverse impact of *OPTIONS* on credit ratings is driven solely by the omission of governance proxies in the model.

appears to be significant.[34] Moreover, the p-values of the joint significance tests of governance variables suggest that the potential multicollinearity does not explain the insignificant coefficients on governance variables.

It is possible, however, that outstanding ESOs are proxying for other dimensions of corporate governance structures that are priced by the credit market but not captured by the governance mechanisms identified by Ashbaugh et al. (2004). Therefore, my second proxy for governance structure is the *Gov-Score* from Brown and Caylor (2004).[35] Brown and Caylor (2004) created *Gov-Score* based on 51 factors provided by Institutional Shareholder Services as of February 1, 2003. These 51 factors can be divided into eight governance categories including: audit, board of directors, charter/bylaws, director education, executive and director compensation, ownership, progressive practices, and state of incorporation. Brown and Caylor (2004) show that firms with higher *Gov-Score* are more profitable, have higher market valuation, and pay out more cash to their shareholders. In addition, *Gov-Score* is better linked to firm performance than is Gompers et al.'s (2003) *G-Index*. Therefore, *Gov-Score* is potentially a more comprehensive summary measure of a firm's governance strength. The results of this analysis are reported in Panel E of Table 6. The coefficient on *Gov-Score* is insignificant in the credit rating model and significant in the opposite direction in the yield spread model. Importantly, the inclusion of this governance proxy does not affect the direction and significance of *OPTIONS*.

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[34] Unlike Ashbaugh et al. (2004), I do not include in this analysis the percentage of independent directors that hold seats on other boards and the percentage of the directors that own stock in the company because almost all of the directors in my sample firms hold some stock of the company and sit on at least one other board.

[35] Brown and Caylor make *GOV_SCORE* publicly available on the following website: http://robinson.gsu.edu/accountancy/gov_score.html.

My third proxy for corporate governance structure is motivated by Core et al.'s (1999) finding that CEOs earn greater compensation when governance structure is weaker. This finding suggests that the excessive ESO compensation of which the cumulative effect is reflected in large outstanding ESOs could be a potential indication of ineffective governance mechanisms. If the negative impact of *OPTIONS* on the perceived credit risk simply communicates creditors' concern over the lavish ESO payments stemming from ineffective governance structure, *OPTIONS* should have a negative impact on the cost of debt only when the company consistently compensates employees with excessive ESO grants. To investigate this possibility, I first create a proxy for excessive ESO grants. As described in Appendix E, I model the benchmark level of ESO grants as a function of idiosyncratic firm risk, growth opportunities, the strength of external monitoring, firm size, cash flow availability, and firm performance. An indicator variable, *EXCESS_ESO*, is set equal to one when the five-year average residual from the benchmark option grant model is positive, suggesting persistent ESO overpayments, and zero otherwise. If the negative relationship between outstanding ESOs and the perceived credit quality is driven by excessive ESO grants, the coefficient on *OPTIONS*, which represents ESOs' impact on the credit risk for firms that are not classified as granting excessive ESOs, should not be significantly different from zero while the coefficient on the interaction term, *OPTIONS*EXCESS_ESO,* which reflects ESOs' impact on credit risk for companies that give away excess ESOs, should be significantly negative (positive) in the credit rating (yield spread) model. Panel F of Table 6 reports this analysis. *OPTIONS* remains significant in the expected direction while *OPTIONS*EXCESS_ESO* is never significant across all regressions. Collectively, results from this subsection

suggest that the unfavorable impact of *OPTIONS* on the cost of debt is unlikely to be driven by the association between the strength of governance structure and the cost of debt.

6.3.4 Grant Date Fair Value and Post-Grant-Date Fair Value Change

The "options-as-liability" hypothesis argues that ESOs are liability-like obligations whose fair value at any point in time provides useful information about the present value of the amount of net cash outflows likely to occur upon the settlement of ESO obligations. To further support this argument, it is important to also demonstrate that creditors find the updated information about the ongoing ESO obligations beyond the grant date helpful in assessing credit risk. In the next analysis, I divide the fair value of outstanding ESOs into the grant date fair value (*GRANT_VALUE*) and the post-grant-date fair value change (*VALUE_CHG*). Outstanding ESOs at a specific point in time comprise a portfolio of options granted in different periods with distinct exercise prices and differing terms and conditions. Since the detailed information about each individual option's grant date, its exercise price and the grant date market value of the underlying stock is not available in the SFAS 123 footnote, I estimate the grant date fair value as if outstanding ESOs were a single option grant with an exercise price equal to their weighted average exercise price. Since ESOs were typically granted at the money to avoid any accounting charges, the weighted average exercise price for outstanding ESOs also serves as a good estimate of the weighted average market price of the underlying stock at the grant date. In addition, I assume that the Black-Scholes assumptions disclosed in the SFAS 123 footnote for new ESO grants apply to all outstanding ESO grants. As a result, the grant date fair value per option is estimated using the Black-

Scholes option pricing model with the footnote disclosed Black-Scholes assumptions as model inputs and assuming that outstanding ESOs were all granted at the money. The fair value per option is then multiplied by the number of outstanding ESOs and scaled by total assets to obtain *GRANT_VALUE*. The value change subsequent to the grant date (*VALUE_CHG*) is simply the difference between the estimated current fair value per option and grant date fair value per option, multipled by the number of outstanding ESOs and scaled by total assets. Results from Panel G of Table 6 show that the coefficients on *GRANT_VALUE* and *VALUE_CHG* are both significant in expected directions, indicating that the value change between the grant date and valuation date provides useful information incremental to that contained in the grant date fair value in explaining credit market participants' credit risk decisions. In other words, this last finding implies that creditors consider mark-to-market information of outstanding ESOs decision-relevant and that they do not regard the value change in ESOs as a simple wealth transfer among shareholders.

CHAPTER 7: CONCLUDING REMARKS

This dissertation empirically examines whether credit market participants view outstanding ESOs as a liability-like or equity-like obligation when assessing the issuing company's credit risk. I hypothesize that, from a creditors' perspective, outstanding ESOs could have both equity-like and liability-like impacts on the company's credit quality. On the one hand, ESOs are financial commitments to create equity infusion in the future and the fair value of ESOs can be viewed as the first installment of the capital contributed by employees with service. Companies retain the benefits of employee services irrespective of whether the second installment of the capital contribution, namely the option exercise price, is eventually collected. This aspect of ESOs suggests that they are equity-like contracts that increase the equity base and enhance the issuer's debt service ability. On the other hand, the settlement of the ESO contracts could involve potential cash outflows because companies typically launch share repurchase programs in response to ESO exercise. The need to fund the ESO "maturity" with cash flows or through refinancing imposes a liquidity risk and makes ESOs an economic liability of the issuing company.

For a sample of 913 firm-year observations from 338 firms over the years 2001-2003, my investigation indicates that firms with higher value of outstanding ESOs receive lower credit ratings assigned by Standard and Poor's after controlling for information risk, operating risk, firm performance and other firm characteristics that are known to predict corporate credit ratings. This relationship holds true in both the "levels" and "change" model specifications and is robust to controls of various corporate governance mechanisms. In addition, the change in outstanding ESOs is associated with

the one-year-ahead change in the firm's credit ratings, which provides further evidence that outstanding ESOs do affect credit rating agencies' evaluation of the firm's debt service ability. Moreover, the unfavorable impact of outstanding ESOs on the firm's credit rating appears to be larger for firms that are more likely to engage in share repurchases surrounding the exercise of ESOs.

To investigate whether credit market investors hold the same belief toward the nature of ESO obligations as credit rating agencies, I perform yield spread tests on a sample of 309 new bonds issued by 195 firms over the period January 2001 to October 2004. The results from yield spread tests are generally consistent with those from credit rating tests. Specifically, firms with higher levels of outstanding ESOs incur higher costs of financing in the form of wider yield spreads. Moreover, I find that *OPTIONS* has a more adverse impact on yield spreads for bonds that have a maturity longer than the expected life of outstanding ESOs and are issued by firms with a propensity to repurchase shares in response to ESO exercise. Taken together, the results from credit rating and yield spread tests are consistent with the notion that credit market participants perceive outstanding ESOs as a liability-like claim, although the economic magnitude of ESOs' impact on the cost of debt is arguably modest. Finally, I demonstrate that the change in the fair value of outstanding ESOs subsequent to the date of grant provides useful information beyond the grant date fair value in explaining the company's perceived credit risk. This latter finding identifies information useful for creditors to make credit risk assessments and therefore provides insights into the kind of disclosure creditors may find useful if the grant-date measurement and equity classification of ESOs are mandated.

This study contributes to the ESO literature by demonstrating that outstanding ESOs provide value relevant information that affects the credit risk premium charged by the credit market for the added default risk associated with ESOs. Given that my empirical analyses focus on the perception of only one group of information users, two caveats are in order. Examining creditors' perception is not the optimal means for assessing the appropriate balance sheet classification of outstanding ESOs. Nor does it speak to whether standard setters should mandate the recognition of the fair value of ESOs on the balance sheet. Nevertheless, this study sheds light on the liability versus equity classification debate. The results from this study indicate that in assessing ESOs' impact on the credit risk, information users appear to respond to the fair value information that is typically provided by accountants for some liabilities but not equity. However, under SFAS 123R, the fair value of ESO grants is computed just once at the grant date. Firms are not required to disclose the fair value of outstanding ESOs, nor the fair value changes in these stock options. In order to keep track of the ESO obligations, credit market participants have to come up with their own estimates every period. As a result, findings in this study, in conjunction with equity market evidence on the value relevance of outstanding ESOs, suggest that SFAS 123R might not mandate sufficient disclosure that provides the most decision-useful information to accounting information users. One could argue that whether or where the fair value and value changes of ESOs are disclosed is irrelevant because the credit (equity) market already incorporates the fair value of ESOs in their credit risk (equity valuation) assessments. This argument, however, fails to consider whether it is informationally efficient to have numerous investors produce their own estimates (Dhaliwal 1986; Lipe 2001), which may or may

not be accurate. After all, managers are in the best position to generate the fair value of ESOs given their private access to the information necessary to compute this value.

Finally, this dissertation suggests several other interesting issues for future research. Of particular interest is whether the recognition of ESOs as equity on the balance sheet changes the credit market's belief about ESOs' impact on the issuer's creditworthiness. In addition, since my sample is concentrated in years when the stock market experienced a downturn and when ESOs received more negative publicity, the results in this study might not be generalized to other periods. Therefore, future research might want to examine whether the credit market's reaction to ESOs changes over time as more firms start to adopt or discontinue ESO programs.

Appendix A: Intuition behind the Fair Value of a Call Option

The fair value of a call option can be thought of as the present value of the expected payoff at the expiration date. At expiration, the payoff of a call option holder is the difference between share market value and the option exercise price (i.e., the intrinsic value) if the option is in or at the money and zero if the call option is out of the money. As a result, at expiration (time T), the value of a call option is:

$$C_T = \max [0, S_T - X] \quad \text{(A1)}$$

Where C is the fair value of the call option, S is the market value of the underlying stock and X is the exercise price of the option.

Since the stock price at expiration date is unknown, the expected value of the option at expiration can be written as follows:

$$E[C_T] = E[\max [0, S_T - X]] \quad \text{(A2)}$$

[.] is the expectation operator.
At any time before expiration, the fair value of the call option is simply the present value of the expected intrinsic at expiration as follows:

$$C_\tau = PV \{ E\{\max [0, S_T - X]\} / (1+\gamma)^t \} \quad \text{(A3)}$$

Where γ is the rate at which the expected value is discounted to calculate a present value and t is the difference between T and

To satisfy ESO exercise, the company typically engages in open market repurchases to make shares available for ESO exercise. Although the actual repurchase does not necessarily coincide with option exercise, the stock price at exercise date serves as a reasonable proxy for the cash that the company has to pay out to acquire shares. Since an ESO will only be exercised when it is in the money, the settlement of the ESO obligation always results in a net cash outflow equal to the excess of the underlying stock price over the option exercise price at the settlement date, which is what equation (A1) measures. Hence, the fair value of outstanding ESOs as calculated in equation (A3) provides an estimate of the present value of the expected net cash outflows that will incur upon the settlement of outstanding ESOs.

Appendix B: Credit Ratings' Numerical Conversions

S&P Letter Ratings	Compustat Quarterly Data *SPDRC*	Conversion Number (Ashbaugh et al. 2004)	Conversion Number (Klock et al. 2004)	Grade
AAA	2	7	22	Investment
AA+	4	6	21	Investment
AA	5	6	20	Investment
AA-	6	6	19	Investment
A+	7	5	18	Investment
A	8	5	17	Investment
A-	9	5	16	Investment
BBB+	10	4	15	Investment
BBB	11	4	14	Investment
BBB-	12	4	13	Investment
BB+	13	3	12	Speculative
BB	14	3	11	Speculative
BB-	15	3	10	Speculative
B+	16	2	9	Speculative
B	17	2	8	Speculative
B-	18	2	7	Speculative
CCC+	19	1	6	Speculative
CCC	20	1	5	Speculative
CCC-	21	1	4	Speculative
CC	23	1	3	Speculative
C	24	1	2	Speculative
D	27	1	1	Speculative
Total				

Appendix C: Variable Definitions

Dependent Variables	
RATING	Long-term domestic issuer credit rating (Compustat Quarterly data *SPDRC*) six months after the fiscal year end. *SPDRC* is converted to *RATING* based on the conversion schedule in Ashbaugh et al. (2004).
SPREAD	The difference between the yield to maturity on the newly issued corporate bond and the yield to maturity on a Treasury bond with similar maturity at the offer date.
DOWNGRADE	An ordinal variable set equal to one if the firm's credit rating is downgraded from year t-1 to t, zero if there is no change in the firm's credit rating and negative one if there is an upgrade in the firm's credit rating.
Independent Variables	
OPTIONS	The fair value of outstanding ESOs as of the end of the fiscal year scaled by total assets (Compustat #6). The fair value of outstanding ESOs is computed as the fair value per option weighted by the number of options outstanding at then end of the fiscal year. The fair value per option as of the end of the fiscal year is calculated based on the Black-Scholes (1973) option valuation model, as modified by Merton (1973) to account for dividend payments, along with the following estimated model assumptions. (1)Volatility is estimated according to the guidance of SFAS 123 as the standard deviation of the natural logarithm of monthly CRSP price relatives (P_n/P_{n-1}) times the square root of 12 and is measured over the past 60 months. (2) Expected life of outstanding ESOs is estimated following Li (2002) as the expected life of new ESO grants minus the age of outstanding ESOs. The age of outstanding ESOs is calculated as the difference between the maximum contractual life and the remaining contractual life, both of which can be obtained from the SFAS 123 footnote. (3) the risk-free interest rate is measured as the yield on U.S. Treasury securities with a remaining time to maturity similar to the expected life calculated in assumption (2) above. (4) Dividends yields are those used by ExecuComp to estimate the fair value of executive stock option grants (ExecuComp data *BS_YIELD*). Following Core and Guay (2002) and Li (2002), I value a firm's outstanding options as if they were a single option grant using the disclosed weighted average exercise price for outstanding options, the fiscal year-end stock price, and the above four model assumptions as model inputs. Core and Guay (2002) demonstrate that the single portfolio method yield values that are 98% correlated with the values calculated using detailed information about each option grant.The Black-Scholes-Merton formula is as follows: $C = S\,N(d_1) - X\,e^{-rt}\,N(d_2)$where $d_1=[\ln(S/X)+(r-d+0.5\sigma^2)*t]/[\sigma\sqrt{t}]$ and $d_2=d_1-\sigma\sqrt{t}$ S is stock price at valuation date; *X* is exercise price of the option; *r* is the risk-free interest rate; *d* is the expected annual dividend yield; σ is the expected annual stock price volatility; t is the expected life of the option in years. N(.) is the cumulative normal distribution function.
MGTESO	The portion of *OPTIONS* accruing to top-five executives scaled by total assets. The portion of *OPTIONS* accruing to top-five executives is estimated as *OPTIONS* times the fraction of outstanding ESOs held by top-five executives, which equals to the total of the number of vested and unvested options that the executive held at the end of the year (ExecuComp data item *UEXNUMEX+UEXNUMUN*) summing across top-five executives and divided by the number of outstanding ESOs.
NONMGTESO	Equals to *OPTIONS* minus *MGTESO*.
GRANT_VALUE	The fair value of outstanding ESOs at their grant dates scaled by total assets at the end of the valuation year.

	The grant date fair value per option is estimated using the Black-Scholes option pricing model with the footnote disclosed Black-Scholes assumptions as model inputs and assuming that outstanding ESOs were all granted at the money. The fair value per option is then multiplied by the number of outstanding ESOs and scaled by total assets at the end of the valuation year to obtain *GRANT_VALUE*.
VALUE_CHG	The change in the fair value of outstanding ESOs subsequent to the grant date scaled by total assets at the end of the valuation year. It is measured as the difference between *OPTIONS* and *GRANT_VALUE*.
Control Variables	
ACCQUALITY	The negative of the standard deviation of the residuals from cross-sectional estimations of the Dechow-Dichev (2002) regression as modified by McNichols (2002), calculated over year t-4 through year t. A higher *ACCQUALITY* indicates better accrual quality.
STDROA	The standard deviation of *ROA* calculated over year t-4 through year t, where *ROA* is defined as income before extraordinary items (Compustat #18) divided by total assets (Compustat #6).
STDCFO	The standard deviation of cash flows from operating activities (Compustat #308) scaled by total assets, calculated over year t-4 through year t.
STDRET	The standard deviation of CRSP monthly returns calculated over the past 60 months.
LEVERAGE	Total debt (Compustat #9 +Compustat #34) divided by total assets (Compustat #6).
ROA	Income before extraordinary items (Compustat #18) divided by total assets (Compustat #6).
CASHFLOWS	Cash flows from operating activities (Compustat #308) scaled by total assets and averaged over the t-4 to t period.
SIZE	The logarithm of the market value of equity (Compustat #25*Compustat #199).
BETA	The systematic equity risk, calculated using the market model based on daily stock returns and value-weighted market index over the fiscal year.
CAP_INTEN	Gross property, plant and equipment (Compustat #7) scaled by total assets (Compustat #6).
INT_COV	Operating income before depreciation (Compustat #13) divided by interest expense (Compustat #15).
B2M	Book to market ratio, measured as the book value of equity (Compustat #60) scaled by the market value of equity (Compustat #25*Compustat #199).
REPUR	An indicator variable coded one if the coefficient on the independent variable from the following Tobit model is significant at the 5% level, and zero otherwise. This model is estimated separately for each firm using data from 1992 to 2003. $REP_{it} = \beta_0 + \beta_1 EXER_{it} + \varepsilon_{it}$ where REP= (Compustat #115- decrease in Compustat #130). EXER=the sum of the value of ESOs exercised (ExecuComp *SOPTEXER*) in the current year and the following year summing across top five executives.
MATYRS	Number of years to maturity at issuance, which is obtained from the SDC database and is rounded to the nearest integer.

ISSUESIZE	The logarithm of the issue size in million dollars. The issue size is obtained from the SDC database.
CALLABLE	An indicator variable taking on the value of 1 if the bond issue is callable, and zero otherwise. A bond issued is defined as non-callable if it meets any of the following condition: (1) it has no call provision; (2) it has a call provision but cannot be called until maturity; (3) it has a "make-whole call" provision.[36]
SUBORD	An indicator variable taking on the value of one if the bond is subordinated, and zero otherwise
LONG	An indicator variable set equal to one if the maturity of the bond is longer than the expected life of outstanding ESOs at the date of new bond issuance, and zero otherwise. Following Li (2002), I measure the expected life of outstanding ESOs as the expected life of the new ESO grants minus the age of outstanding ESOs, which is calculated as the difference between the maximum contractual life and the remaining contractual life of outstanding ESOs.
BD_IND	Board independence is the percentage of independent directors on the board.
POWER	CEO power is a composite score where a firm receives one point if the CEO is also the chair of the board and one point for each committee that the CEO sits on.
POLICY	Governance policy indicator is a dummy variable taking on the value of one if a firm has a formal governance policy and zero otherwise.
INSTPCTG	Institutional ownership is the percentage of shares held by institutional investors.
INSIDERPCTG	Insider ownership is the percentage of shares held by insiders.
BLOCK	The number of blockholders that own 5% or more or the firm's stock (Source: April 2003 version of Compact D).
TRANSP	Following Ashbaugh et al. (2004), the measure of financial transparency, *TRANSP*, is defined as the negative of the squared residual from the following regression: $RET=\beta_0+\beta_1 NIBE+\beta_2 LOSS+\beta_3 NIBE*LOSS+\beta_4 \Delta NIBE+\varepsilon$ Where the regression is estimated cross-sectionally within each Fama-French 48 industry groups conditional on having at least 15 firms within each industry group. NIBE=net income before extraordinary items (Compustat #18) scaled by beginning of period market value of equity (Compustat #25*Coompustat#199). LOSS equals one if NIBE<0 and zero otherwise. ΔNIBE is the change in net income before extra ordinary items scaled by beginning of period market value of equity. The higher the value of *TRANSP*, the more transparent is a company's financial reporting system.
GOV_SCORE	*GOV_SCORE* is created by Brown and Caylor (2004) based on 51 factors provided by Institutional Shareholder Services as of February 1, 2003. Brown and Caylor make *GOV_SCORE* publicly available on the following website: http://robinson.gsu.edu/accountancy/gov_score.html.
EXCESS_ESO	*EXCESS_ESO* is an indicator variable which takes on the value of one if the five-year average residual from the benchmark option grant model described in Appendix E is positive, indicating persistent excessive ESO payments over time, and zero otherwise.

[36] A "make-whole call" is a type of call provision on a bond that allows the borrower to pay off remaining debt early. If this call option is exercised, investors will be compensated, or "made whole." The compensation will be calculated based on the net present value of future coupon payments that would have been paid if the bond were not called. Because the cost can often be significant, make-whole calls are rarely invoked.

Appendix D: Test for Endogeneity of *OPTIONS* in the Credit Ratings Model (Rivers-Vuong 1988 Procedure)

This appendix provides details about the Rivers-Vuong (1988) procedure that I use to test for endogeneity of *OPTIONS* in the credit rating model. The implementation of the Rivers and Vuong procedure requires me to first identify instrumental variables for *OPTIONS* and regress *OPTIONS* on instrumental variables as well as all exogenous variables from the structural equation in a first stage regression. The residual from the first stage regression will then be included in the credit rating model as an additional explanatory variable. A significant coefficient on the first stage residual suggests that the *OPTIONS* variable is endogenous in the credit rating model and the usual ordered probit standard errors are not strictly valid (Wooldridge 2002, p.474). In this case, a consistent estimate of the outstanding ESOs' coefficient and standard error can still be obtained by running the ordered probit model with the first stage residual as an additional explanatory variable in the credit rating model and bootstrapping the correct standard errors.

Drawing upon recent research on the determinants of option grant behaviors (e.g., Core and Guay 2001, Ittner et al. 2003, Hanlon et al. 2003 and Kroumova and Sesil 2003), I first model the level of *OPTIONS* as a function of the firm's monitoring cost, cash flow availability and the firm's accounting as well as stock performance.

OPTIONS = f (*MONITORING COST, CASH FLOW AVAILABILITY, FIRM PERFORMANCE*).

Given that these economic factors are also likely to play a role in credit rating agencies' credit risk decisions, I use the industry median of each economic factor detailed below as the instruments for *OPTIONS* in the Rivers-Vuong procedure. The rationale for the inclusion of each economic determinant and the empirical proxies for the economic determinants are summarized as follows:

Monitoring cost. Corporate governance literature has long argued that compensation systems are important control mechanisms that align the interests of the employees with those of the owners (e.g., Eisenhardt 1989). In contexts when direct monitoring of employee efforts is costly, firms are likely to use more equity incentives to mitigate the agency problem. Core and Guay (1999) predict that shareholders face a higher monitoring cost when there is a greater uncertainty in the firm's operating environment (Demsetz and Lehn 1985), when the firm has greater growth opportunities (Smith and Watts 1992) and when the firm is larger and less centralized (Jensen and Meckling 1976).

Following Core and Guay (1999), I use the logarithm of idiosyncratic risk (*RISK*) as a proxy for the uncertainty in the firm's operating environment. The idiosyncratic risk is measured as the standard deviation of the market model residuals calculated using the firm's stock return data for the preceding 36 months. I also include the standard deviation of return on assets to control for the total risk of the firm (Core et al. 1999). Similar to Core and Guay (1999), Hanlon et al. (2003) and Ittner et al. (2003), I use the following variables to capture the firm's growth opportunity: (1) R&D intensity (*RDINTEN*), which is measured as R&D expenditures (Compustat #46) scaled by sales (Compustat #12). Consistent with Hanlon et al. (2003), I predict that firms with greater R&D intensity will use more stock options to attract highly qualified and less risk averse employees; (2) Growth option per employee (*GROW_EMPL*), which is measured as the difference between the market value of equity and the book value of equity divided by the number

of employees. This variable is used to capture the importance of human capital. The firm is more likely to grant options throughout the organization when firms' growth opportunities depend largely on attracting and retaining high quality employees; and (3) Book to market ratio (*B2M*), which is calculated as the book value of equity (Compustat #60) divided by the market value of equity (Compustat #25*Compustat #199). *B2M* is included in the model to control for the growth opportunity at the firm-wide level. Consistent with prior literature, I expect that firms with lower book to market ratio are likely to have more growth potential not reflected in the book and thus are more likely to compensate employees with stock options. Ittner et al. (2003) argue that shareholders would use less equity-based compensation when there are alternative monitoring mechanisms in place. Therefore, I include *LEVERAGE*, defined as the ratio of total debt to total assets, to proxy for external monitoring by debtholders. Finally, I follow Hanlon et al. (2003) and use the logarithm of sales (*LOGSALES*) to capture the monitoring difficulty arising from firm size.

Cash flow availability. As discussed before, firms facing financial constraints are likely to substitute equity-based compensation for cash pay to conserve cash. Therefore, I include two variables to capture the firm's cash flow availability. The first variable, *CONSTRAIN*, is based on Core and Guay (1999) and measured as the three-year average of cash flows from investing activities plus common and preferred dividends minus cash flow from operations, all deflated by total assets. The second variable, *CASH_EMPL*, measures the firm's ability to compensate employees with cash. This measure is calculated by first taking cash flow from operating activities (Compustat #308) minus cash dividends (Compustat #127), capital expenditures (Compustat #128) and R&D expenditures (Compustat #46). The resulting measure is then divided by the number of employees to arrive at *CASH_EMPL*.

Firm Performance. While the above factors explain the size of the ESO programs, the value of outstanding ESOs also depends on the fair value per option. The value of the options increases when the firm performs well. As a result, I include two firm performance measures as the determinants of *OPTIONS*. Specifically, I include the firm's *AVGROA*, calculated over the three-year period between t-2 and t to capture the firm's accounting performance. I also include the three-year buy-and-hold stock returns, *RET3YR*, calculated using CRSP monthly returns over the t-2 to t period, to measure the firm's stock performance.

My *OPTIONS* model is as follows:

$$OPTIONS_{i,t} = \delta_0 + \delta_1 RISK_{i,t} + \delta_2 RDINTEN_{i,t} + \delta_3 GROW\_EMPL_{i,t} + \delta_4 STDROA_{i,t}$$
$$+\delta_5 B2M_{i,t} + \delta_6 LOGSALES_{i,t} + \delta_7 CASH\_EMPL_{i,t} + \delta_8 CONSTRAIN_{i,t}$$
$$+\delta_9 AVGROA_{i,t} + \delta_{10} RET3YR_{i,t} + \delta_{11} LEVERAGE_{i,t} + \varepsilon_{i,t}$$

(*OPTIONS Model*)

To determine how well the factors identified in this appendix explain the variation in *OPTIONS* for my credit rating sample, I report the results of the *OPTIONS* model in Table D.1. Consistent with my predictions, firms with greater idiosyncratic risk, total firm risk, higher levels of firm-wide as well as per-employee growth opportunities, and better recent stock return performance have greater levels of *OPTIONS*. However, larger firms and firms that are more cash-constrained do not appear to use more ESOs to

compensate employees. This latter finding is consistent with Ittner et al.'s (2003) result that *less* cash constrained new economy firms make larger equity grants. In addition, the coefficient on *CASH_EMPL* is of mixed signs, which is inconsistent with the conventional wisdom that ESOs are used to substitute for cash compensation to preserve scarce cash. The adjusted R-squared of *OPTIONS* model ranges from 38% to 61%, suggesting that the economic factors identified in this appendix exhibit a reasonable statistical power in explaining *OPTIONS*.

As pointed out by econometricians, identifying appropriate instruments that are correlated with the endogenous variable but are exogenous in the structural equation is the most difficult task when adopting the instrumental variable (IV) approach to applied research. Larcker and Rusticus (2005) demonstrate that using instruments that are only weakly correlated with the endogenous variable results in a considerable loss of statistical power associated with IV estimation. In addition, when the instruments selected by the researchers are not substantially 'more exogenous' then the endogenous variable, the IV estimate is likely to have a larger asymptotic bias than the bias in the OLS estimate.

Although the second stage regression in the Rivers-Vuong procedure is an ordered probit as opposed to an OLS regression, the importance of the IV quality carries over. However, there are reasons to believe that creditors' credit risk assessments are not independent of the economic determinants of option grant behaviors discussed above. In fact, the firm-specific economic determinants of *OPTIONS* fail the overidentifying restrictions test when these variables are used as instruments for *OPTIONS* in the two-stage least squares estimation for the yield-spread sample.[37] As a result, I use the industry medians of these economic determinants based on the two-digit SIC code as my instrumental variables in the Rivers-Vuong procedure because industry medians are less likely to determine firm-specific credit ratings and yield spreads but are still likely to affect the firm's ESO compensation policies.

Table D.2 reports the results of the Rivers-Vuong first stage regression. The partial R-squared of the instruments are rather modest, indicating that the selected instruments are only weakly associated with the suspected endogenous variable, *OPTIONS*. Based on the benchmarks developed by Stock et al. (2002), the small partial F-statistics in Table D.2 indicate the presence of a weak instrument problem.[38] Therefore, I repeat the Rivers-Vuong procedure replacing the industry medians with the firm-specific *OPTIONS* determinants as the instrumental variables for *OPTIONS*. The results are reported in the bottom section of Table D.2. Compared to industry median instruments, firm-specific instruments have much higher partial R-squared and partial F-statistics, suggesting that they have a higher correlateion with *OPTIONS*. However, the inferences drawn from the Rivers-Vuong procedures are not sensitive to the set of instruments used in the first stage regression. Specifically, none of the first-stage

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[37] The fact that the determinants of *OPTIONS* are likely to be endogenous in the structural equation suggests that these variables are potential correlated omitted variables in my credit rating and yield spread models. As a sensitivity test, I re-estimate my credit rating and yield spread models including all of the *OPTIONS* determinants identified in this appendix. The positive relationship between outstanding ESOs and the cost of debt remains significant at the conventional levels even after controlling for these potential correlated omitted variables.

[38] Stock et al. (2002) suggest that researchers suffer from the weak instrument problem if the partial F-statistics from the first stage regression are less than 8.96, 11.59, 12.83, 15.09 and 20.88 when the number of instruments is 1, 2, 3, 5, and 10, respectively.

residuals appears to be significant in the second stage ordered probit model. For example, the p-value of the first stage residual is 0.99 (0.54) when industry medians (firm-specific characteristics) are used as instruments and all available firm-year observations are included in the Rivers-Vuong procedure. Taken together, the results from Rivers-Vuong (1988) procedure fail to reject the null hypothesis that *OPTIONS* are exogenous in the credit rating model, which suggests a regular ordered probit model is appropriate. In addition, since industry-medians are more likely to be exogenous in the structural equation but suffer from the weak instrument problem, and the firm-specific characteristics are better correlated with *OPTIONS* but likely to have the endogeneity problem, the instrumental variable estimation is unlikely to yield more reliable statistical inferences than regular ordered probit and OLS estimation. As a result, the empirical analyses for the rest of the dissertation are based on the ordered probit and OLS regressions for the credit rating and yield spread models, respectively.

Table D.1
OLS Regressions of the Determinants of *OPTIONS* (Dependent variable=*OPTIONS*)

Variables	Predicted Sign	OLS Regressions of the Determinants of *OPTIONS*			
		All firm-years	Year 2001	Year 2002	Year 2003
INTERCEPT	?	0.182***	0.157*	0.0290.101***	0.262***
		(0.038)	(0.093)	(0.023)	(0.062)
RISK	+	0.038***	0.055*	0.018*****	0.029*
		(0.012)	(0.031)	(0.007)	(0.016)
STDROA	+	0.160**	0.207*	0.134***	0.166
		(0.067)	(0.106)	(0.038)	(0.120)
RDINTEN	+	-0.025	-0.029	0.061***	0.062***
		(0.071)	(0.093)	(0.029)	(0.080)
GROW_EMPL (+100)	+	0.002**	0.004***	0.002***	0.001
		(0.001)	(0.001)	(0.0006)	(0.001)
B2M	-	-0.038***	-0.035*	-0.017***	-0.071***
		(0.011))	(0.021)	(0.006)	(0.017)
LEVERAGE	-	-0.078***	-0.013	-0.023	-0.107***
		(0.022)	(0.038)	(0.020)	(0.028)
LOGSALES	+	-0.006**	-0.003	-0.005***	-0.014***
		(0.003)	(0.005)	(0.001)	(0.003)
CONSTRAIN	+	-0.078*	-0.041*	-0.046**	-0.071
		(0.043)	(0.078)	(0.023)	(0.043)
CASH_EMPL (+100)	-	-0.029**	-0.015	0.017**	-0.006
		(0.043)	(0.024)	(0.007)	(0.010)
AVGROA	+	0.081	0.208*	0.080*	0.132
		(0.061)	(0.121)	(0.063)	(0.082)
RET3YR	+	0.035***	0.047**	0.013***	0.008
		(0.013)	(0.020)	(0.004)	(0.005)
Sample Size		867	298	309	260
Adjusted R-Squared		0.4566	0.6056	0.4031	0.3758

*,**,*** significant at the 0.1, 0.05 and 0.01 levels (two-tailed).
Heteroskedasticity-robust standard errors are in the parentheses. For the pooled cross-sectional regression, the standard errors are also adjusted for serial correlation per Rogers (1993).
RISK is the logarithm of idiosyncratic risk, measured as the standard deviation of the market model residuals calculated using the firm's stock return data for the preceding 36 months. *STDROA* is the standard deviation of return on assets calculated over the three-year period between t-2 and t. *RDINTEN* is the R&D intensity, measured as R&D expenditures (Compustat #46) scaled by sales (Compustat #12). *GROW_EMPL* is growth option per employee, measured as the difference between the market value of equity and the book value of equity divided by the number of employees. *B2M* is the book to market ratio, calculated as the book value of equity (Compustat #60) divided by the market value of equity (Compustat #25*Compustat #199). *LEVERAGE* is defined as the ratio of total debt (Compustat #9+Compustat #34) divided by total assets. *LOGSALES* is the logarithm of sales. *CONSTRAIN* is measured as the three-year average of cash flows from investing activities plus common and preferred dividends minus cash flow from operations, all deflated by total assets. *CASH_EMPL* equals the cash flow from operating activities (Compustat #308) minus cash dividends (Compustat #127), capital expenditures (Compustat #128), and R&D expenditures (Compustat #46), all scaled by the number of employees. *AVGROA* is the average ROA calculated over the three-year period between t-2 and t, where ROA is income before extraordinary items divided by total assets. *RET3YR* is the three-year buy and hold returns calculated using CRSP monthly returns over the t-2 to t period.

Table D.2
OLS Regressions of the Determinants of *OPTIONS* (Dependent variable=*OPTIONS*)

Variables	OLS Regressions of the Determinants of *OPTIONS*			
	All firm-years	Year 2001	Year 2002	Year 2003
Instruments:				
INTERCEPT	-0.024	-0.145	-0.016	-0.092
	(0.050)	(0.118)	(0.036)	(0.075)
INDRISK	0.012	-0.33	-0.005	-0.041*
	(0.015)	(0.034)	(0.013)	(0.023)
INDSTDROA	-0.218	-0.178	-0.090	0.397
	(0.151)	(0.303)	(0.140)	(0.443)
INDRDINTEN	0.358**	0.474	0.201*	0.574*
	(0.165)	(0.387)	(0.118)	(0.344)
INDGROW_EMPL (+100)	0.004**	0.011	-0.003	-0.004
	(0.002)	(0.013)	(0.005)	(0.003)
INDB2M	-0.045***	-0.046	-0.019	-0.011
	(0.016)	(0.035)	(0.016)	(0.034)
INDLOGSALES	-0.006	0.003	-0.006**	-0.012***
	(0.004)	(0.010)	(0.003)	(0.004)
INDCASH_EMPL (+100)	0.020	0.008	0.030	0.015
	(0.022)	(0.129)	(0.043)	(0.060)
INDCONSTRAIN	0.014	0.0004	0.025	0.016
	(0.073)	(0.211)	(0.061)	(0.143)
INDAVGROA	-0.010	-0.261	0.023	0.382
	(0.114)	(0.400)	(0.082)	(0.262)
INDRET3YR	0.032***	0.031	0.014	0.016
	(0.009)	(0.037)	(0.009)	(0.011)
INDLEVERAGE	0.031**	0.047*	0.012	0.023
	(0.013)	(0.027)	(0.008)	(0.280)
Control variables:				
ACCQUALITY	0.005	0.091	0.0004	0.034**
	(0.019)	(0.127)	(0.010)	(0.016)
STDROA	0.245***	0.339***	0.156***	0.038
	(0.051)	(0.124)	(0.030)	(0.131)
STDCFO	-0.118	-0.249	-0.068	0.065
	(0.145)	(0.396)	(0.067)	(0.156)
STDRET	0.550***	1.100	0.304***	0.522***
	(0.157)	(0.536)**	(0.068)	(0.177)
ROA	0.178***	0.255***	0.130***	0.271***
	(0.040)	(0.084)	(0.020)	(0.077)
CASHFLOWS	0.189**	0.125	0.099**	0.111
	(0.074)	(0.135)	(0.050)	(0.103)
LEVERAGE	-0.030	-0.069	0.009	-0.051
	(0.022)	(0.054)	(0.018)	(0.034)
SIZE	0.003	0.002	0.002	0.0003
	(0.003)	(0.005)	(0.002)	(0.004)
BETA	0.013	-0.001	0.002	0.023
	(0.013)	(0.029)	(0.007)	(0.015)
CAP_INTEN	-0.018**	-0.026*	-0.006	0.002
	(0.009)	(0.015)	(0.006)	(0.015)
INT_COV (+100)	0.030	0.040	0.030**	0.005

	(0.021)	(0.044)	(0.0001)	(0.012)
B2M	-0.034***	-0.081***	-0.012**	-0.055***
	(0.011)	(0.030)	(0.005)	(0.016)
Industry median instruments				
Sample Size	913	321	320	272
Adjusted R-Squared	0.4460	0.4523	0.6706	0.6558
Partial R-squared	0.0342	0.024	0.062	0.090
Partial F-statistic (p-value)	2.86 (0.001)	0.66 (0.773)	1.78 (0.056)	2.23 (0.013)
Rivers-Vuong test p-value	0.99	0.54	0.29	0.83
Firm-specific instruments				
Sample Size	865	297	308	260
Adjusted R-Squared	0.6285	0.8065	0.7326	0.7196
Partial R-squared	0.3383	0.6376	0.2241	0.2217
Partial F-statistic (p-value)	42.60(<0.001)	46.54(<0.001)	9.44(<0.001)	8.77(<0.001)
Rivers-Vuong test p-value	0.54	0.61	0.12	0.28

*,**,*** significant at the 0.1, 0.05 and 0.01 levels (two-tailed).
Heteroskedasticity-robust standard errors are in the parentheses. For the pooled cross-sectional regression, the standard errors are also adjusted for serial correlation per Rogers (1993).
IND# is the industry median of variable # calculated based on the two-digit SIC code, where # is one of the variables in the *OPTIONS* model.

Appendix E: Estimation of Excessive ESO Grants

To identify firms that grant excessive ESOs requires a model of benchmark ESO grants. Using the economic determinants of option-grant behaviors identified in Appendix C, I first estimate the benchmark ESO grant as follows:[39]

$$ESOGRANTS_{i,t} = \delta_0 + \delta_1 RISK_{i,t-1} + \delta_2 RDINTEN_{i,t-1} + \delta_3 GROW\_EMPL_{i,t-1}$$
$$+\delta_4 STDROA_{i,t-1} + \delta_5 B2M_{i,t-1} + \delta_6 LOGSALES_{i,t-1} + \delta_7 CASH\_EMPL_{i,t-1} +$$
$$\delta_8 CONSTRAIN_{i,t-1} + \delta_9 AVGROA_{i,t-1} + \delta_{10} RET3YR_{i,t-1} + \delta_{11} LEVERAGE_{i,t-1}$$
$$+ \sum_{N=1}^{24} \phi_N INDUSTRY_{N,i,t} + \sum_{Y=1992}^{2003} \phi_Y YR_{Y,i,t} + \varepsilon_{i,t}$$

(*ESOGRANTS Model*)

where *ESOGRANTS* is the fair value of the firm-wide ESO grants awarded in year t and scaled by total assets. *ESOGRANTS* is measured as the Black-Scholes value of individual executive option grants estimated by ExecuComp (ExecuComp *NUMSECUR*) divided by the percentage of total option grants in a given year represented by the executive option grants (ExecuComp *PCTTOTOP*). All economic determinants are measured at the end of year t-1. In addition, I also include industry and year dummies in the cross-sectional option grant model in order to control for any industry or time-specific variation in *ESOGRANTS* not captured by the identified independent variables.

The residual from the benchmark model represents the ESO grants that are not explained by the included economic factors and is therefore used as a proxy for excessive ESO grants.[40] To create the indicator variable of excessive ESO compensation, *EXCESS_ESO*, regression residuals are averaged over the five-year period from year t-4 to year t in order to smooth out the temporary fluctuations in the hypothesized economic determinants.

The *ESOGRANTS* model is estimated using all firm-years with necessary data in ExecuComp. The final sample consists of 12,092 firm-year observations from 1992 to 2003. To mitigate the undue influence from extreme outliers, all variables are winsorized at the 1% and 99% levels. Coefficients on industry and time dummies are suppressed for expositional convenience. Results presented in Table E.1 indicate that coefficients on

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[39] While there are reasons to believe that monitoring cost and cash flow availability are associated with the value of both outstanding ESOs and new ESO grants, it is not immediately clear how firm performance as described in Appendix C would be associated with new ESO grants for a given year. I include firm performance in my ESO grant model because agency theory predicts that compensation is an increasing function of firm performance. Core and Guay (2001) argue that if options are used to substitute for cash compensation, option grants are expected to be greater when contemporary and prior firm performance is better. It is worth noting that although I use the same set of firm characteristics to predict the value of outstanding ESOs and new ESO grants, the fact that the adjusted R^2 from the *OPTIONS* model and *ESOGRANTS* model are both greater than 0.4 suggests that this set of variables appears to exhibit reasonable explanatory power in both models.

[40] Admittedly, the residual term is only a noisy proxy for excessive ESO compensation due to the potential model misspecification or measurement errors.

LOGSALES, *CASH_EMPL*, *CONSTRAIN* and *AVGROA* are inconsistent with my predictions. I find that smaller firms and firms that have more cash are more likely to use ESOs to compensate employees. While these results are contrary to my predictions, they are not inconsistent with the empirical findings in prior research (i.e., Hanlon et al. 2003 and Ittner et al. 2003, respectively). Recent accounting performance, however, does not explain new ESO grants for a given year. The adjusted R^2 is 52% for the overall benchmark model and 45% for the model without industry and year dummies. Overall, the economic factors identified in this appendix explains a fair amount of the variation in ESO grants.

Table E.1
OLS Regressions of the optimal option grants (Dependent variable=*ESOGRANTS*)

Variables	Predicted Sign	OLS Regressions of the Determinants of *ESOGRANTS*
		All firm-years
INTERCEPT	?	0.0460*** (0.0043)
RISK	+	0.0113*** (0.0014)
STDROA	+	0.0721*** (0.0132)
RDINTEN	+	0.0522*** (0.0071)
GROW_EMPL (+100)	+	0.0014*** (0.0001)
B2M	-	-0.0077*** (0.0010)
LEVERAGE	-	-0.0267*** (0.0026)
LOGSALES	+	-0.0017*** (0.0003)
CASH_EMPL (+100)	-	0.0032*** (0.0011)
CONSTRAIN	+	-0.0087* (0.0046)
AVGROA	+	-0.0159 (0.0118)
RET3YR	+	0.0019*** (0.0004)
Sample Size		12092
Adjusted R-Squared overall		0.5160
Adjusted R-squared without industry and year dummies		0.4530

*,**,*** significant at the 0.1, 0.05 and 0.01 levels (two-tailed).
The standard errors in parentheses are adjusted for serial correlation and heteroskedasticity per Rogers (1993). Coefficients on industry and time dummies are not shown. *GROW_EMPL* and *CASH_EMPL* are divided by 100 to preserve significant digits of the coefficients. All variables are as defined in Table D.1.

Table 1
Sample Selection

Panel A: Credit Rating Sample from 2001 to 2003

	No. of Firm-Years	No. of Firms[40]
All S&P500 firms in R.G. Associates' stock option database	1491	497
Less: firms not listed in Compustat	(3)	(1)
Add: non-S&P 500 firms that are potential heavy option users	417	139
Less: utilities and financial services firms	(414)	(138)
Initial credit ratings sample	1491	497
Less: firm-years without credit ratings on Compustat	(411)	(147)
Less: firm-years without necessary Compustat, CRSP and ExecuComp data for the credit rating model	(116)	(59)
Less: firm-years voluntarily adopting the fair value method under SFAS 123	(51)	(45)
Number of firm-years used in the credit ratings analyses	913	338

Panel B: Industry and S&P Index distribution for the credit rating sample

Industry	Number of firm-years	%	S&P Index	Number of firm-years (unique firms)	%
Mining and construction	14	1.53	S&P 500	789 (290)	86.42 (85.80)
Food	49	5.37	S&P MidCap	58 (21)	6.35 (6.21)
Textile, printing and publishing	68	7.45	S&P Small Cap	22 (10)	2.41 (2.96)
Chemicals	52	5.70	Non_S&P	44 (17)	4.82 (5.03)
Pharmaceuticals	54	5.91			
Extractive Industries	56	6.13			
Durable manufacturers	233	25.52			
Computers	119	13.03			
Transportation	65	7.12			
Retail	131	14.35			
Services	70	7.67			
Others	2	0.22			
Total	913	100	Total	913 (338)	100 (100)

[40] Note that the adjustments in the 'number of firms' column do not add up to the number of firms in the final sample. This is because when firms have missing data in one of the three sample years, they will show up as adjustments. However, as long as firms have at least one firm-year remaining in the final sample, they will not be excluded from the bottom-line number of firms in the final sample.

Table 1
Sample Selection

Panel C: Yield Spread (New Bond) Sample from January 1, 2001 to October 30, 2004

	No. of Bond Issues	No. of Firms[41]
Total number of new industrial bond issues from January 2001 to October 2004	1039	317
Less: bonds having a maturity date that is earlier than the issue date on SDC	(91)	(62)
Less: firms having multiple bond issues during a given year (only retain the largest issue)	(459)	(0)
Less: firms not listed in Compustat	(22)	(18)
Less: firms not listed in ExecuComp	(79)	(59)
Less: firms having missing or negative credit spreads	(5)	(5)
Less: firms lacking necessary Compustat, CRSP and ExecuComp data for the credit spreads model	(63)	(42)
Less: firms following Canadian GAAP	(3)	(1)
Less: firm-years voluntarily adopting the fair value method under SFAS 123	(8)	(8)
Number of new bond issues used in the yield spread analyses	309	195

Panel D Industry and S&P Index distribution for the credit spread sample

Industry	Number of firm-years	%	S&P Index	Number of firm-years (unique firms)	%
Mining and construction	2	0.65	S&P 500	242 (141)	78.32 (72.31)
Food	24	7.77	S&P MidCap	42 (35)	13.59 (17.95)
Textile, printing and publishing	31	10.03	S&P Small Cap	10 (8)	3.24 (4.10)
Chemicals	28	9.06	Non_S&P	15 (11)	4.85 (5.64)
Pharmaceuticals	16	5.18			
Extractive Industries	28	9.06			
Durable manufacturers	61	19.74			
Computers	19	6.15			
Transportation	32	10.36			
Retail	44	14.24			
Services	20	6.47			
Others	4	1.29			
Total	309	100	Total	309 (195)	100 (100)

The industry membership is assigned based on Lu's (2003) classification: Agriculture (SIC= 0100-0999), Mining and construction (SIC= 1000-1999 except 1300-1399), Food (SIC=2000-2111), Textile, printing and publishing (SIC=2200-2799), Chemicals (SIC=2800-2824 and 2840-2899), Pharmaceuticals

[41] Note that the adjustments in the 'number of firms' column do not add up to the number of firms in the final sample. This is because when firms issue multiple bonds but have missing data necessary for estimating the yield spread model, they will show up as adjustments. But as long as they have at least one bond issue remaining in the final sample, they will not be excluded from the bottom-line number of firms in the final sample.

2840-2899), Pharmaceuticals (SIC=2830-2836), Extractive industries (SIC=2900-2999 and 1300-1399), Durable manufacturers (SIC=3000-3999 except 3570-3579 and 3670-3679), Computers (SIC=7370-7379, 3570-379, and 3670-3679), Transportation (SIC=4000-4899), Utilities (4900-4999), Retail (SIC=5000-5999), Services (SIC=7000-8999, except 7370-7379) and Other (SIC>=9000).

Table 2
Descriptive Statistics

Panel A: Descriptive statistics for all firm-year observations in the credit rating sample across credit rating grade (2001-2003)

	Speculative Grade (n=223)	Investment Grade (n=690)	
	Mean (Median) [Standard Deviation]		Two-sided p-value for t-test (Wilcoxon Test)
RATING	2.6413 (3.0000) [0.4900]	4.6319 (5.0000) [0.7273]	<.0001 (<.0001)
OPTIONS	0.0900 (0.0316) [0.1758]	0.0423 (0.0253) [0.0530]	<.0001 (0.0318)
MGTESO	0.0196 (0.0066) [0.0384]	0.0079 (0.0040) [0.0115]	<.0001 (0.0002)
NONMGTESO	0.0703 (0.0239) [0.1449]	0.0344 (0.0190) [0.0461]	0.0003 0.1097
ACCQUALITY	-0.1068 (-0.0681) [0.1607]	-0.0859 (-0.0441) [0.1683]	0.0953 (<.0001)
STDROA	0.1080 (0.0566) [0.2061]	0.0341 (0.0249) [0.0333]	<.0001 (<.0001)
STDCFO	0.0575 (0.0516) [0.0338]	0.0400 (0.0332) [0.0286]	<.0001 (<.0001)
STDRET	0.2052 (0.1922) [0.0727]	0.1107 (0.1047) [0.0306]	<.0001 (<.0001)
LEVERAGE	0.3358 (0.3081) [0.1894]	0.2674 (0.2618) [0.1335]	<.0001 (<.0001)
ROA	-0.0612 (0.0010) [0.3535]	0.0574 (0.0559) [0.0628]	<.0001 (<.0001)

Table 2
Descriptive Statistics

Panel A (Continued): Descriptive statistics for all firm-year observations in the credit rating sample across credit rating (2001-2003)

	Speculative Grade (n=223)	Investment Grade (n=690)	
	Mean (Median) [Standard Deviation]		Two-sided p-value for t-test (Wilcoxon Test)
CASHFLOWS	0.0787 (0.0766) [0.0590]	0.1235 (0.1205) [0.0543]	<.0001 (<.0001)
SIZE	7.6624 (7.7763) [1.2319]	9.1259 (8.9981) [1.1698]	<.0001 (<.0001)
BETA	1.5518 (1.4603) [0.7185]	0.8669 (0.8654) [0.4311]	<.0001 (<.0001)
CAP_INTEN	0.5129 (0.3969) [0.3722]	0.6190 (0.5423) [0.3517]	0.0002 (<.0001)
INT_COV	7.9131 (3.5447) [24.9985]	19.6794 (9.8132) [34.0368]	<.0001 (<.0001)
B2M	0.4957 (0.4061) [0.6149]	0.3906 (0.3383) [0.2769]	0.0141 (0.0070)
REPUR	0.1570 (0.0000) [0.3646]	0.2130 (0.0000) [0.4098]	0.0535 (0.0689)

All variables are as defined in Appendix C.

Table 2
Descriptive Statistics

Panel B : Descriptive statistics for the yield spread sample across high and low spread firms (January 2001 October 2004)

	Low Spread (n=154)	High Spread (n=155)	
	Mean (Median) [Standard Deviation]		Two-sided p-value for t-test (Wilcoxon Test)
SPREAD	89.8571 (90.5000) [27.9926]	267.6323 (232.0000) [115.4479]	<.0001 (<.0001)
INVGRADE	0.9935 (1.0000) [0.0806]	0.7677 (1.0000) [0.4236]	<.0001 (<.0001)
MATYRS	7.7273 (7.0000) [3.2944]	8.4774 (10.0000) [2.8950]	0.0343 (0.0357)
ISSUESIZE	5.6704 (5.7664) [0.9540]	5.6458 (5.7038) [0.8615]	0.8122 (0.5741)
CALLABLE	0.0260 (0.0000) [0.1596]	0.1161 (0.0000) [0.3214]	0.0020 (0.0023)
SUBORD	0.0000 0.0000 0.0000	0.0645 0.0000 0.2465	0.0014 (0.0015)
OPTIONS	0.0433 (0.0252) [0.0518]	0.0308 (0.0188) [0.0374]	0.0162 (0.0085)
MGTESO	0.0057 (0.0032) [0.0082]	0.0074 (0.0032) [0.0110]	0.1265 (0.5411)
NONMGTESO	0.0376 (0.0193) [0.0472]	0.0235 (0.0141) [0.0289]	0.0017 (0.0008)

Table 2
Descriptive Statistics

Panel B (Continued): Descriptive statistics for the yield spread sample across high and low spread firms (January 2001-October 2004)

	Low Spread (n=154)	High Spread (n=155)	
	Mean (Median) [Standard Deviation]		Two-sided p-value for t-test (Wilcoxon Test)
ACCQUALITY	-0.0474 (-0.0343) [0.0486]	-0.0794 (-0.0418) [0.1687]	0.0244 (0.0453)
STDROA	0.0243 (0.0175) [0.0213]	0.0347 (0.0246) [0.0335]	0.0013 (0.0019)
STDCFO	0.0319 (0.0268) [0.0234]	0.0396 (0.0317) [0.0250]	0.0055 (0.0005)
STDRET	0.0978 (0.0940) [0.0228]	0.1223 (0.1440) [0.0400]	<.0001 (<.0001)
LEVERAGE	0.3052 (0.3020) [0.1175]	0.3450 (0.3441) [0.1176]	0.0032 (0.0023)
ROA	0.0749 (0.0660) [0.0564]	0.0384 (0.0384) [0.0440]	<.0001 (<.0001)
CASHFLOWS	0.1285 (0.1270) [0.0520]	0.0998 (0.0949) [0.0508]	<.0001 (<.0001)
SIZE	9.7516 (9.6377) [1.3048]	8.3014 (8.1951) [1.1510]	<.0001 (<.0001)
BETA	0.6666 (0.6795) [0.3878]	0.6673 (0.5441) [0.4554]	0.9875 (0.5692)

Table 2
Descriptive Statistics

Panel B (Continued): Descriptive statistics for the yield spread sample across high and low spread firms (January 2001-October 2004)

	Low Spread (n=154)	High Spread (n=155)	
	Mean (Median) [Standard Deviation]		Two-sided p-value for t-test (Wilcoxon Test)
CAP_INTEN	0.6687 (0.5678) [0.3315]	0.7432 (0.7049) [0.3981]	0.0749 (0.1655)
INT_COV	14.8556 (9.6715) [15.0222]	6.9613 (5.8824) [5.3384]	<.0001 (<.0001)
B2M	0.3283 (0.2723) [0.2518]	0.5404 (0.4739) [0.3730]	<.0001 (<.0001)
REPUR	0.2662 (0.0000) [0.4434]	0.2065 (0.0000) [0.4061]	0.2175 (0.2181)

All variables are as defined in Appendix C.

Table 3
Correlation Matrix

Panel A: Correlation matrix for the credit rating sample (N=913)

	RATING	OPTIONS	ACC-QUALITY	STDROA	STDCFO	STDRET	LEVERAGE	ROA	CASH-FLOWS	SIZE	BETA	CAP_INTEN	INT_COV	B2M
RATING		-0.16 (<.00)	0.11 (<.00)	-0.32 (<.00)	-0.27 (<.00)	-0.69 (<.00)	-0.25 (<.00)	0.35 (<.00)	0.47 (<.00)	0.64 (<.00)	-0.49 (<.00)	0.09 (<.00)	0.24 (<.00)	-0.21 (<.00)
OPTIONS	0.05 (0.12)		-0.04 (0.23)	0.14 (<.00)	0.14 (<.00)	0.30 (<.00)	-0.12 (<.00)	0.04 (0.26)	0.14 (<.00)	0.05 (0.10)	0.24 (0.00)	-0.21 (<.00)	0.22 (<.00)	-0.24 (<.00)
ACC-QUALITY	0.17 (<.00)	-0.23 (<.00)		-0.15 (<.00)	-0.10 (<.00)	-0.12 (<.00)	0.00 (0.95)	0.08 (0.02)	0.05 (0.14)	0.08 (0.01)	-0.10 (<.00)	0.10 (<.00)	-0.09 (0.01)	-0.01 (0.80)
STDROA	-0.37 (<.00)	0.16 (<.00)	-0.23 (<.00)		0.35 (<.00)	0.47 (<.00)	0.13 (<.00)	-0.82 (<.00)	-0.17 (<.00)	-0.17 (<.00)	0.35 (<.00)	-0.10 (<.00)	-0.05 (0.15)	-0.03 (0.29)
STDCFO	-0.29 (<.00)	0.15 (<.00)	-0.24 (<.00)	0.54 (<.00)		0.35 (<.00)	0.04 (0.28)	-0.14 (<.00)	0.05 (0.13)	-0.24 (<.00)	0.20 (<.00)	-0.10 (<.00)	0.00 (0.99)	-0.05 (0.17)
STDRET	-0.67 (<.00)	0.11 (<.00)	-0.27 (<.00)	0.46 (<.00)	0.36 (<.00)		0.04 (0.22)	-0.42 (<.00)	-0.30 (<.00)	-0.39 (<.00)	0.67 (<.00)	-0.26 (<.00)	-0.05 (0.13)	0.10 (0.00)
LEVERAGE	-0.20 (<.00)	-0.24 (<.00)	0.19 (<.00)	-0.02 (0.47)	-0.09 (0.01)	-0.04 (0.28)		-0.13 (0.00)	-0.20 (<.00)	-0.23 (<.00)	-0.07 (0.04)	0.17 (<.00)	-0.40 (<.00)	-0.08 (0.02)
ROA	0.53 (<.00)	0.41 (<.00)	0.01 (0.84)	-0.28 (<.00)	-0.09 (<.00)	-0.43 (<.00)	-0.22 (<.00)		0.35 (<.00)	0.22 (<.00)	-0.38 (<.00)	0.05 (0.09)	0.16 (<.00)	-0.14 (<.00)
CASH-FLOWS	0.47 (<.00)	0.32 (<.00)	0.03 (0.37)	-0.03 (<.00)	0.03 (0.34)	-0.31 (<.00)	-0.20 (<.00)	0.61 (<.00)		0.37 (<.00)	-0.28 (<.00)	0.17 (<.00)	0.35 (<.00)	-0.30 (<.00)
SIZE	0.57 (<.00)	0.13 (<.00)	0.12 (<.00)	-0.16 (<.00)	-0.23 (<.00)	-0.38 (<.00)	-0.19 (<.00)	0.33 (<.00)	0.35 (<.00)		-0.17 (<.00)	-0.01 (0.82)	0.28 (<.00)	-0.31 (<.00)
BETA	-0.40 (<.00)	0.04 (0.29)	-0.17 (<.00)	0.33 (<.00)	0.19 (<.00)	0.58 (<.00)	-0.14 (0.02)	-0.45 (<.00)	-0.26 (<.00)	-0.15 (<.00)		-0.26 (<.00)	0.01 (0.85)	0.07 (0.05)
CAP_INTEN	0.13 (<.00)	-0.29 (<.00)	0.33 (<.00)	-0.16 (<.00)	-0.13 (<.00)	-0.26 (<.00)	0.23 (<.00)	0.01 (0.73)	0.20 (<.00)	-0.02 (0.90)	-0.25 (<.00)		-0.11 (<.00)	0.05 (0.16)
INT_COV	0.55 (<.00)	0.41 (<.00)	-0.10 (0.45)	-0.14 (<.00)	0.01 (0.88)	-0.29 (<.00)	-0.58 (<.00)	0.71 (<.00)	0.64 (<.00)	0.37 (<.00)	-0.22 (<.00)	-0.06 (0.30)		-0.18 (<.00)
B2M	-0.30 (<.00)	-0.57 (<.00)	0.15 (<.00	-0.08 (0.02)	-0.07 (0.04)	0.20 (<.00)	-0.03 (0.42)	0.52 (<.00)	-0.44 (<.00)	-0.34 (<.00)	0.16 (<.00)	0.08 (0.01)	-0.42 (<.00)	

Table 3
Correlation Matrix

Panel B: Correlation matrix for the yield spread sample (N=309)

	CSPREAD	OPTIONS	ACC-QUALITY	STDROA	STDCFO	STDRET	LEVERAGE	ROA	CASH-FLOWS	SIZE	BETA	CAP_INTEN	INT_COV	B2M
CSPREAD		-0.21 (<.00)	-0.08 (0.18)	0.21 0.0003	0.25 (<.00)	0.52 (<.00)	0.22 (<.00)	-0.43 (<.00)	-0.38 (<.00)	-0.59 (<.00)	0.17 (<.00)	0.01 0.9008	-0.34 (<.00)	0.42 (<.00)
OPTIONS	-0.23 (<.00)		-0.08 (0.14)	0.15 (0.01)	0.07 (0.23)	-0.11 (0.05)	-0.20 (<.00)	0.48 (<.00)	0.47 (<.00)	0.39 (<.00)	-0.19 (<.00)	-0.11 (0.06)	0.37 (<.00)	-0.45 (<.00)
ACC-QUALITY	-0.16 (0.01)	-0.13 (0.02)		-0.11 (0.06)	-0.11 (0.06)	-0.04 (0.44)	0.13 (0.02)	-0.04 (0.48)	0.03 (0.58)	-0.01 (0.89)	-0.10 (0.07)	0.05 (0.35)	-0.09 (0.13)	0.08 (0.15)
STDROA	0.25 (<.00)	0.05 (0.42)	-0.22 (<.00)		0.42 (<.00)	0.35 (<.00)	-0.03 (0.55)	0.07 (0.20)	0.15 (0.01)	-0.11 (0.06)	0.09 (0.11)	0.13 (0.02)	0.05 (0.40)	-0.08 (0.16)
STDCFO	0.24 (<.00)	-0.03 (0.61)	-0.28 (<.00)	0.54 (<.00)		0.26 (<.00)	-0.04 (0.51)	0.10 (0.08)	0.13 (0.02)	-0.18 (<.00)	0.10 (0.08)	-0.02 (0.66)	0.10 (0.09)	0.06 (0.26)
STDRET	0.49 (<.00)	-0.10 (0.08)	-0.22 (<.00)	0.28 (<.00)	0.25 (<.00)		0.11 (0.07)	-0.39 (<.00)	-0.29 (<.00)	-0.38 (<.00)	0.43 (<.00)	-0.06 (0.31)	-0.21 (<.00)	0.23 (<.00)
LEVERAGE	0.21 (<.00)	-0.14 (0.01)	0.19 (<.00)	-0.04 (0.54)	-0.07 (0.23)	0.07 (0.23)		-0.18 (<.00)	-0.12 (0.03)	-0.24 (<.00)	-0.10 (0.08)	0.02 (0.69)	-0.41 (<.00)	-0.05 (0.42)
ROA	-0.46 (<.00)	0.52 (<.00)	-0.07 (0.20)	-0.04 (0.52)	0.01 (0.92)	-0.41 (<.00)	-0.23 (<.00)		0.70 (<.00)	0.42 (<.00)	-0.31 (<.00)	-0.01 (0.85)	0.61 (<.00)	-0.51 (<.00)
CASH-FLOWS	-0.44 (<.00)	0.48 (<.00)	-0.03 (0.63)	0.12 (0.03)	0.12 (0.04)	-0.34 (<.00)	-0.15 (<.00)	0.69 (<.00)		0.28 (<.00)	-0.29 (<.00)	0.25 (<.00)	0.53 (<.00)	-0.51 (<.00)
SIZE	-0.62 (<.00)	0.37 (<.00)	0.15 (0.01)	-0.15 (0.01)	-0.22 (<.00)	-0.38 (<.00)	-0.20 (<.00)	0.43 (<.00)	0.30 (<.00)		-0.052 (0.37)	-0.17 (<.00)	0.40 (<.00)	-0.48 (<.00)
BETA	0.08 (0.18)	-0.22 (<.00)	-0.17 (<.00)	0.06 (0.30)	0.00 0.9369	0.36 (<.00)	-0.11 (0.06)	-0.34 (<.00)	-0.29 (<.00)	-0.08 (0.15)		-0.25 (<.00)	-0.04 (0.52)	0.15 (<.00)
CAP_INTEN	0.01 (0.86)	-0.14 (0.02)	0.21 (<.00)	0.14 (0.01)	0.01 (0.85)	-0.06 (0.27)	0.03 (0.56)	0.04 (0.51)	0.25 (<.00)	-0.12 (0.04)	-0.22 (<.00)		-0.11 (0.05)	0.10 (0.09)
INT_COV	-0.49 (<.00)	0.47 (<.00)	-0.16 (<.00)	-0.01 (0.91)	0.03 (0.54)	-0.29 (<.00)	-0.58 (<.00)	0.75 (<.00)	0.67 (<.00)	0.41 (<.00)	-0.15 (0.01)	0.05 (0.40)		-0.34 (<.00)
B2M	0.44 (<.00)	-0.65 (<.00)	0.08 (0.17)	-0.02 (0.79)	0.05 (0.40)	0.30 (<.00)	-0.03 (0.61)	-0.68 (<.00)	-0.58 (<.00)	-0.53 (<.00)	0.21 (<.00)	0.14 (0.01)	-0.52 (<.00)	

All variables are as defined in Appendix C. Pearson (Spearman) correlation coefficients are in the upper (lower) triangle. P-values are in parentheses.

Table 4
Ordered Probit Regressions of the Effect of Outstanding Employee Stock Options (Dependent Variable=*Rating*)

Panel A: Ordered probit analyses of the credit rating model

Independent Variables	Predicted Sign	Estimated Coefficient			
		All firm years	Year 2001	Year 2002	Year 2003
OPTIONS	?	-2.727***	-2.571***	-5.309**	-3.528**
		(0.591)	(0.750)	(2.198)	(1.421)
ACCQUALITY	+	0.372	1.247*	0.202	0.504
		(0.250)	(0.639)	(0.346)	(0.587)
STDROA	-	-3.489***	-3.248*	-3.291	-4.393*
		(1.220)	(1.873)	(2.550)	(2.348)
STDCFO	-	0.155	-3.958	0.474	2.987
		(1.600)	(2.780)	(2.994)	(2.811)
STDRET	-	-16.275***	-14.647***	-16.151***	-17.830***
		(1.351)	(2.367)	(2.479)	(2.548)
ROA	+	2.612***	3.017**	2.189*	3.423*
		(0.755)	(1.224)	(1.293)	(1.847)
CASHFLOWS	+	6.400***	5.552***	6.908***	6.102***
		(0.955)	(1.592)	(1.691)	(1.975)
LEVERAGE	-	-1.970***	-2.586***	-1.919***	-1.819***
		(0.330)	(0.562)	(0.584)	(0.622)
SIZE	+	0.582***	0.506***	0.678***	0.571***
		(0.041)	(0.067)	(0.073)	(0.081)
BETA	-	-0.234**	-0.362**	-0.229	-0.067
		(0.102)	(0.156)	(0.224)	(0.217)
CAP_INTEN	+	-0.423***	-0.433**	-0.506**	-0.354
		(0.122)	(0.212)	(0.206)	(0.233)
INT_COV (÷100)	+	0.047	0.221	0.001	-0.071
		(0.143)	(0.248)	(0.003)	(0.233)
B2M	-	-0.028	-0.548**	0.154	-0.342
		(0.127)	(0.268)	(0.172)	(0.353)
Sample Size		913	321	320	272
Psuedo R-Squared		0.4332	0.4330	0.4501	0.4440
Likelihoo ratio chi-square		1166.85***	410.02***	425.24***	353.25***
Percentage correctly predicted		63.09	62.93	63.13	63.97

*,**,*** significant at the 0.1, 0.05 and 0.01 levels (two-tailed)
Standard errors are in parentheses
All variables are as defined in Appendix C.

Table 4
Ordered Probit Regressions of the Effect of Outstanding Employee Stock Options
(Dependent Variable=*Rating*)

Panel B: Ordered probit analyses of the credit rating model conditioning on the issuing company's tendency to repurchase shares in response to ESO exercise.

Independent Variables	Predicted Sign	Estimated Coefficient			
		All firm-years	Year 2001	Year 2002	Year 2003
OPTIONS	?	-2.077***	-2.225***	-3.109	-2.539*
		(0.595)	(0.730)	(2.332)	(1.469)
ACCQUALITY	+	0.285	1.043	0.091	0.494
		(0.253)	(0.657)	(0.352)	(0.490)
STDROA	-	-3.508***	-3.681*	-3.348	-4.336*
		(1.232)	(1.908)	(2.572)	(2.354)
STDCFO	-	-0.024	-3.637	-0.364	2.777
		(1.616)	(2.800)	(3.046)	(2.841)
STDRET	-	-15.935***	-14.160***	-15.627***	-17.687***
		(1.358)	(2.391)	(2.493)	(2.558)
ROA	+	2.666***	2.820**	2.291*	3.471**
		(0.762)	(1.232)	(1.32)	(1.855)
CASHFLOWS	+	6.761***	5.992***	7.486***	6.128***
		(0.962)	(1.607)	(1.714)	(1.978)
LEVERAGE	-	-2.194***	-2.943***	-2.042***	-1.983***
		(0.338)	(0.579)	(0.598)	(0.637)
SIZE	+	0.584***	0.499***	0.689***	0.578***
		(0.041)	(0.067)	(0.074)	(0.082)
BETA	-	-0.277***	-0.413***	-0.309	-0.083
		(0.102)	(0.158)	(0.227)	(0.218)
CAP_INTEN	+	-0.443***	-0.464**	-0.522**	-0.345
		(0.122)	(0.214)	(0.208)	(0.233)
INT_COV (÷100)	+	-0.006	0.157	0.007	0.091
		(0.001)	(0.250)	(0.308)	(0.235)
B2M	-	0.002	-0.579**	0.213	-0.300
		(0.127)	(0.270)	(0.174)	(0.356)
REPUR	?	0.669***	0.793***	0.624**	0.694**
		(0.146)	(0.239)	(0.252)	(0.307)
*REPUR*OPTIONS*	-	-23.454***	-20.057***	-32.479***	-24.781**
		(4.888)	(7.056)	(10.869)	(10.081)
Sample Size		913	321	320	272
Psuedo R-Square		0.4429	0.4455	0.4600	0.4521
Likelihoo ratio chi-square		1193.01***	421.82***	434.62***	359.76***
Percent correctly predicted		64.07	63.86	65.00	66.18

*,**,*** significant at the 0.1, 0.05 and 0.01 levels (two-tailed)
Standard errors are in parentheses
All variables are as defined in Appendix C.

Table 4
Probit Regressions of the Effect of Outstanding Employee Stock Options on Credit Ratings

Panel C: Probit analyses of ESOs' impact on credit ratings (Dependent Variable=*INVGRADE*)

Independent Variables	Predicted Sign	Probit	
		Coefficient	Marginal Effect
OPTIONS	?	-3.533*** (1.372)	-0.0362
ACCQUALITY	+	-0.301 (0.477)	-0.00394
STDROA	-	-4.000* (2.043)	-0.02933
STDCFO	-	4.082 (2.866)	0.028721
STDRET	-	-19.102*** (2.295)	-0.21835
ROA	-	0.132 (1.282)	0.004797
CASHFLOWS	+	4.103** (1.812)	0.057939
LEVERAGE	-	-2.079*** (0.570)	-0.02954
SIZE	+	0.649*** (0.088)	0.207119
BETA	-	-0.646*** (0.193)	-0.08809
CAP_INTEN	+	-0.306 (0.224)	-0.03207
INT_COV (÷100)	+	0.006* (0.004)	0.014341
B2M	-	0.115 (0.218)	0.008112
Sample Size		913	
Psuedo/Adj. R-Square		0.6229	
Likelihoo ratio chi-square		632.29***	

*,**,*** significant at the 0.1, 0.05 and 0.01 levels (two-tailed)
Standard errors are in parentheses.
INVGRADE takes on the value of one if credit rating is BBB- or above (i.e., investment grade), and zero otherwise.

Table 5
Ordinary Least Squares Regressions of the Effect of Outstanding Employee Stock Options on Yield Spreads (Dependent Variable=SPREAD)

Independent Variables	Predicted sign	Model (1)	Model (2)	Model (3)	Model (4)
		Coefficient	Coefficient	Coefficient	Coefficient
INTERCEPT	?	290.722***	298.715***	308.284***	316.085***
		(78.992)	(78.219)	(77.618)	(76.506)
OPTIONS	?	355.847***	377.198***	106.421	223.054
		(116.126)	(143.129)	(204.132)	(179.854)
ACCQUALITY	-	-72.518**	-58.765**	-72.433**	-57.339**
		(29.546)	(26.499)	(24.500)	(26.129)
STDROA	+	228.054	272.289	212.301	264.500
		(216.238)	(222.553)	(217.635)	(223.431)
STDCFO	+	521.160*	557.071*	537.290*	569.355**
		(305.565)	(292.491)	(304.972)	(292.053)
STDRET	+	585.242**	632.176***	583.969**	627.932
		(246.378)	(230.035)	(246.138)	(229.437)***
ROA	-	-160.116	-193.445	-164.959	-196.841
		(153.309)	(158.791)	(155.379)	(160.342)
CASHFLOWS	-	-356.654**	-360.313*	-343.428*	-349.684*
		(186.464)	(186.580)	(185.961)	(186.562)
LEVERAGE	+	87.200*	64.662	84.265*	63.609
		(48.840)	(48.470)	(48.428)	(47.900)
SIZE	-	-34.796***	-35.358***	-34.849***	-35.250***
		(5.187)	(5.264)	(5.168)	(5.235)
BETA	+	-5.969	-9.05	-5.210	-8.084
		(15.623)	(15.038)	(15.873)	(15.372)
CAP_INTEN	-	3.942	-1.063	4.073	-0.620
		(18.284)	(19.104)	(18.278)	(19.195)
INT_COV	-	0.097	-0.161	0.070	-0.144
		(0.388)	(0.431)	(0.399)	(0.428)
B2M	+	48.113*	51.234**	47.183*	50.544**
		(25.681)	(25.518)	(24.510)	(24.351)
MATYRS	+	-1.544	-1.106	-1.029	-0.641
		(1.751)	(1.664)	(1.904)	(1.839)
ISSUESIZE	?	17.643***	16.461***	18.084***	16.700***
		(5.409)	(5.183)	(5.566)	(5.340)
CALLABLE	+	87.4261***	87.825***	88.320***	88.435***
		(30.881)	(30.706)	(31.035)	(30.921)
SUBORD	+	57.241	53.528	57.695	54.485
		(37.879)	(37.492)	(38.150)	(37.668)
REPUR	?		41.882**		42.954**
			(18.713)		(18.900)
*REPUR*OPTIONS*	?		-53.362		-541.860
			(182.380)		(329.309)
LONG	?			-26.318	-26.747
				(21.717)	(21.362)
*LONG*OPTIONS*	?			277.808	165.256
				(207.732)	(198.324)
*REPUR*LONG*OPTIONS*	+				512.841*
					(307.509)
N		309	309	309	309
Adjusted R-Squared		0.5608	0.5750	0.5598	0.5734

*,**,*** significant at the 0.1, 0.05 and 0.01 levels (two-tailed)
The standard errors in parentheses are adjusted for serial correlation and heteroskedasticity per Rogers (1993).
All variables are as defined in Appendix C.

Table 6
Specification and Sensitivity Tests

Panel A: Ordered probit analyses on the "change" specification of credit rating model

Independent Variable	Expected Sign	Model (1)	Model (2)
		Contemporaneous *DOWNGRADE*	One-year-ahead *DOWNGRADE*
DIFF_OPTIONS	?	1.662***	6.105***
		(0.607)	(1.569)
DIFF_ACCQUALITY	-	-0.945*	-0.426
		(0.498)	(0.563)
DIFF_STDROA	+	0.455	-8.228***
		(1.463)	(3.017)
DIFF_STDCFO	+	-4.968	14.712***
		(3.298)	(5.403)
DIFF_STDRET	+	21.679***	-12.269**
		(4.435)	(6.477)
DIFF_ROA	-	-1.191*	0.137
		(0.710)	(1.297)
DIFF_CASHFLOW	-	-13.921***	-10.177*
		(3.494)	(5.302)
DIFF_LEVERAGE	+	1.013	-2.195
		(0.798)	(1.334)
DIFF_SIZE	-	-0.886***	-1.231***
		(0.178)	(0.283)
DIFF_BETA	+	0.216	0.743***
		(0.170)	(0.247)
DIFF_CAP_INTEN	-	0.263	0.152
		(0.702)	(0.868)
DIFF_INT_COV	-	-0.003	0.006
		(0.003)	(0.005)
DIFF_B2M	+	-0.274	0.711***
		(0.219)	(0.245)
Sample Size		566	286
Pseudo R^2		0.1911	0.1902

*,**,*** significant at the 0.1, 0.05 and 0.01 levels (two-tailed)
Standard errors are in parentheses.
DOWNGRADE is an ordinal variable set equal to one if the firm's credit rating is downgraded from year t-1 to t, zero if there is no change in the firm's credit rating, and minus one if there is an upgrade in the firm's credit ratings.
DIFF_X is the change in the variable X from year t-1 to t, where X is one of the variables in the credit rating model.

Table 6
Specification and Sensitivity Tests

Panel B: Ordered probit analyses on the "change" specification of *OPTIONS* model

Dependent Variable	Expected Sign	Model (1)	Model (2)
		Contemporaneous *DIFFOPTION*	One-year-ahead *DIFFOPTION*
INTERCEPT		-0.012*** (0.004)	0.012*** (0.003)
DIFF_RATING	?	-0.010 (0.009)	-0.012 (0.013)
DIFF_IDRISK	+	-0.045** (0.018)	-0.029 (0.024)
DIFF_STDROA	+	0.147 (0.242)	0.353*** (0.131)
DIFF_RDINTEN	+	-0.150*** (0.054)	0.033 (0.044)
DIFF_GROW_EMPL(+100)	+	0.002** (0.001)	0.001** (0.0006)
DIFF_B2M	-	-0.014 (0.014)	0.006 (0.008)
DIFF_LEVERAGE	-	-0.080 (0.099)	-0.045 (0.037)
DIFF_LOGSALES	+	-0.019 (0.023)	-0.019 (0.016)
DIFF_CASH_EMPL(+100)	-	-0.027** (0.012)	-0.001 (0.004)
DIFF_CONSTRAIN	+	0.031 (0.091)	0.063 (0.062)
DIFF_AVGROA	+	-0.120 (0.144)	0.106 (0.121)
DIFF_RET3YR	+	0.050*** (0.016)	-0.015** (0.006)
Sample Size		541	236
Pseudo R^2		0.4295	0.2226

*,**,*** significant at the 0.1, 0.05 and 0.01 levels (two-tailed)

DIFF_Y is the change in the variable Y from year t-1 to t, where Y is one of the variables in the *OPTIONS* model described in Appendix D.

The standard errors in parentheses are adjusted for serial correlation and heteroskedasticity per Rogers (1993).

Table 6
Specification and Sensitivity Tests

Panel C: Sensitivity analysis partitioning *OPTIONS* into the component accruing to top-five executives and that accruing to non-executive employees

Dependent Variable	RATING		SPREAD	
	Expected Sign	Coefficient (Standard Error)	Expected Sign	Coefficient (Standard Error)
MGTESO	?	3.340 (2.996)	?	-39.204 (557.008)
NONMGTESO	?	-4.427*** (1.016)	?	429.138*** (138.068)
ACCQUALITY	+	0.387 (0.251)	-	-73.035** (30.034)
STDROA	-	-3.853*** (1.236)	+	240.286 (214.079)
STDCFO	-	0.151 (1.602)	+	507.976 (308.186)
STDRET	-	-16.266*** (1.357)	+	584.848*** (245.497)
ROA	+	2.417*** (0.761)	-	-148.297 (154.114)
CASHFLOW	+	6.756*** (0.972)	-	-363.041* (187.336)
LEVERAGE	-	-2.011*** (0.331)	+	88.200* (48.727)
SIZE	+	0.598*** (0.042)	-	-36.016*** (5.462)
BETA	-	-0.224** (0.102)	+	-5.766 (15.630)
CAP_INTEN	+	-0.424*** (0.122)	-	3.637 (18.268)
INT_COV	+	0.001 (0.001)	-	0.094 (0.379)
B2M	-	-0.024 (0.127)	+	46.794* (25.715)
Sample Size		913		309
Pseudo R^2		0.4348		0.5857

*,**,*** significant at the 0.1, 0.05 and 0.01 levels (two-tailed). The standard errors for the *SPREAD* sample are adjusted for serial correlation and heteroskedasticity per Rogers (1993) For ease of exposition, the intercept of the *SPREAD* model and the coefficients on bond issue characteristics (*MATYRS, ISSUESIZE, CALLABLE and SUBORD*) for the yield spread model are not shown.

Table 6
Specification and Sensitivity Tests

Panel D: Sensitivity analysis using Ashbaugh et al.'s (2004) corporate governance variables

Dependent Variable	RATING				SPREAD	
		Year 2001	Year 2002	Year 2003		
	Expected Sign	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)	Expected Sign	Coefficient (Standard Error)
OPTIONS	?	-2.589*** (0.909)	-4.735* (2.430)	-2.779** (1.537)	?	415.316*** (137.269)
ACCQUALITY	+	3.069** (1.297)	-0.053 (0.407)	0.484 (0.521)	-	-61.766 (45.616)
STDROA	-	-3.965* (2.000)	-3.524 (2.728)	-3.313 (2.423)	+	59.623 (266.000)
STDCFO	-	-2.604 (3.044)	1.817 (3.222)	2.188 (3.546)	+	595.016 (372.518.)
STDRET	-	-17.948*** (2.808)	-19.656*** (2.843)	-20.174*** (3.001)	+	801.885*** (267.201)
ROA	+	3.019** (1.332)	3.204** (1.418)	4.130** (2.030)	-	-187.465 (158.329)
CASHFLOW	+	6.634*** (1.814)	6.703*** (1.845)	6.285*** (2.091)	-	-500.091** (205.136)
LEVERAGE	-	-2.959*** (0.642)	-2.083*** (0.642)	-1.977*** (0.685)	+	73.953 (56.590)
SIZE	+	0.464*** (0.085)	0.675*** (0.090)	0.503*** (0.095)	-	-40.853*** (5.955)
BETA	-	-0.256 (0.173)	0.071 (0.248)	0.075 (0.244)	+	-17.271 (16.223)
CAP_INTEN	+	-0.716*** (0.241)	-0.657*** (0.225)	-0.466* (0.250)	-	-4.927 (19.293)
INT_COV	+	0.001 (0.003)	0.000 (0.003)	-0.001 (0.002)	-	0.513 (0.494)
B2M	-	-0.647** (0.318)	0.154 (0.186)	-0.279 (0.373)	+	44.412* (25.272)
BD_IND	+	0.870 (0.557)	0.562 (0.559)	0.702 (0.599)	-	20.033 (48.515)
POWER	-	0.312*** (0.106)	0.103 (0.105)	0.057 (0.115)	+	-6.983 (7.681)
POLICY	+	-0.003 (0.163)	-0.084 (0.159)	0.000 (0.170)	-	15.344 (15.387)
INSTPCTG	?	-0.325 (0.612)	-0.110 (0.594)	-0.779 (0.672)	?	-45.267 (49.286)
INSIDERSPCTG	-	-0.154 (1.091)	0.355 (1.073)	-0.441 (1.188)	+	0.973 (68.894)
BLOCKHOLDERS	?	0.018 (0.040)	-0.042 (0.040)	-0.033 (0.042)	?	-0.991 (3.713)
G_INDEX	?	-0.013 (0.034)	0.019 (0.033)	0.043 (0.036)	?	-1.059 (2.740)
ACC_TRANSP	+	-0.050 (0.132)	-0.202 (0.838)	0.011 (0.114)	-	-8.968 (8.948)

Sample Size		283	292	248		274
Pseudo/Adj. R^2		0.4601	0.4790	0.4606		0.5844
p-values of the joint significance test of governance variables		0.1103	0.7802	0.4887		0.7744

*,**,*** significant at the 0.1, 0.05 and 0.01 levels (two-tailed)
Standard errors are in parentheses. The standard errors for the *SPREAD* sample are adjusted for serial correlation and heteroskedasticity per Rogers (1993). For ease of exposition, the intercept of the *SPREAD* model and the coefficients on bond issue characteristics (*MATYRS, ISSUESIZE, CALLABLE and SUBORD*) for the yield spread model are not shown. All variables are as defined in Appendix C.

Table 6
Specification and Sensitivity Tests

Panel E: Sensitivity analysis using Brown and Caylor's (2004) Gov_Score as an alternative corporate governance proxy

Dependent Variable	RATING				SPREAD	
		Year 2001	Year 2002	Year 2003		
	Expected Sign	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)	Expected Sign	Coefficient (Standard Error)
OPTIONS	?	-1.874** (0.916)	-8.145*** (2.741)	-5.789*** (1.837)	?	413.246*** (119.413)
ACCQUALITY	+	0.132 (1.163)	0.166 (0.682)	0.448 (0.709)	-	-194.529* (102.564)
STDROA	-	-5.398** (2.525)	-6.232* (3.665)	-2.204 (3.425)	+	299.079 (262.823)
STDCFO	-	-4.397 (3.904)	-4.723 (4.298)	-2.207 (4.579)	+	699.298 (486.936)
STDRET	-	-17.628*** (3.014)	-20.493*** (3.288)	-19.790*** (3.375)	+	724.064*** (289.191)
ROA	+	0.953 (1.784)	3.799* (2.247)	2.048 (2.024)	-	-225.052 (191.898)
CASHFLOW	+	7.474*** (2.248)	10.156*** (2.585)	8.609*** (2.588)	-	-247.925 (210.831)
LEVERAGE	-	-2.567*** (0.714)	-1.710** (0.681)	-1.871*** (0.728)	+	81.039 (54.646)
SIZE	+	0.438*** (0.086)	0.613*** (0.092)	0.560*** (0.100)	-	-33.328*** (6.905)
BETA	-	-0.567*** (0.196)	-0.055 (0.297)	-0.181 (0.277)	+	-6.169 (17.407)
CAP_INTEN	+	-0.401 (0.260)	-0.722*** (0.264)	-0.689** (0.290)	-	-4.585 (20.760)
INT_COV	+	0.004 (0.005)	0.003 (0.004)	-0.001 (0.003)	-	-0.473 (0.462)
B2M	-	-0.819** (0.328)	-0.054 (0.224)	-0.681 (0.448)	+	51.328 (33.145)
GOV_SCORE	-	0.024 (0.021)	0.022 (0.022)	0.007 (0.024)	-	3.216* (1.757)
Sample Size		228	226	192		218
Pseudo R^2		0.4555	0.4980	0.4575		0.5805

*,**,*** significant at the 0.1, 0.05 and 0.01 levels (two-tailed)
Standard errors are in parentheses. The standard errors for the *SPREAD* sample are adjusted for serial correlation and heteroskedasticity per Rogers (1993). For ease of exposition, the intercept of the *SPREAD* model and the coefficients on bond issue characteristics (*MATYRS, ISSUESIZE, CALLABLE and SUBORD*) for the yield spread model are not shown. All variables are as defined in Appendix C.

Table 6
Specification and Sensitivity Tests

Panel F: Sensitivity tests using excessive ESO compensation as an alternative corporate governance proxy

Dependent Variable	RATING				SPREAD	
		Year 2001	Year 2002	Year 2003		
	Expected Sign	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)	Expected Sign	Coefficient (Standard Error)
OPTIONS	?	-2.950*** (1.150)	-3.090 (3.019)	-5.180** (2.185)	?	327.782* (168.055)
ACCQUALITY	+	1.441** (0.656)	0.653 (0.473)	0.510 (0.505)	-	-63.844** (30.039)
STDROA	-	-3.419* (1.916)	-2.622 (2.670)	-3.178 (2.488)	+	208.810 (221.390)
STDCFO	-	-2.486 (2.874)	-0.306 (3.134)	2.325 (2.921)	+	508.914* (305.283)
STDRET	-	-15.415*** (2.609)	-18.676*** (2.690)	-19.469*** (2.800)	+	554.610** (240.756)
ROA	+	3.382*** (1.256)	3.093** (1.394)	2.977 (1.833)	-	-136.901 (154.102)
CASHFLOW	+	5.146*** (1.641)	7.226*** (1.745)	6.922*** (2.028)	-	-415.152** (195.887)
LEVERAGE	-	-2.481*** (0.592)	-1.416** (0.637)	-1.472** (0.672)	+	104.632* (58.104)
SIZE	+	0.534*** (0.070)	0.690*** (0.077)	0.598*** (0.085)	-	-34.448*** (5.078)
BETA	-	-0.362** (0.163)	0.069 (0.240)	-0.092 (0.228)	+	-7.808 (15.734)
CAP_INTEN	+	-0.492** (0.218)	-0.609*** (0.215)	-0.416* (0.237)	-	8.022 (18.100)
INT_COV (+100)	+	0.003 (0.003)	0.056 (0.315)	0.089 (0.243)	-	0.161 (0.395)
B2M	-	-0.345 (0.292)	0.244 (0.208)	-0.265 (0.371)	+	55.075** (24.423)
EXCESS_ESO	-	-0.652*** (0.235)	-0.300 (0.213)	-0.526** (0.236)	+	-25.076* (15.116)
EXCESS_ESO OPTIONS*	+	8.148 (6.718)	-2.288 (7.955)	11.116 (7.293)	-	151.079 (172.115)
Sample Size		299	299	261		309
Pseudo R^2		0.429	0.4613	0.4562		0.5614

*,**,*** significant at the 0.1, 0.05 and 0.01 levels (two-tailed)

Standard errors are in parentheses. The standard errors for the *SPREAD* sample are adjusted for serial correlation and heteroskedasticity per Rogers (1993). For ease of exposition, the intercept of the *SPREAD* model and the coefficients on bond issue characteristics (*MATYRS, ISSUESIZE, CALLABLE and SUBORD*) for the yield spread model are not shown. All variables are as defined in Appendix C.

Table 6
Specification and Sensitivity Tests

Panel G: Sensitivity tests partitioning *OPTIONS* into the grant date fair value and post grant date fair value change

Dependent Variable	RATING		SPREAD	
	Expected Sign	Coefficient (Standard Error)	Expected Sign	Coefficient (Standard Error)
GRANT_VALUE	?	-2.534*** (0.718)	?	764.321*** (227.890)
VALUE_CHG	?	-2.934*** (0.733)	?	231.686* (127.506)
ACCQUALITY	+	0.369 (0.250)	-	-72.311** (30.086)
STDROA	-	-3.495*** (1.219)	+	215.033 (218.61)
STDCFO	-	0.163 (1.600)	+	534.824* (304.053)
STDRET	-	-16.387*** (1.373)	+	440.262* (248.447)
ROA	+	2.653*** (0.760)	-	-142.934 (150.95)
CASHFLOW	+	6.294*** (0.980)	-	-389.542** (192.367)
LEVERAGE	-	-1.959*** (0.330)	+	89.055* (53.691)
SIZE	+	0.581*** (0.041)	-	-37.669*** (5.569)
BETA	-	-0.246** (0.105)	+	-6.793 (15.192)
CAP_INTEN	+	-0.417*** (0.123)	-	9.521 (18.173)
INT_COV (+100)	+	0.045 (0.144)	-	-2.846 (40.071)
B2M	-	-0.028 (0.127)	+	52.473** (25.515)
Sample Size		913		309
Adj./Pseudo R^2		0.4333		0.5662

*,**,*** significant at the 0.1, 0.05 and 0.01 levels (two-tailed)
Standard errors are in parentheses. The standard errors for the *SPREAD* sample are adjusted for serial correlation and heteroskedasticity per Rogers (1993). For ease of exposition, the intercept of the *SPREAD* model and the coefficients on bond issue characteristics (*MATYRS, ISSUESIZE, CALLABLE and SUBORD*) for the yield spread model are not shown. All variables are as defined in Appendix C.

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