Firm Performance, Capital Structure and the Tax Benefits of Employee Stock Options

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Abstract

This paper analyzes the relation between the capital structure of a firm and the tax benefits realized from the exercise of stock options. Theory suggests that firms with tax benefits from the exercise of stock options should carry less debt since tax benefits are a non-debt tax shield. We find that both long- and short-term debt ratios are negatively related to the size of tax benefits from option exercise. Moreover, one-year changes in long-term leverage are negatively related to changes in the number of options exercised. Such a relation does not exist for changes in short-term leverage. Finally, firms with option-related tax benefits tend to issue equity with the net amount of equity issued an increasing function of these tax benefits.

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I. Introduction

In the 1990s stock options were widely used as a method to attract and retain employees, especially in technology firms. Unlike salary compensation, the cost of most employee stock options does not reduce the tax expense on a firm's financial income statement since it is treated as a change in shareholders' equity rather than as an expense.[1] For tax purposes, however, the cost of nonqualified employee stock options is recorded as a deduction on a firm's corporate tax returns, thus decreasing actual taxes paid.[2] One result of this discrepancy between a firm's accounting books and its tax books is that when stock prices are rising, stock options can provide a huge boost to a firm's operating cash flow. This was the case for many technology firms during the late 1990s; the bigger the gain in a firm's stock price, the more employees cashed in their options; the more

[1] Option compensation appears to fit the definition of a permanent difference, since the firm obtains a tax deduction in the year of the exercise but there is no corresponding financial accounting compensation expense recognized, if the firm elects to account for options under Accounting Principals Board Opinion No. 25 (APB 25) treatment. GAAP as per APB 25 requires that ESO tax benefits be credited to additional paid-in capital, with a corresponding debit to reduce taxes payable, rather than as a reduction in the computed current tax expense.

[2] In the wake of the recent wave of corporate accounting scandals, this double standard of using stock options to inflate profits while reducing taxes has received the attention of lawmakers. Senate Bill 1940, introduced in February 2002, would require corporations to deduct the cost of options from reported earnings if they deduct these costs for tax purposes. So far, the bill has little broad-based support. However, a number of companies, including Coca-Cola, GE, and Amazon.com, are choosing to voluntarily expense their options.

options cashed in, the lower the firm's actual tax expense and the bigger the boost to the company's cash flow. A study by Bear Stearns reports that this option-related tax benefit contributed 79 percent of the 1999 operating cash flow for Qualcomm, Inc.[3] The corresponding figures for Dell Computer Corp., Cisco Systems, and Yahoo! were 26, 19, and 17 percent, respectively. More recently, Pender (2001) reports that AOL Time Warner is sitting on $11 billion worth of future tax write-offs due to stock options exercised, and Morgenson (2002) claims that U.S. companies in aggregate cut their tax bills by an estimated $56.4 billion in 2000, versus $27.6 billion just two years earlier.

Ignoring the effect of these tax benefits can potentially impact our understanding of firm profitability and capital structure. Financial economists have long argued for focusing on cash flow, which is less subject to accounting distortions than earnings per share. However, in the case of companies with large tax benefits from option exercise, operating earnings can increase even if the profitability of the company's basic business has not changed.

The primary purpose of this paper is to analyze the impact of tax benefits realized from the exercise of employee stock options on capital structure. While an extensive literature examines the capital structure choices of firms and attempts to distinguish between the tradeoff and pecking order models of capital structure,[4] more recent papers focus on the puzzling phenomenon of "under-leveraged" firms. Both Lemmon and

[3] See McGough (2000).

[4] See, for example, Fama and French (2002), Frank and Goyal (2003), Helwege and Liang (1996), Hovakimian, Opler and Titman (2001), Lemmon and Zender (2001), Mackie-Mason (1990), Minton and Wruck (2001), Rajan and Zingales (1995), Shyam-Sunder and Myers (1999), Titman and Wessels (1988), and Bradley, Jarrell, and Kim (1984).

Zender (2001) and Minton and Wruck (2002) examine firms with conservative financial policies. Lemmon and Zender separate firms into two groups based on the foregone tax benefits associated with debt financing. They document that a large fraction of firms are conservatively financed, and that neither the pecking order nor the tradeoff theory of capital structure adequately explain this result. Minton and Wruck find little evidence that the tradeoff theory explains the capital structure choices of low debt firms. Rather, they find that low debt firms appear to follow a financing hierarchy.

In testing these theories, both Lemmon and Zender (2001) and Minton and Wruck (2002) rely on Graham's (1996) marginal tax rates and on the Graham (2000) method of identifying under-leveraged firms. However, Hanlon and Shevlin (2002) and Graham (2003) note that neither of Graham's measures takes into account the effect of employee stock options. Using a sample of Fortune 500 companies, Graham (2003) shows that these deductions average 50% of financial statement tax expense. As a result, Graham's marginal and effective tax rates, as well as his estimates of foregone tax benefits of debt, could be overstated for many firms. This problem should be especially severe for young, high-growth companies, which are more likely to use stock options to compensate employees and are more likely to have low debt levels.[5] By collecting the actual tax benefits due to the exercise of stock options from firms' annual reports, our results do not suffer from these same problems. We believe that our results show that the tax benefits of stock options explain a significant portion of this underleverage.

[5] For example, Hanlon and Shevlin (2002) report that the traditional measure of tax rates average 34.4 percent in 1999 for firms in the NASDAQ 100. In contrast, after accounting for the tax benefits of employee stock options, the tax rate averaged 14.65 percent.

We begin by examining the types of firms that report large levels of tax benefits due to the exercise of employee stock options. Our results indicate that these firms have lower long-term leverage, lower dividends per share, and higher profitability than firms without tax benefits due to option exercise. These firms also have more options outstanding and more options exercised. This is consistent with the notion that high-growth firms are more likely to offer stock options than older, more established firms. It should be pointed out that these characteristics are also consistent with employees not exercising underwater options.

Next, we examine the capital structure of firms with option-related tax benefits. DeAngelo and Masulis (1980) present a tradeoff model of optimal capital structure that incorporates the impact of debt and non-debt corporate tax shields. They argue that deductions for depreciation and tax-loss carryforwards are substitutes for the tax benefits of debt financing. Since tax benefits due to the exercise of options are another non-debt tax shield, their model would suggest that firms with large tax benefits relative to assets should also include less debt in their capital structure. Using methodologies similar to Mackie-Mason (1990), we examine the capital structure and debt-equity choice of firms with tax benefits due to employee stock options. In particular, we examine whether the tax benefits of employee stock options are used as a substitute for debt. Our results indicate that both long- and short-term leverage are decreasing functions of the level of tax benefits from option exercise.

We also attempt to determine whether firms alter their leverage in response to changing levels of tax benefits. After record profitability and stock returns in the late 1990s, the stock market experienced a decline in the early 2000s that left many

companies with options worth much less than in previous years, and in some cases, worth nothing. Given that options with strike prices lower than the underlying stock's market value will not be exercised, there is no tax benefit or cash flow boost as a result of these options. Consequently, during this period, many companies found that operating cash flows were significantly lower than in past years, even though there had been no significant change in their sales or core business. We examine the impact of this market downturn on companies' capital structures. Our results again are consistent with the argument that tax benefits of employee stock options are used as a substitute for debt and that changes in the level of tax benefits are associated with adjustments in leverage.

Finally, we examine the relation between debt-equity choice and the tax benefit variables. We find that firms which issue equity have larger tax benefits from option exercise than firms which issue debt. We also find that the net amount of equity issued increases with the tax benefits of employee stock options. In contrast, the net amount of debt issued decreases if the firm has negative pretax income *and* high tax benefits, consistent with these firms being unable to take advantage of the tax benefits of debt.

The paper closest in spirit to ours is Graham, Lang, and Shackelford (2004). Like ours, the focus of their paper is on the impact of the tax benefits of employee stock options on capital structure and debt policy. Their results are similar to ours in that they conclude that these tax benefits act as a non-debt tax shield and affect leverage. However, they do not examine the impact of changes in the tax benefit on leverage or the relation between the tax benefits and the choice of debt and equity financing. In addition, we use a random sample of 599 firms selected from Standard and Poor's ExecuComp database, while Graham, Lang and Shackelford (2004) use firms in the Nasdaq 100 and

the S&P 100. Our sample provides both low and high option users, whereas the Nasdaq 100 and S&P 100 are likely to include firms with substantial option use. Variation along the dimension of option usage might be important if the relation between capital structure and expected tax benefits is important. Finally, our methodologies differ substantially since we focus on the direct relation between the size of the tax benefits and capital structure while they focus on the impact of the tax benefit on the marginal tax rate.

The remainder of this paper is organized as follows: Section 1 provides a brief review of the literature and our hypotheses. Section 2 contains a description of our data. The results are presented in section 3 and section 4, while section 5 concludes.

II. Determinants of Capital Structure

This section describes firm characteristics that existing theories of capital structure suggest may be related to the debt-equity choice made by firms. Our primary variables of interest are those that proxy for the tax benefits of employee stock options. In addition, we control for size, profitability, growth, collateral value of assets, non-debt tax shields from operations, and uniqueness.

A. Tax Benefit Variables

Extrapolating from the argument in DeAngelo and Masulis (1980) that there exists a negative relation between leverage and the level of non-debt tax shields, one would expect that leverage would also be negatively related to the size of the tax deduction available from option exercise. This follows from the fact that the deduction is a non-debt tax shield. We use the ratio of options exercised to shares outstanding and the ratio of the tax benefits of options exercised to assets as measures of the tax deduction

realized from option exercise. Since options granted and options outstanding can impact a firm's future tax-paying position, we also include the ratios of options granted to shares outstanding, options outstanding to shares outstanding, and the Black-Scholes value of options granted to assets in our analysis as estimates of future realizable tax benefits.

B. Size

Previous literature suggests that leverage ratios may be related to firm size. Warner (1977) and Ang, Chua, and McConnell (1982) provide evidence that direct bankruptcy costs increase as firm size decreases. Further, larger firms tend to be more diversified and less prone to bankruptcy. These observations suggest that large firms should be more levered than small firms. However, size can also proxy for asymmetric information and access to capital markets. Because of these two factors, Smith (1977) shows that issuing equity is more expensive for small firms than for large firms, suggesting that small firms may be more levered than large firms. We use the book value of assets as a measure of firm size.[6]

C. Profitability

The pecking order theory of Myers (1984), Myers and Majluf (1984), and Shyam-Sunder and Myers (1999) suggests that firms prefer to finance investments first from retained earnings, second from debt, and third from equity. According to this theory, more profitable firms should have lower leverage ratios than less profitable firms since they are able to finance their investment opportunities with retained earnings. This

[6] We also use sales as a measure of firm size. However, the high correlation between sales and assets prevents us from using them in the same model. Although our results focus on assets, the results are not sensitive to the use of sales.

conclusion is reinforced by the argument in Titman and Wessels (1988) that more profitable firms tend to use earnings to pay down debt and would, therefore, have lower leverage than less profitable firms. In addition, Asquith and Mullins (1986) and Masulis and Korwar (1986) find that firms tend to issue equity subsequent to good stock performance, thereby causing profitable firms to be less levered. We use operating income to sales and operating income to assets as measures of a firm's profitability.

D. Growth

If firms with high growth opportunities have high information asymmetry, then we would expect these firms to have less debt. In addition, as suggested by Titman and Wessels (1988), if growth opportunities are viewed as capital assets that do not generate current taxable income, one would expect a negative relation between growth opportunities and leverage. Finally, as suggested by Galai and Masulis (1976), Jensen and Meckling (1976), and Myers (1977), if stockholders have the incentive to expropriate wealth from bondholders by investing in a suboptimal fashion and the cost associated with this agency problem is higher for firms with high growth opportunities, then, again, one would expect leverage to be negatively related to growth opportunities. We use the ratio of research and development to sales as a measure of a firm's growth opportunities. We also use dividends per share as a measure of growth opportunities since firms that pay dividends are less likely to be high growth firms. Following Titman and Wessels (1988), we do not use market to book to proxy for growth since it can be highly correlated with leverage when the latter variable is defined as the ratio of the book value of debt to the sum of the book value of debt and the market value of equity.

E. Collateral Value of Assets

Myers and Majluf (1984) argue that if a firm's managers have better information about a security than outside shareholders, then there may be costs associated with issuing such securities. Since issuing debt that is secured by assets whose values are known would avoid these costs, firms with more collateralizable assets would tend to issue more debt. The agency arguments in the previous section, that suggest a negative relation between growth opportunities and leverage, would also imply a positive relation between collateralization and leverage. Firms with higher collateralizable assets should be able to take on more debt than other firms since there is less information asymmetry involved in these assets. We use the ratio of property, plant, and equipment to assets and the ratio of intangible assets to total assets as measures of the collateral value of assets.

F. Non-Debt Tax Shields from Operations

DeAngelo and Masulis (1980) suggest that tax deductions for depreciation and tax-loss carryforwards are substitutes for debt, and thus firms with large non-debt tax shields should have less debt. We use the ratio of depreciation to assets and net operating loss (NOL) carryforwards to assets as measures of non-debt tax shields from operations.[7]

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G. Uniqueness

Titman (1984) presents a model that implies that firms with unique or specialized products suffer higher costs in the event of liquidation, and thus will have less debt.

[7] Note that research and development, which we use as a proxy for growth opportunities, can also be considered a non-debt tax shield.

Since uniqueness can vary across industries, we use two-digit SIC codes to control for industry effects.[8]

III. Data

We begin with the 2,226 firms that exist on the 2000 Standard and Poor's ExecuComp database. For a random sample of 779 (approximately one-third) of these companies, we examine the annual reports for the most recent year that ExecuComp data is available. Since ExecuComp stops covering companies once they are no longer part of the S&P 1500 (comprised of the S&P500, MidCap 400 and SmallCap 600) but keeps their historical data, our sample ultimately includes 380 firms with data ending in 1999, 140 ending in 1998, 35 ending in 1997, 35 in 1996, 7 in 1995 and 2 in 1994. For these firms, we collect data on the tax benefits of exercised options, the number of options granted, the Black-Scholes value of options granted, the number of options outstanding, and the number of options exercised for this year as well as the previous two years.

As discussed in Hanlon and Shevlin (2002), collection of data on the tax benefits of stock options is potentially problematic. Some companies do not list the actual tax benefits, while others combine the benefits with other items, such as proceeds from option exercise, making the actual benefit difficult to uncover. Determining the amount of the benefit is further complicated by the fact that historically there was no uniformly accepted reporting method. While the Emerging Issues Task Force (EITF) Issue 00-15 requires that companies classify income tax benefits due to stock options as an operating

[8] Bradley, Jarrell, and Kim (1984) document that leverage varies across industries, even after controlling for other explanatory variables.

cash flow in the cash flow statement, this became effective for financial periods ending after July 20, 2000.[9] Prior to 2000, many companies reported the benefits in different ways. For example, Microsoft saved $3.1 billion in 1999 due to employees' exercise of stock options, but reported the gain as coming from financing activities rather than from operations (McGough, 2000). We search both the cash flow statement and the statement of changes in shareholders' equity for information on the tax benefits of stock options. To the extent that firms are not reporting tax benefits, our results should be biased against finding any relation between tax benefits and capital structure. Hanlon and Shevlin (2002) also note that for firms with tax losses, realization of the tax deduction will occur in a later period.[10] This should also bias against our finding a relation between tax benefits and capital structure. As a final means of addressing the problems associated with the tax benefit variable, we also collect data on options granted, options exercised, and options outstanding. These variables do not suffer from the same problems and should proxy for the current and future tax benefits of stock options.

[9] Subsequently, we noted that a number of firms that had not reported any tax benefits in their 1999 annual reports began reporting benefits in their 2000 annual reports. In these cases, we collected data on the 1998 and 1999 tax benefits from the 2000 annual reports.

[10] Hanlon and Shevlin note that for firms with tax losses but no valuation allowance on the deferred tax assets arising from the tax loss (and also for firms that can immediately carry back the loss to obtain a refund of prior taxes), the ESO tax benefit reported in the shareholders' equity section provides a reliable estimate of the ESO tax deduction. For firms with valuation allowances, the ESO tax benefits are recognized in a period later than when they were actually deducted on the firm's tax return. In this case, the magnitude of the ESO tax deduction in any given year can be estimated from the stock option note disclosure. For a more detailed examination of firms with tax losses, see Hanlon and Shevlin (2002).

To summarize, from our initial sample of 779 firms, we exclude any firms for which (a) we are unable to obtain the annual report, (b) data on tax benefits from options is combined with some other figure such as proceeds from options exercise, or (c) Compustat data is unavailable. Our final sample consists of 599 firms, including 286 firms with no tax benefits due to option exercise and 313 firms with tax benefits. For each of these firms, we calculate three-year averages of all variables. Averaging over three years reduces measurement error due to random year-to-year fluctuations in the variables.[11] However, our results are unaffected if we examine only the most recent year of data.

IV. Results

A. Characteristics of firms with tax benefits due to option exercise

Our premise is that in recent years, the tax benefits that firms receive as a result of the exercise of stock options is significant enough to affect capital structure and explain the seemingly conservative debt policies of many firms. Table 1 examines the leverage ratios of firms that do and do not report tax benefits due to option exercise (hereafter firms with and without tax benefits), as well as other variables defined in section 2 that theories of capital structure suggest may affect a firm's debt-equity choice.[12]

[11] In the tests that follow, we do not use lagged values of the explanatory variables since we are using three-year averages.

[12] We initially also include ln(sales), operating income to sales, selling, general and administrative expenses to sales, tax-loss carryforwards to assets, and capital expenditures to assets as explanatory variables. The correlations between ln(sales) and ln(assets), operating income to sales and research and development to sales, tax-loss carryforwards to assets and research and development to assets, selling, general, and

The mean (median) amount of the tax benefit is $11.5M ($2.5M), with a standard deviation of $7.5M. As a percentage of book assets the mean (median) value of the tax benefits is 0.9 (0.3) percent. A more detailed examination of the tax benefits variable shows that 74% of firms that report tax benefits have them in each of the three years of our study. An additional 14% have them for two of the three years, and 12% report them in only one year.

We first compare the leverage ratios of firms with and without tax benefits. Panel A of Table 1 shows that firms with tax benefits have significantly lower average short- and long-term debt ratios, relative to both the book value and the market value of assets. Relative to the market value of assets, firms without tax benefits have long-term leverage ratios of 0.23, compared to 0.13 for firms with tax benefits. Of the firms with (without) tax benefits, 12.8% (5.2%) have no long-term debt in their capital structure, with the p-value for difference being 0.001. Likewise, the mean short-term leverage ratio of firms with tax benefits is 0.031, compared to 0.056 for firms without tax benefits. The median leverage ratio of firms with tax benefits is also significantly lower than that of firms without tax benefits. The averages of the ratio of interest expense to pretax income are not significantly different from each other. However, consistent with the lower leverage ratios, the median interest expense to pretax income ratio is significantly lower for firms with tax benefits than firms without tax benefits.[13]

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administrative expenses to sales and operating income to assets, and capital expenditures to assets and property, plant and equipment to assets all ranged from 0.6 to 0.9 in absolute value. Therefore, we exclude the first variable in each pair from the analysis to avoid problems with multicollinearity.

[13] This result would also suggest that firms with tax benefits are not selecting a lower level of leverage because of diminished debt capacity. Note that the mean for firms without tax benefits is calculated after

We next examine the characteristics of firms with and without tax benefits that might explain their capital structure choices. For firms with tax benefits due to option exercise, the ratio of options exercised to shares outstanding is 0.02, compared to 0.01 for firms without tax benefits.[14,15] These numbers are significantly different at the one

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the removal of one outlier. This outlier had two years of negative pretax income, resulting in a three-year average pretax income close to zero and an interest to income ratio of 2,718.

[14] Firms can issue two types of compensation options: incentive stock options (ISO) and nonqualified options plans (NQO). Both are generally granted at an exercise price equal to the stock price on the day of the grant and with an expiration of 5-10 years. From the perspective of the company, non-qualified options provide greater tax advantages since the company gets a tax deduction equal to the difference between the market price when exercised and the grant price. The employee pays ordinary income taxes on the difference between the market price at exercise and the grant price, and capital gains tax when the share is finally sold on the difference between the sale price and the price at exercise. From the perspective of the employee, incentive options are better since the employee pays capital gains tax on the difference between the grant price and the market price when the shares are finally sold. However, the firm gets no tax deduction for these options, so it is possible for a firm to have no tax benefits even if employees are exercising options. Hall and Lieberman (2000) claim that nonqualified option plans account for 95% of options grants.

[15] There are several reasons why firms with options exercised would have no tax benefits. First, it is possible that the options exercised are incentive, and not nonqualified, options. Second, it is possible that the tax losses resulted in no recognition or realization in the current period. Finally, it is possible that companies are not reporting the tax benefits. Consistent with this latter reason, we find that following EITF Issue 00-15, a number of companies that previously had not reported tax benefits began reporting tax benefits in their 2000 annual reports. It could also be argued that if these firms had negative pretax income, they could not make use of the tax benefits. Consistent with this argument, we find that the 21.7 percent of firms without tax benefits have negative pretax income versus 10.9 percent of firms with tax benefits, with the difference having a p-value of 0.0003.

percent level. Likewise, firms with tax benefits have significantly higher ratios of options granted and options outstanding, relative to shares outstanding, and the Black-Scholes value of options granted to assets is also higher.

If depreciation and NOL carryforwards are also substitutes for debt, firms with high levels of these variables should have less debt. However, high depreciation also indicates high tangible assets, and according to agency arguments firms with tangible assets can take on more debt. Likewise, if firms with NOL carryforwards need to borrow to finance operations, firms with high carryforwards may have more debt. We find no differences in the ratios of depreciation to assets or NOL carryforwards to assets between firms with and without tax benefits from options.

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As stated earlier, the relation between firm size and leverage is an empirical question. The results in Table 1 indicate that the median firm with tax benefits is significantly smaller than the median firm without tax benefits. This is consistent with the fact that high-growth firms are more likely to issue large amounts of stock options to employees than are larger, more established firms. Since these smaller firms also have lower leverage, size would appear to proxy for bankruptcy costs.

The pecking order theory of Myers (1984) and Myers and Majluf (1984) suggests that more profitable firms should have lower leverage ratios than less profitable firms since they are able to finance their investment opportunities with retained earnings. In our sample, firms with tax benefits are more profitable and have lower leverage than firms without tax benefits.

Note that some firms might not have tax benefits because their stock price did not rise sufficiently to induce options exercise. These firms could have lower cash flows and,

therefore, could need to raise money through other sources, such as debt.[16] The data provides weak support for this hypothesis. The mean (median) annual stock return is 18.3 (7.0) percent for firms with tax benefits versus 15.0 (1.0) percent for firms without tax benefits. Although the means are not significantly different from each other, the median is higher for the firms with tax benefits.

According to the arguments in section 2, firms with high growth opportunities, as proxied by high research and development over sales and low dividends per share, should have less debt. There is no significant difference in the mean ratios of research and development to sales between our two types of firms. Firms with tax benefits have significantly higher median R&D to sales, however. Both the mean and the median dividend per share are lower for firms with tax benefits.

Finally, firms with higher collateralizable assets should be able to take on more debt, ceteris paribus. Consistent with this hypothesis, we find that firms with tax benefits have lower ratios of property, plant, and equipment to assets and marginally higher ratios of intangible assets to total assets than firms without tax benefits.

Panel B of Table 1 examines the correlation matrix of the variables in Panel A. For parsimony, we have left out the tax benefit variables. These tax benefit variables are significantly negatively correlated with all of the leverage measures, with the Pearson

[16] We should also note that firms that use options are "shifting" compensation expense out of the income statement and into the footnotes. Therefore, the operating income to sales will be higher for (heavier) option users relative to non-option users. Industry studies show that, for large firms, the SFAS 123 footnote expense can vary between 6 and 12 percent of profits. This would be consistent with our observed difference in the operating performance measures.

correlation coefficients ranging between -0.15 and -0.29. They are significantly positively correlated with each other, with the Pearson correlation coefficients ranging between 0.47 and 0.75. They are not highly correlated with any of the other variables in Table 1. Among the other variables, the book and market leverage ratios are highly correlated, R&D to sales is highly positively correlated with NOL carryforwards to assets, PPE to assets is significantly positively correlated with depreciation to assets, and intangibles to assets is significantly negatively correlated with PPE to assets. The remainder of the correlations generally fall into the range of -0.1 to 0.2.

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Whereas Table 1 studies the differences in the characteristics of firms with and without tax benefits due to option exercise in a univariate setting, Table 2 attempts to control for these differences in a multivariate framework. In Table 2, we run a logistic regression with the dependent variable equal to one if the firm has tax benefits due to option exercise and zero otherwise. The results indicate that firms with tax benefits have lower long-term debt ratios, are more profitable (as measured by operating income to assets), and have higher growth opportunities (as measured by dividends per share) than firms without tax benefits. We include three different option-related variables: the ratio of options exercised to shares outstanding, the ratio of the Black-Scholes value of options granted in that year to assets, and the ratio of options outstanding to shares outstanding. Each of these variables is significant when included separately in the regressions. However, the correlation between each of these variables is in the range of 0.6 to 0.7. Consequently, inclusion of all three variables in the same regression, shown in column 4, results in multicollinearity problems that reduce the significance of each. This analysis

also suggests that the two sets of firms do not differ in size, short-term debt ratios, stock returns, and the ratio of interest to pretax income.

In sum, the results from Tables 1 and 2 show that firms with and without option-related tax benefits break down by leverage differences and by some, but not all, of the characteristics that previous studies show explain leverage choice. This suggests that leverage differences between firms with and without tax benefits are not merely the result of differences in other attributes related to capital structure.

B. Determinants of leverage

In this section, we examine the determinants of a firm's capital structure. Panels A and B of Table 3 use a Tobit model to examine the determinants of long- and short-term leverage, respectively.[17] We censor the model at 0 and 1 since debt cannot constitute less than 0% or more than 100% of a firm's capital structure.[18] The independent variables include size (the natural log of total assets), profitability (the ratio of operating income to total assets), growth opportunities (the ratio of research and development to sales), collateralization (the ratio of property, plant, and equipment to total assets and the ratio of intangible assets to total assets), non-debt tax shields from operations (the ratio of depreciation to assets), the tax benefits from option exercise (the ratio of tax benefits from option exercise to total assets, the ratio of options exercised to

[17] Although the results in Table 3 focus on market value leverage ratios, all results hold if we use book value ratios instead.

[18] One firm in our sample has a long-term market value leverage ratio less than 0 (-0.046). When long-term leverage is measured in terms of book value, we have one firm with a leverage ratio less than 0 (-0.013) and two with ratios greater than 1 (1.12 and 1.38). There are no instances of short-term leverage falling outside the range of 0 and 1.

shares outstanding and the ratio of the Black-Scholes value of options granted to total assets), and options outstanding (the ratio of options outstanding to shares outstanding). Based on the arguments presented earlier, we would expect the coefficients on the size variable, and the collateralization variables to be positive, and the coefficients on the profitability variable, the growth opportunities variable, the non-debt tax shield variables, the tax benefits from option exercise, and options outstanding to be negative. We also include industry dummies in the regressions, since in unreported results, we find that the industry make-up of the two samples differ, with the tax benefits sample more concentrated in computer and high-tech industries.

The tax benefits from option exercise should only affect leverage to the extent that they affect marginal tax rates.[19] If a firm's taxable income is high enough that it can deduct large amounts of both interest and tax benefits from exercised options without affecting its marginal tax rate, then it does not need to lower its leverage in response to stock option exercise. Consequently, we attempt to control for this relation through the use of several dummy variables and interaction terms. The first dummy variable is equal to one for firms whose average pretax income is negative over our three-year measurement period, and accounts for firms whose income is not high enough to take advantage of both debt and non-debt tax shields. We interact this dummy with our tax benefit variable, and hypothesize that firms with negative pretax income and high tax benefits should have less debt. The second dummy variable (MTR dummy) is equal to

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[19] Consistent with the fact that Graham's marginal tax rates do not take into account the tax benefits of stock options, neither the before nor the after interest marginal tax rates are significantly different between the tax benefit and no tax benefit samples.

one for firms whose difference between the marginal tax rate before interest and marginal tax rate after interest is greater than one percent (approximately our sample median). This variable also accounts for firms who cannot take full advantage of both debt and non-debt tax shields, and we hypothesize that firms with larger differences between the two marginal tax rates should have more debt.[20]

As can be seen from Panel A, our results are generally consistent with our predictions. Specifically, we find that long-term leverage increases with size, collateralization and the marginal tax rate difference and decreases with growth opportunities, non-debt tax shields, and the tax benefits from option exercise.[21] The sign of the coefficient of the tax benefit variable is negative with a p-value less than 0.01 for all three definitions considered.[22] The negative pretax income dummy itself is positively related to leverage. Although we have no hypothesis as to the predicted direction of this

[20] We also initially considered both a dummy equal to one for firms with positive NOL carryforwards, since these firms are also less likely to be able to take advantage of non-debt tax shields, and an interaction term between the marginal tax rate dummy and our tax benefits variable. The correlation between the NOL dummy and the marginal tax rate dummy is 0.59, while the correlation between the interaction term and the tax benefits variable itself is 0.56, so we do not include either in our specifications.

[21] The exception to this is the coefficient of intangible assets to total assets, where the coefficient is positive and significant, and the opposite of what is predicted by the collateralization hypothesis. One possible explanation for this result is that intangibles include goodwill and acquisition premiums. Consequently, firms that have been involved in merger activity would have both high intangibles and high debt.

[22] It must be noted that the interpretation of coefficients in a regression that contains all three tax benefit variables and options outstanding is problematic since the correlation between these variable ranges from 0.5 to 0.7. However, since not all firms report the tax benefits due to option exercise in their annual reports, we repeat the regression using the option variables rather than the tax benefit to assets variable.

relation, one possible explanation is that firms with high leverage have high interest payments, and thus are more likely to have negative pretax income. Finally, as hypothesized, the coefficient of the variable that interacts the negative pretax income dummy and the size of the tax benefits is negative and significant at the 1 percent level. This suggests that firms with negative pretax income and high tax benefits have less long-term debt.

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In Panel B of table 3, we examine the determinants of short-term leverage. Short-term leverage is positively related to size. It is negatively related to the tax benefits of option exercise, although the coefficient is significant only when the tax benefit is measured as the Black-Scholes value of options granted. Finally, consistent with the long-term leverage results, short-term leverage is positively related to the negative pretax income dummy.

C. The Impact of Changes in Tax Benefits on Leverage

In this section we analyze whether a change in the number of options exercised, and thus the tax benefit, affects firm leverage. Although our previous tables focus on market value debt ratios, in this section we report the results for book value ratios. The reason for this is that many firms experienced significant declines in market value during the last year of our sample. For these firms, market value debt ratios increase because of the decrease in the market value of equity, regardless of whether the firms' debt levels changed. Focusing on book value ratios should minimize this problem.[23]

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[23] Welch (2004) points out some of the problems with using book value leverage ratios. Nonetheless, managers are concerned about book ratios since debt-rating agencies, such as Moody's, Standard and Poor's, and A.M. Best, use book values in determining a company's credit rating and banks use book

For the purpose of this analysis, we collect data on the number of options exercised and the tax benefits from option exercise for one additional year. This process leaves us with a sample of 445 out of the original 599 firms, 246 of which report tax benefits. Summary statistics for one-year changes in the variables used previously are presented in Table 4.

One-year changes in most of the variables under consideration are not significant at the five-percent level. However, there are significant increases in size and the ratio of options outstanding to shares outstanding. Further, there is a significant decrease in the ratio of operating income to assets for the firms with tax benefits, and significant increases in depreciation to assets for the full sample and the no tax benefits sample. T-tests for the difference in means between the tax benefits and no tax benefits samples show few differences between the two samples: ln(assets) is significantly different at less than the one percent level, while R&D to sales and depreciation to assets are significantly different at the 11% level. The main variables of interest are changes in leverage and the ratio of options exercised to shares outstanding.

Table 5 contains a direct test of our hypothesis that changes in the number of options exercised should be negatively related to changes in leverage. Since we find little difference between the tax benefit and no tax benefit samples in Table 4, we only report the results for the tax benefit sample and the full sample. Specifically, this table provides the results of a regression analysis of one-year changes in long- and short-term leverage

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values in determining creditworthiness. For example, see Moody's Investors Service Global Research Report, October 2000, Measuring Up: The Key Ratios Moody's uses in its Analysis of Finance Companies or Moody's Investors Service Global Research Report, July 1998, Industrial Company Rating Methodology.

on the change in the ratio of the number of options exercised to the number of shares outstanding, the change in the ratio of number of options outstanding to shares outstanding, and changes in other control variables used in the analysis in the previous section.[24] If firms expect the reduction in tax benefits due to option exercise to be temporary, we would expect a negative relation between options exercised and short-term leverage. On the other hand, if firms expect the reduction to be permanent, we would expect a negative relation between options exercised and long-term leverage. Since the market was entering a recession in the latter years of our study, we expect that firms would view this as a temporary setback, and thus a negative relation between options exercised and short-term leverage would be more likely.

Table 5 shows that long-term debt increases over the one-year period under consideration with increases in size, PPE, and intangibles and decreases in growth opportunities (R&D to sales). Surprisingly, we find that one-year changes in long-term debt are negatively related to changes in the ratio of the number of options exercised to number of shares outstanding. This implies that decreases in the number of options exercised are associated with increases in long-term leverage. The magnitude of the coefficient indicates that a one standard deviation decrease in the number of options exercised results in a 3.5 percentage point increase in long-term leverage.

[24] In this regression, we examine changes in options exercised rather than tax benefits to assets. The reason for this is that firms with large net operating loss carryforwards may not report tax benefits from option exercise, even though the deductions created by the exercise increase loss carryforwards and extend the time until taxes will be paid. This delay of tax savings could also reduce corporate leverage, however. Consequently, we include in this regression the change in tax-loss carryforwards and examine changes in options exercised, which must be reported even if the tax benefits are not.

In contrast to the results for long-term leverage, one-year changes in short-term leverage are not significantly related to changes in the ratio of the number of options exercised to number of shares outstanding. For the full sample, changes in short-term leverage are significantly positively related (at the ten-percent level) to changes in intangibles and significantly negatively related to changes in R&D and NOL carryforwards. For the tax benefit sample, changes in short-term leverage are negatively related to profitability.

Deleted: tax-loss

Given the surprising result that changes in long-term debt and options exercised are significantly related, we examine the annual reports of the 40 companies that display the greatest increases in long-term debt in conjunction with a decrease in options exercised. For ten of these companies, the new debt matures within two years. Twenty-two companies increase long-term debt by issuing debt that matures in 3-5 years, and four issue debt that matures in 6-7 years. Only four companies take on debt that matures in 10-20 years. For many of these companies (22 out of 40), the increase in long-term debt is the result of an increase in a revolving line of credit. For example, Xerox took out a $4,400 million revolving line of credit in 2000 that matured in 2002 and classified it as long-term debt. This suggests that the significant relation between changes in long-term debt and options exercised could be attributed to the fact that companies are increasing their level of debt with a relatively short maturity, but that this debt is classified as long-term for reporting purposes since it has a maturity of more than one year.

An alternative explanation for the relation between leverage and option exercise is that the exercise of fewer options is related to poor performance by the stock.[25] This could imply that the firm's profitability was incapable of financing operations, and thus additional debt was necessary. This would result in a negative relation between the change in options exercised and the change in long-term debt. To determine whether this explanation has validity, we re-estimate the models in Table 5 with an additional independent variable – the stock return over the year. We use the one-year stock return since we are examining changes over a one-year period. Inclusion of this variable has no impact on the magnitude or significance of the coefficient on changes in the ratio of the number of options exercised to number of shares outstanding.

D. Robustness Checks

A recent paper by Baker and Wurgler (2002) finds that market timing has persistent effects on capital structure. They find that low leverage firms are firms that raised money when their market-to-book ratios were high, while high leverage firms are firms that raised money when their market-to-book ratios were low. This influence of past market valuations on capital structure persists in the long run, which leads them to conclude that capital structure is the cumulative outcome of repeated attempts to time the equity market.

To address these concerns, we examine various measures of debt and equity issues. First, we collect data on debt and equity issues from Securities Data Corporation (SDC) for all 599 firms in our initial sample. We find that 11.4% (5.2%) of our firms

[25] The correlation between the change in the ratio of number of options exercised to shares outstanding and stock return during the year is 0.4.

without tax benefits issue debt (equity) during the period of study. In contrast, 7.1% (7.7%) of the firms with tax benefits issue debt (equity). When we include dummies for whether a firm issues debt or equity in our regressions, however, the variables are not significant and do not change the sign or significance of our other variables.

Since Baker and Wurgler (2002) find that market to book affects leverage through net equity issues, we also examine the sale of common and preferred stock (Compustat item 108) and the purchase of common and preferred stock (Compustat item 115). Firms with tax benefits purchase an average 1.6% of the market value of their equity (median of 0.5%) during the three-year period that we study. Firms with no tax benefits purchase 2.1% of the market value of their equity (median of 0.8%) during this same time. The means (medians) are significantly different from each other at the ten (one) percent level. Firms with tax benefits sell an average 2.1% of the market value of their equity (median of 1.0%), while firms with no tax benefits sell 1.9% of the market value of their equity (median of 0.4%). These means are not significantly different from each other, but the medians are significantly different at the one-percent level. We also include these variables in the regressions in Table 3. The purchase variable is positive and marginally significant in some specifications. It does not change the significance of the tax benefit variables, however.[26]

We also examine the effect of changes in the purchase of common and preferred stock on changes in leverage. The mean (median) change in repurchases relative to the

[26] The sale of common and preferred stock also has a positive, but insignificant, sign. The problem with this variable, however, is that it includes the proceeds from the exercise of options. Consequently, by including this variable and our options and tax benefits variables, we are effectively double-counting the effect of options exercise. Thus we do not include this variable in our main specifications.

market value of equity is 0.4% (0.0%). When we include this variable in the regressions in Table 5, it is not significant and does not affect the sign and significance of the option variable.

Our sample contains 68 firms in the finance and insurance industry. Since determining debt ratios for financial firms can be problematic, we rerun all of our tests after deleting these firms. Our results are quantitatively unaffected.

Previously, we argued that our findings provide a potential explanation for the puzzling phenomenon of "under-leveraged" firms. In order to provide more evidence on this hypothesis, we also analyze the data in a method similar to Hovakimian, Opler, and Titman (2001). In particular, we regress the market (and book) leverage ratio on variables similar to those in Table 3, but exclude variables related to tax benefits. From this regression, we obtain a predicted leverage ratio for each firm. We then calculate the "leverage deficit" as the actual leverage ratio minus the predicted ratio, and regress this leverage deficit variable on the tax benefit variables. We find that the mean (median) leverage deficit is -0.012 (-0.028) for firms with tax benefits and 0.032 (0.005) for firms without tax benefits (p-value for difference = 0.001). We also find that there is a negative and significant coefficient on the tax benefit variable, indicating that firms with higher tax benefits are more underleveraged. This relation holds regardless of the variable we use to measure tax benefits.[27]

V. The Choice between Debt and Equity

[27] We thank the referee for this suggestion.

The previous section examines both leverage ratios, which are the cumulative result of years of separate decisions by firms, and changes in leverage ratios. In this section, we study incremental financing decisions during our sample period. Studying incremental decisions focuses on the actual decisions made by firms, given their current situation. This analysis is similar in spirit to Mackie-Mason (1990).

A. Issuing Debt versus Equity

Table 6 uses discrete choice analysis to examine the financing decision of firms. Specifically, the table contains the coefficients of a multivariate logit model with independent variables that include proxies for size, profitability, growth, collateralization, non-debt tax shields, tax benefits from employee stock options, options outstanding, a negative pretax income dummy, an interaction variable between the negative pretax income dummy and the tax benefits from option exercise, and the MTR dummy. For this analysis, we condition on the firm raising debt or equity from the public, and thus analyze only those of our initial 599 firms that issued either debt or equity during our sample period. The dependent variable takes the value of one if the firm issued equity and zero if the firm issued debt.[28] As in Mackie-Mason (1990), this econometric analysis relies on a weak revealed preference restriction to measure the determinants of financing choice.

The relation between capital structure and the tax benefits of option exercise are further reinforced by the results in regression 1. Conditional of firms choosing to issue either debt or equity, firms with larger tax benefits from option exercise tend to issue equity. Debt issuers tend to be larger, with more tangible assets and lower stock returns.

[28] Firms that issue both debt and equity are assigned a value of one. The results do not change if we delete these firms, however.

Regressions 2 and 3 repeat the analysis using alternate measures of tax benefits. The results are similar.

B. The Amount of Debt or Equity Issued

Thus far, we show that even after controlling for other factors that affect capital structure, firms with tax benefits have lower leverage. In addition, if raising external funds, these firms are more likely to issue equity. Since capital structure can change not only when a firm issues debt or equity, but also when it repurchases or retires these securities, we next examine whether tax benefits affect net debt and equity issues. Table 7 presents the results of regressions of the net amount of debt and equity issued on independent variables that include proxies for size, profitability, growth, collateralization, non-debt tax shields, tax benefits from employee stock options, options outstanding, a negative pretax income dummy, an interaction variable between the negative pretax income dummy and the tax benefits from option exercise, and the MTR dummy. Net debt (equity) issued is defined as the dollar value of debt (equity) issued minus the dollar value of debt (equity) repurchased.

Regressions 1 and 2 show that the net amount of debt issued is positively related to firm size, intangibles and the negative pretax income dummy, and is negatively related to R&D to sales, stock returns, and the marginal tax rate dummy The result that larger firms issue more debt is consistent with the arguments presented previously. The positive coefficient on the negative pretax income dummy is consistent with the result reported in Table 3 that firms with a pretax income dummy equal to 1 have higher leverage. The net amount of debt issued is not significantly related to the tax benefit variables themselves,

but consistent with the results in Table 3, is negatively related to the interaction between tax benefits and the pretax income dummy.

At first glance, the negative coefficient on the MTR dummy appears to be inconsistent with the results in Table 3, in which long-term leverage is positively related to the MTR dummy. However, it is conceivable that highly levered firms have high leverage because they had an opportunity to benefit from a leverage increase in the past, but cannot issue any new debt because of the high leverage. To test this, we rerun the regressions separately for high and low leverage firms (as measured by the sample median). We find that the coefficient is negative and significant only for the highly levered firms, consistent with the above conjecture. The positive coefficient on intangibles is also not consistent with the collateralization argument, but is consistent with the results in Table 3. As stated earlier, one possible explanation for this result is that intangibles include goodwill and acquisition premiums. Consequently, firms that have been involved in merger activity could have both high intangibles and high debt.

The results in regressions 3 and 4 of the table indicate that the net amount of equity issued decreases with size, profitability, and the ratio of research and development to sales and increases with depreciation. The results on size and profitability are consistent with the fact that large, profitable firms are able to finance investments with retained earnings. The results also indicate that firms with larger tax benefits from option exercise issue more equity. This, again, is consistent with the notion that tax benefits from option exercise act as a non-debt tax shield.

The negative relation between research and development and net equity issued is surprising. Kahle (2002), however, finds a positive relation between employee stock

options and repurchases. If firms with high growth opportunities are using more stock-based compensation and repurchasing more shares in order to avoid dilution, this could explain the negative relation between net equity issues and research and development to sales. To test this, we regress net issues, defined as equity issued minus debt issued, on the same explanatory variables. The coefficient on research and development is no longer significant, while those on both the tax benefit dummy and the ratio of tax benefits to assets are positive and significant. This supports the notion that repurchases are driving the negative relation between net equity issued and research and development.

VI. Summary and Conclusions

The purpose of this paper was to investigate the relation between the tax benefits associated with the exercise of stock options and the capital structure of a firm. We hypothesize that, ceteris paribus, firms with larger tax benefits from option exercise will have a lower leverage since the tax benefit is a non-debt tax shield.

Our results can be summarized as follows:

1. Firms with tax benefits from option exercise are less levered, more profitable, and have more growth opportunities than those without tax benefits.
2. Long-term leverage is negatively related to variables associated with the tax benefits realized from option exercise.
3. Decreases in the number of options exercised are associated with increases in leverage. This new debt tends to be debt with relatively short maturity, but is classified as long-term debt since its maturity is greater than one year.
4. Firms that choose to issue equity rather than debt have larger tax benefits from options exercise.

5. The amount of equity issued by firms is an increasing function of the size of the tax benefits from option exercise.

Overall, these results are consistent with the notion that firms view the tax benefits from option exercise as a substitute for the tax benefit from debt, and that these tax benefits can explain why some firms appear to be underleveraged.

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TABLE 1

Panel A contains univariate comparisons of the characteristics of *313* firms with tax benefits associated with the exercise of stock options and *286* firms with no tax benefits associated with the exercise of stock options over the period starting January 1995 and ending December 1999. All variables are based on three-year averages of Compustat data Variables whose labels are not self explanatory are defined as follows: Assets = book value of assets; Long-term book leverage = long-term debt / assets; Long-term market leverage = long-term debt / (long-term debt + debt in current liabilities + market value of equity); Short-term book leverage = debt in current liabilities / assets and Short-term market leverage = debt in current liabilities / (long-term debt + debt in current liabilities + market value of equity. Figures in parenthesis are medians and p-values associated with a median test.

Panel A

Variable	Firms with tax benefits	Firms without tax benefits	p-value from t-test for difference in means (median test)
Long-term book leverage	0.163 (0.122)	0.245 (0.238)	0.000 (0.000)
Long-term market leverage	0.126 (0.072)	0.235 (0.203)	0.000 (0.000)
Short-term book leverage	0.031 (0.010)	0.047 (0.028)	0.001 (0.000)
Short-term market leverage	0.031 (0.006)	0.056 (0.025)	0.000 (0.000)
Interest to income	0.163 (0.086)	0.146 (0.160)	0.862 (0.007)
Option tax benefits to assets	0.009 (0.003)	0.000 (0.000)	0.000 (0.000)
Options exercised to shares outstanding	0.020 (0.014)	0.009 (0.006)	0.000 (0.000)
Options outstanding to shares outstanding	0.133 (0.101)	0.077 (0.058)	0.000 (0.000)
BS value of options granted to assets	0.046 (0.016)	0.016 (0.004)	0.000 (0.000)
Options granted to shares outstanding	0.048 (0.031)	0.025 (0.017)	0.000 (0.000)
Depreciation to assets	0.041 (0.038)	0.043 (0.037)	0.410 (0.324)
NOL carryforwards to assets	0.024 (0.000)	0.058 (0.000)	0.177 (0.504)
Assets (in millions)	4103.240 (677.070)	5518.330 (1674.980)	0.153 (0.000)
Operating Income to assets	0.149 (0.144)	0.093 (0.119)	0.001 (0.000)
Stock return	0.183 (0.070)	0.150 (0.010)	0.726 (0.000)
R&D to sales	0.052 (0.005)	0.061 (0.000)	0.696 (0.000)
Dividends per share	0.205 (0.000)	0.473 (0.281)	0.000 (0.000)
PPE to assets	0.432 (0.349)	0.664 (0.626)	0.000 (0.000)
Intangibles to assets	0.120 (0.054)	0.095 (0.043)	0.055 (0.296)

TABLE 1, continued

Panel B examines correlation matrix of the variables in panel A. The first number is the Pearson correlation coefficient. The second is the p-value for significance.

Panel B

Variable	Long-term book leverage	Long-term mkt leverage	Short-term book leverage	Short-term mkt leverage	Interest to income	Depreciation to assets	Tax-loss cf to assets	Assets (in millions)	Operating Income to assets	Stock return	RD to sales	Dividends per share	PPE to assets	Inta to
Long-term book leverage	1.00													
Long-term mkt leverage	0.772 0.000	1.00												
Short-term book leverage	0.015 0.712	0.084 0.040	1.00											
Short-term mkt leverage	-0.062 0.132	0.143 0.001	0.816 0.000	1.00										
Interest to income	0.124 0.004	0.132 0.002	-0.012 0.782	-0.009 0.831	1.00									
Depreciation to assets	0.199 0.000	0.029 0.476	-0.087 0.033	-0.243 0.000	-0.030 0.491	1.00								
NOL carryforwards to assets	0.026 0.519	-0.062 0.132	-0.021 0.605	-0.039 0.341	-0.016 0.707	0.052 0.207	1.00							
Assets (in millions)	-0.026 0.520	0.091 0.026	0.292 0.000	0.390 0.000	0.125 0.004	-0.170 0.000	-0.043 0.290	1.00						
Operating Income to assets	0.051 0.212	-0.049 0.233	-0.061 0.137	-0.124 0.002	0.005 0.909	0.096 0.019	-0.276 0.000	-0.046 0.265	1.00					
Stock return	-0.052 0.205	-0.058 0.158	-0.074 0.072	-0.066 0.109	-0.006 0.887	0.016 0.691	-0.006 0.884	-0.039 0.342	-0.091 0.027	1.00				
R&D to sales	0.003 0.933	-0.167 0.000	-0.093 0.024	-0.094 0.022	-0.035 0.414	-0.013 0.761	0.658 0.000	-0.068 0.095	-0.274 0.000	0.038 0.361	1.00			
Dividends per share	-0.010 0.798	0.127 0.002	0.271 0.000	0.296 0.000	0.049 0.257	-0.109 0.008	-0.070 0.086	0.413 0.000	0.013 0.747	-0.079 0.056	-0.107 0.009	1.00		
PPE to assets	0.369 0.000	0.375 0.000	0.066 0.118	0.050 0.239	0.069 0.113	0.555 0.000	0.014 0.789	0.052 0.217	0.100 0.019	-0.048 0.262	-0.121 0.004	0.285 0.000	1.00	
Intangibles to assets	0.206 0.000	0.039 0.370	-0.074 0.090	-0.148 0.001	0.039 0.395	-0.032 0.470	-0.051 0.245	-0.050 0.255	0.084 0.055	-0.025 0.570	-0.081 0.063	-0.116 0.008	-0.334 0.000	

TABLE 2

Estimates of coefficients from a multivariable logit model with the dependent variable set equal to 1 for firms with tax benefits associated with the exercise of stock options and 0 for firms with no tax benefits associated with the exercise of stock options over the period starting January 1995 and ending December 1999. The sample consists of *313* firms with tax benefits and *286* firms with no tax benefits. The independent variables are based on three-year averages. Variables whose labels are not self explanatory are defined as follows: Assets = book value of assets; Long-term market leverage = long-term debt / (long-term debt + debt in current liabilities + market value of equity) and Short-term market leverage = debt in current liabilities / (long-term debt + debt in current liabilities + market value of equity. Stock return is the annual stock return. p-values from a Wald test are in parentheses.

Variable	(1)	(2)	(3)	(4)
Intercept	-1.158 (0.127)	-1.528 (0.093)	-1.320 (0.062)	-1.518 (0.049)
Ln(Assets)	0.079 (0.391)	0.147 (0.114)	0.126 (0.163)	0.094 (0.326)
Long-term market leverage	-2.439 (0.002)	-2.396 (0.003)	-3.043 (0.000)	-2.272 (0.007)
Short-term market leverage	-1.159 (0.536)	-1.106 (0.548)	-1.745 (0.344)	-1.219 (0.522)
Interest to income	0.151 (0.101)	0.146 (0.119)	0.133 (0.147)	0.163 (0.082)
Dividend per share	-1.093 (0.001)	-1.174 (0.000)	-1.065 (0.001)	-0.987 (0.002)
Options exercised to shares outstanding	45.872 (0.000)			31.143 (0.015)
Black-Scholes value of options granted to assets		11.042 (0.004)		6.066 (0.131)
Options outstanding to shares outstanding			6.821 (0.000)	2.036 (0.346)
Operating Income to assets	2.741 (0.013)	4.091 (0.001)	3.083 (0.004)	3.775 (0.002)
Stock return	-0.122 (0.354)	-0.085 (0.400)	-0.088 (0.414)	-0.117 (0.407)
Industry dummies	Yes	Yes	Yes	Yes
Likelihood Ratio	184.32	170.56	178.72	187.74
R^2	0.398	0.381	0.384	0.413

TABLE 3

Estimates of coefficients from a multivariable Tobit model (censored at 0 and 1) with the dependent variable being short-term and long-term leverage ratios. The sample consists of *313* firms with tax benefits associated with the exercise of stock options over the period starting January 1995 and ending December 1999 and 286 firms with no tax benefits. The dependent variables are long-term and short-term debt, relative to the market value of assets. The negative pretax income dummy is equal to one if the firm's average pretax income is less than zero. Dummy*tax benefits is the interaction of the pretax income dummy with option tax benefits to assets. The MTR dummy is equal to one for firms whose difference between their before and after interest expense marginal tax rate is greater than one percent. Figures in parenthesis are p-values from a Wald Chi-squared test.

Panel A: Long-term Market Leverage

Intercept	-0.056 (0.208)	-0.044 (0.318)	-0.039 (0.389)	-0.028 (0.532)
Ln(Assets)	0.024 (0.000)	0.024 (0.000)	0.023 (0.000)	0.024 (0.000)
Option tax benefits to assets	-1.232 (0.027)			
Options exercised/shares		-1.217 (0.002)		-0.969 (0.029)
Black-Scholes value of options granted to assets			-0.260 (0.006)	-0.160 (0.132)
Options outstanding/shares	0.016 (0.826)			
Operating Income to assets	-0.030 (0.384)	-0.032 (0.354)	-0.070 (0.054)	-0.050 (0.179)
R&D to sales	-0.068 (0.041)	-0.062 (0.063)	-0.049 (0.155)	-0.050 (0.148)
PPE to assets	0.141 (0.000)	0.133 (0.000)	0.139 (0.000)	0.128 (0.954)
Intangibles to assets	0.201 (0.000)	0.206 (0.000)	0.216 (0.000)	0.211 (0.000)
Depreciation to assets	-0.998 (0.000)	-0.950 (0.001)	-1.014 (0.000)	-0.980 (0.000)
Negative pretax income dummy	0.108 (0.000)	0.107 (0.000)	0.109 (0.000)	0.106 (0.000)
Dummy*tax benefits	-16.542 (0.009)	-14.933 (0.000)	-17.297 (0.006)	-15.552 (0.014)
MTR dummy	0.058 (0.000)	0.059 (0.000)	0.057 (0.000)	0.058 (0.000)
Industry dummies	Yes	Yes	Yes	Yes
Log likelihood	234.00	236.19	222.83	225.22

TABLE 3, continued

Estimates of coefficients from a multivariable Tobit model (censored at 0 and 1) with the dependent variable being short-term and long-term leverage ratios. The sample consists of *313* firms with tax benefits associated with the exercise of stock options over the period starting January 1995 and ending December 1999 and 286 firms with no tax benefits. The dependent variables are long-term and short-term debt, relative to the market value of assets. The negative pretax income dummy is equal to one if the firm's average pretax income is less than zero. Dummy*tax benefits is the interaction of the pretax income dummy with option tax benefits to assets. The MTR dummy is equal to one for firms whose difference between their before and after interest expense marginal tax rate is greater than one percent. Figures in parenthesis are p-values from a Wald Chi-squared test.

Panel B: Short-term Market leverage

Intercept	-0.044 (0.026)	-0.042 (0.030)	-0.047 (0.020)	-0.046 (0.025)
Ln(Assets)	0.010 (0.000)	0.010 (0.000)	0.011 (0.000)	0.011 (0.000)
Option tax benefits to assets	-0.369 (0.132)			
Options exercised/shares		-0.254 (0.131)		-0.104 (0.595)
Black-Scholes value of options granted to assets			-0.084 (0.043)	-0.073 (0.119)
Options outstanding/shares	0.004 (0.888)			
Operating Income to assets	-0.007 (0.622)	-0.009 (0.558)	-0.022 (0.169)	-0.020 (0.232)
R&D to sales	-0.024 (0.106)	-0.023 (0.118)	-0.016 (0.299)	-0.016 (0.294)
PPE to assets	0.004 (0.724)	0.004 (0.103)	0.005 (0.716)	0.003 (0.792)
Intangibles to assets	-0.024 (0.290)	-0.022 (0.333)	-0.028 (0.230)	-0.028 (0.218)
Depreciation to assets	-0.078 (0.530)	-0.070 (0.576)	-0.067 (0.593)	-0.064 (0.611)
Negative pretax income dummy	0.043 (0.000)	0.043 (0.000)	0.038 (0.000)	0.038 (0.000)
Dummy*tax benefits	-2.734 (0.316)	-2.479 (0.365)	-2.173 (0.065)	-1.984 (0.474)
MTR dummy	-0.001 (0.859)	-0.001 (0.881)	-0.002 (0.767)	-0.002 (0.785)
Industry dummies	Yes	Yes	Yes	Yes
Log likelihood	542.47	542.35	511.74	511.88

TABLE 4

Summary statistics of the characteristics of *445* firms (246 firms with tax benefits and 199 firms without tax benefits) with available data on changes in the number of employee stock options exercised. The sample consists of all firms from our original sample for which we were able to collect one additional year of data on options and tax benefits from the proxy statement. All variables are based on one-year changes in Compustat data. Variables whose labels are not self explanatory are defined as follows: Assets = book value of assets; Long-term book leverage = long-term debt / assets and Short-term book leverage = debt in current liabilities / assets. The t-value (in parentheses) is for the test of the hypothesis that the average change is not significantly different from 0.

	Tax Benefits (N=246)		No Tax benefits (N=199)		Full Sample (N=445)	
	Mean	Median			Mean	Median
Long-term book leverage	-0.0000 (-0.00)	-0.0007	-0.0082 (-1.14)	0	-0.0037 (-0.74)	-0.0007
Short-term book leverage	0.0021 (0.51)	0	0.0082 (0.85)	-0.0010	0.0049 (1.00)	0
Ln(assets)	0.1836 (9.45)	0.1220	0.0777 (3.75)	0.0423	0.1362 (9.47)	0.0720
Options exercised to shares outstanding	0.0004 (0.33)	-0.0016	-0.0010 (-1.25)	-0.0009	-0.0002 (0.30)	-0.0011
Options outstanding to shares outstanding	0.0167 (4.98)	0.0164	0.0131 (4.83)	0.0132	0.0151 (6.84)	0.0147
PPE to assets	-0.0037 (-0.68)	0.0046	-0.0128 (-1.42)	0.0019	-0.0076 (-1.54)	0.0024
R&D to sales	0.0026 (0.70)	0	-0.0483 (-1.56)	0	-0.0200 (-1.44)	0
Operating Income to assets	-0.0074 (-1.82)	-0.0009	-0.0008 (-0.05)	-0.0026	-0.0045 (-0.62)	-0.0016
Intangibles to assets	0.0101 (1.45)	0	0.0067 (1.62)	0	0.0084 (2.07)	0
Depreciation to assets	0.0015 (1.53)	0.0005	0.0054 (2.41)	0.0006	0.0032 (2.84)	0.0006
NOL carryforwards to assets	0.0071 (1.05)	0	0.0105 (0.76)	0	0.0087 (1.20)	0

TABLE 5

Regressions of changes in long-term and short-term leverage on changes in the number of employee stock options exercised over. The sample consists of all 445 firms (246 firms with tax benefits and 199 firms without tax benefits) from our original sample for which we were able to collect one additional year of data on options and tax benefits from the proxy statement. All variables are based on one-year changes in Compustat data. Variables whose labels are not self explanatory are defined as follows: Assets = book value of assets; Long-term book leverage = long-term debt / assets and Short-term book leverage = debt in current liabilities / assets. The figures in parenthesis are p-values.

	Long-term book leverage		**Short-term book leverage**	
	tax benefit only	all	tax benefit only	all
Intercept	-0.054	-0.024	0.018	0.015
	(0.007)	(0.028)	(0.193)	(0.034)
Options exercised to shares outstanding	-1.400	-0.904	0.009	0.214
	(0.009)	(0.033)	(0.981)	(0.434)
Ln(Assets)	0.152	0.074	-0.024	0.003
	(0.000)	(0.001)	(0.385)	(0.842)
PPE to assets	0.323	0.144	0.040	0.022
	(0.030)	(0.029)	(0.700)	(0.599)
R&D to sales	-0.740	-0.017	-0.055	-0.073
	(0.000)	(0.706)	(0.687)	(0.012)
Operating Income to assets	-0.191	-0.047	-0.177	-0.033
	(0.204)	(0.283)	(0.098)	(0.240)
Intangibles to assets	0.282	0.185	0.071	0.091
	(0.027)	(0.024)	(0.428)	(0.086)
Depreciation to assets	0.377	0.040	-0.715	-0.147
	(0.650)	(0.922)	(0.225)	(0.580)
NOL carryforwards to assets	-0.208	-0.063	-0.008	-0.143
	(0.110)	(0.464)	(0.928)	(0.011)
Industry dummies	yes	yes	yes	yes
Adjusted R^2	0.164	0.079	-0.072	0.003

TABLE 6

Estimates of coefficients from a multivariable logit model. The sample is restricted to those firms from the initial sample of *313* firms with tax benefits and *286* firms with no tax benefits that issued either equity or debt over the three-year period. The dependent variable takes on the value of 1 for equity issues and zero for debt issues. All independent variables are three-year averages. The negative pretax income dummy is equal to one if the firm's average pretax income is less than zero. Dummy*tax benefits is the interaction of the pretax income dummy with option tax benefits to assets. The MTR dummy is equal to one for firms whose difference between their before and after interest expense marginal tax rate is greater than one percent. Stock return is the annual stock return. The figures in parenthesis are p-values.

	(1)	**(2)**	**(3)**
Intercept	5.739 (0.001)	3.830 (0.027)	5.740 (0.000)
Ln(Assets)	-0.628 (0.000)	-0.418 (0.019)	-0.600 (0.000)
Option tax benefits to assets	118.70 (0.051)		
Options outstanding to shares outstanding	1.393 (0.679)		
Black-Scholes value of options granted to assets		67.52 (0.015)	
Options exercised to shares outstanding			43.396 (0.057)
Operating income to assets	-6.626 (0.162)	-6.314 (0.192)	-3.568 (0.386)
Negative pretax income dummy	0.293 (0.730)	0.082 (0.935)	0.296 (0.730)
Dummy*tax benefits	3167.5 (0.437)	3111.6 (0.435)	3296.9 (0.419)
MTR dummy	-0.122 (0.797)	-0.176 (0.722)	-0.056 (0.904)
R&D to sales	-4.105 (0.454)	-11.591 (0.129)	-3.447 (0.548)
PPE to assets	-1.724 (0.049)	-1.392 (0.108)	-1.687 (0.050)
Intangibles to assets	0.391 (0.783)	0.397 (0.784)	0.244 (0.863)
Depreciation to assets	2.950 (0.802)	-0.092 (0.994)	1.294 (0.910)
Stock Return	2.063 (0.014)	2.219 (0.010)	2.171 (0.010)
Likelihood ratio	88.79	90.61	87.41
R^2	0.535	0.558	0.529

TABLE 7

Regressions of the net amount of debt and equity issued on the tax benefits associated with employee stock options. The sample consists of *313* firms with tax benefits associated with the exercise of stock options over the period starting January 1995 and ending December 1999 and *286* firms with no tax benefits. All independent variables are three-year averages. The negative pretax income dummy is equal to one if the firm's average pretax income is less than zero. Dummy*tax benefits is the interaction of the pretax income dummy with option tax benefits to assets. The MTR dummy is equal to one for firms whose difference between their before and after interest expense marginal tax rate is greater than one percent. Stock return is the annual stock return. The figures in parenthesis are p-values.

	Net amount of debt issued		**Net amount of equity issued**[a]	
Intercept	-0.015 (0.354)	-0.014 (0.363)	0.039 (0.000)	0.037 (0.000)
Ln(Assets)	0.006 (0.003)	0.006 (0.004)	-0.003 (0.002)	-0.003 (0.002)
Option tax benefits to assets	0.110 (0.691)		0.339 (0.020)	
Options outstanding to shares outstanding	-0.004 (0.910)		-0.018 (0.325)	
Black-Scholes value of options granted to assets		-0.000 (0.996)		0.031 (0.083)
Operating income to assets	-0.038 (0.181)	-0.035 (0.203)	-0.126 (0.000)	-0.118 (0.000)
Negative pretax income dummy	0.044 (0.000)	0.044 (0.000)	-0.004 (0.359)	-0.004 (0.348)
Dummy*tax benefits	-7.088 (0.002)	-7.035 (0.002)	1.476 (0.207)	1.636 (0.163)
MTR dummy	-0.010 (0.087)	-0.010 (0.094)	-0.002 (0.559)	-0.001 (0.678)
R&D to sales	-0.025 (0.056)	-0.025 (0.076)	-0.032 (0.000)	-0.034 (0.000)
PPE to assets	0.007 (0.419)	0.007 (0.439)	-0.002 (0.602)	-0.002 (0.632)
Intangibles to assets	0.043 (0.066)	0.040 (0.074)	0.004 (0.729)	0.003 (0.978)
Depreciation to assets	-0.094 (0.346)	-0.095 (0.339)	0.168 (0.001)	0.158 (0.002)
Stock Return	-0.010 (0.000)	-0.010 (0.000)	-0.001 (0.109)	-0.002 (0.128)
Adjusted R^2	0.197	0.199	0.280	0.277

[a]All coefficients need to be multiplied by 10^{-2}.