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Do leases expand debt capacity?☆

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ABSTRACT

Theoretically and empirically, debt and leases have been shown to be both substitutes and complements. To explore the relation, we divide our sample into two subsets: those that exhibit a complementary relation (43% increase debt after increasing leases), and those that exhibit a substitutionary relation (57% decrease debt after increasing leases). For complement firms, we find a significant negative relation between leasing and the firm's size, marginal tax rate, and z-score, consistent with "complementary" theories. For substitute firms, we find a positive and significant relation between leasing, the marginal tax rate and changes in cash. We also find a significant positive stock market reaction to the announcement of the SLB, which is stronger for the complement subset of firms.

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1. Introduction

Most theoretical models of leasing have assumed that leases substitute for debt in the sense that more leasing should result in less debt because leases use up debt capacity. However, not all theoretical models have made this assumption. The leasing models presented by Lewis and Schallheim (1992) and Eisfeldt and Rampini (2009) predict the possibility that debt and leases can be complements, and that leases can actually increase debt capacity, by utilizing theories based on taxes or bankruptcy costs, respectively. In this paper, we carefully examine firms that exhibit a complementary relation between debt and leases, and contrast them with firms that have a more traditional substitutionary relation between debt and leases.

Ang and Peterson (1984) find that firms that use more leases tend to have, in fact, more debt and label their finding the "leasing puzzle." A body of literature has developed since Ang and Peterson posed this puzzle. The preponderance of evidence in the literature supports debt and leases as substitutes. Bayliss and David Diltz (1986), Beattie et al. (2000), Marston and Harris (1988)and Yan (2006) all find that debt and leases are substitutes, with varying degrees of substitutability. One of the problems with the literature that examines this issue previously is the familiar *ceteris paribus* condition; the assumption that all else remains equal is problematic because almost all leases involve the acquisition of a new asset for the firm. One exception is the sale-and-leaseback (SLB) transaction, in which the assets of the firm do not change because of the leasing transaction. While firms can make changes to their asset base following a SLB, the actual sale and leaseback transaction does not result in a change of physical assets and is strictly financial. We employ a large sample of hand-collected SLBs and then observe the firm's actions after the transaction to determine differences between firms that use debt and leases as substitutes or complements. That is, we are able to observe whether firms increase or decrease their debt and categorize our sample firms as either members of the complement subset or substitute subset.

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The following examples of SLB transactions and the subsequent debt changes illustrate the differences. In 1998, Nike, Inc. completed the SLB of a distribution center to TriNet Corporate Realty Trust, Inc. Following the SLB transaction for $24 million, Nike reduced their long term debt by $24 million while their total debt decreased by $36.8 million; this is a clear example of a substitutionary relation. In 1999, Famous Dave's of America, Inc. completed the SLB of three restaurant locations to Franchise Financial Corp. of America. The SLB transaction was for $5 million. Following this transaction, Famous Dave's long-term debt increased by $8.4 million while its total debt increased by $4.1 million (total debt includes issuance less retirements). Thus, while some firms clearly treat debt and leases as substitutes, other firms appear to treat debt and leases as complements. To our knowledge, this study is the first to separate and examine a subgroup of firms that actually increase the firms' debt after a lease transaction.

We begin our analysis by separating firms by whether they increase or decrease debt after a SLB transaction. We find that over 42% of the 392 firms in our sample exhibit a complementary relation. For this group, we find that firms tend to have higher debt ratios, higher market to book ratios, and more capital expenditures than the substitute subset. While many of the SLB transactions we examine involve real estate – about 63% of the overall sample – real estate is not a driving factor between our two subsets. Although it is interesting to note the differences between the two subsets, much of our analysis focuses on the relation between debt and leases within each subset and for the entire sample of SLBs.

When we examine the overall sample, we find some support that debt and leases are substitutes for the average SLB firm. The result, however, is not robust to different definitions of debt. Given the significant proportion of firms in our sample that increase debt after the SLB transaction, this result is not surprising.

In addition to the relation between leasing and debt, we incorporate control variables in our analysis to account for changes in assets, tax effects, and financial constraints. We find that firms in the total sample and both subsets use more leases as size decreases (a proxy for financial constrained firms), z-score decreases (a proxy for financial distressed firms), and cash increases (indicating liquidity and financial slack). Furthermore, our estimate of Investment Grade rated firms, which is an indicator variable if the firm has debt rated BBB- or better, is significant at the 10% level for our entire sample. These results indicate that financing constraints play a role in the SLB decision, which is consistent with the finding in Faulkender and Petersen (2006) that firms that lack an investment grade rating have less access to capital.

For the substitute subset, a dollar of SLBs appears to substitute for approximately $0.73 of total debt. When examining only the long-term debt in the substitutionary subset, a dollar of leases appears to substitute for approximately $0.51 of long-term debt. The substitute subset also exhibits a significant decrease in the ratio of capital leases to operating leases, indicating that these firms are motivated to remove debt from their balance sheets.

Analyzing the complement subset allows us to test the impact of taxes and financial constraints as posited by the Eisfeldt and Rampini (2009) and Lewis and Schallheim (1992) theories. According to our analysis of the complement subset, the marginal tax rate is significantly and negatively associated with the amount of the SLB. We also find support for an association between SLBs and financial constraints (z-score) for this subgroup. Furthermore, the complement subset of firms do not display a change in the ratio of capital leases to operating leases, indicating that they are less concerned with accounting leverage ratios than the substitutionary subgroup.

To examine the robustness of our results, we analyze the subsample of SLB firms that do not contain real estate and obtain qualitatively similar results for the total sample and for each subset. We also perform an event study analysis of the market's reaction to the announcement of the SLB transactions and find an overall positive return of 1.61%. The stock market reaction is stronger for the complement subset than for the substitute group.

One of the main takeaways from our analysis concerns the results for the complementary subset. Within the group of firms that increase debt after the SLB transaction, there is an increasing relation among leasing and firm size, Altman's z-score, and the marginal tax rate. These results are consistent with the models that predict leases can increase debt capacity for firms that are financially constrained or have limited ability to use tax shields.

This paper is organized as follows: Section 2 describes the theoretical and empirical literature related to leasing and SLBs, Section 3 discusses our testable hypotheses, Section 4 describes our sample of SLB transactions, and Section 5 presents our results. We state our conclusions in Section 6.

2. Literature related to leasing and sale-and-leasebacks

2.1. Leasing theory

Under the assumption of perfect capital markets, Modigliani and Miller (1958) show that the method of financing is irrelevant to the total value of the firm given the investment opportunity set. The notion that debt and leases are substitutes can be traced to the theoretical model of Myers, Dill, and Bautista (Myers et al., 1976), who present a model of lease or buy (borrow). Even in the presence of corporate taxes, the choice between debt and leases can be irrelevant given common tax rates and no other market imperfections. In the MDB model, leasing can be advantageous to both parties of a transaction if the tax rates between lessor and lessee differ.[3] The MDB model has a parameter, λ, which represents the substitution between debt and leases. The values for λ

[3] The common notion that a low tax rate firm benefits from leasing to a high tax rate firm is not unconditionally true. It is true under normal contracting terms, but it is possible to devise situations in which the opposite holds. However, the conditions for a high tax rate lessee benefiting from a low tax rate lessor are quite unusual and not likely to arise very often in practice.

range between 0 and 1. In other words, the substitution between debt and leases may be dollar for dollar, or a dollar of leases may substitute for less than a dollar of debt. However, MDB never consider the possibility that λ could be less than 0, i.e., that a lease could actually allow the firm to take on more debt. In other words, can leases and debt be complements?

Two theories directly address the issue that leases and debt can be complements. Lewis and Schallheim (1992) present a tax-based model that allows for low tax paying firms to sell excess tax shields to firms that place a much higher value on these tax deductions. By removing redundant tax shields, the lessee firm can be motivated to increase its proportion of debt relative to an otherwise identical firm that does not use leasing.

Eisfeldt and Rampini (2009) provide another model for increased debt capacity due to leasing. The Eisfeldt and Rampini model is based on the repossession advantage of leasing to lessors who are willing to lease to more financially constrained firms. Counter-balancing this effect, however, is the agency costs of leasing due to the separation of ownership and control of the leased assets. The net advantage allows lessors to offer leases to more credit-constrained firms who will then choose to lease more of their capital than less constrained firms. Thus, debt and leases can be complements.

Recent work by Rauh and Sufi (2012) re-examines the industry determinants of capital structure with a focus on the assets used in the production process, as well as the capitalization of off-balance sheet leasing. Rauh and Sufi state, "Regardless of whether lease and nonlease debt are complements or substitutes, it is clear that secure debt and leases have much in common in that they represent cash flow commitments the borrower or lessee must make to continue using the asset." They point out, however, that the repossession advantage of leasing, as suggested by Eisfeldt and Rampini (2009), offers potentially cheaper capital to firms facing high costs of raising capital. Rauh and Sufi also conclude that the assets used in production (and what the firm produces) are the most important determinant in the financing decision.

There are other theories that relate to leasing but do not directly address the substitute vs. complement issue. The issue of asset specificity arises with regard to contracting theory. Klein et al. (1978) argue that assets with more firm-specific uses are more likely to be owned (vertical integration) and more general-purpose assets are more likely to be leased.

With regard to agency theory, there are the problems of over-investment (or asset substitution) and under-investment. Because leases are tied to a specific asset, leasing can help reduce the over-investment problem. There is also the issue of the separation of ownership and control with attendant agency issues, as discussed in Smith and Macdonald Wakeman (1985) Finally, the general implications of information costs have also been explored in detail. However, many of the information-cost theories are related to the financial distress costs, as incorporated by the Eisfeldt and Rampini (2009) theory. There is, however, one unique leasing feature related to information: by definition, operating leases are off-balance sheet financing. From an economic point of view, it is unclear why off-balance sheet financing may be valuable, but firms certainly appear to be willing to undertake such transactions, even paying significant transaction costs to facilitate these leases (for example, synthetic leases).

Two theory papers directly model the sale-and-leaseback contract. Kim et al. (1978) show that SLB transactions can cause a wealth transfer from senior debtholders to stockholders. The reason for the wealth appropriation is the violation of me-first rules, where senior debtholders would have had claim to the assets prior to their sale and leaseback. After the SLB transaction, the senior debtholders' position is less secure and the loss in value to the debtholders is gained by stockholders. Handa (1991) derives a signaling, separating equilibrium with good firms purchasing and poor firms leasing. In a symmetric information environment, all firms would prefer a SLB to debt financing. This is because the transfer of tax shields to the lessor allows the lessee to obtain the value of the depreciation tax shield rather than risk not being able to use the tax shield in the future due to low earnings. With asymmetric information, firms facing lower earnings prospects will favor the SLB transaction in order to gain the depreciation tax shield. However, the SLB transaction signals to the market the lower earnings forecast and thus the market value will fall (but by less than the gain from the tax shield). Firms with good earnings prospects will therefore prefer to own the asset in order to separate from the SLB firms and not lose market value. Furthermore, these firms will have a higher probability of fully utilizing the tax shield from depreciation.

2.2. Empirical literature about leasing

Ang and Peterson (1984) demonstrate a positive correlation between leasing and debt, and conclude that debt and leases appear to be complements. Earlier evidence by Bowman (1980) also demonstrates a positive association between relative levels of debt and leases. A drawback to these studies is that only a cross-sectional relation was examined. Thus, the findings are consistent with the result that firms with high external financing requirements use debt and leasing interchangeably and thus cannot reject the hypothesis that debt and leases are substitutes.

In another approach to the question, Bayliss and David Diltz (1986) conduct a survey of bank loan officers, presenting them with firms who use varying lease obligations and measure their willingness to make loans to these firms. Bayliss and Diltz determine a debt displacement for lease obligations of approximately $1 of leases, displacing $0.85 of debt. Marston and Harris (1988) examine the changes in debt and lease obligations and find that $1 of leasing displaces about $0.60 of non-leasing debt. Using UK data, Beattie et al. (2000) find that £1 of leasing displaces £0.23 of non-lease debt.

Yan (2006) considers the problem that the use of debt and leases are simultaneously chosen. This endogenous choice of debt and leases is modeled as a system of simultaneous equations. Another complication is that the potential instrumental variables used to predict debt choice are almost all the same variables that are used to determine lease choice. Yan addresses this problem by using lagged dependent variables as instruments. Using a GMM model to estimate parameters, Yan rejects the hypothesis that debt and leases are complements, but cannot reject the hypothesis that they are substitutes. However, Yan's results suffer from the same criticism that new leases are accompanied necessarily by new assets (unless they are SLB transactions, which are a very

small minority of leasing transactions).[4] Yan goes on to find that the degree of substitutability is greater for firms that pay no dividends (more asymmetric information), firms that have more investment opportunities (higher agency costs from underinvestment), and firms that have higher marginal tax rates (transferring tax shields is less valuable).

Ezzell and Vora (2001) compare sale and leaseback transactions to direct leasing and find that SLBs are associated with increases in equity and that gains in direct leases depend on the types of assets leased. Ben-David (2005) examines the relation between the type of asset leased and the performance of the lessee. He finds that the type of asset leased plays a large role in the future growth of the firm. Elayan et al. (2006) focus on the motivations of tax-exempt lessors, specifically REITs. They find a positive relation between the amount of the SLB and the market reaction for lessors, and find evidence supporting the role of agency costs in the decision to purchase a property through a SLB.

Slovin et al. (1990) conduct an event-study analysis of SLB transactions. They find a positive stock price reaction for the lessee firms who sell and leaseback structures (59 observations) and aircraft (14 observations). They were able to examine 8 lessor announcement returns for aircraft transactions, but find no announcement effect for those firms. They also examine 10 Safe Harbor leases of aircraft and find significant positive returns. Safe Harbor leases were introduced by the 1981 Economic Recovery Tax Act (and were phased out by the 1982 tax act) to allow a simpler transfer of tax shields via leasing (for example, a one dollar buyout of the asset at the end of the lease was allowed by ERTA). Slovin, Sushka, and Polonchek conclude that SLB transactions generate positive wealth for lessee firms but not for the lessors, and that the positive gain is attributable to the present value of tax reductions. Handa (1991) examines a sample of 64 SLBs and finds a negative stock price reaction to the announcement of these transactions. He also finds that the SLB firms had lower operating earnings subsequent to the transaction. While these findings support Handa's model of lower quality firms taking part in SLB transactions, the majority of research has found a positive market reaction associated with the announcement of SLB transactions.

3. Testable hypotheses

The SLB transaction provides a "pure" financing event where the substitution and complement hypothesis for debt and leases can be analyzed more carefully. To begin, consider the traditional financial balance sheet for the firm. The simplified book value of assets equals the sum of the values of debt, lease, and equity financing:

$$\text{Assets} = \text{Debt} + \text{Leases} + \text{Equity}$$

$$A = D + L + E$$

If we state these amounts in terms of changes:

$$\Delta A = \Delta D + \Delta L + \Delta E.$$

In the instance of the SLB, assets do not change ($\Delta A = 0$) and equity does not change ($\Delta E = 0$), so

$$\Delta L = -\lambda\, \Delta D,$$

where λ is the Myers et al. (1976), p. 806 parameter that represents "the lease payments and the various tax shields support at most λ of debt per dollar of assets leased." If debt and leases are perfect substitutes, $\lambda = 1$. Otherwise, according to the Myers, Dill, and Bautista theory, debt and leases are imperfect substitutes such that $0 < \lambda < 1$. Ang and Peterson (1984) are surprised to find in their empirical tests that debt and leases do not appear to be substitutes at all in that they find $\lambda < 0$. They label this result "the leasing puzzle."

3.1. Hypotheses concerning the substitution of leasing and debt

We can now state our first testable hypothesis.

H1. Debt and leases are substitutes ($0 < \lambda \leq 1$).

We begin our analysis testing the average relation across our entire sample. This is analogous to the tests performed in most of the prior literature that has considered the substitutability of debt and leases. The estimation equation is

$$\Delta L_i = b_0 + b_1 \Delta D_i + \varepsilon_i.$$

The coefficient b_1 is our estimate of *negative* λ. We want to test if b_1 is equal to negative one (perfect substitutes), between 0 and -1 (substitutes), or greater than zero (complements).

[4] Yan's study does not specify differences between the cost functions for debt and lease financing. He only assumes that these costs are derived from the market imperfections of information asymmetries, agency problems, and taxes. Missing, for example, is the leasing attribute of a residual value and other contracting differences.

Corollary 1. *Leases substitute for long-term debt financing.*

Leases are generally long-term (or intermediate-term) contracts averaging five years in maturity.[5] Therefore, leases should be equivalent to similar-term debt contracts. The estimation equation to test the corollary is:

$$\Delta L_i = b_0 + b_1 \Delta D_i + \varepsilon_i.$$

One important caveat concerning Hypothesis H1 and the respective Corollary is that we cannot measure the balance sheet impact of the SLB immediately. Realistically, there will be a delay in the accounting statements and our *ceteris paribus* conditions will not hold in practice. In order to help account for this delay, we will include a set of control variables that include balance sheet items, tax effects, and financial distress controls. Furthermore, the research question that we address – do leases expand debt capacity? – appears to be affirmative in some cases. That is, a subset of firms *increase* debt after the SLB transaction (around 43% of our sample) while the remaining firms decrease debt after the SLB transaction (the remaining 57% of our sample). We refer to the set of transactions in which firms increase debt as the complement subset of leases, the firms as "complement firms," the set of transactions that decrease debt as the substitute subset of leases, and the firms as "substitute firms." We examine these two subsets of SLB firms in order to test various theories about the motivation for leasing, the decision to use funds generated by the SLB transaction, and the differences between the two groups.

In order to compare the complement firms to the substitute firms, we begin with several hypotheses based on the extant theory.[6]

H2. The proceeds from the SLB transaction will be used to increase assets.

If leases are not perfect substitutes for debt ($0 < \lambda < 1$) and, assuming no change in equity, then

$$\Delta L = -\lambda \Delta D + (1-\lambda)\, \Delta A.$$

An increase in a dollar of lease payments leads to a λ dollar reduction in debt and a $1 - \lambda$ dollar increase in assets. In the first instance, the cash account will increase due to the asset sale. Firms may hold the increase cash for the sake of liquidity needs and financial slack (for possible future investment). With regard to increase investment, we will be using capital expenditures to proxy for fixed-asset changes.

For the subset that exhibits debt increasing after the SLB transaction, we have various hypotheses to potentially explain the result. There is the tax hypothesis and/or the bankruptcy cost hypothesis and there is the possibility that the additional funds are used to increase assets.

H3. SLB transactions are more likely for

H3.a. firms that are in lower tax-paying positions;

H3.b. firms that are more financially constrained

In our test of H3, as well as the other hypotheses, we will be using a regression equation that, in addition to changes in debt, contains independent variables for capital expenditures, a real estate dummy variable for the SLBs that are structures only, the marginal tax rate to test the tax based theories of leasing, the size of the firm defined as the log of total assets, and the interest coverage ratio. The last two variables are our proxies for financial constraints. In addition, the regressions for the total sample, as well as the complement and substitute subgroups, contain all of these explanatory variables (size, capital expenditures, tax rate, interest coverage, investment grade, and the real estate dummy) in order to empirically explore the impact of SLBs on asset and debt substitutions, transaction and information costs, and the marginal tax rate. In the end, we examine changes in assets, taxes, and financial constraints for the overall sample, as well as each subgroup.

The previous hypotheses relate changes in leases and debt to book values. What about the impact of the SLB transactions on market value for our sample? Previous research has shown both positive and negative stock market reactions to the announcement of SLB transactions. Whether leases and debt are substitutes or complements may be interesting as a theoretical question, but do the SLB transactions enhance firm value, reduce firm value, or have no impact on firm value (as Myers (1977)) suggestion about neutral mutations in financial markets implies? Previous literature has not examined the substitute and complement subsets that are unique to this research. Furthermore, the impact on the market value of debt is interesting in light of the arguments made by Kim et al. (1978) regarding the wealth transfer between stockholders and bondholders. Thus, we will test the following hypothesis:

H4.a. The announcement of the SLB transaction leads to a positive stock price reaction.

H4.b. The announcement of the SLB transaction leads to a negative bond price reaction.

[5] There is reliable evidence that the average lease is about 5 years in length. Schallheim et al. (1987)) show an average maturity of 60 months for their sample of 363 lease contracts. The Equipment Leasing and Finance Association show in their annual Survey of Industry Activity that the average maturity is 5 years.

[6] It is also possible that the funds from the SLB transaction could be used to buy back equity or increase dividends, but we find no evidence of this in our sample.

Hypothesis H4.a suggests that the SLB transaction adds value to the firm. The source of this value can be from tax savings, increased debt capacity, or a transaction costs saving (such as reducing the costs to dispose of used assets). This should be true for both the substitute and complement subsets. It is difficult to predict any systematic differences between the two. Hypothesis H4.b tests the hypothesis from Kim et al. (1978) and shows that the SLB transaction is a method by which shareholders may circumvent the me-first rules protecting secured debtholders and thus transfer wealth to themselves.[7]

3.2. A comparison of the complement subset to the substitute subset

Given the possibility of fundamental differences between the two subsets, our empirical section contains comparison between the two groups of firms. We look at differences in transaction, firm, and industry characteristics. Information costs leading to reporting differences between the two subsets also may exist. Consider the use of the book values of assets and liabilities in the accounting treatment of leases. Since 1976, Financial Accounting Standards Board Statement 13 has governed the reporting of leases as either capital leases (reported on the balance sheet) or as operating leases (not reported on the balance sheet but disclosed in footnotes). Exactly what the value is to a lessee firm for having off-balance sheet reporting of the lease is not clear if capital markets are (reasonably) efficient. Many financial institutions, credit rating agencies, and stock market investors appear to take into account operating leases as though they were reported on the balance sheet.[8] While the value of off-balance sheet leases is unclear, leasing companies almost always advertise the off-balance sheet advantage of leasing and lessees are willing to pay for this advantage, as evidenced by the fairly large transaction costs involved in synthetic leases.[9] It appears that at least some firms believe that off-balance sheet financing has value.

In the case where leases and debt are substitutes, it would be in the best interests of these firms to reduce their balance sheet debt as they substitute operating leases for debt. The increased use of operating leases could also indicate that the firm has been financially constrained. This conjecture leads to the following hypothesis:

H5. Conditional on debt and leases as substitutes, the ratio of capital leases to operating leases will decrease after the SLB transaction. For debt and leases as complements, no prediction is made.

We use the ratio of capital leases to operating leases because almost all firms have operating leases while not all report capital leases.[10] For the complement subset, these firms are not likely to be concerned about their book leverage ratios, so we make no prediction about the change in the capital lease to operating lease ratio.

4. Sample

Our empirical sample comes from several sources and spans three decades. Our final sample includes 392 sale and leaseback transactions from 1980 to 2011. All of the data is hand-collected using a variety of search engines that include: Dow Jones Interactive, Moody's Bank and Finance Manual, Reuters' Business Briefing, Factiva, the Wall Street Journal, LexisNexis, and Bloomberg. The final sample of 392 includes 167 observations that we collected, 36 observations from Ezzell and Vora (2001), 131 observations from Ben-David (2005), and 58 observations from Elayan et al. (2006). Given that each dataset was collected independently, some transactions show up in each of the datasets. In the end, we used the data from whichever source had the most detail on the duplicate transaction and use the different sources as a way to verify the accuracy of the data collected. We also lose some observations from each dataset because firm level data is not available on CRSP or Compustat. Our sample size of 392 can be compared to the other studies: Ezzell and Vora (2001) have 44 observations, Ben-David (2005) has 298 observations, and Elayan et al. (2006) have 127 observations.

Elayan et al. (2006) focus on the motivations of tax exempt lessors (REITs), so their data is primarily focused on the sale and leaseback of real estate. Ezzell and Vora (2001) consider the motivations and consequences of SLB transactions for the lessee, but only have data from 1984 to 1991. Ben-David (2005) examines the difference between the type of asset used in a SLB (general versus specific), as well as the declared motivations for the transaction. However, many of the firms from Ben-David (2005) are not found in Compustat. Thus, while our original dataset of SLB transactions includes more than 570 non-duplicate observations, many of these observations do not have corresponding data in CRSP or Compustat and cannot be used in our analysis. We also tried to collect missing data from firm-specific SEC filings, but found that in most cases, the firm had either gone out of business, merged with another firm, or gone private. In the end, our final sample of SLB transactions is one of the largest used in academic research and we would like to give special thanks those that have been willing to share their data.

In Table 1, we present the summary statistics for the SLB transactions. The majority of the transactions involve real estate, with nearly 64% of the sample reporting real estate as part of the transaction. Any transaction that is entirely real estate, or real estate

[7] To further explore the wealth transfer hypothesis, we also examined the repurchase of equity by SLB firms. In our sample, 23 firms repurchased shares within 6 months of the SLB transaction. While this is consistent with the wealth transfer hypothesis, given the small sample size, more formal tests were inconclusive and are unreported.

[8] Abdel-Khalik (1981) found that the capitalization of leases has no significant impact on the stock or bond prices of lessee firms. El-Gazzar et al. (1986)) found that high-debt firms were more likely to use operating leases. Ely (1995) finds that investors do take into account operating lease obligations when assessing the equity risk of the firm.

[9] Synthetic leases are treated as loans for tax purposes but as operating (off-balance sheet) leases for financial reporting purposes. The substantially higher transaction costs related to synthetic leases is noted by Altamuro (2006) and Zechman (2010).

[10] Graham et al. (1998) report that 99.9query% of firms in the Compustat database report operating leases while 52.6% report capital leases.

Table 1
Summary statistics for firm's conducting sale-and-leaseback transactions. This table reports summary statistics from data collected from press releases announcing sale-and-leaseback transactions from 1980 through 2011. The sample consists of 392 observations. Data on the specifics of each SLB transaction was collected from press releases and company filings. Detailed variable definitions can be found in Appendix A. The amount of the slb, market value of equity, total assets, and annual earnings are reported in millions.

	Mean	Median	Std dev
Amount of SLB	174.01	32.75	503.58
Change in total debt/total assets	0.162	0.002	1.306
Change in LT debt/total assets	0.111	0.000	0.962
Change in ST debt/total assets	0.046	0.000	0.417
Debt to asset ratio	0.567	0.340	2.884
Lease to asset ratio	0.248	0.086	1.520
Capital lease to operating lease	0.267	0.000	0.761
Market value of equity	4135.74	341.24	20,252.92
Total assets	1727.55	87.24	11073.66
Market to book	3.100	1.399	20.953
Cash/total assets	0.127	0.055	0.329
Change in cash/total assets	0.086	0.001	1.105
Capital expenditures/total assets	0.178	0.059	0.829
Interest coverage ratio	−0.266	2.639	39.798
Investment grade (1/0)	0.244	0.000	0.430
Z-score	2.018	1.921	1.699
Marginal tax rate	0.304	0.350	0.133
Prior 6-month return	−0.064	0.017	0.474
Annual earnings	−16.45	6.49	2470.21
Real estate (1/0)	0.633	1.000	0.483

combined with plant and equipment, is labeled as a real estate transaction. The mean (median) amount of the assets in the SLB transaction is $174 million ($33 million). We also collect data on each firm from Compustat and report select debt and market value ratios in Table 1. The mean firm actually increases its total debt, including both long-term and short-term debt. The mean firm also increases its cash and capital expenditures after the SLB transaction.

The year reported in Appendix B and in the tables represents the fiscal year end and may not be equal to the year the transaction was announced. For instance, if the SLB transaction occurred in December of 1996, but the firm reports fiscal year end results in June, the SLB transaction year is changed to 1997. Appendix B also reports the industries represented by the firms involved in the SLB transactions. Although most industries are represented in the sample, the healthcare and financial industries are the most frequent.

Table 2
Comparison of firms that increase or decrease debt with SLB. Firms that increase their debt (complement) after a SLB are compared to firms that decrease their debt (substitute). Summary statistics and difference tests are reported. The sample consists of 392 observations. Detailed variable definitions can be found in Appendix A. The amount of the SLB, market value of equity, total assets, and annual earnings are reported in millions. Mean difference reports the p-value from a two-tailed *t*-test that assumes unequal variances. Median difference reports the p-value from a two-tailed Wilcoxon rank sum test.

	Complement N = 168			Substitute N = 224			Mean	Median
	Mean	Median	Std dev	Mean	Median	Std dev	Difference	Difference
Amount of SLB	123.88	36.00	250.72	211.61	32.25	627.90	0.059	0.579
Change in total debt/total assets	0.419	0.104	1.798	−0.101	−0.058	0.125	0.000	0.000
Change in LT debt/total assets	0.283	0.057	1.328	−0.066	−0.033	0.094	0.001	0.000
Change in ST debt/total assets	0.135	0.014	0.597	−0.030	−0.003	0.101	0.001	0.000
Debt to asset ratio	0.816	0.441	4.178	0.345	0.266	0.320	0.018	0.010
Lease to asset ratio	0.381	0.113	2.183	0.124	0.066	0.133	0.002	0.030
Capital lease to operating lease	0.299	0.000	0.783	0.239	0.000	0.744	0.363	0.633
Market value of equity	4679.76	393.81	25540.80	3106.79	298.56	14868.19	0.665	0.354
Total assets	1757.84	89.65	11717.05	1702.11	84.76	10532.59	0.962	0.441
Market to book	4.823	1.588	30.607	1.628	1.211	3.429	0.185	0.005
Cash/total assets	0.161	0.055	0.464	0.099	0.055	0.131	0.099	0.390
Change in cash/total assets	0.182	0.002	1.627	0.006	−0.004	0.128	0.163	0.471
Capital expenditures/total assets	0.293	0.081	1.180	0.070	0.047	0.087	0.016	0.000
Interest coverage ratio	0.784	2.395	56.262	2.909	2.734	12.062	0.146	0.291
Investment grade (1/0)	0.251	0.000	0.435	0.239	0.000	0.427	0.012	0.769
Z-score	1.984	1.764	0.880	2.080	2.001	2.114	0.027	0.000
Marginal tax rate	0.305	0.350	0.137	0.304	0.345	0.130	0.962	0.593
Prior 6-month return	−0.039	0.016	0.432	−0.083	0.017	0.505	0.376	0.806
Annual earnings	−6.69	8.58	2701.29	24.92	4.81	2264.06	0.730	0.653
Real estate (1/0)	0.607	1.000	0.490	0.652	1.000	0.477	0.367	0.365

5. Results

We first examine general differences between firms contained in the complement subset compared to firms in the substitute subset. The results are presented in Table 2. The average amount of the SLB is higher for the substitute subset, but the median amount is not. In other dimensions, such as size, performance of earnings, stock returns, and interest coverage ratio, the two sets of firms do not display significant differences. While the changes in debt are different by design, it is interesting that the complement subset has a much higher debt to asset ratio (0.816) compared to the substitute subset (0.345), which is significantly different for both means and medians. The operating lease to asset ratios also are much higher for the complement subset than the substitute subset, but the capital lease ratios are not significantly different.

The market to book ratio for complement subset (mean of 4.8 and median of 1.6) is higher than the substitute subset (mean of 1.6 and median of 1.2), but only the median difference is statistically significant. This gives some support to the notion that complementary firms have higher investment opportunities. Also consistent with this notion, the capital expenditures to asset ratio for the complement subset is much higher after the SLB than the ratio for the substitute subset. Liquidity concerns could also influence a firm's decision to sell and leaseback an asset. Constrained firms might sell assets in a final attempt to raise cash. To explore this possibility, we examine cash holdings, changes in cash holdings, interest coverage ratios, and debt ratings. However, we do not find any differences between our substitute and complement subsets. Finally, the financial risk of the substitute subset after the transaction, as measured by Altman's z-score, is lower than the financial risk for the complement subset (higher z-score indicates lower risk of bankruptcy). This result is partially driven by the greater leverage of the firms in the complement subset. However, the mean percentage of firms with investment grade bonds is slightly higher for the complement subset (25%) than the substitute subset (24%), but the medians show no difference (both medians are zero).

We also examined the time-series pattern for the two subsets going from 10 years before to 3 years after the SLB transaction. Fig. 1 displays these time-series patterns for four variables: z-score, total debt to assets, market to book, and earnings to assets. Both the z-score and the Earnings indicate some decline in the years leading up to the SLB transaction, which is consistent with growing financial risk and distress. However, the z-score for the substitute subset improves post transaction, while the complement subset appears to decline. The debt ratio for the complement subset grows while the ratio for the substitute subset is flat or declining leading up to the SLB transaction. Post transaction, the debt ratio for the complement subset approaches the substitute subset. The market to book ratios for both subsets do not display much of a pattern, but there is a significant gap between the two groups right before the transaction; this is supported by the statistical differences in the mean and median, as previously reported. Given that there is little information regarding the original purchase date of the asset involved in the SLB, it is difficult to draw many conclusions from these historical patterns.

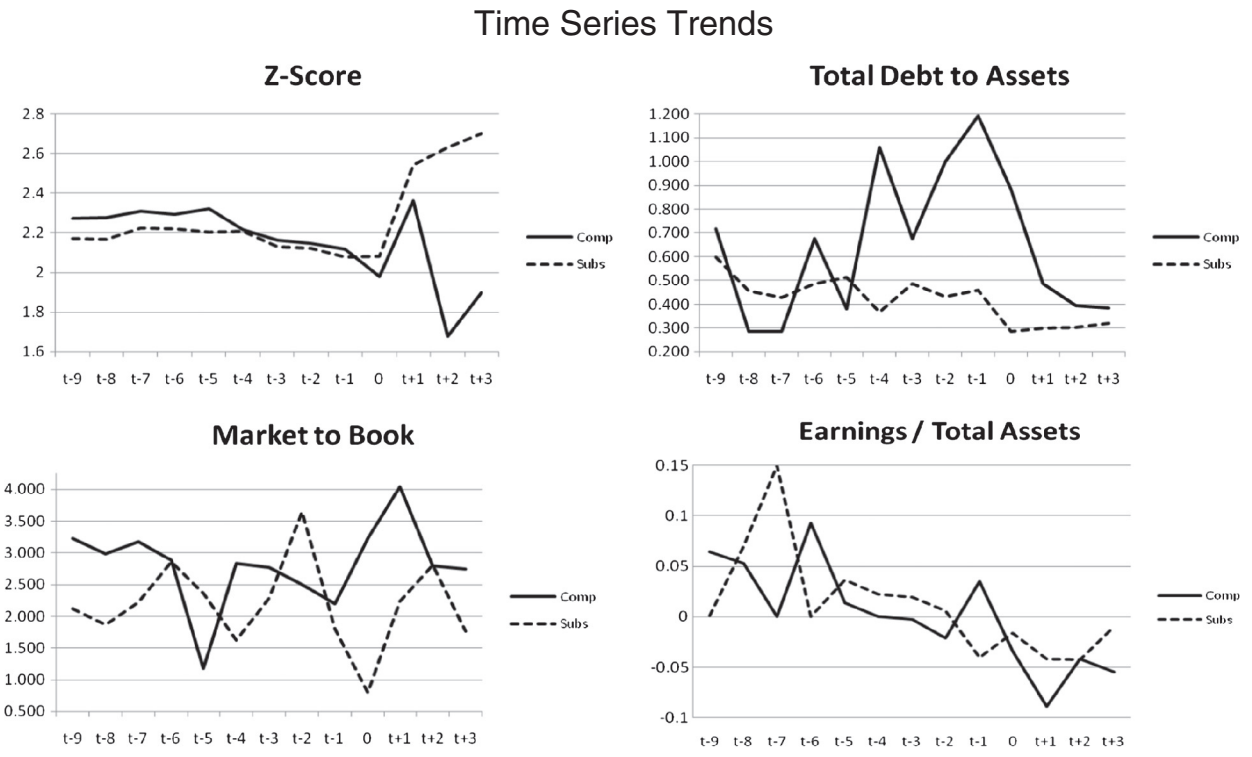

Fig. 1. Time series trends.

Table 3
Change in lease on change in debt regressions for SLB Firms. This table reports results from regressing change in leases on change in debt. The dependent variable is the amount of sale in a sale-and-leaseback scaled by total assets. Where appropriate, variables are scaled by total assets. Detailed variable definitions can be found in Appendix A. t-statistics are reported in parentheses and statistical significance is denoted as follows: ***p < 0.01, **p < 0.05, *p < 0.10.

	1	2	3	4
Constant	0.420***	0.405***	0.395***	0.408***
	(5.932)	(5.643)	(5.859)	(5.670)
Change in total debt	−0.102***			
	(−2.699)			
Change in LT debt		−0.000		−0.000
		(−0.159)		(−0.025)
Change in ST debt			0.050	0.047
			(0.783)	(0.709)
ln (Total assets)	−0.028***	−0.026***	−0.025***	−0.026***
	(−4.902)	(−4.557)	(−4.676)	(−4.595)
Change in cash	0.180**	0.152**	0.146**	0.150**
	(2.437)	(2.041)	(2.005)	(2.012)
Capital expenditures	0.005	0.022*	0.023*	0.022*
	(0.371)	(1.680)	(1.812)	(1.661)
Marginal tax rate	0.153*	0.151	0.120	0.149
	(1.657)	(1.612)	(1.324)	(1.590)
Interest coverage	0.000	0.000	0.000	0.000
	(0.425)	(0.319)	(0.308)	(0.335)
Investment grade (1/0)	−0.038	−0.046*	−0.044*	−0.045*
	(−1.358)	(−1.625)	(−1.649)	(−1.561)
Z-score	−0.024*	−0.024*	−0.024*	−0.024*
	(−1.517)	(−1.414)	(−1.548)	(−1.482)
Real estate (1/0)	−0.006	−0.007	−0.007	−0.007
	(−0.264)	(−0.338)	(−0.333)	(−0.308)
Observations	392	392	392	392
R-squared	0.221	0.201	0.208	0.212
F-statistic	8.668	7.701	8.047	8.132
Prob F	0.000	0.000	0.000	0.000

The univariate comparisons of means, medians, and time-series patterns are interesting, but a fuller explanation of these subsets is gained by a multivariate analysis. Our next set of results examines the relation between the SLB and changes in debt in order to test the hypotheses described in Section 3. We begin with the full sample of SLB transactions and then examine the substitute and complement subsets separately.

Table 3 presents the main result for the total sample of SLB transactions. In the full sample of 392 firms, the SLB displays a significant negative change in total debt (column 1). Based on this result, we reject the null hypothesis and find support for Hypothesis H1: leases and debt are substitutes for total debt. Column 2 of Table 3 tests the Corollary to H1 that long-term debt and leases are substitutes, but does not provide support for that corollary with respect to the entire sample. With respect to the type of debt – long-term or short-term – we do not find a significant relation between debt and leases for the entire sample. However, we do see that SLB transactions decrease with size, have increasing cash balances, and are negatively related to z-score (distress) and investment grade ratings. The size effect and z-score findings are consistent with the Eisfeldt and Rampini (2009) theory that firms with a higher likelihood of distress favor more lease financing and supports Hypothesis H3.b.

Capital expenditures are not significantly related to the SLBs and thus not supportive of Hypothesis H2. However, changes in cash and the relative levels of SLBs are significantly and positively related, indicating that some of the funds from the SLB transaction are likely retained in the cash account. The insignificance of the marginal tax rate does not support Hypothesis H3.a.

Table 4 presents similar regressions to those in Table 3 (entire sample), but for the substitute subset.[11] Our estimate of the substitution parameter, λ, is of course significantly higher for this subset. For changes in total debt, we find nearly $0.73 of debt is substituted for each $1 of leases. The regression equations that include the control variables are very similar to the results for the total sample where SLBs are also related to size and changes in cash. However, the z-score is insignificant and the marginal tax rate has a positive sign. For this subset of firms, it appears that a higher marginal tax rate is associated with higher SLB transactions and a lowering of their debt ratios. This result contradicts Hypothesis H3.a for the substitute subset.

Examining the regression results in Table 5 confirms that both total debt and long-term debt increase for the complement subset (by design). As with the overall sample and the substitute subset, we see a positive relation between leasing and changes in cash and a negative relation between leasing and the size of the firm. Similar to the overall sample but distinct from the

[11] Regressions on the non-random subsets (substitute and complement) may have a sample selection bias that could impact our results. For example, if all firms decided to increase or decrease their debt after a SLB transaction by flipping a coin, then our subsets would still be considered random and the standard OLS assumptions would apply. Since firms probably have common elements in their decision making process regarding debt levels after a SLB, analyzing only half the sample that makes a specific choice could bias our results. To alleviate the sample selection bias, we also utilized a two-stage, Heckman correction procedure. However, the Lambda coefficient from the Heckman specifications was not significant while the other coefficients remained similar to those reported. Only the OLS results are presented in the tables.

Table 4
Change in lease on change in debt regressions for substitute Slb firms. This table reports results from regressing change in leases on change in debt for firms that decrease their debt after a SLB transaction. The dependent variable is the amount of sale in a sale-and-leaseback scaled by total assets. Where appropriate, variables are scaled by total assets. Detailed variable definitions can be found in Appendix A. t-statistics are reported in parentheses and statistical significance is denoted as follows: ***p < 0.01, **p < 0.05, *p < 0.10.

	1	2	3	4
Constant	0.265***	0.273***	0.264***	0.264***
	(4.571)	(4.987)	(5.079)	(4.526)
Change in total debt	−0.730**			
	(−2.297)			
Change in LT debt		−0.517**		−0.498**
		(−2.048)		(−2.009)
Change in ST debt			−0.073	−0.071
			(−0.525)	(−0.480)
ln (Total assets)	−0.035***	−0.036***	−0.035***	−0.035***
	(−5.055)	(−5.268)	(−5.727)	(−5.052)
Change in cash	0.426***	0.426***	0.431***	0.430***
	(3.447)	(3.441)	(3.659)	(3.455)
Capital expenditures	0.169	0.167	0.209	0.169
	(0.725)	(0.716)	(0.960)	(0.720)
Marginal tax rate	0.227**	0.228**	0.191**	0.239**
	(1.921)	(1.898)	(1.706)	(1.949)
Interest coverage	0.000	0.000	0.000	0.000
	(0.252)	(0.264)	(0.194)	(0.242)
Investment grade (1/0)	−0.011	−0.008	−0.004	−0.011
	(−0.304)	(−0.235)	(−0.113)	(−0.310)
Z-score	0.003	0.003	0.003	0.003
	(1.088)	(1.166)	(1.138)	(1.032)
Real estate (1/0)	−0.033	−0.033	−0.028	−0.033
	(−1.211)	(−1.196)	(−1.146)	(−1.196)
Observations	224	224	224	224
R-squared	0.311	0.311	0.310	0.312
F-statistic	6.381	6.367	7.130	5.718
Prob F	0.000	0.000	0.000	0.000

substitute subset, we find a negative relation between leasing and distress (z-score) in the complementary subset. Unique to this subset, the marginal tax rate exhibits negative significance in all model specifications. The conclusion we can tentatively draw from this analysis is that if debt and leases are complements, tax effects and distress appear to be the driving forces as implied by the theories of Eisfeldt and Rampini (2009) and Lewis and Schallheim (1992). Overall, the results are consistent with Hypotheses H3.a (taxes) and H3.b (financial constraints) for the complement subset.

The real estate dummy variable, which is equal to one for SLB transactions that are mainly structures, is not significant in any of our regression specifications. We include the real estate variable because Handa (1991) finds a significant difference between real estate SLBs and equipment leases. Slovin et al. (1990) also separate their sample into the two groups but find a positive stock market reaction for both groups, while Handa finds a negative stock price reaction for all SLB transactions. Finally, Eisfeldt and Rampini (2009) also separate their sample into subgroups of structures and equipment. They suggest that the effect of financial constraints may be harder to detect in the equipment group, perhaps due to greater moral hazard problems for equipment. Nevertheless, real estate transactions do not appear to differ from the others in our sample. To further alleviate concerns that our results are driven by factors specific to real estate, we perform our analysis on the non-real estate transactions. Results are reported in Table 6. While we have less power because of the reduction in our sample, we find, with one exception, similar results to those presented for the full sample. The lack of significance with respect to changes in cash is the major difference we see when examining only non-real estate SLBs.

Table 7 presents tests of Hypothesis H5 concerning the changes in the capital lease to operating lease ratio before and after the SLB transaction. Consistent with Hypothesis H5, we find a significant drop in the ratio from 0.239 before to 0.157 after the SLB transaction for the substitute subset. This difference is statistically significant. In results not reported in the table, the average amount of operating leases increases while the average amount of capital leases decreases. This is consistent with the conjecture that firms that are substituting lease for debt financing are financially constrained and would desire to show lower leverage ratios after the transaction. For the complement subset, there is an insignificant change in the capital to operating lease ratio after the SLB transaction.

Hypothesis H4.a suggests that the announcement of SLB transactions would be met with a positive stock market reaction. Table 8 shows that Hypothesis H4.a is supported by the evidence. We show a 5 day stock market reaction for the entire sample of 1.61%. This positive announcement effect is consistent with the majority of prior research. We also look at the announcement period return for both subsets. The substitute subset has a return of 1.52% with a p-value of .006. The complement subset has a higher announcement return of 1.75%, which is significant at the .001 level. This suggests that the market has a more favorable reaction for the subset of firms that actually increased their debt post SLB transaction.

Table 5
Change in lease on change in debt regressions for complement slb firms. This table reports results from regressing change in leases on change in debt for firms that increase their debt after a SLB transaction. The dependent variable is the amount of sale in a sale-and-leaseback scaled by total assets. Where appropriate, variables are scaled by total assets. Detailed variable definitions can be found in Appendix A. t-statistics are reported in parentheses and statistical significance is denoted as follows: ***p < 0.01, **p < 0.05, *p < 0.10.

	1	2	3	4
Constant	0.358***	0.366***	0.397***	0.359***
	(5.439)	(5.720)	(5.907)	(5.509)
Change in total debt	0.129***			
	(2.969)			
Change in LT debt		0.201***		0.199***
		(3.438)		(3.406)
Change in ST debt			0.049	0.042
			(0.724)	(0.647)
ln (Total assets)	−0.049***	−0.048***	−0.051***	−0.048***
	(−6.274)	(−6.320)	(−6.375)	(−6.264)
Change in cash	0.196**	0.229***	0.165**	0.225***
	(2.479)	(2.878)	(2.015)	(2.813)
Capital expenditures	−0.002	−0.012	0.016	−0.011
	(−0.110)	(−0.782)	(1.195)	(−0.746)
Marginal tax rate	−0.178**	−0.160*	−0.168*	−0.165**
	(−1.688)	(−1.583)	(−1.681)	(−1.654)
Interest coverage	0.001	0.001	0.001	0.001
	(0.933)	(1.050)	(1.015)	(1.004)
Investment grade (1/0)	0.010	0.008	0.006	0.009
	(0.259)	(0.206)	(0.145)	(0.233)
Z-score	−0.041*	−0.040*	−0.045*	−0.040
	(−1.452)	(−1.373)	(−1.517)	(−1.230)
Real estate (1/0)	0.013	0.009	0.010	0.010
	(0.479)	(0.328)	(0.351)	(0.381)
Observations	168	168	168	168
R-squared	0.442	0.456	0.400	0.458
F-statistic	9.611	10.170	8.083	9.142
Prob F	0.000	0.000	0.000	0.000

Our test of hypothesis H4.b is limited by the availability of bond price data. However, bond prices are available through TRACE beginning in 2002. We were able to find 41 firms in our SLB sample with bond prices around the SLB announcement. We compared the bond prices from the week before the SLB transaction to the prices the week after the SLB, computed the raw

Table 6
Non-real estate transactions. This table reports results from regressing change in leases on change in debt for firms with SLB transactions that do not involve real estate. The dependent variable is the amount of sale in a sale-and-leaseback scaled by total assets. Where appropriate, variables are scaled by total assets. Model 1 uses all non-real estate transactions, model 2 is for firms with a complementary relation, and model 3 is for firms with a substitutionary relation. Detailed variable definitions can be found in Appendix A. t-statistics are reported in parentheses and statistical significance is denoted as follows: ***p < 0.01, **p < 0.05, *p < 0.10.

	All	Complement	Substitute
Constant	0.374***	0.241**	0.446***
	(6.018)	(1.778)	(4.595)
Change in total debt	0.090**	0.121**	−0.237
	(2.085)	(2.130)	(−1.184)
ln (Total assets)	−0.050***	−0.047***	−0.052***
	(−7.343)	(−3.638)	(−5.220)
Change in cash	0.086	0.046	0.087
	(0.748)	(0.261)	(0.351)
Capital expenditures	0.009	0.010	0.127
	(0.534)	(0.440)	(0.361)
Marginal tax rate	−0.142	−0.541**	0.127
	(−1.018)	(−1.806)	(0.620)
Interest coverage	0.000	0.002	0.000
	(0.251)	(0.885)	(0.031)
Investment grade (1/0)	−0.001	0.003	−0.023
	(−0.027)	(0.051)	(−0.469)
Z-score	0.000	−0.009	0.000
	(0.162)	(−1.015)	(0.019)
Observations	144	70	74
R-squared	0.514	0.571	0.515
F-statistic	10.160	5.490	4.639
Prob F	0.000	0.000	0.000

Table 7
Analysis of lease ratios for SLB firms. The ratio of capital leases to operating leases is calculated for the substitute and complement subsets. Capitalized lease obligations are directly reported on Compustat. Operating leases are calculated as the present value of the minimum future rental commitments for the next 5 years, using a discount rate of 10%. Mean lease ratios are reported for the year of the SLB announcement and the year following the announcement. The change in the lease ratio is reported with its corresponding p-value from the test that the change is equal to 0. Capital and operating leases scaled by total assets are also reported for the year of the announcement and are multiplied by 100 for reporting purposes.

	Lease ratio year of announcement	Lease ratio year after announcement	Change in lease ratio	p-Value for change in lease = 0	Capital lease/total assets	Operating lease/ total assets
Complement	0.299	0.334	0.035	0.872	0.553	1.851
Substitute	0.239	0.157	−0.081	0.055	0.574	2.395

returns, and tested whether the returns were significantly different from zero. For all 41 SLBs, the average return is not significantly different from zero. However, the removal of one outlier, Lucent Technologies, leads to a statistically significant drop in bond prices with an average return of −0.65%. Therefore, there is weak evidence of a wealth transfer from bondholders to stockholders around the SLB transactions. However, the magnitude of the equity gain of 1.61% appears to dominate any bondholder losses.

6. Conclusions

Most theoretical models predict that debt and leases should act as substitutes. While the preponderance of evidence supports this claim, there remain significant cases where debt and leases appear to be complements. One of the problems with prior research is that it is difficult to properly control for the changing asset base associated with leasing in cross-sectional tests. To overcome this problem, we examine a sample of sale-and-leaseback (SLB) transactions where the assets of the firm do not change due to the lease.

Consistent with prior research, the average firm in our sample appears to use leases and debt as substitutes. However, we find that more than 40% of the firms in our sample increase their total debt after a SLB transaction, which is evidence that at least some firms treat debt and leases as complements. Thus, assuming all firms treat debt and leases similarly as either complements or substitutes might be too simplistic. To further investigate the difference between firms that treat leases and debt as substitutes versus complements, we divide the sample of SLBs into two groups: those that show an increase in total debt (complement) after the SLB transaction, and those that show a decrease in total debt (substitute).

We find clear differences between the complement and substitute firms. Compared to substitute firms, complement firms have more debt, more leases, lower z-scores, and spend more on capital expenditures. In our regression analysis, we find that substitute firms display leasing as positively related to the marginal tax rate and changes in cash, while negatively related to firm size. For the complement subset, SLB transactions are negatively related to the marginal tax rate, firm size, and z-score. These results are consistent with theories suggesting that leasing can increase debt capacity based on tax and financial distress assumptions.

Finally, it appears that SLB transactions enhance firm value. While the average event return for the entire sample is positive and significant, results are stronger for the sample of complement firms.

Table 8
Event study results. Cumulative abnormal returns are reported for the firms announcing sale-and-leaseback transactions. CARs are adjusted using a market model. The day of the announcement is t = 0. Individual CARs are reported for the substitute and complement subsets. Patell z-statistics and their corresponding p-values are reported for each CAR. Bond market data are from TRACE. Returns are calculated using the last trade prior to the SLB and the first trade after the SLB as long as those trades occurred within 7 days of the SLB announcement. t-statistics and p-values from a Student's *t*-test of whether the average bond return is equal to zero are also reported.

A. Stock market adjusted returns

Interval	Sample	N	CAR	z-Statistic	p-Value
(−2, +2)	All firms	313	1.61%	3.108	0.003
	Substitute	189	1.52%	2.876	0.006
	Complement	124	1.75%	3.290	0.001

B. Bond market raw returns

Interval	Sample	N	AR	t-Statistic	p-Value
(−1 week,	Firms − 2002	41	−0.11%	−0.32	0.751
+1 week)	Without 1 outlier	40	−0.65%	−4.09	0.000

Appendix A. Variable definitions

Amount of SLB	Amount of SLB from press release in millions.
Change in total debt/total assets	Total debt in year t minus the total debt in year t-1, scaled by total assets from year t-1.
Change in LT debt/total assets	Long term debt in year t minus the long term debt in year t-1, scaled by total assets from year t-1.
Change in ST debt/total assets	Short term debt in year t minus the short term debt in year t-1, scaled by total assets from year t-1.
Debt to asset ratio	Total debt divided by total assets in year t.
Lease to asset ratio	The present value of operating leases divided by total assets in year t.
Market value of equity	Number of shares outstanding multiplied by the stock price at the time of the SLB.
Total assets	Total assets of the firm as reported in Compustat in year t.
Market to book	Market value of equity from month t-1 divided by the book value of equity from the previous fiscal year.
Cash/total assets	Cash and marketable securities divided by total assets as of year t.
Capital expenditures/total assets	Capital expenditures during year t divided by total assets from year t-1.
Interest coverage ratio	Operating earings (EBITDA) divided by interest expense.
Investment grade (1/0)	Equal to 1 if firm has S&P debt rating greater than BBB-, 0 otherwise.
Marginal tax rate	Is calculated by John Graham according to Graham (1996a).
Prior 6-month return	Buy and hold stock return from months t-7 to t-1.
Annual earnings	Annual earnings from the current fiscal year.
Real estate (1/0)	Equal to 1 if the SLB transaction contained real estate assets, 0 otherwise.
Z-score	Calculated following Altman (1968)

Appendix B. Industry and year detail

Industry	Complement	Substitute	Total
Food Products	1	1	2
Beer & Liquor	1	0	1
Tobacco Products	0	0	0
Recreation	0	2	2
Printing and Publishing	0	1	1
Consumer Goods	3	4	7
Apparel	0	1	1
Healthcare, Medical Equipment, Pharmaceutical	22	28	50
Chemicals	0	0	0
Textiles	0	0	0
Construction and Construction Materials	2	3	5
Steel Works, etc.	0	0	0
Fabricated Products and Machinery	9	12	21
Electrical Equipment	0	0	0
Automobiles and Trucks	1	6	7
Aircraft, ships, and railroad equipment	0	2	2
Precious Metals, Non-Metallic, and Mining	3	3	6
Coal	0	2	2
Petroleum and Natural Gas	6	7	13
Utilities	8	18	26
Communication	7	14	21
Personal and Business Services	16	22	38
Business Equipment	10	19	29
Business Supplies and Shipping Containers	3	0	3
Transportation	20	15	35
Wholesale	0	6	6
Retail	18	17	35
Restaurants, Hotels, Motels	14	12	26
Banking, Insurance, Real Estate, Trading	18	27	45
Everything else	6	2	8
Total	168	224	392

Year	Complement	Substitute	Total
1980	0	1	1
1981	2	1	3
1982	2	0	2
1983	1	1	2
1984	6	3	9
1985	7	8	15
1986	12	19	31
1987	6	11	17
1988	9	16	25
1989	7	4	11
1990	5	4	9

(continued on next page)

Appendix B (*continued*)

Year	Complement	Substitute	Total
1991	3	7	10
1992	1	9	10
1993	2	3	5
1994	11	9	20
1995	14	8	22
1996	10	10	20
1997	8	11	19
1998	6	5	11
1999	4	4	8
2000	12	3	15
2001	13	23	36
2002	13	23	36
2003	5	28	33
2004	0	0	0
2005	2	1	3
2006	0	2	2
2007	2	3	5
2008	1	2	3
2009	2	2	4
2010	1	2	3
2011	1	1	2
Total	168	224	392

References

Abdel-Khalik, Rashad, 1981. Economic Effects on Lessees of FASB Statement No. 13, Accounting for Leases. FASB.

Altamuro, Jennifer Lynne M., December 2006. The determinants of synthetic lease financing and the impact on the cost of future debt. (Available at SSRN: http://ssrn.com/abstract=951514).

Altman, Edward I., 1968. Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. J. Finance 189–209.

Ang, James, Peterson, Pamela P., 1984. The leasing puzzle. J. Finance 39, 1055–1065.

Bayliss, Mark E., David Diltz, J., 1986. An empirical study of the debt displacement effects of leasing. Financ. Manag. 15, 53–60.

Beattie, Vivien, Goodacre, Alan, Thomson, Sarah, 2000. J. Bank. Finance 24, 427–470.

Ben-David, Itzhak, 2005. Company performance and leased assets in sale-and-leaseback transactions. J. Equip. Lease Financ. 23.

Bowman, Robert G., 1980. The debt equivalence of leases: an empirical investigation. Account. Rev. 2, 237–253.

Eisfeldt, Andrea L., Rampini, Adriano A., 2009. Leasing, ability to repossess, and debt capacity. Rev. Financ. Stud. 22, 1621–1657.

Elayan, Fayez A., Meyer, Thomas O., Li, Jingyu, 2006. Evidence from tax-exempt firms on motives for participating in sale-leaseback agreements. J. Real Estate Res. 28, 381–409.

El-Gazzar, Samir, Lilien, Steve, Pastena, Victor, 1986. Accounting for leases by lessees. J. Account. Econ. 8, 217–237.

Ely, Kirsten, 1995. Operating lease accounting and the market's assessment of equity risk. J. Account. Res. 33, 397–415.

Ezzell, John R., Vora, Premal P., 2001. Leasing versus purchasing: direct evidence on a corporation's motivations for leasing and consequences of leasing. Q. Rev. Econ. Finance 41, 33–47.

Faulkender, Michael, Petersen, Mitchell A., 2006. Does the source of capital affect capital structure? Rev. Financ. Stud. 19 (1), 45–79.

Graham, John R., 1996. Debt and the marginal tax rate. J. Financ. Econ. 41, 41–73.

Graham, John R., Lemmon, Michael L., Schallheim, James S., 1998. Debt, lease, taxes, and the endogeneity of corporate tax status. J. Finance 53, 131–162.

Handa, Puneet, 1991. An economic analysis of leasebacks. Rev. Quant. Finan. Acc. 1, 177–189.

Kim, E. Han, Lewellen, Wilbur G., McConnell, John J., 1978. Sale-and-leaseback agreements and enterprise valuation. J. Financ. Quant. Anal. 13, 871–883.

Klein, Benjamin, Crawford, Robert G., Alchian, Armen A., 1978. Vertical integration, appropriable rents, and the competitive contracting process. J. Law Econ. 21, 297–326.

Lewis, Craig M., Schallheim, James S., 1992. Are debt and leases substitutes? J. Financ. Quant. Anal. 27, 497–511.

Marston, Felicia, Harris, Robert S., 1988. Substitutability of leases and debt in corporate capital structures. J. Account. Audit. Finance 3, 147–170.

Modigliani, Franco, Miller, Merton H., 1958. The cost of capital, corporate finance, and the theory of investment. American Economic Review 48, 261–297.

Myers, Stewart C., 1977. Determinants of corporate borrowing. J. Financ. Econ. 5, 147–175.

Myers, Stewart C., Dill, David A., Bautista, Alberto J., 1976. Valuation of financial lease contracts. J. Finance 31, 799–819.

Rauh, Joshua D., Sufi, Amir, 2012. Explaining corporate capital structure: product market, leases, and asset similarity. Rev. Finan. 16, 115–155.

Schallheim, James S., Johnson, Ramon E., Lease, Ronald C., McConnell, John J., 1987. The determinants of yields on financial leasing contracts. J. Financ. Econ. 19, 45–67.

Slovin, Myron B., Sushka, Marie E., Polonchek, John A., 1990. Corporate sale-and-leasebacks and shareholder wealth. J. Finance 45, 289–299.

Smith Jr., Clifford W., Macdonald Wakeman, L., 1985. Determinants of corporate leasing policy. J. Finance 40, 895–908.

Yan, An, 2006. Leasing and debt financing: substitutes or complements? J. Financ. Quant. Anal. 41 (3), 709–731.

Zechman, S.L.C., 2010. The relation between voluntary disclosure and financial reporting: evidence from synthetic leases. J. Account. Res. 48, 725–765.