# CEO Ownership, Leasing, and Debt Financing

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In this empirical study, we examine the effect of CEO stock ownership on leasing. Although financial contracting theory suggests that ownership structure is potentially an important determinant of debt financing and leasing, its effect on leasing has not been previously explored. We also control for explanatory factors that have been found important in other leasing studies. We find that CEO ownership is positively related to companies' leasing and debt financing activity, consistent with contracting theory. This suggests that CEOs with large ownership stakes engage in more leasing to reduce their exposure to obsolescence and other asset-specific risks.

■Formerly, the finance literature on corporate leasing tended to place primary emphasis on tax considerations and the extent to which lease financing displaced other forms of borrowing (e.g., Franks and Hodges, 1978; Miller and Upton, 1976; and Myers, Dill, and Bautista, 1976). In recent years, however, there has been an increasing tendency to view leasing in the broader context of financial contracting (e.g., Barclay and Smith, 1995; Sharpe and Nguyen, 1995; and Smith and Wakeman, 1985). While not denying the potential importance of taxes and the substitutability between leasing and debt, this newer literature has placed greater emphasis on the relative abilities of different types of financial contracts to control agency costs.

Financial contracting theory suggests that such company characteristics as business risk and the nature of the investment opportunity set should affect contracting costs and thus the choice to lease rather than buy assets. Empirical studies have provided some support for these predictions (Barclay and Smith, 1995; Sharpe and Nguyen, 1995; and Graham, Lemmon, and Schallheim, 1998). The theoretical literature has also suggested that a corporation's ownership structure, which in turn affects managerial and investor incentives, should influence the decision to lease assets (Flath, 1980; and Smith and Wakeman, 1985). For example, a manager with a large ownership stake may prefer leasing to reduce personal exposure to obsolescence or other asset-specific risks. However, ownership structure has not yet been included as an explanatory variable in empirical studies of corporate leasing behavior.

In this study we examine ownership structure, as measured by the fraction of common shares owned by the company's chief executive officer (CEO), as a possible determinant of corporate leasing. We also include variables that reflect business risk, investment opportunities, and tax considerations, and we explore further the interaction between leasing and other debt financing. We find that CEO ownership is positively related to companies' leasing activity, regardless of whether we include only capitalized leases or both

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capitalized and operating leases in our dependent variable. Our results also provide mixed evidence on the relationship between debt and leasing. Tobit estimates suggest a complementary relationship between debt and capitalized leases. However, we do not find evidence of a significant interaction between debt and operating leases.

In Section I, we review some elements of financial contracting theory to generate hypotheses about the determinants of leasing and debt financing. In Section II we review the principal findings from previous empirical studies of leasing. We present our own empirical specification in Section III and discuss data and measurement of variables in Section IV. In Section V, we present our empirical results, and we offer conclusions in Section VI.

## I. Financial Contracting

A well-designed financial contract can enhance corporate value in at least three ways. First, contracts can transfer different forms of risk to those parties who are able to bear them most cheaply. Second, contracts affect the incentives of the contracting parties. They can afford positive incentives for agents to take value-maximizing actions, as in the case of executive stock options, or they can be used to mitigate perverse incentives, as in the case of restrictive debt covenants. Third, it may be possible through financial contracts to transfer tax liabilities from heavily taxed to more lightly taxed parties.

Firms may choose from a wide range of financial contracts in their efforts to balance risk-sharing, incentive, and tax considerations most efficiently. These include common and preferred stock, debt with different maturities and indenture provisions, and operating and financial leases. The financial contracting literature has identified four company characteristics that influence the choice among these contractual forms in financing a new asset: the company's ownership structure, the nature of its investment opportunities, its business risk, and its tax-paying status.

### A. Ownership Structure

Ownership structure includes such features as the proportion of company stock owned by top management and the presence or absence of large blockholders. These features can influence managerial incentives and the effectiveness of shareholder monitoring of management, as described in the agency theory of Jensen and Meckling (1976). Fixed claims in general expose management to greater personal risk, but they help reduce agency costs by forcing the payout of free cash. Managers in firms with dispersed ownership may choose to reduce personal risk by relying less heavily on debt financing. However, managers with significant ownership stakes may use more debt financing, because, as shareholders, they reap its agency cost-reducing benefits. In addition, Kim and Sorensen (1986) point out that debt financing can allow managers with high ownership shares to maintain their control over the firm.

Flath (1980) and Smith and Wakeman (1985) have analyzed the role of ownership structure in the decision to lease assets. Flath argues that leasing is more likely in closely held firms. Both debt and leasing expose the owners of such firms to the financial risk of fixed obligations, but they can differ in their allocation of asset value risk. When an asset is leased for a period shorter than its useful life, the lessor absorbs most of the risk of obsolescence or other changes in asset value. However, a lessor company with both a diversified asset portfolio and widely dispersed ownership may be able to bear such risks more cheaply. Thus, leasing can be mutually beneficial. Smith and Wakeman point out that the potential benefits are enhanced if the lessor has any comparative advantage in disposing of assets in the second-hand market. This literature predicts that higher levels of managerial ownership should be associated with higher levels of both ordinary debt and lease financing.

### B. The Investment-Opportunity Set

A company's investment-opportunity set, as characterized by the nature of its current and future assets, influences investors' willingness to lend against those assets and the severity of conflicts of interest between stockholders and fixed-claim holders. The financial contracting literature suggests that the importance of growth opportunities relative to assets in place and the firm-specificity of assets will influence both debt financing and leasing.

For example, Myers (1977) has argued that firms with a higher proportion of growth opportunities should use a smaller proportion of fixed-claim financing to limit the underinvestment problem. At the same time, Stulz and Johnson (1985) have shown that high-priority claims, such as leasing, can help mitigate the underinvestment problem relative to other forms of debt. This is because the issuance of senior claims against new projects limits the transfer of wealth from stockholders to existing bondholders. Working from the Stulz and Johnson model, Barclay and Smith (1995) have argued that, for a given amount of fixed-claim financing, firms with a greater proportion of growth opportunities can be expected to rely more heavily on lease financing than on more junior forms of debt.

Smith and Wakeman (1985) suggest that firms are

unlikely to lease assets highly specific to the organization, because the resulting bilateral monopoly problem would create conflicts and agency costs between lessor and lessee. They predict, for example, that corporations are more likely to lease generic office facilities than firm-specific production or research facilities. Williamson (1988) argues similarly that more easily redeployable assets (e.g., aircraft or trucks) are better suited both for leasing and for use as collateral in debt contracts.

To summarize, the financial contracting literature predicts that high proportions of growth opportunities and firm-specific assets are conducive to neither leasing nor debt financing. However, for a given level of fixed-claim financing, greater growth opportunities should be associated with more leasing.

### C. Business Risk

Business risk is a third major determinant of financial contract choice. The riskier a firm's business, the greater the potential for conflicts of interest between shareholders and fixed-claim holders and the greater the likelihood of incurring financial distress costs. The financial contracting literature predicts that greater business risk will tend to reduce the use of fixed claims in general, although this argument does not carry special weight for leasing relative to other types of fixed claims. A determinant of business risk that may have special influence on leasing, however, is firm size. As Grinblatt and Titman (1998) argue, smaller firms may have greater flexibility to engage in asset substitution and also greater top management ownership shares, on average. This may in turn promote more leasing, as creditors seek more secure positions and as top management seeks to limit personal risk.

### D. Tax-Paying Status

Whether or not a firm is in a tax-paying position determines the possibilities for shifting tax burdens among parties to a contract. Since both interest and lease payments are tax deductible, and since there are potential costs from bankruptcy, one would expect firms to be more willing to incur the risk of bankruptcy when they have taxable income to shield (DeAngelo and Masulis, 1980). However, leasing is different from other fixed claims in that it is a substitute for asset ownership. Since ownership entails tax benefits, primarily in the form of depreciation tax shields, leasing rather than purchasing an asset can be a means to transfer the tax benefits of ownership to an investor who will derive greater value from them than the company using the asset. To summarize, the financial contracting literature predicts that companies with little or no tax liabilities will be less likely to use debt financing, but more likely to lease assets than companies in a fully taxable position.

## II. Previous Empirical Findings on Corporate Leasing

Before presenting our own model and results, we briefly review the principal findings from previous empirical studies of corporate leasing. In line with earlier theoretical research, many of these studies have focused on the degree of substitutability between debt and leasing and on tax considerations. More recent empirical studies have begun to include variables that reflect financial contracting costs.

### A. Substitutability Between Debt and Leasing

One of the more controversial issues in previous empirical work has been the question of whether debt and leasing are substitutes or complements. It was originally presumed that, since both debt and lease contracts commit the firm to a set of fixed payments, they should be substitutes. However, several studies have challenged that presumption. Bowman (1980), Ang and Peterson (1984), and Finucane (1988), for example, all found that leasing and debt financing tend to be positively related. By contrast, Marston and Harris (1988), Krishnan and Moyer (1994), Bayless and Diltz (1986), and Mukherjee (1991) found at least some evidence of a substitution relationship.

The evidence of a positive relationship between debt and leasing may be explicable in at least two ways. First, Lewis and Schallheim (1992) have established the theoretical possibility that the two forms of financing are complementary. For example, if lessees transfer non-debt tax deductions to diversified lessors, interest tax deductions may then become more valuable to the lessees at the margin, inducing them to increase debt, rather than reduce it. Alternatively, there may be firm characteristics that are conducive to both debt and leasing. Empirical studies that do not control for these characteristics could then give the appearance of a positive relationship. In view of the contrary evidence of a substitution relationship, however, it is safe to say that the interaction between debt and leasing is not yet well understood at the empirical level.

### B. Tax Considerations

Empirical identification of tax effects on leasing has proven elusive. Both Barclay and Smith (1995) and Sharpe and Nguyen (1995) found positive correlations between leasing and a dummy variable indicating the

presence of operating loss carryforwards. This is consistent with greater use of leasing by more lightly taxed firms. However, the effect is not entirely consistent across years and across different measures of corporations' tax-paying status. Most recently, Graham, Lemmon, and Schallheim (1998) have argued that previous studies have all used tax variables that already reflect the effects of firms' financing choices and that this may lead to spurious correlations with leasing activity. Using a specially constructed measure of the "before-financing" marginal tax rate faced by each firm, they found that this tax rate bore a positive relationship to the use of debt and a negative relationship to leasing, consistent with tax-based theories.

### C. Financial Contracting Costs

As described above, many of the more recent empirical studies have focused attention on financial contracting cost variables. Some of these have included measures of the collateral value or the firm-specificity of corporations' assets. Finucane (1988), for example, found evidence that leasing is positively associated with firms' use of mortgage debt. This could indicate that firms with assets that make good collateral are also likely to have assets conducive to leasing. In a similar vein, Graham, Lemmon, and Schallheim (1998) found a positive relationship between leasing and the proportion of assets represented by property, plant, and equipment. Sharpe and Nguyen (1995) argued that firms with more capital-intensive production processes are likely to use more firm-specific equipment and hence are less likely to lease assets, and they found evidence consistent with this hypothesis.

Recent studies have also examined the effect of growth opportunities on leasing, using the market-to-book ratio as a proxy for the relative importance of growth opportunities. However, Barclay and Smith (1995) found that market-to-book is negatively related to debt usage and positively related to leasing, as they predicted, while Graham, Lemmon, and Schallheim (1998) found that market-to-book is negatively related to both debt usage and leasing.

Firm size may serve as a proxy for the cost of issuing other types of securities, or for the firm's investment flexibility and the diversification of its asset base. Using different measures of firm size, Barclay and Smith (1995), Sharpe and Nguyen (1995), and Graham, Lemmon, and Schallheim (1998) have all found a negative relationship between firm size and leasing. Sharpe and Nguyen also used other measures of the cost of external funds and found that firms with lower bond ratings and less availability of internal funds were more likely to lease.

A substantial body of evidence has by now accumulated, therefore, to support the importance of financial contracting costs in the decision to lease assets or issue other forms of debt. To date, however, the effect of the structure of share ownership on leasing has not been examined.

## III. Model Specification

Our aim is to specify a model for empirical testing that incorporates the potential impact of ownership structure on leasing in addition to other variables that have exhibited explanatory power in past studies. A secondary goal is to construct a model that can shed further light on the interaction between leasing and other forms of debt.

The latter goal faces one primary difficulty. Our review of the literature in Section I suggests that variables reflecting ownership structure, the nature of the investment-opportunity set, business risk, and tax-paying status should appear in equations explaining both leasing and other forms of debt. However, theory does not suggest a natural, simultaneous equation specification that allows identification of both a leasing and a debt equation. It seems especially difficult to point to variables that should have explanatory power for leasing but that should not appear in the debt equation.

One alternative is to simply include the same set of explanatory variables in both a leasing and a debt equation. Barclay and Smith (1995) and Graham, Lemmon, and Schallheim (1998) have followed this reduced-form approach, but it does not allow for direct estimation of any interaction between debt and leasing.

A second alternative, which we have chosen, is a recursive specification. It seems plausible that a firm determines its overall capacity to issue fixed claims, based on contracting cost and tax considerations, and that only then does it consider how to allocate that fixed-claim capacity between leasing and other forms of debt. In a recursive specification, then, the use of debt depends on a set of control variables, while the use of leasing depends on the use of debt plus a set of additional control variables:

$$\text{Debt Intensity} = f(\text{Control Variables}) \quad (1)$$

$$\text{Lease Intensity} = g(\text{Debt Intensity, Control Variables}) \quad (2)$$

The next step is to specify the control variables in each equation. We base the control variables in our debt equation on Myers' (1984) pecking-order theory, which stipulates that firms finance their investment needs through internal funds first, then debt, and finally by new stock issues, once debt capacity has

been exhausted. Following Baskin (1989), we use variables reflecting the firm's profitability and dividend policy to capture its ability to finance its needs internally. Among determinants of debt capacity, as enumerated in Grinblatt and Titman (1998), we include measures of tax-paying status, the split between growth opportunities and assets-in-place, business risk, and ownership structure.

We find it less compelling, based on existing theory, to suppose that profitability and dividend policy should exert any direct influence on leasing, so we have omitted them from the list of control variables in our specification of Equation (2). Based on the discussion in Section I, on the other hand, we have included variables reflecting ownership structure, the investment-opportunity set, business risk, and tax-paying status in our leasing equation.

## IV. Data and Variable Measurement

Our sample consists of 176 manufacturing firms, listed on the Compustat Industrial Annual File, with SIC codes in the range 2000-3999, for the years 1986-1991. This gives us a total of 1056 firm-year observations. We constructed our sample by merging the manufacturing firm portions of the samples used by Anderson (1997) and Yermack (1995).

We wanted our measure of debt intensity, the dependent variable in Equation (1), to approximate a market value debt ratio. Accordingly, we measured this variable as the book value of short-term plus long-term debt, divided by the sum of the book values of short and long-term debt and the market value of equity.

Leasing intensity, the dependent variable in Equation (2), posed some measurement difficulties. One measure that we used, available from balance sheet data, is the ratio of net capitalized lease obligations to total assets. However, as Sharpe and Nguyen (1995) and Graham, Lemmon, and Schallheim (1998) have pointed out, a considerable portion of leasing activity takes the form of operating leases, which do not appear on the balance sheet. Operating leases are particularly important for capturing ownership structure effects, since the use of leasing to avoid personal exposure to obsolescence risk is far more plausible when the term of the lease contract is considerably less than the asset's useful life. Capitalized leases, by contrast, typically cover substantially all of an asset's useful life.[1] Inclusion of operating leases is also potentially important in capturing tax effects. As Graham, Lemmon, and Schallheim point out, operating leases are more likely than capitalized leases to qualify as "true leases" under Internal Revenue Service guidelines. Since only true leases allow transfer of non-debt tax shields, consideration of only capitalized leases may cause us to miss the true effect of tax status on leasing.[2]

Accordingly, we used the share of lease payments in total capital costs, as estimated by Sharpe and Nguyen (1995), as an alternative dependent variable in Equation (2). This variable measures rental commitments in a given year relative to the total cost of capital services in that year. The total cost of capital services consists of rental commitments, depreciation expense, and the opportunity cost of capital, proxied by multiplying the AAA bond rate by net property, plant, and equipment. The ratio is also adjusted to reflect the firm's mix of operating and capitalized leases, as described in detail in Sharpe and Nguyen. Since this measure is a ratio of two annual flows, it could also be interpreted as roughly equivalent to a ratio of present values and hence to a market value measure of leasing intensity.

Turning to our independent variables, we measure ownership structure as the fraction of common shares owned by the firm's CEO. We concentrate on CEO ownership, rather than a broader measure of managerial ownership, in view of Flath's (1980) and Smith and Wakeman's (1985) emphasis on the ability of leasing to reduce risk for a single owner-manager. We also include the square of this variable in our regressions to allow for nonlinearities.

The two pecking-order variables that appear in the debt equation are taken from Baskin (1989). The first is a return-on-assets ratio, measured as a four-year average of the ratios of EBIT to assets. The second reflects the firm's payout policy and is measured by the average ratio of dividends paid to book equity for the two years prior to the observation year.

We used two variables to measure business risk. The first is the standard deviation, measured over the years 1984-1991, of annual return on investment. Return on investment is in turn measured as the ratio of each year's operating income plus interest expense to the preceding year's total assets. We included this measure of business risk in our debt equation but not our leasing equation. The rationale is that this variable is more closely related to the firm's ability to issue fixed claims generally than to the allocation of these claims between leasing and ordinary debt. The variable still affects leasing indirectly through the effect of debt

[1] A further difficulty with using capitalized leases is that many firms do not use them. In our sample, only 68 of the 176 firms reported capitalized lease obligations during the sample period. This censoring of the dependent variable at zero causes potential problems for regression analysis, an issue that we address further in Section V.

[2] See Graham, Lemmon, and Schallheim (1998) for an informative summary of the differences between capitalized and operating leases from an accounting standpoint and the difference between true and nontrue leases from a tax standpoint.

on leasing. The second business risk variable is firm size, as measured by the natural logarithm of total sales. Higher values of this variable may be associated with a more diversified pool of assets, so we included it in our debt equation. We also included size in our leasing equation in view of Grinblatt and Titman's (1998) argument that smaller firms may lease more to bond themselves against asset-substitution incentives.

We used the firm's market-to-book ratio to characterize its investment-opportunity set. This variable has been employed in numerous studies as a proxy for the relative importance of growth opportunities and assets-in-place. As suggested by theory, we used this variable in both our debt and leasing equations.

Our measure of tax-paying status is the "before-financing" marginal tax rate, as used by Graham, Lemmon, and Schallheim (1998).[3] This variable is an estimate of the marginal corporate tax rate faced by a firm in the absence of any tax effects from current or past financing decisions. The estimate is based on a simulation, assuming that the firm's taxable income follows a random walk, so it includes the effects of any net operating loss carryforwards. We included this before-financing marginal tax rate variable in both our debt and leasing equations.

## V. Empirical Results

In this section, we examine our sample's characteristics. We then present estimates of a simple model of the relationship between leasing intensity, ownership structure, and firm size, followed by estimates of our complete specification.

### A. Sample Characteristics

Summary statistics for selected sample variables are reported in Table 1. Substantial differences in firm size, financial policy, profitability, and valuation are represented among the sample firms. Although not shown in Table 1, it is also of interest to note that more than half our sample firms have no capitalized leases. In contrast, all of the sample firms have at least some amount of operating leases. The importance of operating leases is reflected in its 21.7% mean share of total capital costs, while the mean share of capitalized leases in total assets is only 0.6%.

It may seem surprising that the minimum market-to-book ratio represented in our sample is negative. This is attributable to three firms in our sample that report negative book net worth.

### B. Leasing and Ownership Structure: A Simple Model

Since our primary focus in this paper is to investigate the relationship between leasing and ownership structure, we first ran a very simple regression of each of our two leasing intensity variables against CEO ownership and its square as well as size and its square. We estimate the equation using ordinary-least-squares (OLS) regression for both leasing-intensity variables, but since many of the firms have no capitalized leases, we also estimated the Tobit regression for the capitalized-lease variable to alleviate the truncated dependent variable problem. The results are shown in Table 2.

We included size in these regressions because of the strong correlation (-0.69) between CEO ownership and size in our sample. In all three regressions, CEO ownership has a positive effect on leasing, whether measured by capitalized leases or the share of lease payments in total capital costs, and this effect is highly statistically significant. Since CEO ownership holds its own, despite the presence of size, this gives us some confidence that CEO ownership is exerting an independent effect on leasing intensity.

In addition, the estimated coefficients of the squared term in all three equations are negative. This suggests that the tendency of higher CEO ownership to induce more leasing diminishes at the margin as the CEO ownership share grows. One might have expected that the marginal effect of ownership on the propensity to lease would grow stronger, as CEOs with higher ownership levels are more personally exposed to asset-specific risk and might have a greater tendency to try to reduce this exposure through leasing. Instead, the data indicate a diminishing marginal effect.

The negative second derivative also raises a question about the economic significance of the impact of CEO ownership on leasing intensity. If the marginal effect were to turn negative within our sample range for CEO ownership, this might cast some doubt on the overall importance of the effect, as well as on its interpretation. However, we can use the coefficient estimates to calculate the critical CEO ownership levels at which the marginal effect is equal to zero. This results in ownership levels of 65%, 65%, and 90%, respectively, for the three regressions in Table 2. Since all three levels exceed our sample maximum of 58% for CEO ownership, we conclude that the marginal ownership effect on leasing is positive everywhere in our sample.

[3] See Graham, Lemmon, and Schallheim (1998) and Graham (1996) for details of the simulation procedure used to create this variable. Data for this variable may be obtained from the *Journal of Finance* website (http://www.cob.ohio.edu/~fin/journal/jof.htm).

## Table 1. Sample Characteristics

Summary statistics of variables used in the regression equations. The sample consists of 176 firms with SIC codes between 2000-3999, in the period 1986-1991.

| Variables | Mean | Median | Minimum | Maximum |
|---|---|---|---|---|
| Capitalized Lease Obligations/Total Assets | 0.006 | 0.000 | 0.000 | 0.172 |
| Leasing Share of Total Capital Cost [a] | 0.217 | 0.195 | 0.032 | 0.691 |
| Operating Lease Share of Total Capital Cost [a] | 0.190 | 0.176 | 0.027 | 0.680 |
| Fraction of Shares Held by CEO [b] | 0.045 | 0.002 | 0.000 | 0.579 |
| EBIT/Total Assets | 0.118 | 0.121 | -0.290 | 0.607 |
| Dividends/Stockholders' Equity | 0.052 | 0.042 | 0.000 | 2.187 |
| Total Assets ($ Millions) | 3,164 | 1,405 | 10.00 | 92,473 |
| Sales ($ Millions) | 3,407 | 1,630 | 7.00 | 69,018 |
| Market Value/Book Value | 2.220 | 1.784 | -17.210 | 67.968 |
| Short-Term + Long-Term Debt/ (S.T. + L.T. Debt + Market Value of Equity) | 0.360 | 0.340 | 0.013 | 0.932 |
| Before-Financing Marginal Tax Rate[c] | 0.353 | 0.340 | 0.000 | 0.460 |
| Standard Deviation of EBIT to Assets Between 1984-1991 | 0.050 | 0.011 | 0.001 | 0.927 |

[a]From Sharpe and Nguyen (1995).
[b]Includes stock options exercisable within 60 days.
[c]From Graham, Lemmon, and Schallheim (1998).

## Table 2. Simple Model Estimates

This table presents the ordinary-least-squares (OLS) and Tobit estimates of models of how intensively a firm relies on leasing to finance its acquisition of capital assets. The sample consists of 176 firms with SIC codes between 2000-3999, during the period 1986-1991. (p-values are in parentheses).

| | Dependent Variables | | |
|---|---|---|---|
| Independent Variables | Capitalized Lease Obligations/Total Assets (OLS) | Capitalized Lease Obligations/Total Assets (Tobit) | Leasing Share of Total Capital Cost (OLS) |
| Intercept | 0.021<br>(0.0001)*** | 0.022<br>(0.1534) | 0.429<br>(0.0001)*** |
| Fraction of Shares Held by CEO[a] | 0.055<br>(0.0002)*** | 0.082<br>(0.0049)*** | 0.064<br>(0.0001)*** |
| Fraction of Shares Held by CEO Squared | -0.084<br>(0.0082)*** | -0.126<br>(0.0444)** | -0.071<br>(0.0051)*** |
| Log(Sales) | -0.004<br>(0.0302)** | -0.009<br>(0.0235)** | -0.046<br>(0.0086)*** |
| Log(Sales) Squared | 0.0003<br>(0.0319)** | 0.001<br>(0.0125)** | 0.001<br>(0.0931)* |
| Adjusted $R^2$ (%) | 4.01 | | 6.72 |
| F-Statistics | 12.026 | | 20.025 |

[a]Includes stock options exercisable within 60 days.

***Significant at the 0.01 level.
**Significant at the 0.05 level.
*Significant at the 0.10 level.

### C. Recursive System Estimates

Estimates of the recursive system specified in Section III are shown in Table 3. We estimated the debt equation using ordinary least squares and then followed a two-step procedure, in which fitted values from the debt equation were used for the debt variable in the leasing equation. In so doing, we attempted to avoid the possibility that some omitted variable, which influences both debt and leasing, could induce correlation between the error term and an independent variable in the leasing equation, resulting in inconsistent estimates for that equation. We also corrected the standard errors of the coefficient estimates in each equation for heteroskedasticity, as in White (1980). Because of the truncated-dependent-variable problem, we estimated a Tobit regression for the capitalized-lease variable, but we used OLS for the leasing-share-of-total-capital-cost variable.

Of primary interest to this study, the estimated coefficients of the CEO ownership variable are positive, and all three are statistically significant at the 0.05 level or better. The estimates indicate that, consistent with financial contracting theory, higher levels of CEO ownership are conducive to both greater use of debt financing and more leasing of assets. The result for debt financing is consistent with the findings of Kim and Sorensen (1986) and Mehran (1992), but the result for leasing is new. The coefficients of CEO ownership squared are all negative, although this coefficient is insignificantly different from zero in the debt equation.[4]

The remaining coefficient estimates in Table 3 offer some support for the pecking order and financial contracting cost theories. In the debt equation, companies with higher levels of operating earnings use less debt, but those that pay higher dividends use more debt. Consistent with Myers (1984), then, the availability of internal funds appears to be a major determinant of companies' debt levels.

The coefficients of the business risk variables offer mixed results. The coefficient of the standard deviation of EBIT in the debt equation is highly significant, but its positive sign is the opposite of what theory would predict. However, the coefficient of the firm-size (sales) variable is consistent with financial contracting theory in the debt equation, indicating that, as business risk decreases, firms use more debt.[5] In the leasing equations, on the other hand, firm size has an insignificant effect on capitalized leases and a strong positive effect on leasing's share of total capital costs. The latter result suggests that, holding other factors constant, larger firms are more likely to use operating leases.

The coefficients of the investment-opportunity-set variables also offer mixed results. The market-to-book ratio has a significantly negative coefficient in the debt equation, consistent with Myers' (1977) prediction that companies with relatively greater growth opportunities will find borrowing unattractive. However, capitalized leasing is also negatively related to the market-to-book ratio. This is inconsistent with Barclay and Smith's (1995) argument that leasing can mitigate the underinvestment problem that arises in the face of growth opportunities. By contrast, the market-to-book ratio is positively but insignificantly related to leasing's share of total capital costs.

The coefficients of the before-financing marginal tax rate are somewhat disappointing. The coefficient of the tax variable is significant in the debt equation, but it is negative, contrary to theory and opposite to what Graham, Lemmon, and Schallheim (1998) found. This difference in results may be attributable in part to Graham, Lemmon, and Schallheim's larger sample, which includes non-manufacturing as well as manufacturing firms. They also used different variable definitions in a number of instances. In the leasing equations, the tax-variable coefficient is positive, consistent with Graham, Lemmon, and Schallheim, but it is statistically significant only in the capitalized-lease equation. Since operating leases are more likely than capitalized leases to qualify for favorable tax treatment, we would expect the tax effect to be more significant in the leasing-share-of-total-capital-costs equation.

The coefficient of the fitted values of the debt ratio is significantly positive in the capitalized-lease equation. This could indicate that some factor that influences both debt and leasing in the same direction has yet to be included in the equations. Alternatively, one might conclude that debt and leasing are in fact complementary, based on the tax factors analyzed by Lewis and Schallheim (1992). This latter interpretation seems less plausible, however. Tax effects are more likely to appear for operating leases, and in the equation in which leasing intensity includes operating leases, the coefficient of the fitted debt ratio is

[4]If we calculate the critical levels of CEO ownership at which the marginal effect of ownership on leasing intensity goes to zero, the level is 98% for the leasing-share-of-total-capital-cost variable but only 6% for the capitalized lease variable. This does cast some doubt on the effect of CEO ownership on capitalized leases. As we argued in Section IV, however, the risk-reduction effects of leasing are likely to be greatest for operating leases, and consistent with that argument, the marginal effect of ownership on leasing's share of total capital costs is positive throughout virtually the entire possible range of CEO ownership levels.

[5]Firm size could also be a proxy for the extent of a firm's cumulative investment opportunities. The pecking-order theory predicts that the greater these are, for a given capacity to generate funds internally, the greater will be the firm's outstanding debt.

**Table 3. Recursive Model Estimates**

This table depicts the results of ordinary-least-square (OLS) and Tobit estimates of models of how intensively a firm relies on non-leasing liabilities and leasing to finance its acquisition of capital assets. Predicted values from nonlease liabilities are used in the leasing equations. The sample consists of 176 firms with SIC codes between 2000-3999, during the period 1986-1991. (p-values are in parentheses).

| | Dependent Variables | | |
|---|---|---|---|
| Independent Variables | S.T. + L.T. Debt/(S.T. + L.T. Debt + Market Value of Equity) (OLS) | Capitalized Lease Obligations/Total Assets (Tobit) | Leasing Share of Total Capital Cost (OLS) |
| Intercept | 0.519<br>(0.1105) | -0.020<br>(0.0368)** | 0.305<br>(0.0001)*** |
| Fraction of Shares Held by CEO[a] | 2.122<br>(0.0441)** | 0.031<br>(0.0001)*** | 0.265<br>(0.0317)** |
| Fraction of Shares Held by CEO Squared | -1.661<br>(0.5430) | -0.544<br>(0.0001)*** | -0.271<br>(0.0552)* |
| EBIT/Total Assets | -3.991<br>(0.0001)*** | | |
| Dividends/Stockholders' Equity | 1.232<br>(0.0134)** | | |
| Standard Deviation of EBIT to Assets Between 1984-1991 | 2.591<br>(0.0001)*** | | |
| Predicted Values of S.T. + L.T. Debt/(S.T. + L.T. Debt + Market Value of Equity) | | 0.009<br>(0.0001)*** | 0.001<br>(0.8699) |
| Log (Sales) | 0.140<br>(0.0001)*** | -0.0002<br>(0.1659) | 0.013<br>(0.0001)*** |
| Market Value/Book Value | -0.079<br>(0.0001)*** | -0.002<br>(0.7889) | 0.003<br>(0.0001)*** |
| Before-Financing Marginal Tax Rate | -1.066<br>(0.0508)* | 0.028<br>(0.0430)** | 0.011<br>(0.8294) |
| Year Indicator Variables | Yes | Yes | Yes |
| Adjusted $R^2$ | 19.18 | 8.18 | |
| F-Statistics | 18.905 | 6.817 | |

[a]Includes stock options exercisable within 60 days.

***Significant at the 0.01 level.
**Significant at the 0.05 level.
*Significant at the 0.10 level.

insignificantly different from zero.

Finally, we incorporated dummy variables for the different years in our sample to allow for intertemporal shifts. The estimated coefficients for these dummy variables are significant as a group at the 0.05 level for both the capitalized lease and debt equations. However, the dummies are not significant by conventional standards when we measure leasing by its share of total capital costs.

## VI. Conclusions

In this paper, we have adopted the financial contracting cost perspective that has been common in recent empirical studies of corporate leasing. Our primary addition to the analysis in previous studies has been to include a variable measuring top management share ownership in equations that are intended to explain both corporate leasing and debt financing. Ownership structure has been identified in the theoretical literature as a potential determinant of corporate financing behavior, but to date, it has not been included as an explanatory variable in empirical studies of leasing.

Our estimates indicate that CEO ownership has a significant positive effect on both debt financing and leasing. When CEOs have larger ownership stakes, their interests are more closely aligned with shareholders, and they have a greater incentive to use debt financing when it is value-enhancing to do so. Using debt rather than equity financing also helps CEOs maintain their control over the firm. Greater debt financing, however, increases the personal risk borne by the CEO. Thus, CEOs with large ownership stakes use more leasing to reduce their exposure to obsolescence and other asset-specific risks.

We also find that firm size exerts a strong positive effect on debt financing, as financial contracting theory predicts. On the other hand, firm size is also positively related to leasing's share of total capital costs. This is contrary to Grinblatt and Titman's (1998) argument that smaller firms may rely more heavily on leasing as a way to reduce the asset-substitution problem. Our evidence in support of investment-opportunity set and tax effects on leasing is also somewhat weak. Other studies that have found stronger evidence of these effects have used larger samples, so it may be that our sample size is insufficient to identify these effects clearly. Finally, we find evidence of a positive interaction between debt and leasing only for capitalized leases, but when the lease variable includes operating leases, we find no significant interaction. ■

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