The role of economic and reporting incentives in operating lease use: Evidence from the airline industry

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Abstract

Accounting for leases has long been a controversial topic for standard setters, practitioners, and researchers. The current accounting standards' off-balance sheet treatment of operating leases is often criticized for facilitating opportunistic reporting. However, the accounting criteria for operating lease classification exhibit significant overlap with the tax and bankruptcy classifications of true leases, which are treated differently from security interests. Additionally, operating leases provide companies with more flexibility than ownership. We use a novel sample of publicly-traded and privately-held airlines to study the extent to which these reporting incentives and economic factors explain the use of operating leases. In cross-sectional tests, we find significantly higher use of operating leases among privately-held airlines. We find that proxies for financial risk, the need for flexible capacity and, to a lesser extent, tax incentives can explain these cross-sectional differences. We also study changes in lease activity around going-public transactions and large borrowings, and find no evidence of increased use of operating leases around these events. Our findings suggest that the separate treatment of operating and capital leases provide useful information about the underlying economics of the transactions to the users of financial statements.

JEL classification: G32; G33; K34; M41.

Keywords: Lease accounting; reporting incentives; airlines; bankruptcy code; tax code; operating flexibility.

1 Introduction

Current accounting rules distinguish between operating leases, which companies treat as executory contracts, and capital leases, which companies explicitly treat as financing by recording assets and liabilities (ASC-840). The separate treatment of leases originates from the commercial law (Uniform Commercial Code Articles 2A and 9), which aims to distinguish transactions based on their underlying economics. However, critics of lease accounting contend that the use of operating leases makes companies "look less indebted than they really are" (e.g., Rapoport 2013). Partly in response to such criticisms, the Financial Accounting Standards Board (FASB) has proposed revisions to lease accounting that require companies to recognize assets and liabilities associated with virtually all leases (FASB 2013). In this study, we utilize a comprehensive sample of publicly-traded and privately-held airlines to shed light on the extent to which financial reporting preferences and non-reporting factors determine the use of operating leases. We find that privately-held airlines have significantly greater use of operating leases than publicly-traded airlines, and that the private and public firms make approximately the same use of operating leases after controlling for non-reporting determinants of leases. Our findings suggest that the separate classification of leases as operating and capital leases is informative about the underlying economics of the firm, and they cast some doubt on the notion that reporting concerns play a dominant role in the use of operating leases.

Similar to the current accounting designation of capital leases as *de facto* financing, bankruptcy courts and tax rules distinguish between "true leases" and what amounts to a security interest. The accounting classification for operating leases exhibits significant overlap with both the bankruptcy and tax classifications for true leases (See Eisfeldt and Rampini 2009, Table 1 for a summary). For example, an operating lease always qualifies as a true lease for the tax purposes

(e.g., Fabozzi 2006, p. 211).[1] This overlap is important for investors as the treatments of true leases from bankruptcy and tax perspectives significantly differ from those of security interests.

In the event of non-payment, true leases facilitate repossession by financiers, saving the cost and time of navigating a bankruptcy settlement (Littlejohns and McGairl 1998). While repossession harms debtors *ex post*, it gives them the *ex ante* benefit of access to more equipment than they might obtain with traditional secured financing. Eisfeldt and Rampini (2009) provide evidence that the use of true leases expands firms' borrowing capacity. Beatty et al. (2010) find evidence that manufacturers with low accounting quality use leases, consistent with leases increasing financing capacity by reducing financiers' risk.

In addition to financier protections, true leases provide tax and operational efficiencies. The asymmetric treatment of losses makes it tax efficient for firms with low profits to lease assets from firms with sufficient taxable income to utilize deductions for depreciation (e.g., Berk and Demarzo 2011, Ch. 25). Gavazza (2011a) provides evidence that operating flexibility plays a major role in aircraft leasing decisions. Shleifer and Vishny (1992) note that "[t]he institution of airline leasing seems to be designed partly to avoid fire sales of assets". In particular, leasing provides a simple way for airlines to adjust their capacity.

Because of the overlap between the definition of true leases and operating leases, financial statement users can use operating leases as a reasonable approximation of companies' true leases. As such, we consider financial risk, taxes, and operational flexibility as three major non-reporting determinants of operating lease use. In contrast, the FASB's current exposure draft places no emphasis on the role of these factors in operating lease use. The term "true lease" does not appear in the exposure draft, and the only mention of bankruptcy is in relation to an example

[1] Companies can utilize differences in book and tax consolidation rules to structure synthetic leases that receive operating lease treatment for book purposes and loan treatment for tax purposes (e.g., Little 1997).

where it pertains to a write-off of accounts receivable unrelated to leases. The exposure draft also makes no mention of the tax classification of leases (FASB 2013). Instead, the proposed changes to accounting rules are primarily motivated by the concern that existing standards fail to meet the needs of users of financial statements as they keep operating leases off-balance sheet.[2]

The proposed treatment of leases can impact the usefulness of financial statements.[3] Watts (2003) argues that some financial statement users, especially lenders, utilize balance sheets to estimate firms' liquidation values. In support of this view, Demerjian (2011) provides evidence that lenders curtail the use of balance sheet-based covenants as they become less reflective of liquidation values. True leases vanish in the event of liquidation (Chapter 7) as the lessors are allowed to rapidly repossess the asset whereas security interests are subject to certain automatic stay rules. While in Chapter 11 bankruptcies, Section 1110 gives equal treatment to lessors and other secured lenders of certain aircrafts and aircraft components, the bankruptcy code establishes that non-aircraft claims of secured lenders are more diluted than comparable claims of lessors. For example, after filing for Chapter 11 in 2002, United Airlines sought a declaratory judgment that $155 million of its non-aircraft leases be treated as secured financing, a treatment which allows the airline to keep the assets without making the full payment (United Airlines Inc., v. HSBC Bank USA, N.A. 416 F.3d 609, 7th Cir. 2005).[4] Because of the differential treatment of true leases in bankruptcies, the recognition of assets and liabilities from true leases can detract from the ability to use the balance sheet to determine liquidation values.

[2] See, however, the September 9, 2013 comment letter from the FASB's Investor Advisory Committee that, while somewhat supportive of recognizing lease liabilities, clearly states a preference for the current income and cash flow treatment of operating leases.

[3] According to an estimate by The Equipment Leasing and Finance Association the new rules will increase total assets of US companies by about $2.0 trillion (11% increase in debt) and decrease total shareholders' equity by $96 billion (ELFA 2011).

[4] Another example is Continental Airlines which, upon filing for Chapter 11 in 1991, requested that some of its aircraft related leases be regarded as debt securities and the lessors disagreed (In re Continental Airlines, Inc. 932 f.2d 282, 3d Cir. 1991). Section 1110 of Chapter 11 was revised in 1994 to provide special provisions for certain aircraft and aircraft parts.

Altamuro et al. (2013) provide evidence that lenders and ratings agencies attempt to distinguish true leases from security interests, and attempt to make *pro forma* capitalizations of only security interests (Also see Bratten et al. 2013). To the extent that operating leases reflect the underlying economics of true leases, the off-balance-sheet treatment of operating leases may enhance the usefulness of financial statements both for estimating liquidation values, and for forecasting the tax effects of leases.

The airline industry provides a unique setting that allows us to examine the relative extent to which underlying economic reasons, versus window dressing incentives, impact the use of operating leases. The US Bureau of Transportation Statistics (BTS) collects financial and operational data for all airlines operating in the US. Airlines file reports with the BTS under the Uniform System of Accounts and Reports. These reports follow generally accepted accounting principles as prescribed by the FASB. This allows us to measure the extent of operating lease use by both publicly and privately-held airlines. Similar to Beatty and Harris (1999) and Beatty et al. (2002), we utilize the firms' public status to proxy for the incentive to engage in window dressing. We measure the use of operating leases using financial statement based methods from prior studies, as well as using a direct measure based on aircraft ownership data, which identifies the nature of the airlines' interest in the aircraft.

We find that private airlines make much greater use of operating leases than public airlines. Further analysis shows that economic determinants explain this difference, rather than private status *per se*. Specifically, we find no statistically significant association between operating leases and private status after controlling for proxies of tax incentives, bankruptcy risk, and the need for operational flexibility. On the other hand, we find support for economic determinants, especially bankruptcy risk and operating flexibility, playing major roles in

operating lease use. We then extend our analysis to debt markets and find no significant change in the use of operating lease use prior to major debt issuances.

This study contributes to the literature on the accounting for leases by providing evidence that the separation of operating and capital leases is informative about the underlying economics of transactions and that reporting considerations likely play a secondary role to the economic determinants of leases. To the extent that public status and large borrowings create incentives to engage in window dressing, we show that these events have little effect on leasing by airlines. In contrast, the use of operating leases appears to depend on incentives related to financial risk and the need for flexible capacity. The statistical significance of the effect of taxes depends on the specification. These findings contribute to the debate on accounting for leases by showing that the two-type classification of leases provides useful information to users of financial statements. Our findings suggest that a principles-based standard for lease accounting that considers the underlying economic rationale for leasing could be a better approach for addressing the issues that arise as a result of the bright-line rules in lease accounting than eliminating operating lease classification.

Aircraft leasing has several unique features that may limit the generalizability of our results; however, we believe that these affect the costs and benefits of leasing rather than incentives to use leases for window dressing. First, many types of aircraft trade in relatively deep markets, which facilitates redeploying aircraft (Gavazza 2010). Second, aircraft lessors can repossess planes following missed payments, albeit with varying levels of difficulty (e.g., Joiner 2010). Third, the benefits of leasing aircraft from a bankruptcy perspective changed significantly with the revision of Section 1110 of the bankruptcy code, which applies to reorganizations (Chapter 11 bankruptcies) but not liquidations (Chapter 7). In particular, Section 1110 conveys

secured lenders, including leases deemed to be security interests, nearly the same rights as lessors of true leases (ABA 2003). This rule, which applies only to aircraft placed into service after 1994, gives repossession rights to financiers if the debtor fails to satisfy its obligations within sixty days.[5]

The remainder of the paper proceeds as follows. Section 2 develops our hypothesis and explains our research design. Section 3 describes our data and provides summary statistics. Section 4 provides our main analysis of the use of leases by airlines. Section 5 concludes.

2 Hypothesis development and research design

The current accounting standards distinguish between on-balance-sheet capital leases and off-balance-sheet operating leases based on bright-line rules. The rule-based approach creates the possibility that firms structure leases to manipulate their financial statements (e.g., Imhoff and Thomas 1988; Dechow et al. 2011).[6] In fact, in the absence of valid economic concerns, there is little reason, other than the reporting incentives, for firms to have a preference for operating leases.

However, there are several possible economic reasons for using operating leases. First, the definition of operating leases largely overlap with the bankruptcy code definition of true leases, which give lessors more favorable treatment in bankruptcy than financial leases. In true leases the ownership of the equipment belongs to the lessor, and hence the lessor enjoys the right to reclaim the property with relative ease. In contrast, in financial leases the lessor has merely security interest, which makes it more similar to debt than a true lease. Thus, risky firms could find it easier to lease equipment, as leasing places little risk on the lessor in the case of

[5] The common interpretation of "placing into service" is the date equipment is delivered by the manufacturer to the initial user (Resnick and Sommer 2011, chapter 24). Considering that the average useful life of commercial aircraft is around 30 years (e.g., Jiang 2013), the impact of the rule was likely gradual.

[6] This issue is different from investors' ability to process off-balance sheet information (Ely 1995; Ge 2006). Lipe (2001) provides a discussion on both issues and calls for more research on accounting for leases.

bankruptcy. Second, the definition of operating leases also overlaps with the tax code definition of true leases.[7] Taxes are widely cited as one of the most important reasons for using leasing. Miller and Upton (1976) show that in a Modigliani-Miller setting, firms are indifferent between leasing and buying unless they face different tax rates. Myers, Dill, and Bautista (1976) provide a formula for evaluating lease vs. buy decision and show that, *ceteris paribus* lower tax rate firms are better off by leasing since incremental cash flows from leasing are positive in the earlier periods and negative in later periods. Third, the flexibility of leases is also widely cited as a major reason for choosing operating leases over alternatives. For example, AWAS, one of the leading lessors of aircrafts, markets operating leases as: "[c]ustomers gain operating flexibility through lease periods where there is a predefined exit route if and when the airline requires it". Additional reasons that have been suggested for leasing in the literature include: a monopolist lessors' interest in reducing competition/extending his market power (e.g., Waldman 1997; Hendel and Lizzeri 1999) and economizing transaction costs (e.g., Flath 1980; Gavazza 2011b).

Similar to Beatty and Harris (1999) and Beatty et al. (2002), we use firms' public/private status as a proxy for window dressing incentives.[8] In particular, we estimate fractional logit regressions of the following form for airline i and quarter q:[9]

$$\%\ \text{Leased}_{iq} = \Lambda\left(\beta_0 + \beta_1 \text{Public}_{iq} + \beta_2 \text{Financial risk}_{iq} + \beta_3 \text{Tax}_{iq} + \beta_4 \text{Volatility}_{iq} + e_{iq}\right), \quad (1)$$

where Λ denotes the logistic function, % Leased denotes the relative use of leases, and the other variables represent proxies for financial risk, tax motivations, and volatility of operations. We now describe our specific measures. In equation (1), Public is defined as an indicator variable

[7] See Eisfeldt and Rampini (2009), Table 1 for a comparison of rules.
[8] See Burgstahler et al. (2006) for an alternative perspective. They find evidence that private firms engage in more earnings management; however, aside from their evidence related to tax incentives, it is not clear why managers of private firms would wish to engage in more earnings management.
[9] In the next revision of this study we plan to include an aircraft level test which would allow us to identify the determinants of lease choice at the aircraft level. We also plan to examine the effect of the changes in Chapter 11 Section 1110 on operating lease use using this specification.

that equals one if the airline has publicly-traded equity and zero otherwise. If reporting incentives provided by the equity market play an important role in operating lease use, we expect a positive coefficient on this indicator variable, controlling for the other factors.

By facilitating repossession of assets, leasing can make financing available to financially risky firms at a lower cost than secured lending (Sharpe and Nguyen 1995; Eisfeldt and Rampini 2009). We accordingly predict that the association between financial risk and leasing holds in our sample. We measure bankruptcy risk using Chava and Jarrow's (2004, Table III) private firm application of the Shumway (2001) hazard model for predicting bankruptcy:[10]

$$\text{Financial risk}_{iq} = \Lambda\left(-8.2909 - 3.5646 \times \frac{\text{Net income}_{iq}}{\text{Total assets}_{iq}} + 3.5618 \times \frac{\text{Total liabilities}_{iq}}{\text{Total assets}_{iq}}\right). \quad (2)$$

We expect financial risk to have a positive relation with the use of leases.

Because gains incur immediate tax payments while firms can use losses to offset past or future taxes on gains, firms with low tax rates have incentives to finance via true leases (e.g., Graham, Lemmon, and Schallheim 1998; Berk and DeMarzo 2011). Interest and depreciation tend to generate front-loaded tax deductions that benefit only companies with sufficiently high taxable income. We use firms' effective tax rates (Income tax expense / Pretax income) as a proxy for tax incentives to lease, and expect it to have a negative relation with the use of leases.

Gavazza (2011b) provides evidence that leases facilitate capacity adjustments. Companies can both acquire and return leased equipment more efficiently than they can acquire and dispose of equipment that they own. We expect airlines with volatile capacity needs particularly value this facet of leases. We proxy for volatility of capacity and operating flexibility using the variance of seasonally-differenced revenues scaled by beginning total assets, and size

[10] The coefficients are from the 'Private firm model with industry effects' model in Chava and Jarrow (2004, Table III, Panel A), for the 'transportation, communications, and utilities' (IND3) grouping.

of the airline, measured as the total revenues.[11] We expect high volatility firms to use more operating leases to facilitate capacity adjustments, and that larger firms use less because they have more ability to redeploy aircraft within their own routes. As an alternative specification of equation (1) we measure operating lease use and operating flexibility based on aircraft and flight route counts. These non-financial variables allow us to examine how physical counts map into financial statements and check the robustness of our findings with respect to alternative measurement methods. The drawback of physical count data is that it is available with only annual frequency, it covers a shorter time period, and it does not take into account the relative costs of the aircraft. For example, if an airline has an equal number of large and small aircraft, but tends to lease the large aircraft, the financial statement measures would reflect this but the quantity-based measure would not.

3 Data and summary statistics

We obtain airlines' quarterly financial data from the US Department of Transportation's Bureau of Transportation Statistics (BTS). Per Part 241 of Code of Federal Regulations Title 14, all large certified air carriers are required to provide periodic reports to the BTS.[12] These filings are uniform across air carriers and are based on generally accepted accounting principles.[13] Specifically, we utilize data from Form 41 schedules B-1 (Quarterly balance sheets), B-43 (Annual inventory of airframe and aircraft engines), P-1.2 (Income statement), P-6 (Operating

[11] Both size and revenue volatility can also be correlated with financial risk. In particular, to the extent that revenue volatility leads to earnings volatility, it will be related to financial risk.

[12] A large certified air carrier is as an air carrier that operates aircraft designed to have a maximum passenger capacity of 60 or more or a maximum payload capacity of more than 18,000 pounds and operates in at least one terminal outside of the United States.

[13] In particular, Section 2-1, Paragraph (a) of Part 241 states: "The accounting provisions contained in this part are based on generally accepted accounting principles (GAAP). Persons subject to this part are authorized to implement, as prescribed by the Financial Accounting Standards Board, newly issued GAAP pronouncements until and unless the Director, Office of Airline Information (OAI), issues an Accounting Directive making an initial determination that implementation of a new pronouncement would adversely affect the Department's programs." For carriers that operate in more than one region the balance sheet and income statement data are provided separately for each region. We aggregate these data items over regions for each carrier.

expenses), B-12 (Cash flow statement) and T-100 Market (Flight origins/destinations). With the exception of the inventory data and cash flow statement data, data items are available from the first quarter of 1990 till the last quarter of 2012. Cash flow statement data are available starting the third quarter of 1997 and the inventory data are available with annual frequency starting 1992.[14]

To identify the ownership type (private/public) of each air carrier in a given quarter, we conduct searches on the *SEC Edgar*, *CRSP*, *Compustat*, and the official company websites. When necessary we also use additional online resources through Google searches. To the extent possible, we cross check the dates among these sources to ensure the validity of classifications. For airlines that were held by a parent company (e.g., United Air Lines – UAL Corp.), we identify ownership status based on that of the parent company. We manage to identify the ownership status as well as the parent company of all airlines for the sample period.

As presented in Table 1, we begin with an initial sample of 144 airlines and 5,679 airline-quarters. Of this initial dataset, we exclude Southern Air Transport which was once owned and later operated as a front company for the Central Intelligence Agency and was allegedly involved in arms/drug trafficking for several years prior to its shutdown (Farnsworth 1987).[15] We also exclude 28 transition quarters during which an airline's ownership status switched from public to private or from private to public. Additionally, we exclude 197 airline-quarters that lack valid data on total assets, total revenues, net income, shareholders' equity, rental expense and

[14] Data from cash flow statement (Schedule B-12) are not available as a machine readable dataset from the BTS. Accordingly we have requested actual filings from the Department of Transportation for all periods the records were kept (2004-2012). The filings for pre-2004 periods were not available from the Department of Transportation but filings for post-1997Q2 period were available from a third-party data vendor (www.airlineinfo.com) which we utilized. The filings for prior periods were not available in either source or in any other that we have contacted. The cash flow statement data is manually coded for analyses.

[15] While a second airline (Evergreen Airlines) is also speculated to have ties with the CIA, officially it has never been owned by the CIA. Accordingly we do not exclude it from the sample. Our results are robust to the exclusion of this airline.

depreciation and accordingly cannot be used in the analysis. Our final dataset includes 142 airlines 5,421 airline-quarters.

(Insert Table 1 about here)

We build three measures of operating lease usage. Following Sharpe and Nguyen (1995) and Eisfeldt and Rampini (2009) our first measure is based on the quarterly income statement values:[16]

$$\%\ Leased\ \left(I/S\right) = \frac{rental\_expense}{rental\_expense + depreciation + r \times noncurrent\_assets}. \qquad (3)$$

In equation (3) the numerator, rental expense (Schedule P-6, Rentals) reflects the cost of operating leases and the denominator reflects the total cost which is equal to the cost of operating leases and the implicit rental cost of non-current assets. Depreciation is the depreciation expense (Schedule P-6, Depreciation), *r* is the firm's effective interest rate (defined as interest expense divided by total long term debt and capital leases). When the effective interest rate is missing or non-positive, we use the average of one quarter lagged and one quarter ahead cost of borrowing and when only one of the lagged or future cost of borrowing is available we use that value.[17] When both of the values are missing we set *r* equal to the median borrowing cost of all airlines in that quarter. We define non-current assets as total assets (Schedule B-1, Assets) minus current assets (Schedule B-1, CurrAssets).

The second measure of operating lease use is based on balance sheet values. This measure assumes capitalization of rolling-four-quarter operating leases using an "8x" multiple, a common practice among investors and rating agencies (e.g., Moody's 2004):

[16] This approach is analogous to the perpetuity measure of Lim, Mann, and Mihov (2005), which they show as the best predictor of future leasing expenses.
[17] When missing, long-term debt and capital lease values are set to zero. All findings remain similar when we treat these observations as missing.

$$\%\ Leased\ \ (B/S) = \frac{rolling\_rental\_expense \times 8}{rolling\_rental\_expense \times 8 + noncurrent\_assets}. \quad (4)$$

In addition to the two financial statement based measures of operating lease use, we build a third measure based on the fraction of aircraft under operating leases. This measure is based on data from Schedule B-43 which is available annually starting 1992:

$$\%Leased = \frac{\#\ of\ \ Aircraft\ under\ operating\ lease}{Total\ \#\ of\ \ aircraft} \quad (5)$$

In the main specification of equation (1) we measure operating flexibility of the airlines using current quarter *Total Revenue* (Schedule P-1.2, OpRevenues) which we use as a measure of firm size, and $Volatility_{revenue}$, the variance of the seasonally differenced revenues (defined as the difference between current quarter and four quarter lagged revenues scaled by beginning total assets) over the past eight quarters.[18] To measure the financial risk, we use the *Financial Risk* measure defined by equation (2). The ratios used in calculation of this measure are total liabilities divided by total assets, and four-quarter-rolling net income (Schedule P-1.2, NetIncome) divided by total assets both measured at the end of the current quarter. Liabilities are defined as the difference between total assets and shareholders' equity (Schedule B-1, ShHldEquitNet). To measure the impact of taxes, we use effective tax rate (*ETR*), which is defined as current quarter income tax expense (Schedule P-1.2, IncomeTax) divided by pre-tax income (Schedule P-1.2, IncomePreTax). We require *ETR* to be in between 0 and 1, and treat values that do not satisfy this criterion as missing.[19] When the current quarter ETR is missing, we use the first valid lagged value provided that a valid value is available within the previous four quarters.

[18] We require that a minimum of four quarters of valid data be available for volatility calculation.

[19] Prior studies truncate ETR at 0 and 1 as the number of outliers is typically small (e.g., Eisfeldt and Rampini 2009) and report robustness to exclusion of these observations. In our setting, because losses are not uncommon among airlines, these "outliers" account for over 40% of available observations. Our findings for ETR are sensitive to this treatment and become insignificant in all models when we truncate ETR at 0 and 1.

We also test an alternative specification of equation (1) where we use annual data and focus on *%Leased* as defined by equation (5) as the measure of operating lease use. In this alternative specification we measure operating flexibility using *Routes*, the number of routes that the airline operates as of the end of the measurement year (based on unique origin and destination pairs from T-100), and $Volatility_{aircraft}$ the variance of the annual percentage change in the number of aircraft operated by the airline over the past three years.

Additional control variables include *Profit Margin*, defined as current quarter net income divided by total revenues, and *Age*, defined as the current year minus the year the airline was founded. The foundation year of the airline is identified from the company's own website or from Google searches.

Table 2, Panel A presents descriptive statistics. All variables are winsorized at 1% and 99% level. Consistent with operating leases being a major source of financing in the airline industry, all three measures have median proportions of operating lease that exceed 50%. As we later discuss, leases appear to be an especially important financing source for small- and medium-sized airlines. Airline size, as measured by total revenue, exhibits high skew as indicated by the mean revenues of $538 million, versus the median revenues of $75 million. Airlines exhibit high leverage compared to the mean and median leverage of about 0.53 in Chava and Jarrow (2004). The tax rates appear to be fairly close to the U.S. Federal Corporate tax rate of 35%.

(Insert Table 2 about here)

Table 2, Panel B shows Pearson and Spearman correlations among the three operating lease use variables we employ. The income statement and balance sheet based variables have correlations over 90%. Because the *%Leased* is available annually, we calculate correlations with

%Leased under the assumption that it relates to the last quarter of the year. The correlations of financial statement based operating lease use variables with the aircraft count-based measure are somewhat weaker, ranging from 74% to 79%, consistent with differences in the costs of different aircraft and count-based measure not reflecting financing on other equipment. The high correlations with the financial statement-based variables indicate that they serve as reasonable, but noisy, proxies for the fraction of leased aircraft.

4 Use of operating leases by public versus private airlines

4.1 Comparison of public and private airlines

Table 3 provides a comparison of public and private airlines. *t*-statistic for the difference-in-means test and the *z*-statistic for the Wilcoxon rank-sum test are both based on standard errors clustered at the firm-level (via bootstrapping based on 1,000 draws for Wilcoxon rank-sum test statistic). Based on the median values of the operating lease use measures private airlines use 19% to 28% more operating lease financing than public airlines. The differences in the mean and the median values are statistically significant for the two financial statement based measures and significant for the median value using the aircraft count-based measure. To the extent that public status increases the incentive to manipulate financial statements, these differences are inconsistent with the use of operating leases to "hide" debt from the view of shareholders.

(Insert Table 3 about here)

The preceding univariate comparison of leasing fails to account for the fact that public and private airlines also differ in other aspects. Private airlines are significantly smaller, younger, and they operate in fewer routes. They also have lower effective tax rates and have more volatile operations. Sharpe and Nguyen (1995) and Eisfeldt and Rampini (2009) predict and find that operating lease use declines with size and profitability/cash flows. Graham, Lemmon, and

Schallheim (1998) provide evidence that firms with lower tax rates use more operating leases, consistent with low-profit firms using operating leases to shift assets and the tax deductions from ownership to more profitable lessors. The number of routes an airline operates could determine an aircraft's redeployability and hence operating flexibility, which Smith and Wakeman (1985) cite among the determinants of leasing decisions. Gavazza (2011b) provides evidence that leases facilitate capacity adjustments. Firms that have more volatile operations require more flexibility. Accordingly, these factors need to be controlled for in the comparison of operating lease use by private and public airlines.

Additionally, Table 3 shows that private airlines have higher leverage and financial risk than public airlines, albeit the differences are statistically weak in the rank-sum tests. Eisfeldt and Rampini (2009) find a marginally positive impact of leverage on operating lease use, whereas Sharpe and Nguyen (1995) find that investment grade issuers use operating leases less. Gavazza (2011b) provides a model which predicts more operating lease use by high volatility firms compared to low volatility firms. We control for these factors in the multivariate analysis, which we present next.

Table 4 presents the estimates from the fractional logit model introduced in equation (1). In Table 4 we report results where the dependent variable is *%Leased (I/S)*. We also run the same set of analysis using *%Leased (B/S)* but do not tabulate the estimates as there are qualitatively no differences between the two sets of results. In all specifications we cluster standard errors at the firm-level and include time fixed-effects. Columns (1) - (8) present the association between operating lease use and public/private indicator variable controlling for each factor separately, and Columns (9) – (11) show results with combinations of control variables. To avoid sample attrition due to missing values of variables, we include dummy variables for missing values of

each variable and set the value of the variable to zero.[20]

(Insert Table 4 about here)

Consistent with the results reported in Table 3, Column (1) shows that public airlines on average rely less on operating leases as a source of financing. However, when controls for size, effective tax rate, and age are added to the model separately, the coefficient on *Public* becomes insignificant. This suggests that the difference between private and public airlines could be an artifact of operating flexibility and taxes. *Log Total Revenue* (column 2) and *ETR* (column 7) have significantly negative associations with operating lease use, consistent with larger firms and firms with higher tax rates relying less on operating leases. *Leverage* (column 3), *Financial Risk* (column 4), and $Volatility_{revenues}$ (column 5) have positive associations with operating lease use, consistent with the bankruptcy risk and the need for flexibility having a significant role in the operating lease choice.

The *Public* dummy remains insignificant when several control variables are added together into the models. Columns (9) and (10) show that when size, bankruptcy risk and volatility are included in the model, all remain significant in the predicted directions. In columns (10) and (11) *ETR* remains negative but statistically insignificant.[21] In column (11) both *Log Age* and *Log Total Revenue* becomes insignificant, which likely results from these two variables having a significant correlation (50%).

In Table 5, we replicate this analysis using *%Leased* variable which is based on the physical count of aircraft under operating leases. This analysis is conducted using annual data. We replace *Log Total revenue* with *Log Routes* as a measure of size and $Volatility_{revenues}$ with

[20] Aside from column (7), with ETR, the results reported in Table 4 remain qualitatively unchanged if we do not include the dummy variables for missing observations. The coefficient on ETR in column (7) is insignificant if we truncate it at 0 and 1 rather than use indicators for truncated observations. In this case the coefficient on Public remains statistically insignificant.

[21] The statistical significance of ETR depends on the specification. In particular, when Financial Risk variable is excluded from column (10), or when operating lease use is defined as %Leased (B/S), ETR becomes significant.

$Volatility_{aircraft}$ as a measure of volatility of capacity. For this test we require data availability on *%Leased* and *Routes*. Because the dependent variable and $Volatility_{aircraft}$ are available with annual frequency, we use fourth quarter values for the remaining independent variables. Results from this alternative specification confirm the findings in Table 4.[22] In particular, *Log Routes* are negatively associated with operating lease use whereas *Financial risk* and $Volatility_{aircraft}$ both have significantly positive associations with operating lease use. The coefficient on *ETR* has negative sign but again is insignificant.

(Insert Table 5 about here)

The results in Table 4 and Table 5 indicate that economic factors – especially operating flexibility and bankruptcy risk– play a primary role in operating lease use. On average, privately-held airlines rely more on operating leases than their publicly-traded counterparts. Controlling for the three economic factors that are predicted to play important roles in operating lease use, we find no difference between private and public airlines' use of operating leases. These findings provide no support for reporting requirements being a dominant factor in operating lease use decision.

4.2 Operating lease use around ownership type changes

Findings so far suggest that the primary rationale for operating lease use is the underlying economic incentives and that reporting incentive is not a major determinant of operating lease use. To further examine the role of reporting incentives, we utilize changes in ownership type from privately-held to publicly-traded as a natural setting for testing whether reporting incentives affect operating lease use in the airline industry. This approach is analogous to that of the studies that examine earnings management around seasoned equity offerings (Rangan 1998; Shivakumar

[22] Similar to Table 4 we include missing observation dummies in Table 5. Results remain qualitatively unchanged if we do not include the dummy variables for missing observations.

2000). In our sample, there are twenty-one cases where a privately-held airline became publicly-traded. In eleven of these cases the airline went public through an equity offering and in ten cases the airline was acquired by a publicly-traded company but continued to operate under their own carrier name. In both types of cases we expect that, to the extent reporting incentives play a role in operating lease use, the airlines would see an increase prior to and/or after becoming public.

We use two specifications for this test. Our first test is similar to those used in Rangan (1998) and Shivakumar (2000) to examine earnings management around equity offerings. In particular, we examine raw and abnormal changes in operating lease use –measured using *%Leased (I/S)* - around the quarter the firm goes public. Abnormal changes in *%Leased (I/S)* is calculated as the raw value of *%Leased (I/S)* minus the median value of *%Leased (I/S)* of all airlines for the same quarter.

Our second test is based on matched sample analysis. In particular, we use propensity score matching to match each airline that becomes public to an airline that does not switch its ownership. We first estimate the following logit model using a pooled sample:

$$\begin{aligned} \mathrm{P}(Public_{i,t+1}) = \Lambda(&Log\ Total\ revenues_{it}, Log\ Age_{it}, Net\ income / Total\ assets_{it}, \\ &Total\ liab. / Total\ assets_{it}, Retained\ earn. / Total\ assets_{it}) \end{aligned} \tag{6}$$

Based on the closest matches of predicted values from this model, we match each airline that goes public during the following quarter with another airline that does not change its ownership and compare the changes *%Leased (I/S)* for the quarter before going public for the two airlines.

Table 6 Panel A shows that changes in raw and abnormal operating lease use are neither statistically significant nor consistently positive prior to or following becoming public. In nine out of sixteen quarters the changes are negative. These results suggest that airlines do not significantly alter their operating lease use immediately before or after becoming publicly-traded.

In untabulated tests, we also separately examine airlines that went public and those that were acquired by a public holding company and find similar patterns in both cases.

(Insert Table 6 about here)

Table 6 Panel B reports the coefficients from equation (6) and comparison of the propensity score matched samples. In this analysis we lose two airlines due to data availability. Estimates from equation (6) indicate that size, leverage and profitability are predictors of public/private status. The model has a pseudo-R^2 of 0.40. The matched sample analysis indicates that the treatment sample (the airlines that switch from private to public in the following quarter) has an average reduction in operating lease use of about 4%. In contrast, for the non-switching airlines the change is positive 1%. In other words, the average treatment effect is negative - albeit it is statistically insignificant- which does not support the argument that reporting incentives play a major role in operating lease use.

To visually examine changes in operating leases around ownership change in a constant sample, we restrict the sample to seven airlines that have data for all 16 quarters around the ownership change and graph the median operating lease use for each quarter. As Figure 1 shows, if anything, there appears to be a slight reduction in the percentage of operating leases after the airlines became public. Overall, the findings using ownership changes are inconsistent with reporting incentives being an important factor in the use of operating leases.

(Insert Figure 1 about here)

4.3 Changes in operating lease use around major borrowings

In this section we examine whether debt issuances provide a strong incentive in operating lease use. On the one hand, debt markets may provide incentives for airlines to use leases to lower balance-sheet-based leverage measures in an effort to either obtain loans or reduce their

borrowing rates. On the other hand, prior research (e.g., Altamuro et al. 2013) provides evidence that lenders take leases into account when setting terms of debt. If debt issuances provide a strong motivation for reporting lower indebtedness, we expect to see an increase in operating lease use prior to debt issuances.

We examine whether airlines increase their operating lease use prior to major borrowings, which we define as 5% of more of beginning total assets.[23] We identify the size of the borrowing in two ways, 1) proceeds from debt issuance as reported in the cash flow statement, 2) changes in long-term debt as reported on the balance sheet. While the cash flow statement provides a cleaner measure of the size of the borrowing as it allows separating the proceeds from repayments, these data are available only for periods after the second quarter of 1997 until the end of 2010.[24] We find that the correlation between the cash flow statement measure and the non-negative values of the balance sheet measure is 70% based on the airline-quarters for which both measures are available. Our results for the two measures are qualitatively similar and for brevity's sake we do not tabulate results for the balance sheet measure.

Table 7 shows changes in operating lease use around major borrowings. In Panel A, there is no discernible increasing pattern in the operating lease use prior to the quarter of a major borrowing. The sign of the difference is negative in five, and positive in three of the eight quarters prior to a major borrowing. Only one of the positive values is marginally statistically significant. Following the major borrowings, there is again little persistent change in the operating lease use. While the operating lease use drops following the quarter of borrowing, this result appears to be mechanical as the new debt is often used for purchasing new assets, which in turn reduces the relative size of operating leases in the capital.

[23] All results remain the similar when we set the cut-off at 10% of beginning assets.
[24] We are in the process of incorporating 2011 and 2012 to this sample.

(Insert Table 7 about here)

An alternative explanation for the weak results is that firms are planning ahead and making a gradual switch to operating leases prior to major borrowings. If this is the case, the changes in a given quarter may be small but may persist for several quarters. To account for this possibility, we test the following model:

$$Av\%Lease(I/S)_{t-1,t-4} - Av\%Lease(I/S)_{t-5,t-8} = b_0 + b_1 \times MDB_t + \varepsilon \quad (7)$$

where $Av\%Leased(I/S)_{t-1,t-4}$ is the average value of *%Leased(I/S)* variable over quarters t - 1 and t - 4 and MDB_t is an indicator variable that equals one if the airline had a major debt borrowing during quarter t.

The model defined in (7) allows us to test whether an airline increases its operating lease use above normal levels prior to a major borrowing, where "normal" is defined as the average operating lease usage during a year earlier. Result for this model is presented in Table 7, Panel B. The findings in Panel B do not show any indication of an increase in operating leases prior to a large borrowing as the variable MDB_t does not have a positive coefficient. In sum, these findings suggest that reporting incentives do not play a major role in operating lease use prior to major debt borrowings.

5 Conclusion

We investigate the importance of economic and reporting incentives in airlines' operating lease use. We consider three non-reporting incentives: operating flexibility, financial risk, and taxes. The accounting definition of operating leases largely overlap with the definition of "true leases" in the bankruptcy and tax codes. From the bankruptcy and tax perspectives, the treatment of true leases significantly differs from security interests. Proposed changes in accounting for leases seemingly place little emphasis on how accounting for leases relate to these non-reporting

incentives. For example, the operating leases under the current standards give investors a proxy for true leases, which investors can use when forecasting the tax impact of leases and the effects of leases in bankruptcy. The proposed lease standard does not rely on or reflect the distinction of true leases for tax and bankruptcy purposes.

We examine the role of reporting incentives using a comprehensive sample from the US airline industry. Leasing is common in the airline industry and US Department of Transportation requires all public and private air carriers to file financial statements prepared in accordance with US GAAP. While airline industry has certain characteristics (e.g., redeployability, relatively easy repossession) that may affect the generalizability of our findings, we believe those characteristics mostly relate to the costs and benefits of leasing rather than to reporting incentives.

We find that, on average, private airlines use more operating lease financing than do public airlines. Controlling for non-reporting determinants of operating lease use, we find no significant difference between private and public airlines' use of operating leases. In contrast, our results suggest that non-reporting determinants play significant roles in operating lease use. We also examine the changes in operating lease use around ownership changes from private to public. Our findings indicate that equity markets do not provide a strong reporting incentive for operating lease use. We also examine the changes in operating lease use around large debt borrowings. We find no evidence that large debt borrowings provide reporting incentives for operating lease use.

Our study highlights the usefulness of classifying leases into two distinct groups. Our findings suggest that non-reporting incentives play the primary role in operating lease use and hence distinguishing operating leases from capital leases is informative for investors. Our findings also go against the popular belief that firms often use operating leases for window

dressing. Nevertheless, we do not rule out the possibility that, at the margin, some firms prefer operating leases to show lower indebtedness. The current bright-line lease accounting rules provide means for such opportunistic behavior. Given our findings, we believe that a more principles-based approach in lease accounting could be more beneficial than completely abolishing operating leases. Additionally, we suggest that future research consider accounting for leases in view of non-reporting incentives.

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Table 1: Sample construction

The following details our sample attrition. We obtain airlines' quarterly financial data from the Bureau of Transportation Statistics website. In addition to deleting the airline linked to the Central Intelligence Agency and transition quarters, we also delete observations that fail the following data requirements: missing or non-positive total assets or total revenues; missing or negative data for rental expense, depreciation, or current assets; missing net income, or shareholders' equity.

	Airlines	Airline-Quarters
All airlines with an Airline ID filing Form 41	144	5,679
Less Airline owned by/operate as a front company for the CIA	-1	-33
Less Transition quarters (Public to Private or Private to Public)		-28
Less Observations not meeting data requirements	-1	-197
Final sample	142	5,421
Publicly-traded airlines	63	2,664
Privately-held airlines	102	2,757
Total	142	5,421

Table 2: Descriptive statistics

Panel A provides descriptive statistics for the entire sample. Sample period for quarterly (annual) data items is 1990Q1-2012Q2 (1992-2012). Panel B provides the correlations of lease measures for the years in which the *% Leased* variable is available (1992-2012), with p-values in parentheses. We obtain data from Schedules B-1 (quarterly balance sheets), P-1.2 (quarterly income statements), P-6 (quarterly operating expenses), B-43 (annual inventory of airframe and engine) and T-100 (origins/destinations). *% Leased (I/S)* equals the current quarter rental expense (P-6: Rentals) divided by the sum of current quarter rental expense and the implicit rental cost of non-current assets. *% Leased (B/S)* equals capitalized value of operating leases calculated as eight times the four-quarter rolling rental expense divided by the sum of the capitalized value and the value of non-current assets (B1:Assets-ShHldEquitNet). *Total revenue*, *Total liabilities*, *Total assets*, and *Net income* are self-explanatory (P-1.2: OpRevenues, B-1: Assets- ShHldEquitNet, B-1: Assets, P-1.2: NetIncome, respectively); *Financial risk* is bankruptcy risk probability measure based on Chava and Jarrow (2004, Table III); $Volatility_{revenue}$ is defined as the variance of seasonally differenced revenues scaled by beginning total assets over the past eight quarters; *Profit Margin* equals current quarter net income (P-1.2: IncomeBeforeOth) divided by total revenues; *ETR* is equal to current quarter income tax expense divided by pre-tax income (P-1.2: IncomeTax/IncomePreTax); *Age* is equal to current year minus the year airline was founded; *% Leased* is equal to the fraction of aircraft under operating leases at the end of the year (B-43); $Volatility_{aircraft}$ is the variance of the annual percentage change in the number of aircraft operated by the airline over the past three years (B-43); *Routes* is equal to the number of unique fly routes flown by the airline during the last month of the year (T-100). All variables are winsorized at the top and bottom 1%.

Panel A: Descriptive statistics

	N	Mean	St.Dev	25%	50%	75%
Variables measured quarterly						
% Leased (I/S)	5,421	0.565	0.283	0.343	0.572	0.828
% Leased (B/S)	4,883	0.605	0.280	0.371	0.624	0.877
Total revenue	5,421	538	1,210	25	75	274
Total liabilities/Total assets	5,421	0.882	0.471	0.618	0.818	0.985
Net income/Total assets	4,921	-0.013	0.256	-0.058	0.015	0.074
Financial risk	4,920	0.049	0.167	0.002	0.004	0.009
$Volatility_{revenue}$	4,397	0.198	0.824	0.008	0.021	0.068
Profit margin	5,347	-0.017	0.142	-0.054	0.013	0.057
Effective tax rate (ETR)	4,145	0.318	0.177	0.220	0.375	0.403
Age	5,421	31	22	13	25	44
Variables measured annually						
% Leased	1,097	0.609	0.364	0.286	0.692	1.000
Routes	1,097	221	279	40	97	272
$Volatility_{aircraft}$	778	0.177	0.239	0.040	0.099	0.215

Panel B: Correlations of lease measures (Pearson below diagonal, Spearman above diagonal)

	% Leased	% Leased (I/S)	% Leased (B/S)
% Leased		0.757	0.785
		(0.000)	(0.000)
% Leased (I/S)	0.742		0.905
	(0.000)		(0.000)
% Leased (B/S)	0.776	0.915	
	(0.000)	(0.000)	

Table 3: Univariate comparisons

This table provides univariate comparisons between publicly-traded and privately-held airlines. Sample period for quarterly (annual) data items is 1990Q1-2012Q2 (1992-2012). Table 2 provides detailed variable definitions. The *t*-statistic for the difference-in-means test and the *z*-statistic for the Wilcoxon difference in distributions test are based on standard errors robust to firm clusters, where we employ bootstrapping to obtain a cluster-robust Wilcoxon statistic. *, **, and *** denote significance at a two sided 10%, 5% and 1% level, respectively.

	Publicly-Traded			Privately-Held			Test of Differences	
	N	Mean	Median	N	Mean	Median	Mean (t)	Rank-sum (z)
Variables measured quarterly								
% Leased (I/S)	2,664	0.520	0.500	2,757	0.609	0.685	2.09 **	2.22 **
% Leased (B/S)	2,461	0.535	0.516	2,422	0.675	0.774	3.11 ***	3.01 ***
Log Total revenue	2,664	12.623	12.353	2,757	10.315	10.306	-8.27 ***	-6.27 ***
Total liabilities/Total assets	2,664	0.818	0.790	2,757	0.943	0.858	2.23 **	1.37
Net income/Total assets	2,470	-0.011	0.014	2,451	-0.014	0.016	-0.13	0.52
Financial risk	2,470	0.025	0.004	2,450	0.073	0.005	3.16 ***	0.80
$\text{Volatility}_{\text{revenue}}$	2,302	0.116	0.011	2,095	0.288	0.048	2.66 ***	4.73 ***
Profit margin	2,639	-0.009	0.017	2,708	-0.025	0.008	-1.38	-0.86
Effective tax rate (ETR)	2,479	0.343	0.380	1,666	0.282	0.350	-2.39 **	-2.74 ***
Log Age	2,664	3.351	3.367	2,757	2.935	3.000	-3.08 ***	-2.71 ***
Variables measured annually								
% Leased	576	0.569	0.578	521	0.653	0.854	1.36	1.77 *
Log Routes	576	5.283	5.400	521	3.874	3.892	-7.22 ***	-5.06 ***
$\text{Volatility}_{\text{aircraft}}$	424	0.126	0.063	354	0.237	0.151	3.36 ***	3.60 ***

Table 4: Lease usage regressions based on financial data

This table presents fractional logit regressions where the dependent variable is the income-statement estimate of operating lease usage (*% Leased (I/S)*). Models are estimated based on quarterly data. *Public* is an indicator variable that equals one if the airline or its parent company has publicly-traded equity and zero otherwise. For each independent variable with one or more missing values, there is a missing observation indicator that equals to one for the missing values and zero for non-missing values. Table 2 provides detailed definitions for the remaining variables. Standard errors are clustered at the firm-level. R^2's are computed as in OLS (1-SSR/SST) following Papke and Wooldridge (1996). *, **, and *** denote significance at a two sided 10%, 5% and 1% level, respectively.

	Pred.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Public	?	-0.375**	-0.088	-0.312*	-0.317*	-0.315*	-0.372**	-0.272	-0.295	-0.088	-0.060	-0.076
		(-2.11)	(-0.42)	(-1.83)	(-1.77)	(-1.76)	(-2.08)	(-1.38)	(-1.64)	(-0.43)	(-0.29)	(-0.35)
Log Total revenue	-		-0.126**							-0.088*	-0.089*	-0.073
			(-2.55)							(-1.73)	(-1.68)	(-1.22)
Total liab./Total assets	+			0.499***								
				(3.21)								
Financial risk	+				1.352***					1.156***	1.270***	1.248***
					(4.08)					(3.47)	(3.80)	(3.71)
$Volatility_{revenue}$	+					0.322***				0.266***	0.258***	0.255***
						(3.83)				(3.65)	(3.53)	(3.53)
Profit margin	-						-0.225				0.329	0.317
							(-0.63)				(0.88)	(0.85)
ETR	-							-0.823*			-0.625	-0.590
								(-1.91)			(-1.47)	(-1.38)
Log Age	-								-0.203*			-0.082
									(-1.69)			(-0.57)
Missing obs. indicators		-	-	-	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes
Fixed Effects		Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time
Clusters		Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
R^2		0.05	0.08	0.08	0.08	0.08	0.05	0.07	0.07	0.11	0.12	0.12
Obs. Count		5,421	5,421	5,421	5,421	5,421	5,421	5,421	5,421	5,421	5,421	5,421

Table 5: Lease usage regressions based on aircraft count

This table presents fractional logit regressions where the dependent variable is the estimate of lease usage based on aircraft count (*% Leased*). The dependent variable and $Volatility_{aircraft}$ are measured with annual frequency and the remaining variables are based on the fourth quarter data. *Public* is an indicator variable that equals one if the airline or its parent company has publicly-traded equity and zero otherwise. For each independent variable with one or more missing values, there is a missing observation indicator that equals to one for the missing values and zero for non-missing values. Table 2 provides detailed definitions for the remaining variables. Standard errors are clustered at the firm-level. R^2's are computed as in OLS (1-SSR/SST) following Papke and Wooldridge (1996). *, **, and *** denote significance at a two sided 10%, 5% and 1% level, respectively.

	Pred.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Public	?	-0.362	0.006	-0.262	-0.266	-0.250	-0.250	0.113
		(-1.37)	(0.02)	(-0.99)	(-0.99)	(-0.94)	(-0.90)	(0.37)
Log Routes	-		-0.266**					-0.196*
			(-2.51)					(-1.75)
Total liab./Total assets	+			0.888***				
				(3.15)				
Financial risk	+				2.722***			2.407***
					(3.51)			(3.22)
$Volatility_{aircraft}$	+					1.386**		0.979*
						(2.34)		(1.80)
ETR	-						-0.537	-0.353
							(-0.93)	(-0.59)
Missing obs. indicators		-	-	-	Yes	Yes	Yes	Yes
Fixed Effects		Year	Year	Year	Year	Year	Year	Year
Clusters		Firm	Firm	Firm	Firm	Firm	Firm	Firm
R^2		0.03	0.07	0.08	0.07	0.06	0.04	0.11
Obs. Count		1,097	1,097	1,097	1,097	1,097	1,097	1,097

Table 6: Operating leases around ownership type changes

This table compares changes in lease usage around ownership type changes from privately-held to publicly-traded. Panel A reports quarterly raw and abnormal changes in *% Leased (I/S)* where abnormal change equals to *Δ% Leased (I/S)* minus the quarterly median of *Δ% Leased (I/S)* for all airlines in the sample. Panel B reports the estimates from the model to calculate propensity scores where the dependent variable is the public status of the firm in the next quarter. Panel B also presents the comparison of *Δ% Leased (I/S)* for each of the 19 airlines that switched ownership from private to public to that of a propensity score matched non-switching airline for the quarter prior to the ownership switching. Table 2 provides detailed variable definitions. *, **, and *** denote significance at a two sided 10%, 5% and 1% level, respectively.

Panel A: Raw and Abnormal Changes in Operating Lease Use

		Δ% Leased (I/S)		*AbnΔ% Leased (I/S)*		
Quarter	Obs. Count	Mean	t-value	Mean	t-value	
-8	14	0.040	1.31	0.040	1.30	
-7	14	-0.056	-1.40	-0.054	-1.37	
-6	15	-0.002	-0.15	0.001	-0.08	
-5	16	0.003	0.17	0.003	0.19	
-4	16	-0.013	-0.99	-0.013	-0.96	
-3	17	0.014	1.08	0.014	1.02	
-2	18	-0.012	-0.64	-0.011	-0.62	
-1	20	-0.026	-1.06	-0.026	-1.06	
0	-	-	-	-	-	
1	21	0.073	1.47	0.072	1.46	
2	21	-0.020	-0.85	-0.018	-0.79	
3	20	0.010	1.57	0.011	1.79	*
4	20	-0.011	-0.95	-0.011	-0.90	
5	18	-0.007	-0.44	-0.007	-0.45	
6	17	0.025	0.79	0.025	0.78	
7	16	-0.031	-1.14	-0.030	-1.10	
8	15	0.027	0.97	0.027	0.99	

Panel B: Propensity Score Matching

Log Total revenues	Log Age	Total liab/ Total assets	Net income/ Total assets	Ret. Earnings/ Total assets	F.E.	Clusters	Pseudo R^2	Obs. Count (Switching/ Non-Switching)
1.369***	-0.276	-1.460**	-1.456**	-0.223	Year	Firm	0.40	19/4,796
(6.50)	(-0.87)	(-2.26)	(-2.20)	(-1.48)				

	Δ% Leased (I/S) in the quarter prior to ownership type switching
Switching Airlines	-0.044
Match Airlines	0.010
Difference (ATT)	-0.054
t-stat	-1.62
Number of Matched Groups	19

Table 7: Operating leases around major borrowings

This table compares changes in lease usage around major debt borrowings, where major debt borrowings are defined as those that exceed 5% of beginning assets. Panel A reports quarterly raw and abnormal changes in *% Leased (I/S)* where abnormal change equals to *Δ% Leased (I/S)* minus the quarterly median of *Δ% Leased (I/S)* for all airlines in the sample. Panel B provides results from the model defined in Panel B, where MDB_t equals one if the firm had a major debt borrowing during quarter t. Table 2 provides detailed variable definitions. *, **, and *** denote significance at a two sided 10%, 5% and 1% level, respectively.

Panel A: Raw and Abnormal Changes in Operating Lease Use

		Δ% Leased (I/S)			*AbnΔ% Leased (I/S)*		
Quarter	Obs. Count	Mean	t-value		Mean	t-value	
-8	34	0.093	1.01		0.010	1.08	
-7	41	-0.004	-0.33		-0.002	-0.29	
-6	53	0.016	1.69	*	0.017	1.73	*
-5	61	-0.003	-0.33		-0.001	-0.22	
-4	67	-0.008	-1.03		-0.007	-0.91	
-3	93	-0.008	-1.13		-0.008	-0.99	
-2	130	-0.011	-1.50		-0.010	-1.36	
-1	175	0.005	0.63		0.006	0.74	
0	-	-	-		-	-	
1	180	-0.023	-2.97	***	-0.023	-2.86	***
2	138	0.002	0.29		0.003	0.42	
3	107	0.004	0.43		0.005	0.56	
4	84	-0.006	-0.95		-0.006	-0.88	
5	76	0.016	1.78	*	0.017	1.83	*
6	69	0.001	0.13		0.001	0.16	
7	54	0.020	1.87	*	0.021	1.98	**
8	46	-0.003	-0.50		-0.003	-0.41	

Panel B: Regression Analysis

$$(Av\%Lease(I/S)_{t-1,t-4} - Av\%Lease(I/S)_{t-5,t-8}) = b_0 + b_1 \; x \; MDB_t + \varepsilon$$

	b_1	t-stat
MDB_{CFS}	-0.008	-1.37
Obs. Count		2,269
R^2		0.00

Figure 1: Change in operating leases around ownership changes

This figure shows the median value of operating lease share of total capital measure *% Leased* (*I/S*) around ownership type change from privately-held to publicly-traded of seven airline companies. The sample includes airlines that have data available for all sixteen quarters around the quarter of switching (quarter 0, not shown) and switched only once during the sample period and stayed public afterwards.