5-2011

# Price Appreciation, Bargaining Power, and the Determinants of Corporate Leasing Policy

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May, 2011

**ABSTRACT**

This study uses price appreciation and bargaining power measures to determine whether current accounting standards are effective at classifying leases by ownership risk. I use a regression model, and find that there is a positive and significant relationship between changes in capital leases and my proxies for price appreciation and the interaction between price appreciation and bargaining power. I also find, however, that it's possible that operating leases may be increasing faster, which would discount the theory that these standards are operating properly. These results should be cause for further study on the subject and should be interesting to regulators.

## 1. Introduction

Since it was first issued by the Financial Accounting Standards Board (FASB), Statement of Financial Accounting Standards 13 (SFAS 13) has caused controversy about how leases should be accounted for. This topic is especially timely as the FASB is currently exploring convergence options with the International Accounting Standards Board (IASB). The major point of controversy is whether or not managers use the "bright line" rules set forth by the FASB in SFAS 13 to structure lease contracts in their favor. Operating leases give managers several perceived benefits—they aren't featured on the balance sheet as an asset or a liability, but are rather reported in the footnotes to the financial statements. Capital leases, on the other hand, are shown on the balance sheet as both and asset and a liability, which can negatively affect the debt and liquidity ratios of the firm.

The distinction between capital and operating leases can be narrow, but the "bright line" rules set forth by SFAS 13 are geared towards ensuring that anything that substantially transfers ownership risk is classified as a capital lease. The main problem is that these "bright line" rules are fairly easy to game. For instance, if a firm wants to lease an asset, they may set the term for a length equal to 74% of the leased asset's useful life; this would give them a lower lease payment while still not having to capitalize the lease (75% or greater is the threshold set by the FASB).

The aim of this study is to find some support for whether these rules are defensible or not. As the distinction between operating and capital leases is theoretically the risk of ownership, this study seeks to determine whether this is what those rules do in practice. In order to do this, I determine a measure of the changes in ownership risk, which is linked to the price appreciation and depreciation trends of a leased asset. I choose the Producer Price Index (PPI) as the only real method available of estimating business-to-business asset sales.

Aside from classifying leases based on the economic substance of the lease agreement, prior literature has documented several other incentives and firm characteristics that may affect their

decision. The marginal tax rate of respective firms may allow for the transfer of "tax shields" between lessees and lessors (Graham et al., 1998). Further, the way managers are evaluated has the possibility of influencing this decision, especially if they are evaluated based on a type of return on invested capital metric (Smith et al., 1984). Given this knowledge, it isn't out of the question that a firm may decide whether or not to capitalize a lease based on upward and downward trends in a firm's market price.

This is one small part of the pricing question, though, as the PPI is a measure of average price appreciation or depreciation. In order to get a better idea of the determinants of corporate leasing policy, I further investigate the effects of bargaining power, with the logic that bargaining power will explain most deviations from the PPI measures of price. Based on prior literature, I use the Herfindahl-Hirschman Index (HHI) as a measure of bargaining power that stems from industry firms' respective market shares (Kale et al., 2007; Inderst et al., 2007). The measure I choose, The Herfindahl-Hirschman Index, is calculated as the sum of the squares of industry firms' individual market shares. This measure of industry concentration is common in the extant literature should be a reasonable approximation of true bargaining power.

I test these relationships using a *changes*-based model of capital structure analysis. Graham (1999) suggests that, due to a similarity of determinants and resulting obligations, leases can be treated like debt for capital structure analysis purposes. I elect to use a *changes*-based rather than a *levels*-based model for this study based on several pieces of prior literature that use a similar approach (Dhaliwal et al., 2007; Graham, 1999; MacKie-Mason, 1990) in an effort to capture incremental changes in the firms' capital structure. Since capital structure levels are the result of many discrete choices to raise or lower debt (or lease) levels, levels-based tests could confound results and inferences. For my main regression model, I regress the changes in capital leases against my proxy for price appreciation and my interaction between price appreciation and bargaining power, as well as a set of control variables based on the related prior literature.

I find that there is a significant and positive relationship between price appreciation and changes in capital leases, suggesting that there is an increased willingness to take on ownership risk by managers when prices are appreciating. This is in line with the theory behind SFAS 13, where the more ownership risk assumed should lead to more capital leases. This relationship, however, is no longer significant when I test for the relationship between capital leases and the interaction between price appreciation and bargaining power. Instead, I now find a positive and significant between changes in capital leases and this interaction, suggesting that the association between leased asset appreciation and capital leases is concentrated in lessees with the most bargaining power. So, the increased willingness to take on ownership risk seems to be accurately reflected with an increase in capital leases.

My study contributes to literature by examining some previously unstudied determinants of leasing behavior. This contributes to both capital structure and leasing literature by providing evidence of another determinant of those respective decisions. I also present a unique perspective here by considering the role of bargaining power, which is important in leasing contracts but previously unstudied. It suggests that, despite allegations of gaming the system on the part of financial managers, there is at least some truth in the theory that capital leases are structured to represent leased assets that are closer to a sale, and that should then be recorded as both an asset and liability. This information may be of use to regulators, who are considering doing away with this distinction and making all leases capital obligations, even though it does seem there is a distinction in risk between the two.

## 2. Literature Review and Hypothesis Development

*Institutional Background*

In 1976, the Financial Accounting Standards Board (FASB) issued Statement of Financial Accounting Standards (SFAS) 13, which remains to this day the primary source of lease accounting rules. Under SFAS 13, firms are able to classify leases in two ways: operating leases and capital leases. Despite

the similarity of the underlying economic principles, these two types of leases are treated very differently for financial reporting purposes. A fundamental concept driving lease classification under SFAS 13 is ownership risk. Capital leases, which theoretically transfer ownership risk similar to purchasing, are recorded by a firm as a distinct asset and liability. Operating leases, which do not transfer the same amount of ownership risk, are kept off the balance sheet and expensed on the income statement[1]. SFAS 13 sets up so-called "bright line" rules that guide the classification of these leases for financial statement purposes.[2]

These "bright line" rules are structured in a manner that seeks to determine whether the lease transfers substantial ownership risk or not.[3] For instance, if the present value of the lease payments exceeds 90% of the fair market value of the asset, it clearly transfers ownership risk and must be classified as a capital lease. Further, if the lease term exceeds 75% of the economic life of the asset, it also transfers significant ownership. The concept of residual value is another important point here. SFAS 13 provides some very broad guidelines on residual value. In practice, residual value is the value left in the asset at the end of the lease term. It may be guaranteed or unguaranteed by the lessee or a third-party insurer. If the terms of a lease contract require the lessee to guarantee the residual value, said lessee will be interested in the prospects for the asset's value in future years. With an operating lease the future value of the leased asset is unlikely to be a concern to the lessee. All else equal, if a firm sees an asset in decline, it may be less likely to enter into a capital lease.

[1] When acquired, an operating lease is not booked, but is expensed on this income statement as rent and interest expense as incurred. A capital lease is booked as an asset and liability, which is then depreciated over the life of the lease. This depreciation is an additional expense to interest expense, and both come off the income statement. The actual lease payments serve to reduce the liability, and depreciation to reduce the asset.

[2] Practitioners, academics and regulators have suggested that firms select their desired financial statement classification ex-ante and structure lease contracts accordingly, rather than letting the economics of the lease contract guide the financial statement classification. While this gaming of lease accounting rules is interesting, it is not central to my hypotheses, nor do I believe detecting this behavior is necessary in order to support my hypotheses.

[3] Paragraph 60 of the pronouncement states that "The provisions of this Statement derive from the view that a lease that transfers substantially all of the benefits and risks incident to the ownership of property should be accounted for as the acquisition of an asset and the incurrence of an obligation by the lessee and as a sale or financing by the lessor. All other leases should be accounted for as operating leases."

*Lease Literature*

Although the financial reporting guidance under SFAS 13 is meant to reflect the economics of the lease transaction, firms have several other incentives to classify a lease in a specific way. For example, Smith, Jr. & Wakeman (1984) discuss several possible determinants of a leasing decision. They briefly discuss managers and their incentive to lease, especially if they are evaluated based on a return on invested capital metric. Since the return on invested capital performance metric is calculated with assets in the denominator managers have an incentive to enter into operating leases, which reduces the denominator and increases measures of performance. Smith, Jr. & Wakeman (1984) further discuss marginal tax rates as a possible determinant of leasing. Their prediction is supported by Graham, Lemmon, and Schallheim (1998). This study presents evidence consistent with a transfer of tax shields, in the form of depreciation deductions, from low marginal tax rate lessees to higher tax rate lessors. In empirical results Graham et al. (1998) document a negative relation between operating leases (and debt levels) and marginal tax rates suggesting that low marginal tax rate firms are more likely to enter into operating leases, allowing high-tax rate lessors to take the leased asset's depreciation deductions. [4]

Prior research has also empirically documented relationships between investor perception of firm risk and leases. In a 2009 paper, Dhaliwal, Lee & Neamtiu discuss the implications of leasing policy for a firm's ex-ante cost of capital. They document a positive relationship between the ex-ante cost of capital and the capitalization of off-balance sheet operating leases. This suggests that investors do take these off-balance sheet lease commitments into account when making decisions about firm risk. More pertinently, Dhaliwal et al. (2009) document a weaker positive relationship for these off-balance sheet leases as opposed to on-balance sheet capital leases, suggesting that investors do take into account the

[4] These tax shields allow low tax rate firms, in this case the lessees, to sell tax advantages to high tax rate firms who value the depreciation deductions more highly. These high tax rate firms then pass along some of their tax savings to the low tax rate firms in the form of smaller lease payments.

increased ownership risk associated with capital leases. This result suggests that market participants view the differences in lease classifications according to the economic fundamentals underlying SFAS 13.

*Capital Structure and Financial Determinants Literature*

A unique aspect of capital lease transactions is their simultaneous presence on the balance sheet as an asset and as a liability. Since capital lease liabilities represent fixed obligations, Graham (1999) asserts leases resemble debt in firms' capital structures. Accordingly, empirical lease research tends to borrow from methods and theory used to study capital structure, namely debt.

Recent studies that seek to identify the determinants of firms' decision to use corporate debt in their capital structure including Dhaliwal, Erickson and Krull (2007), Graham (1999) and MacKie-Mason (1990) elect to use changes specifications. Since variation in capital structure at any point in time (levels) represents the accumulation of many discrete choices to increase or decrease debt levels, a changes specification better captures determinants of incremental financing decisions. Given the inclusion of leases as a capital structure variable by Graham (1999) and the preference for research designs that capture incremental capital structure decisions, my study employs a similar design.

*Industry Concentration and Bargaining Power*

I expect that in general, lessees and lessors negotiate contracts for the leasing of assets or groups of assets as the need for capital arises. Since contracting involves a bargaining process between two parties it would be reasonable to assume a significant driver of contract terms is bargaining power of the contracting parties. Kale and Shahrur (2007) provide support for the theory that bargaining power, as related to industry concentration, does indeed play a role in the pricing and contract process. They test this, and document a negative relationship between market share (i.e. firms with more industry concentration) and debt. This result provides support for the use of industry concentration as a measure of bargaining power. Using the framework in Kale and Shahur (2007) it then follows that a lessor would

act as a "supplier," while the lessee would act as a "buyer." If the lessee has a relatively high market share, it should have more bargaining power, and thus more ability to negotiate better terms.

Several other recent papers use similar methods to get at a measure of bargaining power in the contracting process. Inderst and Wey (2007) also found strong support for the theory that industry concentration gives rise to bargaining power. They suggest that bargaining power is related to buyer bargaining power as well. Again, the firm in question's market share being higher is theorized to lead to more bargaining power.

There are multiple measures for bargaining power used in the economics, accounting, and finance literatures. Market share on its own is the source of much of these measures. The Herfindahl-Hirschman Index (HHI) is the most widely used of these measures, and it is derived from the market share of firms within each respective industry. The source of the raw market share data used to determine the HHI, however, has come under fire in recent years. Many times, the source of such data is Compustat, but recent literature argues that because Compustat excludes data on private firms, it is more imprecise. For my tests I use the U.S. Census data as this is a much more reliable source from which to derive industry concentration (Ashiq, Klasa, & Yeung, 2009).

*Hypothesis Development*

**Leasing as Related to Asset Price Levels**

As previously discussed, there are many determinants of corporate leasing policy, such as the marginal tax rate (Graham, Lemmon, & Schallheim, 1998) and the basis of managerial performance evaluation (Smith, Jr. & Wakeman, 1984). Another major determinant of lease contracting, and the accounting classification of leases as either operating or capital leases that is driven by these determinants, is the transfer of ownership risk. As SFAS 13 intends, capital leases should represent a real transfer of ownership risk to the lessee, while operating leases should be something more like a rental.

Quantifying ownership risk is a non-trivial task. My prediction is that the recent change in value of leased assets is a leading indicator of the ownership risk that is inherent in those assets. If values are rapidly depreciating, or look unlikely to appreciate, the decision to take that asset onto the books as a capital lease looks much less attractive than keeping it in an off-balance sheet account for use as an operating lease. These price-related determinants lead to the first hypothesis:

*H1: A firm's capital leases-to-value increase with an increase in the leased asset's appreciation.*

It should be noted that there are many other determinants of the lease decision that may impede my ability to document this relationship. Further, the appreciation of a leased-asset is difficult to use as a predictor. Past appreciation is not an indicator of future appreciation, and managers may be focused more on other methods of determining future appreciation. For example, trade journals or other news outlets would allow a manager to learn about field developments to decide whether an asset may be about to become obsolete or not.

**Bargaining Power and Industry Concentration**

Another determinant of leasing mentioned before is the bargaining power of lessees and lessors. Previously cited papers (Inderst et al., 2007; Kale et al., 2007) give support to the theory that industry concentration does, in fact, lead to varying levels of bargaining power. I predict that this bargaining power is then used in the leasing transaction to negotiate more favorable terms for the lessee. In tandem with leased asset appreciation, I expect bargaining power to allow lessee firms to negotiate more favorable terms that, in turn, make them more willing to engage in a capital lease since more favorable lease contract terms reduce the cost of assuming ownership risk. For example, a lessee with higher bargaining power is more likely to negotiate an unguaranteed residual value, which will lessen the risk of classifying the lease as capital. Unguaranteed residual values do not affect the minimum lease payments as guaranteed residual values do. This is a serious trade-off, however, because employing a guaranteed residual value would allow a reduction in the minimum lease payments. The cost of this

would be much lower if the asset is steadily appreciating. A firm with higher bargaining power may instead be able to negotiate a lower guaranteed residual value or be able to take the full gain (or a large percentage of it) if the asset appreciates over the guaranteed residual value. In all cases I expect that leased asset appreciation has a significant impact even when there is bargaining power in the mix. This brings about my second hypothesis:

*H2: The positive association betweeen a firm's capital leases-to-value and leased asset appreciation will be greater for lessees with more bargaining power.*

Once again, there are many determinants of the leasing decision that it may be difficult to document a significant relationship between any single one. I do not make any predictions on the main effect of bargaining power alone since its impact on the leasing decision is unclear.

## 3. Data and Research Design

*Data*

I obtain data on capital leases and the data required to estimate operating leases from the Compustat Annual North American database, price appreciation data from the Bureau of Labor Statistics (BLS), and estimates of industry concentration from U.S. Census data.

Capital leases are discretely presented on financial statements and are easily retrieved from the Compustat database. Operating leases do not appear on firm financial statements. This makes it difficult to compile this data, because operating leases are customarily presented only in footnotes and schedules within financial reports. I follow the method set forth in Dhaliwal et al. (2009) and use this footnote information to calculate the present value of these future payment obligations. This calculation uses rental expense and the present value of the future cash flows to determine what the capital lease would look like today "as if capitalized." This provides a measure of operating leases that is theoretically equivalent to capital lease measures.

I use U.S. Census data rather than Compustat data for industry concentration because the Census data takes private firms into account, while Compustat is a database for purely public firms (Ashiq et al., 2009)[5].

I use the Producer Price Index (PPI) data taken directly from the U.S. Bureau of Labor Statistics (BLS) to estimate leased asset appreciation. I match this PPI data to individual firms in my sample based on their industry affiliation (determined by NAIC or SIC codes) and determine which asset class is the most likely to be leased by firms in this industry. To determine the most likely leased asset by each firm involved I study financial statements and their footnotes for a selection of industry firms. I then identify the most likely leased asset and match it to the industry that would produce that asset. This allows me to use the PPI data for that industry to calculate a price appreciation measure. The PPI provides one of the only real measures of overall price appreciation for business-to-business sales in the nation.

Following related studies I include other determinants of leasing activity including Tobin's Q, firm size, capital intensity, and marginal tax rate (Graham, Lemmon, & Schallheim, 1998). To control for potential relationships between operating and capital leases I include operating leases in some model specifications. I obtain data to construct Tobin's Q, firm size, capital intensity and operating leases from Compustat and marginal tax rates from John Graham's website[6].

*Measuring Leased Asset Appreciation and Industry Concentration*

Most of the measures used in this study are straightforward. The exceptions are the Herfindahl-Hirschman Index (HHI) and the 2 year buy and hold return on assets.

The HHI is used to determine an industry's concentration level and serve as a proxy for bargaining power in lease contracting. The HHI is calculated by summing the squares of firms' market share within an industry. The higher the final sum is, the more likely a firm in that industry is to have bargaining power.

[5] Special thanks to Sandy Klasa for access to his Herfindahl-Hirschman Index data.
[6] John Graham's website may be accessed at http://faculty.fuqua.duke.edu/~jgraham/taxform.html.

I use the 2 year buy and hold return of the PPI as my proxy for leased asset appreciation[7]. In theory, a buy and hold return should be more representative of price trends and more likely to be the measure that will affect managers' decisions with respect to lease contracting.

*Research Design*

To test my hypotheses, I opt to use an Ordinary Least Squares (OLS) regression model. Specifically, I regress changes in capital leases scaled by the market value of equity on my variables of interest and a set of control variables. Scaling by the market value of equity is consistent with Graham et al (1998) and captures the percentages of capital leases within the firm's capital structure rather than an absolute measure. I use a *changes*-based regression as advocated by Graham (1999). Graham (1999) suggests it is the increase and decrease in levels of leases and such, not the absolute level, which is theorized to drive incremental leasing decisions. Consequently the dependent variable and control variables are generally measured in annual changes. This brings me to my primary research model below:

$$\text{CAPL\_CHANGE} = \alpha_1 + \beta_1*\text{APPREC} + \beta_2*\text{HHI} + \beta_3*(\text{APPREC}*\text{HHI}) + \beta_4*\text{MTR\_CHANGE} + \beta_5*\text{TOBINSQ\_CHANGE} + \beta_6*\text{LNMVE\_CHANGE} + \beta_7*\text{CAPINTENS\_CHANGE} + \varepsilon \quad (1)$$

*$CAPL\_CHANGE_i$ = Year over year change in a firm's capital leases-to-value;*[8]

*$APPREC_k$ = Buy and hold return on the producer price index (PPI) for the last two years;*

*$HHI_k$ = Sum of the squares of industry firms' market share for the lessee evaluated annually;*

*$MTR\_CHANGE_i$ = Year over year change in a firm's fiscal year-end marginal tax rate;*

*$TOBINSQ\_CHANGE_i$ = Year over year change in Tobin's Q, where Tobin's Q is measured as the market value of the firm over the book-value of the firm at fiscal year-end;*

[7] I also ran the 1 and 3 year buy and hold return on the PPI and found similar results.

[8] Subscript *i* denotes a firm-level observation, while subscript *k* denotes an industry-level observation.

*$LNMVE\_CHANGE_i$ = Year over year change in the natural log of a firm's market value of equity, where market value of equity is the number of common shares outstanding at fiscal year-end times the stock price at fiscal year-end;*

*$CAPINTENS\_CHANGE_i$ = Year over year change in a firm's capital intensity, where capital intensity is measured as property, plant and equipment over total assets all evaluated at fiscal year end.*

A positive and significant coefficient loading on my $\beta_1$ would support my first hypothesis. A positive coefficient loading would be consistent with my theory that price appreciation reduces ownership risk, which in turn would make a lessee more willing to capitalize the asset.

Some issues that may impede my ability to document this include the degree to which the price level data used is representative of the entire market as well as the ability to match related assets to firms. In the first case, it is difficult to get any measure of average price level and leased asset appreciation other than the Producer Price Index (PPI). As reliable as this data is, it is an average measure and many firms in the sample may lie at extremes unexplained by changes in the PPI. Consequently, the measure itself is noisy. Many of these firms will have different degrees of bargaining power, which they can then use to lease at a lower price than the average. This is why I have included a further test to examine the joint effects of price appreciation and bargaining power. Further, while the data is organized in many ways (Fama-French Industry Codes, NAICS, SIC, etc.), it is not always clear what the most likely related asset is for a firm.[9]

For my second hypothesis, I expect to find a positive and significant coefficient loading on $\beta_3$. This interaction tests whether the joint effect of leased asset appreciation and bargaining power is positively related to changes in capital leases. I expect that bargaining power will either give lessees the

[9] By most likely related asset, I mean the asset that the firm is most likely to lease. In many cases, it is simply land and buildings, which have leasing behavior entirely different from many other asset classes.

opportunity to reduce the price of the lease itself or negotiate more favorable terms, like an unguaranteed residual value. The interaction between a safer looking asset and the ability to negotiate favorable terms is further consistent with my hypothesis that a reduced risk of ownership will make a firm more likely to capitalize the related asset.

Bargaining power, however, is perhaps an even noisier measure than ownership risk. The Herfindahl-Hirschman Index is one measure of bargaining power that uses market share to determine its magnitude, where this may not always be the best indicator. Other factors, such as intellectual property rights, that may play a role and these effects will not be captured by this study. However, this should only bias me against finding results.

*Sample Descriptives*

The initial sample includes 44,788 COMPUSTAT firms for the years between 1986 and 2006 that have data available to calculate changes in capital leases, Tobin's Q, market value of equity, and capital intensity. This drops slightly to 42,700 after truncating data beyond the 1st and 99th percentiles to control for outlier observations. When controlling for data that has PPI data available, the sample size drops again to 12,015. When data for the Herfindahl-Hirschman Index is needed, this sample size drops to a final size of 9,506.

**Descriptive Data for Final Sample**

| Variable | N | Mean | 1st Pctl | 25th Pctl | Median | 75th Pctl | 99th Pctl |
|---|---|---|---|---|---|---|---|
| **chcl2** | 9506 | 0.0061 | -4.8452 | 0.0000 | 0.0000 | 0.0000 | 5.8808 |
| **bhrppi2** | 9506 | 0.0448 | -0.0649 | 0.0125 | 0.0368 | 0.0794 | 0.1668 |
| **lessee_sherf2** | 9506 | 0.0247 | 0.0008 | 0.0080 | 0.0137 | 0.0179 | 0.1686 |
| **chmtr** | 9506 | -0.0042 | -0.3418 | -0.0044 | 0.0000 | 0.0073 | 0.3366 |
| **chq** | 9506 | 0.0473 | -9.0469 | -0.4583 | -0.0024 | 0.4261 | 10.4914 |
| **chlnmve** | 9506 | 0.0005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **chcapintens** | 9506 | -0.0099 | -0.3279 | -0.0328 | -0.0040 | 0.0203 | 0.2508 |
| **chol** | 9506 | 0.0115 | -0.3909 | -0.0123 | 0.0002 | 0.0163 | 0.6447 |
| **chmix** | 9348 | -0.0088 | -0.5055 | -0.0012 | 0.0000 | 0.0000 | 0.4369 |

Interesting to note here is that the change in capital leases at the 25th and 75th percentiles is zero. The majority of this sample, then, has very little change in leasing, year over year. In truth, there are only about 3,500 observations that have a non-zero change in capital leases. In sensitivity analysis I separately analyze this sample by eliminating firms where the change in capital leases is equal to 0 and arrived at inferences similar to those in tabulated results.

Results from the univariate analysis of correlations may be found in Table 1. There are no indications of highly correlated variables, which minimizes the likelihood multicollinearity influences my results. The highest correlation coefficient is on the change in capital leases and the change in operating leases (0.248, p-value = <.0001). This is somewhat low, and reduces my expectation of finding any serious multicollinearity in my study. For added assurance, I perform collinearity diagnostics for each of my regression models by determining and reporting variance inflation factors.

Some interesting initial results indicate a positive and significant relationship between price appreciation and the change in capital leases (correlation coefficient = 0.018, p-value = 0.082). However, this positive and statistically significant relationship is only present in the Pearson correlations; in the Spearman table, this relationship is entirely insignificant (correlation coefficient = 0.005, p-value = 0.656). Changes in operating leases and changes in capital leases also appear to be positively and significantly correlated. This suggests that firms tend to increase or decrease both operating and capital leases at the same time. I find some support for Graham et al. (1998) in that there is a significant negative relationship between changes in operating leases and changes in the marginal tax rate (correlation coefficient = -0.151, p-value = <.0001). The coefficient is the same direction for capital leases, but the coefficient loading is smaller in magnitude (correlation coefficient = -0.061, p-value = <.0001)[10].

[10] John Graham's study uses levels of marginal tax rates, not changes. When I adjust for that, I get a positive and significant loading. See additional regression results using marginal tax rates levels in Table 3.

## 4. Empirical Results

*Main Regression Results*

My main regression results of model (1) are summarized in Table 2. In column (1) I find a positive and relationship significant at the 5% level between my measure of asset appreciation (APPREC) and the changes in capital leases (0.876, t-stat = 2.31). This provides the main support for my first hypothesis that as price appreciation rises, so too will the level of capital leases. As I add in the interaction between price appreciation and bargaining power in columns (2) and (3), however, my result for the test of H1 is no longer significant (-0.030, t-stat = -0.06). In column (3) the interaction of leased asset appreciation and bargaining power (APPREC*HHI) is positive and also significant at the 5% level (34.870, t-stat = 2.13). This seems to suggest that the firms in my sample with higher bargaining power are more willing to assume ownership risk and therefore enter into capital leases. My results appear to suggest that while leased asset appreciation is important on average, the combination of leased asset appreciation and lessee bargaining power drives the result.

Some other statistically significant results include the change in marginal tax rate. I document a negative coefficient loading that is significant at the 1% level (-0.880, t-stat = -4.40). Graham et al (1998) say that capital leases are a mix of true tax-advantaged leases and non-true ones and that no significant relationship should be found, however Graham (1998) examined levels of marginal tax rates on their effect on changes and levels of leases. In alternative regression results discussed below, I use marginal tax rate levels and document results consistent with assertions from prior literature. Further, there are significant negative relationships between the lease changes and changes in firms' growth opportunities (TOBINSQ_CHANGE). Firms with these high growth opportunities tend to be less capital intensive and also tend to be smaller firms with lower marginal tax rates, who will then be more likely to use operating leases (Graham et al, 1998). Significant relationships between changes in capital leases and changes in operating leases (OPL_CHANGE) and changes in capital intensity (CAPINTENS_CHANGE) are equally

expected. Changes in operating leases are likely to be correlated with changes in capital leases as they are both part of a firm's capital structure, and changes in capital intensity are likely to go in tandem with changes in capital leases as those capital leases factor into the numerator of the calculate for capital intensity.

I also verify that there is little collinearity within my regression. The correlations presented in Table 1 had already indicated a lack of multicollinearity, and for this regression, the variance inflation factor (VIF) is under 3 for each individual test. Kutner, Nachstein, Neter and Li (2004) indicate that multi-collinearity is not a problem when VIFs are less than 10.

*Alternate Regression Results*

To see if I can triangulate with the theory in Graham et al. (1998) that changes in capital leases should be positively related to marginal tax rates, I run an alternative regression model that replaces changes in marginal tax rates from model (1) with a lag of the marginal tax rate (LAG_MTR):

$$\text{CAPL\_CHANGE} = \alpha_0 + \beta_1 \text{APPREC} + \beta_2 \text{HHI} + \beta_3 \text{APPREC*HHI} + \beta_4 \text{LAG\_MTR} + \beta_5 \text{TOBINSQ\_CHANGE} + \beta_6 \text{LNMVE\_CHANGE} + \beta_7 \text{CAPINTENS\_CHANGE} + \beta_8 \text{OPL\_CHANGE} + \varepsilon \quad (2)$$

The logic behind using a marginal tax rate level is that firms are more likely to adjust behavior based on the last marginal tax rate they were subject to, rather than the change from the previous year to the next year. Results for regression model (2) are summarized in Table 3.

I document results similar to those in my primary tests of model (1), though the replacement of changes in marginal tax rates with the lagged marginal tax rate does make the relationship between changes in capital leases and the interaction between price appreciation and bargaining power drop in significance to the 10% level (-2.185, t-stat = -1.73). More importantly, I now show a positive loading for the relationship between the change in capital leases and the change in marginal tax rate. Since capital

leases allow firms to take depreciation deductions on the leased asset, all else equal, firms with higher marginal tax rates have a greater incentive to enter into a capital lease over an operating lease.[11]

My second alternate regression, summarized in Table 4, focuses on the mix of leases (change in capital leases over operating leases), denoted by CAPL/OPL_CHANGE:

$$(CAPL/OPL)\_CHANGE = \alpha_0 + \beta_1 APPREC + \beta_2 HHI + \beta_3 APPREC*HHI + \beta_4 MTR\_CHANGE + \beta_5 TOBINSQ\_CHANGE + \beta_6 LNMVE\_CHANGE + \beta_7 CAPINTENS\_CHANGE + \varepsilon \quad (3)$$

Using this alternative dependent variable, I find support for my second hypothesis through a significant and positive coefficient loading on $\beta_3$ (279.542, t-stat = 1.96). I do not document results consistent with my first hypothesis. In fact, using this specification I find a negative coefficient loading on APPREC, significant at the 10% level (-6.365, t-stat = -1.76). This result can be explained in several ways. Most likely, the increase in operating leases with price appreciation is greater than that of capital leases. This would not reflect true ownership risk transfer, but SFAS 13's "bright line" rules have been known to be fudged in the past. It is possible I am also seeing more purchases rather than leases as price appreciation rises, because purchases would be more likely to hurt the capital leases in the numerator and are more likely to occur when the asset is perceived to be safer. The relationship between the mix and changes in marginal tax rate is no longer significant, either.

## 5. Conclusion

Accounting for leases is a topic that has been controversial in the past, and recent developments in the field have brought the issue to the forefront as two distinct accounting systems attempt to converge. The question continues to be whether or not there should be a distinction between capital

[11] Graham et al. (1999) found no statistically significant relationship between marginal tax rates and capital leases. He suggests this was due to the fact that capital leases per financial statements are a mix of truly and non-truly tax advantaged leases. My statistically significant result is supported by theory and may differ from Graham et al. (1999) because of differences in sample composition between my study and theirs.

leases, leases that theoretically transfer greater ownership (and are thus reported on the balance sheet as an asset and a liability), and operating leases, which transfer little ownership and may be found only in the footnotes to financial statements.

My study extends prior literature as far as the determinants of this leasing decision go. Previous literature has found that marginal tax rates and manager incentives affect this to some extent, but there was little study done as far as the effectiveness of lease accounting standards in doing what they intend to do. Lease standards intend to classify leases by ownership risk assumed, so I took price appreciation and bargaining power measures to determine the willingness of managers to take on ownership risk. I theorize that there is a positive and significant relationship between these variables and changes in capital leases, which reflects managers' willingness to take on the ownership risk when they can negotiate better deals.

I document these results after regression analysis. This seems to confirm that there is some effectiveness on the part of the FASB's "bright line" rules in separating out leases with varying levels of ownership risks. This finding extends prior literature's findings that investors perceive differences in the risk of operating and capital leases. Findings from my alternate regressions, however, find that it is possible operating leases may be increasing faster than capital leases under these same circumstances. This would certainly be an interesting point for regulators or academics to investigate for further study, as it would suggest that current classification methods are not successful, and thus convergence of international standards may be of benefit.

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**Table 1**
Correlations for Capital Lease Changes and Price Appreciation Measure
Pearson above, Spearman below

| | CAPL_CHANGE | APPREC | HHI | MTR_CHAGNE | TOBINSQ_CHANGE | LNMVE_CHANGE | CAPINTENS_CHANGE | OPL_CHANGE |
|---|---|---|---|---|---|---|---|---|
| **CAPL_CHANGE** | - | 0.018 | -0.002 | -0.061 | -0.018 | -0.014 | 0.015 | 0.210 |
| | | *0.082* | *0.870* | *<.0001* | *0.082* | *0.166* | *0.152* | *<.0001* |
| **APPREC** | 0.005 | - | 0.057 | 0.020 | 0.012 | 0.007 | -0.004 | -0.020 |
| | *0.656* | | *<.0001* | *0.047* | *0.239* | *0.469* | *0.719* | *0.046* |
| **HHI** | -0.015 | -0.154 | - | 0.011 | -0.006 | 0.030 | 0.006 | 0.010 |
| | *0.149* | *<.0001* | | *0.272* | *0.569* | *0.003* | *0.581* | *0.320* |
| **MTR_CHANGE** | -0.069 | -0.003 | 0.004 | - | 0.01 | -0.01 | 0.06 | -0.07 |
| | *<.0001* | *0.778* | *0.670* | | *0.47* | *0.37* | *<.0001* | *<.0001* |
| **TOBINSQ_CHANGE** | -0.207 | -0.004 | -0.006 | 0.073 | - | 0.000 | 0.006 | -0.024 |
| | *<.0001* | *0.728* | *0.549* | *<.0001* | | *0.998* | *0.565* | *0.017* |
| **LNMVE_CHANGE** | -0.031 | 0.006 | 0.012 | -0.001 | 0.00 | - | -0.008 | -0.007 |
| | *0.002* | *0.573* | *0.226* | *0.890* | *0.78* | | *0.415* | *0.473* |
| **CAPINTENS_CHAGNE** | 0.025 | 0.003 | 0.020 | 0.077 | 0.02 | -0.007 | - | -0.039 |
| | *0.013* | *0.762* | *0.054* | *<.0001* | *0.05* | *0.517* | | *0.000* |
| **OPL_CHANGE** | 0.248 | -0.009 | -0.009 | -0.151 | -0.54 | -0.031 | -0.093 | - |
| | *<.0001* | *0.381* | *0.382* | *<.0001* | *<.0001* | *0.002* | *<.0001* | |

**Table 2**
Regression Results for Main Hypothesis Test

| Dependent Variable | CAPL_CHANGE | | |
|---|---|---|---|
| | **(1)** | **(2)** | **(3)** |
| APPREC | 0.876 | -0.132 | -0.030 |
| | (2.31)** | (-0.26) | (-0.06) |
| HHI | 0.124 | -1.692 | -1.912 |
| | (0.20) | (-1.51) | (-1.71)* |
| APPREC*HHI | | 33.026 | 34.870 |
| | | (1.99)** | (2.13)** |
| MTR_CHANGE | -0.881 | -1.118 | -0.880 |
| | (-4.41)*** | (-5.39)*** | (-4.40)*** |
| TOBINSQ_CHANGE | -0.003 | -0.004 | -0.003 |
| | (-2.45)** | (-2.55)*** | (-2.44)** |
| LNMVE_CHANGE | -1.003 | -1.176 | -0.987 |
| | (-2.55)** | (-2.94)*** | (-2.44)** |
| CAPINTENS_CHANGE | 0.610 | 0.471 | 0.609 |
| | (2.18)** | (1.70)* | (2.18)** |
| OPL_CHANGE | 1.777 | | 1.778 |
| | (3.67)*** | | (3.67)*** |
| Year Fixed Effects | Yes | Yes | Yes |
| $R^2$ | 0.0540 | 0.0153 | 0.0547 |
| Nobs | 9506 | 9506 | 9506 |
| Collinearity diagnostics: | | | |
| All VIF's less than | 1.35 | 2.94 | 2.94 |

* Denotes significance at the 10% level
** Denotes significance at the 5% level
*** Denotes significance at the 1% level

**Table 3**
Alternate Regression Results: Marginal Tax Rate Lag

| Dependent Variable | CAPL_CHANGE | | |
|---|---|---|---|
| | **(1)** | **(2)** | **(3)** |
| APPREC | 0.930 | -0.021 | 0.080 |
| | (2.29)** | (0.06) | (0.14) |
| HHI | -0.012 | -1.907 | -2.185 |
| | (-0.02) | (-1.52) | (-1.73)* |
| APPREC*HHI | | 32.274 | 34.696 |
| | | (1.63) | (1.76)* |
| LAG_MTR | 0.275 | 0.241 | 0.277 |
| | (2.13)** | (1.82)* | (2.14)** |
| TOBINSQ_CHANGE | -0.006 | -0.008 | -0.006 |
| | (-2.01)** | (-2.04)** | (-2.01)** |
| LNMVE_CHANGE | -0.738 | -1.013 | -0.759 |
| | (-1.44) | (-1.68)* | (-1.32) |
| CAPINTENS_CHANGE | 0.558 | 0.397 | 0.561 |
| | (1.88)* | (1.36) | (1.89)* |
| OPL_CHANGE | 1.945 | | 1.946 |
| | (3.79)*** | | (3.79)*** |
| Year Fixed Effects | Yes | Yes | Yes |
| $R^2$ | 0.0658 | 0.0103 | 0.0538 |
| Nobs | 9012 | 9012 | 9012 |
| Collinearity diagnostics: | | | |
| All VIF's less than | 1.24 | 3.24 | 3.25 |

* Denotes significance at the 10% level
** Denotes significance at the 5% level
*** Denotes significance at the 1% level

**Table 4**
Alternate Regression Results: Change in Lease Mix

| Dependent Variable | (CAPL/OPL)_CHANGE |
|---|---|
| | **(1)** |
| APPREC | -6.365 |
| | (-1.76)* |
| HHI | -23.582 |
| | (-2.19)** |
| APPREC*HHI | 279.542 |
| | (1.96)** |
| MTR_CHANGE | -0.560 |
| | (-0.47) |
| TOBINSQ_CHANGE | -0.017 |
| | (-1.71)* |
| LNMVE_CHANGE | 5.732 |
| | (2.41)** |
| CAPINTENS_CHANGE | 5.154 |
| | (1.88)** |
| | Yes |
| Year Fixed Effects | |
| $R^2$ | 0.0117 |
| Nobs | 9389 |
| Collinearity diagnostics: | |
| All VIF's less than | 3.25 |

* Denotes significance at the 10% level
** Denotes significance at the 5% level
*** Denotes significance at the 1% level