Non-cancellable operating leases and operating leverage

Abstract

We explore the link between the firm's non-cancellable operating lease commitments and stock returns. Firms with more operating lease commitments earn a significant premium over firms with less commitments, and this premium is countercyclical. Non-cancellable operating lease payments represent a major claim on firms' cash flows. Firms with high operating leases have higher cash flow sensitivity to aggregate shocks and hence higher operating leverage. The relationship between operating leases and stock returns is stronger in small firms than in big firms.

JEL classification: *E22*, G12

Keywords: *Operating leases, Operating leverage, Cross section of expected returns*

We are grateful to Selale Tuzel for many comments and discussions. Furthermore, we would like to thank Huseyin Gulen, Dong Lu, Armin Schwienbacher, seminar participants at the 2013 Borsa Istanbul Conference, 2014 AFFI Conference and Bilkent University for their helpful suggestions.

1. Introduction

Operating leases are the most common and important source of off-balance sheet financing, and operating lease use has increased substantially over the past several decades.[1] According to Eisfeldt and Rampini (2009), leasing is of comparable importance to long-term debt, and for small firms, leasing may hence be the largest source of external financing.[2] Consequently, operating lease payments represent a major claim on firms' cash flows. Some of these leases are short term leases, they can be reversible and provide flexibility to the firm compared to the ownership. However, on the other hand some operating leases are non-cancellable during the lease term unless the event of bankruptcy. During the business cycle, firms cannot easily cancel or adjust the terms of contracts of these types of leases between their lessors. This inflexibility of operating lease costs increase firm risk. Firms with relatively high levels of operating lease commitments are more vulnerable to the business cycle than those with less commitments. Consequently, shareholders require a higher rate of return for bearing this risk and the expected stock returns of firms with higher operating leases are higher compared to the ones with lower operating leases.

The inflexibility of the firm's lease obligations creating cyclicality in the firm's cash flows is related to the concept of operating leverage.[3] For the shareholders, lease expense is a form of leverage making the equity more risky. During recessions (expansions) revenues fall (rise) but

[1] Currently, the Financial Accounting Standards Board (FASB) in America and the International Accounting Standards Board (IASB) are debating whether operating and capital leases should be combined and presented on the balance sheet (Wall Street Journal, March 18 2014). The boards agreed to recognize certain operating leases on the balance sheet. However, they failed to reach a consensus on how to recognize expenses on the lessee's income statement.

[2] Graham, et al. (1998) report that operating leases, capital leases, and debt are 42%, 6%, and 52% of fixed claims, respectively, in 1981–1992 Compustat data.

[3] See Lev (1974), Mandelker and Rhee (1984), Carlson et al. (2004) and Novy-Marx (2010).

lease commitments do not fall (rise) by as much as revenues. The idea of labor induced operating leverage[4], wages' limited comovement with revenues increasing the firm's risk, can also be extended to operating leases. These precommitted payments transfer the risk to shareholders. Therefore, in our setting the operating leverage mechanism is created by the firm's non-cancellable leasing contracts.

In this paper, we show that the firm's non-cancellable leases is positively and monotonically related to expected returns. We construct a measure of the firm's operating lease ratio by dividing the one year lagged minimum lease commitments in the first year by the firm's total assets. This ratio represents the fraction of non-cancellable operating lease use. On average, firms with high leasing rates have higher expected stock returns than firms with low lease rates, a difference of 11.7% per annum for equal-weighted portfolios and 4.7% per annum for value-weighted portfolios.

Especially during recessions, firms with high levels of operating leases are more risky and have higher expected returns. The return spread between the high lease ratio and low lease ratio firms is countercyclical and it is about four times as high during recessions as it is during expansions. In order to investigate the operating leverage risk mechanism behind expected returns, we show that, cash flows of firms with high levels of operating leases are more sensitive to aggregate shocks than cash flows of firms with lower levels of operating leases. This high sensitivity to aggregate shocks makes firms risky especially during recessions.

[4] See Danthine and Donaldson (2002), Gourio (2007), Chen et al. (2011), Favilukis and Lin(2013) and Donangelo (2014).

A firm's financing and leasing decisions are possibly related. Theoretically and empirically, debt and leases have been shown to be both substitutes and complements. Chen et al. (2013) argue that firms with greater inflexible operating costs endogenously choose lower financial leverage ex ante to reduce the likelihood of default in future bad states. Supporting the substitute argument, we find that firms that use higher levels of operating leases have lower financial leverage.

In the literature, empirical evidence on the relationship between financial leverage and stock returns is mixed. When other firm characteristics are included in regressions, financial leverage often becomes insignificant in predicting returns (Fama and French, 1992).[5] When we control for financial leverage in the Fama-Macbeth regressions, our operating lease ratio is still significantly related to expected returns. In portfolio sorts with unlevered returns, lease premium is statistically significant in equal-weighted returns, however insignificant in value-weighted returns. When we use industry adjusted lease ratio sorted portfolios, both value and equal-weighted return spreads are significant. We interpret these results due to the lower power of operating leases in creating an operating leverage effect for bigger firms compared to small firms. Gomes and Schmid (2010) explain that the relationship between financial leverage and stock returns is inconclusive because of the changing firm risk over the firm's life cycle. In their investment-based asset pricing model, mature, bigger firms have higher financial leverage with low underlying asset risk, while small firms are more subject to operating leverage and fixed costs of default are more important for small firms.

[5] George and Hwang (2010) provide further evidence that the book leverage premium is weak and potentially negative.

Production based asset pricing models help us to understand the consequences of this type of capital heterogeneity for firm risk. Danthine and Donaldson (2002) propose a general equilibrium model with labor-induced operating leverage. In their model, wages are less volatile than profits, and firms provide a kind of insurance to workers through labor contracts. Therefore, stable wages act as an extra risk factor for shareholders. Danthine and Donaldson's model generates a better match to the observed equity premium. Akdeniz and Dechert (2012) show both analytically and numerically that the equity premium can be higher in a production-based asset pricing model in which the firm leases its capital from the consumer side than an asset pricing model, in which the firm owns its capital. These models provide us with the intuition that firms with high levels of non-cancellable operating leases can have higher risk and expected returns in the cross section.

This paper is related to several strands of literature. A large literature in asset pricing links firm characteristics to stock returns in the cross section. Fama and French (2008) and Goyal (2012) provide a survey of this literature. To this literature, our paper adds the firm level operating leases rate as a variable that contributes to the firm's operating leverage risk and establishes a link to expected stock returns. While the role of operating leverage on the firm's risk is studied in the theoretical works of Hamada (1972), Rubinstein (1973), Lev (1974), and Bowman (1979), there is limited supporting empirical evidence on the association of the firm's operating leverage and stock returns. Novy-Marx (2010) uses a non-traditional measure of operating leverage, the firm's cost of goods sold plus selling, general and administrative expenses divided by the firm's total assets, and also argues that firms with high operating leverage have higher expected returns. This measure include a large set of costs such as material and overhead costs or advertising and marketing expenses. The degree of the inflexibility of these costs is mixed. Some of these costs are more variable than fixed.

The association of operating leases and equity risk is studied by Imhoff et al. (1993) and Ely (1995). Imhoff et al. (1993) using six years of data, find that in the airline and grocery industries, debt-to-equity ratios which are adjusted by capitalizing operating leases are more highly correlated with standard deviation of stock returns than those that do not. Ely (1995) test whether using operating leases-adjusted debt-to-equity and return on assets ratios have more explanatory power in explaining standard deviation stock returns. Her sample period is nine years with 202 firms. Dhaliwal et al. (2011) also find that cost-of-equity capital is positively associated with adjustments to financial leverage from capitalizing off-balance sheet operating leases. Our study covers a longer period with a broader data set than previous studies. We are investigating the direct relationship between the operating leases-induced operating leverage and stock returns, rather than the relationship between financial leverage with capitalized operating leases and volatile stock returns or cost-of-equity-capital.

In summary, our work identifies a newly defined source of operating leverage: the firm's non-cancellable operating lease commitments representing a claim on the firm's cash flows. Section 2 examines the relationship between lease ratio and expected returns, other related firm characteristics, financial leverage, industry effects and cash flow sensitivity. Section 3 concludes.

2. Empirical Analysis and Results

In this section, we show the empirical link between the firm's non-cancellable operating lease commitments and expected stock returns in the cross section. We construct a measure of the firm's level of operating leases relative to the firm's total assets using widely available accounting data. We call this ratio, "operating lease ratio". We follow two complementary empirical methodologies to examine the relationship between the firm's operating lease ratio and its stock returns. In the first approach, we construct portfolios sorted on the lease ratio, and in the second approach we run firm-level Fama-Macbeth regressions. These approaches allow us to cross-check the results and guide us through further tests to answer the question of whether our operating lease variable systematically related to the firm's risk.

2.1. *Data*

For operating leases, Compustat has fields for one-year through five-year-out minimum operating lease commitments (MRC1-MRC5), five-year total lease commitment (MRCT), thereafter (beyond five years) commitments (MRCTA), and rental expense (XRENT). XRENT represents all costs charged to operations for the rental of space and/or equipment. MRC1 includes only non-cancelable leases with lease term of longer than one year . Therefore we use the minimum lease commitments due in one year lagged by one year as in Sharpe and Nguyen (1995) for the level of the firm's non-concancellable annual operating lease commitments. This annual payment is divided by the firm's total assets. If we use net property, plant and equipment or the firm's total operating expenses in the denominator, we obtain similar results.

Alternatively, we can estimate the present value of firm's non-cancellable operating lease commitments and use it in the nominator. There are three major approaches in the literature for estimating the stock value of operating leases. The first one is the present value method. It capitalizes the present value of minimum lease payments for five years plus the "thereafter" value. The second method is Moody's factor method and it capitalizes operating leases by eight times the current year rent expense. The third method of operating lease capitalization suggested by Lim et al. (2003) uses the perpetuity estimate of the operating lease payment. The first method is known to be significantly underestimating the leased capital, since lease commitments are a lower bound on obligations and do not account for lease renewals and the available data starts from 1985. The second and third methods either multiply or divide the current year's operating lease expense by a certain multiple or a discount rate. Therefore our measure of minimum operating lease commitments is a conservative measure of the non-cancellable operating lease obligation and free from our assumptions about the discount rates used in estimation and the firm's accounting practices about its operating leases.

Our key variable, operating lease ratio, is as follows:

$$\text{Operating Lease Ratio} = \frac{\text{Firm's operating lease payments}}{\text{Firm's total assets}} \tag{1}$$

We also keep track of the following variables as control variables. Market capitalization (size) is stock price in June of t+1 times shares outstanding at the end of December of t, from CRSP. Book-to-market ratio is measured for the fiscal year ending in calendar year t. Following Fama and French, we define book equity as stockholders equity, plus balance sheet deferred taxes and investment tax credit (if available), plus post-retirement benefit liabilities (if available), minus the book value of preferred stock. Depending on availability, we use redemption, liquidation, or par value (in that order) for the book value of preferred stock. If stockholder equity number is not available, we use the book value of common equity plus the book value of preferred stock. If common equity is not available, we compute stockholders' equity as the book value of assets minus total liabilities. We compare our lease ratio with Novy-Marx's (2010) operating leverage measure, which is the sum of cost of goods sold and selling, general and administrative expenses, divided by total assets. Financial leverage is calculated as the ratio of long term debt plus debt in current liabilities divided by total assets. As in Eisfeldt and Rampini (2009), we include cash and short-term investments to total assets ratio, and cash flow income before extraordinary items plus depreciation and amortization divided by total assets to indicate firms that are financially constrained.

The sample is from 1975 to 2011 since MRC1 is not available before 1975. We include only companies with ordinary shares and listed on NYSE, Amex or Nasdaq. We exclude firms with missing SIC codes, negative book values and missing June market values and missing or zero minimum lease commitments due in one year. As is the standard, we omit regulated firms whose primary standard industry classification is between 4900 and 4999 (regulated firms) or between 6000 and 6999 (financial firms). Following Vuolteenaho (2002) and Xing (2008), we require a firm to have a December fiscal-year end in order to align the accounting data across firms. Following Fama and French (1993), we include only firms with at least two years of data to be included in the sample. Monthly stock returns are from CRSP and accounting information is from CRSP/COMPUSTAT database. Our sample consists of 46,823 observations corresponding to 5,484 firms. The data for the three Fama-French (1993) factors small-minus-big, SMB, high-minus-low, HML, and market, MKT are from Kenneth French's web page. PIN estimates are from Soeren Hvidkiaer's web page.

2.2. *Portfolio Sorts*

We construct ten one-way-sorted lease portfolios and investigate the characteristics of the portfolios' post-formation average stock returns. Following Fama and French (1993), we match CRSP stock return data from July of year t to June of year t+1 with lease ratio information for fiscal year ending in year t-1. In each end of June year t, we sort the firms in the sample according to their lease ratio and group them into decile portfolios.

Table 1 below shows the dispersion in descriptive characteristics of lease ratio sorted portfolios and the time-series averages of the cross-section Spearman rank correlations between other firm characteristics. The first row provides data on the average level of the lease ratio of the firms in these decile portfolios. Results in Table 1 indicate a monotonic relationship between lease ratio and size. Firms who have large non-cancellable lease obligations are small firms with low financial leverage. They carry higher cash levels to fund lease payments and they are financially constrained as measured similarly in Eisfeldt and Rampini (2009) and Cosci et al.(2013). The high correlation between firm size and fraction of lease ratio is expected, as documented in Eisfeldt and Rampini (2009). The high positive correlation between Novy-Marx's operating leverage and our lease ratio is due to the similarity in the numerator. A firm's operating lease payments constitute a portion of cost of goods sold. Despite the correlation, we will show that our lease ratio has a significant impact after controlling for the Novy-Marx's measure of operating leverage in Fama-Macbeth regressions.

A reason as to why firms lease their capital versus owning it is given by Eisfeldt and Rampini (2009). They argue that for more financially constrained firms, the benefit of the higher debt capacity of leased capital outweighs the costs due to the agency problem induced by the

Table 1

Descriptive statistics for portfolios sorted on lease ratio

The top panel reports the median value of firm characteristics of lease variable sorted portfolios averaged over the years (we report portfolio 1, which we label as "Low", and 10, which we label as "High"). The bottom panel reports the time-series averages of the cross-section Spearman rank correlations between the firm characteristics. OPLEASE= Ratio of non-cancellable operating lease payments to total assets, OPLEASE PAY= Non-cancellable operating lease payments, ASSETS= Total assets, B/M= Book-to-market ratio, SIZE= Market capitalization, OPLEV= Novy-Marx's operating leverage, FINLEV= Financial leverage, CF= Cash flow divided by total assets, CASH= Cash divided by total assets, INTEREST/OPLEASE=Interest expense divided by non-cancellable operating lease payments.

	Low	2	3	4	5	6	7	8	9	High
OPLEASE	0.2%	0.4%	0.6%	0.8%	1.0%	1.3%	1.7%	2.2%	3.3%	7.9%
OPLEASE PAY	5.50	18.84	21.82	23.35	23.71	25.35	22.30	20.78	22.19	30.23
ASSETS	3241	5043	3925	3049	2413	2014	1347	915	669	425
SIZE	2302	3786	3006	2771	2065	1617	1146	795	624	371
BM	0.82	0.80	0.82	0.76	0.76	0.80	0.81	0.80	0.82	0.78
OPLEV	0.62	0.78	0.89	0.99	1.04	1.13	1.19	1.28	1.40	1.73
FINLEV	0.27	0.25	0.23	0.22	0.22	0.21	0.21	0.21	0.20	0.19
CASH	0.08	0.08	0.08	0.07	0.07	0.06	0.04	0.04	0.02	0.01
CF	0.13	0.15	0.14	0.15	0.16	0.16	0.17	0.18	0.18	0.17
INTEREST/OPLEASE	22.74	5.62	3.63	2.62	2.02	1.60	1.28	0.97	0.70	0.33

Spearman rank correlations

	OPLEASE	SIZE	B/M	OPLEV	FINLEV	CASH	CF
OPLEASE	1						
SIZE	(0.28)	1					
B/M	(0.04)	(0.24)	1				
OPLEV	0.43	(0.29)	0.09	1			
FINLEV	(0.12)	0.05	0.18	(0.10)	1		
CASH	0.10	(0.09)	(0.28)	(0.12)	(0.52)	1	
CF	(0.09)	0.33	(0.27)	0.05	(0.20)	(0.01)	1

separation of ownership and control in leasing. Therefore more financially constrained firms, which have limited internal funds, lease a larger fraction of their capital than less constrained firms. Eisfeldt and Rampini (2009) use cash flow to assets as the most direct measure of available internal funds. In Table 1, cash flows to assets is negatively correlated to the fraction of leased capital.

Firms with high lease commitments have lower cash flow to asset ratios. The other measure of available funds, cash to assets ratio, is positively correlated to our lease ratio. This cash measure as explained in Eisfeldt and Rampini (2009) represents net working capital to fund the firm's operations. Therefore firm's with higher lease ratios have higher cash balances to compensate their inflexible higher lease costs. However their retained earnings are lower to finance capital investments. The fraction of interest expense to non-cancellable operating leases is also decreasing with the lease ratio. For firms in the higher lease ratio deciles, lease payments exceed interest expense.

2.3. *Returns of Lease Ratio Sorted Portfolios*

In Table 2, we investigate the relationship between our lease ratio and the expected excess returns (excess of the risk-free rate). The table shows the dispersion in both equal and value-weighted portfolio returns for firms sorted into 10 portfolios based on the lease ratio. The average expected returns of the portfolios are increasing monotonically with the lease ratio. The annualized difference between the returns of high and low lease ratio firms is 11.4% for equal-weighted portfolios and 4.7% for value-weighted portfolios and both spreads are statistically significant. Excluding the first decile, standard deviations of portfolio returns are also monotonically increasing with the lease ratio.

In order to understand the relationship between lease ratio and expected returns over the business cycles, we separate our sample into expansionary and contractionary periods around the portfolio formation time (see Imrohoroglu and Tuzel, 2013, for a similar approach). We use NBER business cycle dates reported on the NBER website. We designate recession/expansion in June of each year and look at the returns of lease ratio sorted portfolios over the following 12 months.

Table 2

Portfolio sorts on lease variable

This table reports the average expected returns of lease variable sorted portfolios (we report portfolio 1, which we label as "Low", and 10, which we label as "High"). R^e_{EW} is equal-weighted monthly excess returns (excess of risk-free rate). R^e_{VW} is value-weighted monthly excess returns (%) . δ^e_{EW} and δ^e_{VW} are the corresponding standard deviations. t-statisitics are reported in parentheses. Expected returns are measured in the year following the portfolio formation, from July of year t+1 to June of year t+2. Expansion and contraction periods are designated in June of year t +1 based on the NBER business cycle that year. Returns over the expansions and contractions are measured from July of year t+1 to June of year t+2.

	Expected Returns, July 1976-June 2011										
	All states, 420 months										
	Low	2	3	4	5	6	7	8	9	High	High-Low
R^e_{EW}	0.81	1.00	0.94	1.17	1.10	1.31	1.27	1.56	1.69	1.76	0.95
t	(2.67)	(3.48)	(3.26)	(4.05)	(3.73)	(4.32)	(3.88)	(4.74)	(5.17)	(5.43)	(5.11)
δ^e_{EW}	6.25	5.91	5.92	5.92	6.06	6.20	6.71	6.72	6.68	6.65	3.81
R^e_{VW}	0.52	0.49	0.50	0.71	0.77	0.73	0.54	0.68	0.67	0.91	0.39
t	(1.83)	(2.22)	(2.04)	(2.85)	(3.07)	(2.78)	(1.86)	(2.51)	(2.37)	(3.21)	(1.77)
δ^e_{VW}	5.86	4.48	5.00	5.10	5.17	5.41	5.93	5.60	5.81	5.83	4.52
	Expansions, 348 months										
R^e_{EW}	0.83	0.99	0.87	1.02	0.95	1.18	1.12	1.40	1.51	1.48	0.65
t	(2.80)	(3.43)	(3.04)	(3.52)	(3.19)	(3.86)	(3.32)	(4.08)	(4.43)	(4.50)	(3.36)
δ^e_{EW}	5.52	5.36	5.34	5.40	5.56	5.68	6.31	6.41	6.35	6.12	3.60
R^e_{VW}	0.66	0.55	0.55	0.76	0.88	0.79	0.58	0.70	0.68	0.78	0.12
t	(2.35)	(2.38)	(2.29)	(3.08)	(3.35)	(2.81)	(1.96)	(2.47)	(2.36)	(2.72)	(0.54)
δ^e_{VW}	5.25	4.29	4.52	4.61	4.88	5.27	5.50	5.26	5.38	5.37	4.20
	Contractions, 72 months										
R^e_{EW}	0.73	1.09	1.28	1.89	1.85	1.94	1.99	2.31	2.55	3.15	2.42
t	(0.69)	(1.14)	(1.34)	(2.02)	(1.95)	(2.00)	(2.02)	(2.44)	(2.70)	(3.09)	(4.62)
δ^e_{EW}	8.96	8.08	8.16	7.92	8.04	8.24	8.33	8.02	8.03	8.65	4.43
R^e_{VW}	(0.14)	0.19	0.22	0.46	0.28	0.43	0.34	0.63	0.63	1.55	1.69
t	(-0.14)	(0.30)	(0.27)	(0.56)	(0.37)	(0.61)	(0.38)	(0.76)	(0.71)	(1.72)	(2.52)
δ^e_{VW}	8.17	5.32	6.85	7.00	6.34	6.00	7.65	6.99	7.56	7.65	5.67

We find that the positive relationship between lease ratio and expected returns persists both in expansions and in contractions for equal-weighted portfolios. However, there are significant differences in returns over the business cycles. The average level of expected returns is much higher in recessions than in expansions. The annualized spread between the returns of high and low lease ratio portfolios is also much higher during contractions, 29.0%, than expansions, 7.8%, in equal-weighted portfolios. For value-weighted portfolios, the spread is 20.3% and is significant during contractions. However, the value-weighted spread is not significant during expansions.

The low lease ratio firms have lower expected returns in recessions in value-weighted returns and the high lease ratio firms have lower expected returns during expansions. The increase in expected returns of high lease portfolios is particularly large, from 17.7% in expansions to 37.8% in contractions. For low lease ratio firms, expected returns decrease from 10.0% in expansions to 8.8% in contractions in equal-weighted portfolios and decrease from 7.9% to -1.7% in value weighted portfolios. Our interpretation of the spread in the average expected returns across these portfolios, especially in recessions, is the risk premia associated with the higher risk of high lease ratio firms.

2.4. *Firm-Level Fama-Macbeth Regressions*

Portfolio sorts indicate that there is a statistically and economically significant positive relation between lease ratio and returns. We now use a different approach to investigate the strength of relationship between lease rates and stock returns. We run firm level Fama-Macbeth cross-sectional regressions (Fama and MacBeth, 1973) to predict stock returns using the lagged firm level lease rates as return predictors.

We estimate the following cross-sectional regression for firm i = 1, . . ., N in each month:

$$R_i = \alpha + \beta\lambda_i + \gamma D_i + \varepsilon_i \qquad (2)$$

In the specification above, i is a firm index, and monthly returns are denoted by R_i. Our measure of the lease ratio is denoted by λ_i, and D_i is a vector of controls. We measure λ_i and all control variables based on accounting ratios at the end of the previous year. We run the cross-sectional regression for each month separately. We then take the time series of the estimated monthly cross-sectional regression coefficients and calculate the mean regression coefficients. To test their significance, we report autocorrelation and heteroskedasticity corrected Newey-West standard errors for the estimated coefficients. The average regression coefficients are reported in Table 3.

We find that lease rate is strongly positively related to expected returns. The cross-sectional regression, where lease rate is the only explanatory variable, produces an average slope of 17.15. The magnitude of the effect is significant both statistically and economically. The 17.15 average regression coefficient translates into approximately 6.7% higher expected returns for the firms in the highest lease decile compared to the firms in the lowest lease decile. When we divide our sample into two time periods, the results are not sensitive to the sample period, although the effect is stronger in the second half of the sample period, which is from 1993 to 2009. We present our results both with using the natural log of the operating lease ratio and without using the log transformation. As in Fama and French (1992), preliminary tests indicated that logs are a good functional form for capturing leverage effects in average returns.

In order to understand the marginal predictive power of the lease rate, we control for several firm characteristics that could be related to our lease ratio variable. As in Fama and French (2008) we do not include the market beta since the market beta for individual stocks is not precisely measured in the data. We find that the cross sectional regressions that include operating leverage, log size and log book-to-market all produce positive and statistically significant average slopes for the lease ratio. The firm's financial leverage does not have an impact on the relationship between the firm's operating leases and stock returns.

We also control for the effects of the possible information assymetries created by the nature of operating lease transactions. Operating leases are found in the footnotes of financial statements and may not be properly reported. This accounting deficiency causes information risk. Probability of informed trade (PIN) has been used as a measure of information risk by prior studies in the finance literature (e.g., Easley et al., 2002; Chen et al., 2007). The PIN estimates span the 1983-2001 period. Although the coefficient on the lease ratio is lower when PIN measure is included in the regressions, it is still positive and statistically significant.

In the literature, taxes are widely seen as one of the most important reasons to lease. According to Lasfer and Levis (1998), while large companies lease mainly for tax savings, small companies lease to overcome their inability to access debt to finance growth opportunities and survival. Lewis and Schallheim (1992) model implies that those firms with lesser ability to use tax shields are those for which the leasing is most advantageous. We find that firms with high lease ratios have lower marginal tax rates.[6] Although the question why firms use leases is not the focus of our paper, taxes may have a mechanical link to firm risk. When we control for marginal tax

[6] Marginal tax rate estimates of Blouin et al. (2010) have been used. The data is avaialable from 1980.

Table 3

Fama-MacBeth regressions employing lease rate

This table reports the results from Fama-MacBeth regressions of firms' returns on firms' lease ratios. Specifications 2–6 include controls for firm characteristics. OPLEASE= Ratio of operating lease payments to total assets. B/M=Book-to-market ratio, SIZE= Market capitalization, OPLEV=Novy Mark's operating leverage, FINLEV=Financial leverage. PIN= Probability of informed trade. t-statistics are reported in parentheses below coefficient estimates (computed as in Newey-West with 4 lags). The sample covers July 1976 to June 2011.

Panel A

Independent variables	All (1)	(2)	(3)	(4)	(5)	Micro-cap (7)	Small-cap (8)	Big-cap (9)	All but micro (10)
Log(OPLEASE)	0.28	0.17	0.21	0.26	0.13	0.17	0.14	0.09	0.09
	(4.99)	(3.88)	(3.76)	(4.97)	(3.32)	(3.30)	(2.38)	(1.69)	(1.87)
Log(SIZE)		-0.23			-0.23	-0.62	-0.01	-0.11	-0.12
		(-4.62)			(-4.68)	(-6.83)	(-0.04)	(-1.96)	(-2.49)
Log(B/M)		0.24			0.23	0.16	0.25	0.19	0.20
		(2.34)			(2.53)	(1.43)	(2.24)	(1.76)	(2.13)
Log(OPLEV)			0.18		0.05				0.01
			(2.03)		(0.50)				(0.07)
Log(FINLEV)				0.05	0.01				0.02
				(1.18)	(0.25)				(0.40)

Panel B

Independent variables	All (1)	(2)	(3)	(4)	(5)	(6)	Micro-cap (7)	Small-cap (8)	Big-cap (9)	All but micro (10)
OPLEASE	17.15	9.95	14.77	17.08	9.39	7.66	9.95	6.43	4.30	9.17
	(5.08)	(3.90)	(4.52)	(5.19)	(4.00)	(1.74)	(3.90)	(1.74)	(1.19)	(1.74)
Log(SIZE)		-0.23			-0.23		-0.62	-0.01	-0.15	-0.13
		(-4.57)			(-4.68)		(-6.76)	(-0.11)	(-2.06)	(-2.61)
Log(B/M)		0.24			0.23		0.16	0.25	0.19	0.21
		(2.35)			(2.42)		(1.42)	(2.20)	(1.77)	(2.09)
OPLEV			0.14		0.23					0.00
			(2.44)		(0.40)					(-0.05)
FINLEV				0.24	-0.01					-0.06
				(0.63)	(-0.03)					(-0.18)
PIN						1.60				
						(1.35)				

rates in our regressions, operating leases have a coefficient of 6.24 which is statistically significant at the 1% level.

Following Fama and French (2008), we present the cross sectional regression results for three groups of stocks (microcap, small, and big stocks) estimated separately. The three groups are classified using the Fama and French (2008) size breakpoints of smallest 20%, middle 20% to 50%, and largest 50% of all NYSE firms. After controlling for size and book-to-market, we see that the relationship between operating leases and expected returns is stronger in smaller stocks than in bigger stocks. Cross-sectional regressions excluding microcaps and including control variables also produce significant coefficients for our lease ratio.

2.5. *Asset Pricing Tests*

In order to investigate if the variation in the excess returns across these portfolios reflects a compensation for risk, we conduct time series asset pricing tests using the CAPM and the Fama and French (1993) three factor model as the benchmark asset pricing models. As we demonstrate in Table 1, our lease ratio is related to size at the firm level. Therefore, we explore whether the returns of lease ratio sorted portfolios are systematically related to SMB (small minus big) factor.

Table 4 presents the alphas (pricing errors) and betas of lease ratio sorted portfolios for the CAPM and Fama-French models. Alphas are estimated as intercepts from the regressions of lease ratio sorted portfolio excess returns on the market excess return portfolio (MKT) and on the SMB and HML (high minus low) factors. The top panel reports the results for the equal-weighted portfolios, and the lower panel reports the value-weighted portfolio results. We find that portfolios with high lease ratios load heavily on SMB, whereas the loadings of the low lease

Table 4

Alphas and betas of portfolios sorted on lease ratio

This table presents the regressions of equal-weighted and value-weighted excess portfolio returns on various factor returns. MKT, SMB, and HML factors are taken from Kenneth French's website. The portfolios are sorted on lease ratio. t-statistics, computed using the Newey-West estimator, are in parentheses.

Dependent variable: Excess returns, July 1976 - June 2011

Equal Weighted Portfolios

	Low	2	3	4	5	6	7	8	9	High	High-Low
CAPM											
alpha	0.16	0.37	0.31	0.53	0.46	0.66	0.59	0.87	1.01	1.14	0.98
	(1.04)	(2.74)	(2.27)	(4.05)	(3.20)	(4.27)	(3.26)	(4.91)	(5.57)	(5.54)	(5.20)
MKT	1.19	1.16	1.16	1.17	1.17	1.18	1.24	1.25	1.23	1.15	-0.05
	(34.85)	(39.27)	(38.76)	(40.87)	(37.26)	(34.87)	(31.03)	(32.23)	(30.80)	(25.45)	(-1.08)
Fama French											
alpha	-0.03	0.20	0.10	0.35	0.26	0.47	0.38	0.67	0.79	0.84	0.87
	(-0.66)	(1.81)	(0.91)	(3.57)	(2.53)	(4.77)	(3.35)	(5.90)	(6.62)	(5.99)	(5.05)
MKT	1.15	1.10	1.10	1.09	1.08	1.06	1.08	1.10	1.09	1.02	-0.14
	(35.52)	(42.21)	(44.08)	(48.57)	(44.99)	(46.13)	(40.92)	(41.72)	(39.44)	(31.21)	(-3.42)
HML	0.21	0.14	0.21	0.14	0.14	0.07	0.05	0.04	0.09	0.21	0.00
	(4.28)	(3.47)	(5.56)	(4.01)	(3.68)	(1.97)	(1.29)	(1.01)	(2.24)	(4.22)	(-0.04)
SMB	0.51	0.54	0.59	0.62	0.70	0.82	0.98	0.94	0.96	1.06	0.55
	(10.98)	(14.48)	(16.45)	(19.14)	(20.29)	(25.09)	(25.73)	(24.68)	(13.76)	(22.69)	(9.52)

Value Weighted Portfolios

	Low	2	3	4	5	6	7	8	9	High	High-Low
CAPM											
alpha	-0.08	0.00	-0.05	0.15	0.20	0.16	-0.08	0.08	0.05	0.31	0.39
	(-0.53)	(0.04)	(-0.45)	(1.41)	(2.00)	(1.24)	(-0.54)	(0.65)	(0.38)	(2.10)	(1.74)
MKT	1.10	0.88	0.99	1.02	1.04	1.05	1.12	1.10	1.13	1.11	0.01
	(33.21)	(39.64)	(42.69)	(44.06)	(47.30)	(38.40)	(34.83)	(39.91)	(38.76)	(34.50)	(0.10)
Fama French											
alpha	0.05	0.03	0.04	0.12	0.25	0.24	-0.08	-0.01	0.05	0.14	0.09
	(0.34)	(0.36)	(-0.44)	(1.34)	(2.49)	(1.96)	(-0.52)	(-0.08)	(0.34)	(1.03)	(0.44)
MKT	1.07	0.93	1.04	1.05	1.04	0.99	1.07	1.10	1.12	1.10	0.02
	(30.60)	(42.54)	(43.32)	(42.43)	(44.23)	(34.67)	(31.48)	(37.80)	(35.41)	(33.90)	(0.49)
HML	-0.23	0.04	0.07	0.06	-0.07	-0.21	-0.09	0.13	-0.02	0.21	0.43
	(-4.24)	(1.35)	(2.03)	(1.63)	(-1.97)	(-4.92)	(-1.70)	(2.90)	(-0.38)	(4.26)	(5.84)
SMB	-0.14	-0.26	-0.19	-0.09	-0.10	0.06	0.19	0.17	0.07	0.35	0.50
	(-2.80)	(-8.37)	(-5.39)	(-2.50)	(-2.96)	(1.45)	(3.96)	(4.14)	(1.52)	(7.60)	(7.01)

ratio portfolios are low, even negative in value-weighted portfolios. The loadings on HML are non-monotonic. The value-weighted high lease ratio portfolios have higher loadings on MKT compared to the low lease ratio portfolios.

Neither the CAPM, nor the Fama-French three factor model completely explain the return spread in the equally weighted portfolios: High-Low lease ratio portfolio has a CAPM alpha around 11.76%, and Fama-French alpha of 10.44%, which are both statistically significant. The spreads in alphas of value-weighted portfolios are not statistically significant. Based on our results, we do not propose that our lease ratio is a separate risk factor that is not captured by these factors, but rather that our lease ratio is systematically related to SMB.

2.5. *Unlevered Equity Returns*

We also consider whether the impact of our lease ratio is related to financial leverage. In Table 1, we see that high lease ratio firms have lower financial leverage. This could imply that leasing and debt are substitutes, or managers offset the risk of lease factors on equity through lower financial leverage. In the Fama-Macbeth regressions, financial leverage does not have an impact on the marginal power of our lease ratio. However, we cross check our results using portfolio sorts with unlevered excess returns. For each firm, we compute the unlevered cost of equity from the standard weighted average cost of capital formula as below:

$$R^{U}_{i,m,t}=\left[R_{i,m,t}\left(1-L_{i,t-1}\right) + R^{B}_{i,m,t}\, L_{i,t-1}\left(1-\rho_{t-1}\right)\right]- R^{T}_{m,t} \tag{5}$$

where $R_{i,m,t}$ denotes the monthly stock return of firm i over month m of year t, $R^{T}_{m,t}$ denotes the one-month Treasury bill rate in month m of year t, $R^{B}_{i,m,t}$ denotes the monthly debt return of firm i over month m of year t and $L_{i,t-1}$ denotes the leverage ratio, defined as the book value of debt over the sum of the book value of debt plus the market value of equity at the end of year t-1. ρ_{t-1} is the firm's tax rate.

Firm-level corporate bond data are rather limited, and only a small percentage of firms have corporate bond ratings in Compustat (item SPLTICRM). To construct bond returns, $R^B_{i,m,t}$, for firms without bond ratings, we follow Liu et al. (2009). The computation involves imputing bond ratings for all firms in our sample following the procedure in Blume et al. (1998). In order to impute bond ratings we first estimate an ordered probit model that relates credit ratings to observed explanatory variables using all the firms that have credit ratings. Second, from this regression, we calculate the cutoff values for each rating. Third, we estimate the credit scores for firms without credit ratings using the coefficients estimated from the ordered probit model and impute bond ratings by applying the cutoff values for the diffelease credit ratings. Finally, we match the corresponding corporate bond returns to a given credit rating for all the firms with the same credit rating. The bond return data is from Barclays Capital U.S. Long Term Corporate Bond Returns for the rating categories Aaa, Aa, A, Baa and High Yield. The data source is Morningstar.

The ordered probit model contains the following explanatory variables: interest coverage, the ratio of operating income after depreciation (item OIADP) plus interest expense (item XINT) to interest expense; the operating margin, the ratio of operating income before depreciation (item OIBDP) to sales (item SALE), long-term leverage, the ratio of long-term debt (item DLTT) to assets (item AT); total leverage, the ratio of long-term debt plus debt in curlease liabilities (item DLC) plus short-term borrowing (item BAST) to assets; the natural logarithm of the market value of equity (item PRCC_C times item CSHO) deflated to 1973 by the consumer price index; as well as the market beta (CRSP data item BETAV) and standard deviation of returns (CRSP data item

SDEVV). Data on rating categories start in January 1973. We measure ρ_{t-1} as the statutory corporate income tax rate. From 1973 to 1978, the tax rate is 48 percent, drops to 46 percent in 1986 and then to 40 percent in 1987, and further to 34 percent in 1987and stays at that level afterward. The source is the Commerce Clearing House, annual publications.

We repeat our portfolio sorts using the unlevered future excess returns as our cost of capital measure. Table 5 presents the equal and value-weighted expected excess unlevered returns of decile portfolios sorted on lease ratio. In equal-weighted returns, the spreads are slightly smaller, but still significant. In value weighted returns, the spread is only significant during contractions. For bigger firms, part of the effect of operating leases on equity risk could be offset by financial leverage. When we adjust our lease ratio for industry effects, the value-weighted unlevered return spread becomes significant. Overall, we find that the effect of operating leases is stronger for smaller firms than bigger firms since their financing is more dependent on operating leases.

2.6. *Portfolio Sorts of Industry Adjusted Lease Ratio*

The capital composition of firms differs among industries. For example, airlines and retail industries are known to be heavy users of operating leases. In order to compare firms from different industries, we calculate industry-adjusted lease ratios for firms. Every year, we form industry portfolios using two-digit SIC codes and calculate the average lease ratio within each portfolio. Then we divide the firm’s lease ratio to the corresponding industry’s lease ratio. This fraction tells us whether the lease ratio of the firm is high or low compared to the industry average. In June of each year, we rank stocks according to this industry-adjusted lease ratio and group them into decile portfolios. There must be at least five firms each year from each two digit SIC code in order to

Table 5

Excess unlevered returns for lease ratio sorted portfolios

This table reports the average unlevered expected returns of lease variable sorted portfolios (we report portfolio 1, which we label as "Low", and 10, which we label as "High"). R^e_{EW} is equal-weighted monthly excess returns (excess of risk-free rate). R^e_{VW} is value-weighted monthly excess returns (%). δ^e_{EW} and δ^e_{VW} are the corresponding standard deviations. t-statistics are reported in parentheses.

	Expected Returns, July 1976-June 2011										
	All states, 420 months										
	Low	2	3	4	5	6	7	8	9	High	High-Low
R^e_{EW}	0.54	0.65	0.62	0.81	0.75	0.91	0.86	1.09	1.07	1.23	0.69
t	(2.41)	(3.05)	(2.97)	(3.74)	(3.42)	(4.01)	(3.43)	(4.25)	(4.38)	(4.87)	(4.66)
δ^e_{EW}	4.59	4.34	4.30	4.43	4.52	4.64	5.11	5.23	5.02	5.18	3.04
R^e_{VW}	0.45	0.33	0.37	0.54	0.59	0.58	0.36	0.48	0.53	0.73	0.28
t	(1.87)	(1.93)	(1.89)	(2.60)	(2.80)	(2.63)	(1.51)	(2.15)	(2.35)	(3.03)	(1.40)
δ^e_{VW}	4.96	3.54	4.04	4.24	4.31	4.50	4.94	4.57	4.63	4.97	4.10
	Expansions, 348 months										
R^e_{EW}	0.57	0.62	0.58	0.76	0.69	0.84	0.79	0.98	0.99	1.04	0.47
t	(2.69)	(3.06)	(2.85)	(3.49)	(3.18)	(3.69)	(3.12)	(3.71)	(3.90)	(4.09)	(3.04)
δ^e_{EW}	3.96	3.79	3.80	4.04	4.05	4.27	4.73	4.94	4.72	4.76	2.89
R^e_{VW}	0.58	0.39	0.43	0.59	0.71	0.64	0.43	0.49	0.51	0.61	0.03
t	(2.41)	(2.19)	(2.19)	(2.89)	(3.24)	(2.76)	(1.77)	(2.16)	(2.21)	(2.50)	(0.15)
δ^e_{VW}	4.50	3.31	3.65	3.83	4.07	4.33	4.52	4.27	4.30	4.56	3.88
	Contractions, 72 months										
R^e_{EW}	0.38	0.77	0.82	1.07	1.06	1.21	1.17	1.58	1.49	2.14	1.76
t	(0.48)	(1.03)	(1.13)	(1.52)	(1.44)	(1.70)	(1.51)	(2.10)	(2.04)	(2.69)	(4.30)
δ^e_{EW}	6.80	6.32	6.11	5.95	6.25	6.05	6.61	6.38	6.22	6.74	3.47
R^e_{VW}	(0.16)	0.06	0.11	0.26	0.02	0.28	0.06	0.41	0.63	1.32	1.49
t	(-0.21)	(0.12)	(0.17)	(0.38)	(0.03)	(0.46)	(0.08)	(0.60)	(0.90)	(1.72)	(2.62)
δ^e_{VW}	6.67	4.43	5.52	5.78	5.28	5.21	6.56	5.74	5.92	6.52	4.81

include firms from that industry. Following Fama and French (1993), we match CRSP stock return data from July of year t to June of year t+1 with industry-adjusted lease ratio for fiscal year ending in year t-1. Table 6 presents the excess returns and unlevered returns of industry-adjusted lease ratio sorted portfolios. Our results show that the spread is higher both in equal and value- weighted portfolios sorted with adjustment compared to the portfolios formed without industry adjustment.

Table 6

Portfolio sorts on industry-adjusted lease ratio

This table reports the average excess returns of industry adjusted lease variable sorted portfolios (we report portfolio 1, which we label as “Low”, and 10, which we label as “High”). R_{EW}^{e} is equal-weighted monthly excess returns (excess of risk free rate). R_{VW}^{e} is value-weighted monthly excess returns (%). δ_{EW}^{e} and δ_{VW}^{e} are the corresponding standard deviations. t-statisitics are reported in parentheses. Expected returns are measured in the year following the portfolio formation, from July of year t+1 to June of year t+2. Industry adjusted lease ratio is the firm’s lease ratio ivided by the average lease ratio of the industry to which the firm belongs. We exclude financials and utilities.

Levered Returns, July 1976-June 2011

	Low	2	3	4	5	6	7	8	9	High	High-Low
R_{EW}^{e}	0.77	0.99	1.06	1.17	1.20	1.20	1.27	1.42	1.56	1.89	1.11
t	(2.54)	(3.37)	(3.69)	(4.02)	(4.13)	(4.04)	(4.23)	(4.53)	(4.77)	(5.53)	(7.44)
δ_{EW}^{e}	6.25	6.02	5.91	5.96	5.96	6.10	6.14	6.44	6.73	6.99	3.07
R_{VW}^{e}	0.51	0.48	0.60	0.46	0.64	0.58	0.71	0.82	0.85	0.95	0.44
t	(1.54)	(1.91)	(2.70)	(2.00)	(2.64)	(2.40)	(2.70)	(2.94)	(2.88)	(2.88)	(1.98)
δ_{EW}^{e}	6.75	5.15	4.58	4.69	4.96	4.93	5.40	5.72	6.09	6.77	4.61

Unlevered Returns, July 1976-June 2011

	Low	2	3	4	5	6	7	8	9	High	High-Low
R_{EW}^{e}	0.59	0.74	0.69	0.79	0.71	0.75	0.81	1.03	1.05	1.41	0.83
t	(2.57)	(3.39)	(3.21)	(3.66)	(3.29)	(3.57)	(3.60)	(4.27)	(4.11)	(4.88)	(5.61)
δ_{EW}^{e}	4.67	4.44	4.39	4.43	4.42	4.31	4.63	4.92	5.23	5.93	3.02
R_{VW}^{e}	0.44	0.44	0.41	0.37	0.42	0.49	0.51	0.62	0.54	0.82	0.38
t	(1.64)	(2.15)	(2.27)	(1.93)	(2.08)	(2.49)	(2.29)	(2.72)	(2.25)	(2.93)	(1.86)
δ_{EW}^{e}	5.53	4.17	3.71	3.93	4.14	4.04	4.58	4.69	4.91	5.75	4.15

2.7. *Cash Flow Sensitivity*

We investigate further whether there are systematic differences in the sensitivity of high and low lease ratio firms' cash flows to aggregate shocks in the economy. The existence of such a difference could support the operating leverage mechanism behind the risk and return differences between high and low lease ratio firms. We expect that the cash flows of firms with high lease ratios would be more sensitive to aggregate shocks than the cash flows of low lease ratio firms. The measure for cash flow is the firm's income before extraordinary items plus depreciation. We estimate the following pooled time series/cross sectional regressions of the form:

$$\Delta CashFlow_{i,t}=\propto_i +\beta\Delta CashFlow_{agg,t}+u_{i,t} \qquad (6)$$

where $\Delta CashFlow_{i,t}$ is the change in the cash flows of firm i between year t -1 and t, scaled by firm's assets in year t-1. $\propto_i$ captures the individual firm effect and we proxy aggregate shocks with the cross sectional average of $\Delta CashFlow_{i,t}$ over all firms in our sample. Since we use ΔCashFlow on each side of the regression, at the firm level on the left hand side and aggregate on the right hand side, we can interpret the regression coefficient as the firm's cash flow beta to aggregate shocks. We divide firms into 10 lease ratio deciles based on their lease ratio in year t-1, and we run panel regressions in each lease ratio decile and present the regression coefficients in Table 7. High lease ratio firms have higher sensitivity to aggregate shocks in the economy. The regression coefficient is 1.36 for the firms in the highest lease ratio group, and 0.23 for the lowest lease ratio group. Firms' cash flow betas are increasing monotonically with their operating lease ratios.

Table 7

Cash flow regressions for lease ratio sorted panels

The table presents the results of panel regressions of change in firm level cash flow on change in aggregate cash flow. Change in cash flow is measured as the level difference between cash flows at time t and t-1, scaled by total assets at time t-1. Change in aggregate cash flow is measured as the cross sectional average of firm level changes. Firms are sorted into 10 decile groups based on the past year's lease ratios. The sample period is 1975-2009. Standard errors are clustered by firm. t-statistics are in parentheses.

Dependent Variable: $\Delta CashFlow_{i,t}$

	Low	2	3	4	5	6	7	8	9	High
$\Delta CashFlow_{agg,t}$	0.23	0.36	0.53	0.71	0.55	0.55	0.79	0.80	0.85	1.36
	(1.73)	(3.38)	(3.47)	(3.82)	(3.37)	(3.19)	(4.29)	(3.65)	(2.87)	(6.21)

2.8 *Persistency of the Lease Ratio*

We are also interested in whether level of operating leases is a firm characteristic which shows persistency in the short run. We expect that the firm's fraction of leased capital change over time depending on the firm's life cycle. However, the probability of a firm moving from a certain decile to other deciles in the next period should not be high since leased capital is difficult to adjust in the short run. Table 8 presents the transition probability matrix for the firms in our sample sorted into lease ratio decile portfolios. The probability of staying in the lowest lease ratio portfolio is 58%, whereas the probability of staying in the highest lease ratio portfolio is 67%. The higher probabilities along the diagonal show that there is some persistency in the ratio of operating leases. The drop-off probabilities in Table 8 shows the probability that a firm in a given lease ratio portfolio will disappear from our sample in the next year. The reasons for drop-off could be either firm failure or a missing data item in the next year. The probability of drop-off is higher for the firms in the highest lease ratio portfolio. Excluding the first decile, the drop-off rate is monotonically increasing. Therefore we can interpret the higher drop-off rates of high lease ratio firms as the higher probability of failure.

Table 8

Portfolio transition probabilities

This table reports the transition probability matrix for the firms sorted into lease ratio decile portfolios. Drop-off is the probability that a firm in a given lease ratio portfolio will disappear from the sample in the next year.

		Year t										
		Low	2	3	4	5	6	7	8	9	High	Drop off
Year t-1	Low	58%	17%	5%	2%	2%	1%	1%	1%	0%	0%	12.7%
	2	14%	42%	19%	6%	3%	2%	1%	1%	0%	0%	10.7%
	3	4%	16%	35%	19%	7%	4%	2%	1%	1%	0%	10.3%
	4	2%	5%	16%	31%	20%	8%	3%	2%	1%	1%	10.6%
	5	1%	2%	6%	18%	30%	19%	8%	3%	1%	0%	10.8%
	6	1%	1%	3%	7%	18%	31%	19%	7%	2%	1%	11.1%
	7	1%	1%	1%	3%	6%	17%	32%	19%	6%	1%	12.3%
	8	0%	0%	1%	2%	2%	5%	17%	37%	19%	3%	12.2%
	9	0%	0%	0%	1%	1%	2%	4%	16%	46%	16%	12.5%
	High	0%	0%	0%	0%	0%	1%	2%	2%	13%	67%	13.8%

3. Conclusion

This paper provides empirical evidence about the link between the firm’s level of non-cancellable operating lease commitments and expected stock returns, offering an economic explanation as to how firm characteristics can predict returns. Our interpretation of the return differences of the lease ratio portfolios is that firms who have higher operating leases have also higher operating leverage and consequently are riskier than firms with lower levels of operating leases. These firms with high levels of non-cancellable operating leases are particularly risky in recessions.

There are several dimensions of operating leases that our simple lease ratio ignores here. For example, the nature of the lease contract, maturity structure and the restrictions on how the asset can be deployed or utilized (Tuzel, 2010) may affect the flexibility of the lease commitments. Currently FASB and IASB is working on a converged accounting standard for firms' leasing activities. When the boards implement the new accounting rule on leases, we expect to have a more detailed disclosure of the firm's operating leasing contracts in the financial statements, then we can have a better picture of the firm.

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