Economic consequences of operating lease recognition☆

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ABSTRACT

Accounting Standards Update No. 2016−02 (ASU 2016−02) generated considerable debate between managers and standard setters. We find evidence that after issuance of ASU 2016−02, lessee firms decreased their use of long-term operating leases, increased their use of short-term operating leases, and increased their use of capital expenditures. The shift from long-term operating leases to capital expenditures is more pronounced for firms that had greater reporting incentives to use operating leases prior to ASU 2016−02. However, we find no evidence that the change in leasing behavior leads to negative outcomes predicted by managers (i.e., no evidence of a decrease in reported firm performance, a decrease in firm value, increase in firm risk, decrease in credit ratings, increase in debt covenant violations, or decrease in employment). Our study adds to the literature on the real impacts of accounting standards on managers' investment behavior and economic consequences for lessee firms and their stakeholders.

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1. Introduction

Accounting Standards Update No. 2016−02 (ASU 2016−02) requires U.S. public firms to recognize operating lease liabilities (and corresponding right-of-use assets) on the balance sheet for annual reporting periods beginning after December 15, 2018 (FASB, 2016). Many believe that the recognition of operating leases is needed to help financial statement users more comprehensively understand the costs of property essential to a firm's operations and its debt financing risk (e.g., PwC, 2019). The new standard is also expected to discourage lease transactions primarily motivated by reporting considerations (SEC, 2005). However, many managers complained that the new accounting standard would harm lessee firms by unnecessarily affecting their balance sheets and financial ratios, leading to an increase in cost of external financing, lower profitability, and ultimately lower firm value. The dire predictions of managers of having to recognize operating leases versus the strong demand by regulators for increased transparency led to a 10-year debate resulting in ASU 2016−02. The FASB has called for research on the new lease standard to help inform its current post-implementation-review process (FASB, 2021). In this study,

we examine whether the new standard affected lessee firms' use of operating leases and capital expenditures and whether these firms' response to the new standard negatively affected their performance and stakeholders.

We first examine the impact of ASU 2016−02 on firms' use of operating leases. Prior research provides mixed explanations for firms' excessive reliance on operating leases prior to ASU 2016−02. One line of research (e.g., Dechow et al., 2011; Cornaggia et al., 2013; Lim et al., 2017; Eaton et al., 2021) suggests that firms disproportionately used operating leases due to managers' reporting incentives.[1] Reporting incentives for operating leases manifest in at least two ways. First, managers may have believed that keeping lease obligations off the balance sheet helped to reduce the firm's perceived risk, lower the cost of capital, and facilitate access to additional capital. Second, an agency view suggests that managers may have been attempting to extract economic rent and gain private benefits by using operating leases as a method of off-balance-sheet financing. Under either scenario, ASU 2016−02 is expected to reduce managers' reporting incentives to use operating leases.

A second line of research (e.g., Caskey and Ozel, 2019) argues that the increase in firms' use of operating leases over the 1990−2017 period is due to non-reporting incentives related to the tax and strategic operating advantages of operating leases. Operating leases facilitate borrowing for firms facing financial constraints, help minimize taxes for firms with low marginal tax rates, and allow operational flexibility for firms facing volatile business environments (Eisfeldt and Rampini, 2009; Graham et al., 1998; Gavazza, 2011). Because ASU 2016-02 has no effect on these non-reporting incentives, the conclusion from Caskey and Ozel would suggest the new lease standard should have no effect on managers' decisions on whether to use operating leases.

Using a difference-in-differences test, we find a significant decline in new operating lease commitments after issuance of the new standard (2016−2019) for treatment firms that rely more heavily on operating leases before issuance (2011−2014). This finding supports the argument that by eliminating off-balance-sheet financing, ASU 2016-02 significantly reduced managers' reporting incentives of using operating leases. The results are robust to alternative definitions of treatment firms and controlling for several firm characteristics, macro-economic factors, and firm fixed effects.

We exploit an exception in the new lease standard to further show that the change in operating leasing behavior relates to balance sheet recognition. Specifically, according to ASU 2016−02, operating lease commitments due within one year are not required to be recognized on the balance sheet. Therefore, the off-balance-sheet reporting of short-term leases remains. We find that firms shorten their lease commitments and switch from longer-term to shorter-term operating leases following ASU 2016−02. As anecdotal support of these results, International Workplace Group, a global provider of office space leases, suggested in its 2018 annual report that the short-term lease exception under ASU 2016-02 has increased demand for its short-term services (Bloomberg, 2019). Many managers expressed similar beliefs that their firms will shorten lease terms.[2] In total, our findings support the conclusion that the decline in firms' use of operating leases is attributable to the reduction in reporting incentives for using operating leases.

Following the literature on lease-versus-buy decision (e.g., Beatty et al., 2010), we next hypothesize and find evidence that lessee firms *increase* their capital expenditures following issuance of the new standard. The increase in capital expenditures is consistent with recent survey responses by managers that the new standard would cause them to change their real investment behavior (Deloitte, 2014). To further validate whether the shift from operating leases to capital expenditures is consistent with reporting incentives, we provide several cross-sectional tests. We expect the shift from operating leases to capital expenditures to be more pronounced for firms that had greater reporting incentives to use operating leases prior to ASU 2016−02. We find evidence consistent with this expectation. The decrease (increase) in operating leases (capital expenditures) is greater for firms with higher sales growth and with a higher ratio of long-term leases to total leases. In addition, while prior research focuses on the balance sheet incentives of operating leases, we introduce income statement and cash flow reporting incentives. Firms with greater incentives to report higher EBITDA or higher operating cash flows experience a larger shift from operating leases to capital expenditures.[3] In contrast, for firms that were more likely using operating leases prior to ASU 2016−02 for non-reporting incentives (e.g., financial constraints prevented them from purchasing assets), the switch from operating leases to capital expenditures is mitigated. Overall, the cross-sectional tests provide additional evidence that firms' leasing behavior is affected by reporting incentives.

We next examine whether firms' response to ASU 2016−02 affected their financial performance and stakeholders. The predicted consequences of the new standard on firm performance are mixed. While managers issued dire warnings that ASU 2016−02 would have negative effects on firm performance, standard setters and academic researchers suggested that the new standard should have no effect or perhaps even have positive effects on firm performance by constraining opportunistic uses of operating leases and encouraging more cost-efficient methods of asset acquisition. For our treatment firms that reduced their use of operating leases following the issuance of ASU 2016−02, we find no evidence of negative effects on reported firm performance. We do, however, find an *increase* in their net income, operating cash flows, and sales growth

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[1] Reporting incentives refer to managers' preference for operating leases (as opposed to capitalized leases or debt-financed asset purchases) because the off-balance sheet reporting of operating leases allowed managers to achieve certain economic objectives, such as influencing contractual outcomes or extracting economic rent.

[2] See https://deloitte.wsj.com/cfo/files/2014/01/lease_accounting_survey.pdf.

[3] As explained in more detail later, a switch from operating leases to capital expenditures has the effect of mechanically increasing reported EBITDA and operating cash flows. Thus, without the reporting benefits of off-balance-sheet financing, firms with greater incentives to report higher EBITDA and operating cash flows responded to ASU 2016-02 by decreasing (increasing) their use of operating leases (capital expenditures). We identify these additional reporting incentives as industries with a higher number of analyst forecasts of EBITDA and operating cash flows.

relative to other firms. We also find no evidence of negative consequences to other stakeholders (i.e., lessee firms' shareholders, creditors, and employees). For treatment firms that reduced their use of operating leases after issuance of 2016−02, we find neither a decrease in firm value nor an increase in risk for shareholders. In fact, we find some evidence of an increase in firm value and a decrease in systematic market risk (beta), both of which are not consistent with managers' dire predictions. We also do not observe significant effects of the reduction in operating leases on debt covenant violations or employment following ASU 2016−02. Instead, we find a relative increase in credit ratings for firms that reduce their use of operating leases, likely due to their improved financial performance. Overall, our findings do not support concerns about negative consequences of the new standard.

Our study contributes broadly to an interesting literature on understanding the impact of disclosure versus recognition of accounting information (e.g., Mittelstaedt et al., 1995; Davis-Friday et al., 1999; Guay et al., 2003; Choudhary, 2011; Bratten et al., 2013). Views expressed by managers, regulators, standard setters, and academics on the impact of mandatory accounting changes can sometimes differ dramatically. Managers commonly express negative views on recognition of certain items (e.g., employee stock options, post-retirement benefits, and leases), while they demonstrate less objection to disclosure of these items. Regulators and standard setters tend to believe recognition provides greater transparency, allows greater comparability, reduces users' information processing costs, and deters management opportunism. Academic researchers most often find that investors and creditors can incorporate disclosed versus recognized information similarly in their decisions when reliability is similar across the two sources.

Our study focuses specifically on the economic consequences of requiring recognition of operating leases by lessee firms. Imhoff et al. (1993) find that implementation of *Statement of Financial Accounting Standards No. 13: Accounting for Leases* (SFAS 13) had real implications on firms' leasing decisions, causing firms to shift from capital leases to operating leases. We extend the analysis to ASU 2016−02 and find a decrease in operating leases and an increase in capital expenditures. As discussed above, prior literature provides mixed arguments on whether reporting incentives contribute to firms' use of operating leases. We believe that ASU 2016−02 provides a powerful setting to address this issue. Consistent with the conclusions of reporting incentives, the decline in operating leases is stronger for firms that likely employed operating leases for their reporting benefits.

Our findings are especially relevant, given the prior debate on the potential impacts of ASU 2016−02. In a study commissioned by the Chamber of Commerce, Chang & Adams Consulting (2012) suggests that the lease accounting change could have a major negative impact on the U.S. economy and job market. However, in a response commissioned by the Financial Accounting Foundation, Lipe (2015) argues that many information users already treat operating lease commitments as a liability prior to the new standard and that the economic impacts would be minimal. We do not find any evidence that firms' reduction in operating leases after the new standard causes negative consequences to lessee firms or their stakeholders. We find no evidence of a decline in profitability, growth, firm value, credit ratings, or change in employees. We also do not find any evidence of an increase in risk or debt covenant violations. The overall evidence in our study favors regulators' and standard setters' decision to recognize operating leases, despite strong opposition by managers.

2. Literature review and hypothesis

2.1. SFAS 13 and ASU 2016-02

The FASB issued SFAS 13 in 1976. According to SFAS 13, "A lease is defined as an agreement conveying the right to use property, plant, or equipment (land and/or depreciable assets) usually for a stated period of time" (FASB, 1976). Leases were classified into two groups: capital leases and operating leases. The former refers to a noncancelable lease that meets one of the following four criteria: (i) ownership is transferred at the end of the lease, (ii) the lease includes a bargain purchase option that allows the lessee to purchase the asset, (iii) the lease term exceeds 75 percent of the asset's useful life, and (iv) the present value of the lease payment commitment is over 90 percent of the asset's fair value. If none of these four criteria were met, a lease was considered an operating lease. Lessees were required to recognize capital leases on the balance sheet, while operating leases were not recognized. Thus, capital leases were effectively treated as a debt-financing purchase arrangement, while operating leases were treated as rental agreements.

SFAS 13 was long criticized for several reasons. For example, the "bright-line" lease criteria used to classify capital leases versus operating leases give lessees opportunities to structure transactions to avoid the recognition of additional liabilities on the balance sheet (e.g., Monson, 2001). A lease would not be recognized if its term accounts for 74 percent of an asset's useful life, though it is not materially different from a lease that lasts 75 percent of the asset's useful life. Thus, economically similar transactions would be treated differently by different firms, which decreases financial statement comparability and the faithful representation of accounting information (Weidner, 2017). To compare information across firms, information users will need to spend time and effort on adjusting financial ratios, which could lead to significant inaccuracies (Lipe, 2001).

In 2005, the SEC issued a report on firms' off-balance-sheet financing behavior and recommended that the FASB reconsider accounting rules to recognize operating leases.[4] The FASB and the IASB undertook a joint project to develop a new lease

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[4] This report was partly motivated by the Enron and WorldCom scandals, causing Congress to enact the Sarbanes-Oxley Act of 2002 ("SOX"). Section 401(c)(1) of SOX required the SEC to study whether financial statements have reflected "the economics of such off-balance-sheet transactions to investors in a transparent fashion."

accounting standard in 2006 and issued an exposure draft in 2010. The chairman of the FASB, Leslie Seidman, suggested, "The proposal is responsive to the widespread view of investors that leases are liabilities that belong on the balance sheet" (FASB, 2013). The chairman of the IASB, Hans Hoogervorst, also commented, "The development of an improved standard for leasing … will go a great distance towards improving the quality and comparability of financial reporting in this area" (FASB, 2013).[5]

Comiran and Graham (2016) analyzes more than 1,000 comment letters to the FASB's exposure draft on leases and finds that most managers expressed concerns to the change in reporting. In June 2013, the U.S. Chamber of Commerce together with 30 other private business associations submitted a comment letter with a summary of concerns about potential adverse consequences of ASU 2016−02. They argued that the increased book leverage due to the recognition of operating lease liabilities would lead to breaches of loan covenants and contractual arrangements. These changes would make it harder for firms with high leverage to borrow and therefore their operations would be interrupted.

The Chamber of Commerce also commissioned Chang & Adams Consulting to prepare a study on the impacts of the proposed change. Their study suggested that the new lease standard would lead to losses in real estate value and destroy at least 190,000 jobs in real estate and other related industries. Their report also estimated that U.S. public firms will spend more than $10 billion extra in interest expense due to the increase in borrowing cost.

In a survey of corporate executives (Deloitte, 2014), most respondents suggested that the new lease standard will significantly affect firms' balance sheets by increasing leverage and lowering return on assets, and these changes would significantly affect existing debt covenants. Also, 42 percent of the executives believed the new lease standard would make it more difficult for their firms to obtain debt financing, and 40 percent suggested their firms would seek to shorten lease terms. As a result of the shorter lease terms, rental expenses were expected to increase.

Nevertheless, even with dire warnings by managers for several years, regulators and standard setters (both the FASB and IASB) agreed that operating leases should be recognized on the balance sheet. The recent academic literature supports the view that managers' concerns may be overblown. Several academic studies provide evidence that various stakeholders understood the use of operating leases as off-balance-sheet debt financing and incorporated them in their assessment of firm risk. For example, Imhoff et al. (1993) and Ely (1995) suggest that shareholders incorporate operating leases in their risk assessments, proxied by stock return volatility. Altamuro et al. (2014) and Kraft (2015) find that credit rating agencies and banks also adjust their risk assessments for operating leases. Dhaliwal et al. (2011) and Bratten et al. (2013) show that operating leases increase the cost of equity capital.[6] Bratten et al. further argue that the two types of leases are viewed similarly. Also, many private debt contracts have frozen GAAP rules that explicitly exclude or provide an option for excluding the effects of changes in lease accounting rules (e.g., Cheng et al., 2022). Thus, ASU 2016−02 may not lead to negative economic consequences (Lipe, 2015).

According to ASU 2016−02, leases are still classified into two types: finance leases and operating leases. The former are effectively the same as capital leases as defined in SFAS 13 and treated in the same way. The same four criteria for classification as a finance lease are still applied, although in a more principles-based approach. In addition, a fifth criterion has been added to account for the specialized nature of the leased asset. For operating leases longer than 12 months, firms are now required to recognize lease assets and liabilities.[7]

2.2. Prior literature and Hypotheses

Whether firms' choice of operating leases is motivated by reporting incentives or non-reporting incentives has been debated in the literature, and mixed arguments have been provided. The first line of literature suggests that the excessive use of operating leases is due to managers' belief in the advantages of off-balance-sheet reporting, despite the potential higher costs of operating leases. Dechow et al. (2011) show that managers are motivated to use operating leases to reduce reported debt. Cornaggia et al. (2013) suggest that the tremendous increase in operating leases over time cannot be explained by non-reporting incentives. They find that companies are more likely to use operating leases when they have debt contracts that limit debt capacity or capital spending. These findings lead to their conclusion that firms' leasing decisions are distorted by the availability of off-balance-sheet financing (i.e., reporting incentives). Lim et al. (2017) find that firms use more operating leases as they approach credit ratings borderlines, consistent with off-balance-sheet reporting incentives. Even though research shows that several groups of sophisticated information users understand the use of operating leases as off-balance-sheet debt financing (e.g., Imhoff et al., 1993; Dhaliwal et al., 2011; Bratten et al., 2013; Altamuro et al., 2014), managers may still believe that the use of operating leases helps lower the cost of capital and increase debt capacity, and thus they prefer operating leases to other methods of asset acquisition.

A less benign view of managers' reporting incentives in this line of literature offers an agency-based explanation that managers used off-balance sheet financing to extract economic rents and gain private benefits. Imhoff et al. (1993) conclude that executive compensation committees fail to adjust management compensation based on firms' use of operating leases.

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[5] According to a 2016 report by the International Accounting Standards Board (IASB), the total amount of off-balance-sheet financing through operating leases by U.S. public firms exceeded $2.8 trillion. See https://www.ifrs.org/-/media/project/leases/ifrs/published-documents/ifrs16-effects-analysis.pdf.

[6] Dhaliwal et al. (2011) find that operating leases have a weaker effect on the cost of equity than capital leases.

[7] Initial recognition of the right-of-use asset and lease liability is the same for operating leases and finance leases. However, amortization of the right-of-use asset and the reporting of total lease expense in the income statement differ between the two types of leases. There are also differences in reporting in the statement of cash flows. IFRS has adopted finance leases only.

The concern is that some user groups may not adequately incorporate nonrecognized items in their decisions. As a result, managers could use operating leases to over-invest and boost their compensation. Consistent with this agency view, Eaton et al. (2021) find that managers used operating leases in the pre-ASU 2016−02 period to grow sales and increase their compensation, despite the negative impact that over-investment had on firm future performance.

A second line of literature provides an alternative view of managers' reliance on operating leases. Specifically, Caskey and Ozel (2019) argue that *non*-reporting incentives are the main driver for firms' use of operating leases. Caskey and Ozel explain the economic benefits of using operating leases versus finance leases from the perspective of bankruptcy court, tax laws, and operating flexibility. For example, according to the Uniform Commercial Code (UCC), operating leases enhance financiers' rights in the event of bankruptcy and thus are more likely to be used by firms facing financing constraints attempting to increase their debt capacity (Eisfeldt and Rampini, 2009). Operating leases are more likely to be used by lessee firms with lower marginal tax rates as a way to help maximize the present value of cash flows from tax deductions (Miller and Upton, 1976; Graham et al., 1998). Gavazza (2011) models and provides evidence from the airline industry that firms with more volatile operations prefer operating leases because of the simplicity in acquiring and returning these assets as demand fluctuates.[8]

In summary, to the extent that the new lease standard eliminates managers' perceived off-balance-sheet reporting benefits, we expect firms to decrease their use of operating leases after ASU 2016−02.[9] In addition, if the recognition of operating leases better reveals managers' rent extracting behavior to other stakeholders who may not have fully incorporated prior lease disclosures (e.g., executive compensation committees), the new standard would also reduce managers' use of operating leases. We formally state this prediction in our first hypothesis in the alternative form:

Hypothesis 1. Firms initiate fewer operating leases after the issuance of ASU 2016−02.

It is possible that we may not observe the predicted effect in our first hypothesis. The new lease standard does not affect the *non*-reporting incentives for using operating leases (e.g., tax advantage and operational flexibility). Thus, if firms' use of operating leases is mainly driven by *non*-reporting incentives prior to ASU 2016−02, there is no reason to expect a decrease in operating leases.

Our second hypothesis addresses whether ASU 2016-02 has led to other changes in managers' investment behavior. Operating leases are generally considered to be more expensive than other forms of asset acquisition (e.g., Milano, 2012; Shumsky, 2016). Over the four decades spanning SFAS 13 to ASU 2016−02, managers seemingly have been willing to forgo these higher costs to obtain the reporting advantage or private benefits of off-balance-sheet financing. With the recognition of operating leases on the balance sheet, managers should be less likely to see leasing as cost effective or personally advantageous. Thus, the new standard is expected to change managers' corporate investment behavior. Consistent with these views, survey evidence shows that most executives expected that their firms would be more likely to purchase than lease an asset after the new standard (Deloitte, 2014).

Imhoff and Thomas (1988) found evidence of a change in managers' investment behavior following SFAS 13's requirement to recognize capital leases on the balance sheet. They found that firms switched from capital leases to operating leases and other non-lease sources of financing after the issuance of SFAS 13. The switch was especially evident for firms using capital leases more heavily at the time of SFAS 13. We test this same idea in the context of ASU 2016−02. Prior literature on the lease-versus-buy decision suggests that firms trade off the benefits and costs of leasing and capital investment (e.g., Beatty et al., 2010). To the extent managers were using operating leases because of their perceived reporting benefits or private benefits, managers are more likely to shift their investment behavior to capital expenditures after such benefits are mitigated.[10],[11] We state our second hypothesis as follows:

Hypothesis 2. Firms increase their capital expenditures after the issuance of ASU 2016−02.

Our third hypothesis relates to whether the predicted reduction in the use of operating leases has consequences on lessee firms' performance. Consistent with a long line of research in accounting (Watts and Zimmerman, 1978, 1986; Armstrong et al., 2010), managers expressed the view that external parties base their decisions on implicit and explicit contracts using reported accounting numbers. When those reported numbers are adversely affected by mandatory accounting changes (i.e., ASU 2016−02), economic costs may be imposed on the firm. For example, if certain lenders are less willing to provide financing or if suppliers are less willing to develop long-term relationships due to the perceived increase in risk, firms may be unable to fulfill their productive asset needs, which would disrupt operations and adversely affect performance.

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[8] Despite the apparent non-reporting incentives for the use of operating leases in the airline industries, Li and Venkatachalam (2022) demonstrate a decrease in operating leases after ASU 2016−02 and an increase in asset ownership, consistent with reporting incentives causing airlines to shift from leasing to buying.

[9] This expectation is consistent with survey evidence of managers' stated beliefs (Deloitte, 2014) and with analytical models that assume managers believe the cost of financing is a function of recognized book leverage (Christensen et al., 2022). This expectation is also consistent with prior empirical and experimental research showing managers have a preference toward disclosed liabilities over recognized liabilities (Davis-Friday et al., 1999; Clor-Proell and Maines, 2014).

[10] The predicted reduction in operating leases in Hypothesis 1 is an underlying assumption for the predicted increase in capital expenditures in Hypothesis 2.

[11] We believe firms are more likely to switch to capital expenditures rather than finance leases, because the benefits and costs of finance leases become largely similar to those of operating leases after the new standard. However, purchases of asset through capital expenditures are expected to be less costly than operating leases. Consistent with our expectation, we do not find a significant effect of the new standard on finance leases.

However, it is also possible that the new standard could increase firm performance. This could occur for two reasons. First, as we discussed previously, prior research finds that sophisticated investors and creditors appropriately incorporated operating lease disclosures in their risk assessment. Therefore, to the extent managers over-relied on costly operating leases prior to ASU 2016−02 and then switched to other more cost-efficient asset acquisitions after the new standard (e.g., Milano, 2012; Shumsky, 2016), the firm gains real economic benefits. Second, to the extent managers were using nonrecognition of operating leases to extract private benefits, recognition would help reveal and eliminate such agency costs, and firm performance should improve. As a final point, if firms always choose their optimal level of operating leases based on non-reporting incentives (Caskey and Ozel, 2019), then there is no reason to expect ASU 2016−02 to affect the cross-sectional relation between firm performance and a decrease in the use of operating leases.

Given the starkly contrasting predictions, the impact of reducing operating leases is an empirical question that warrants investigation. Because the effect on firm performance could be either positive or negative, we state the third hypothesis in the null form:

Hypothesis 3.　Firm financial performance is not affected by the reduction in operating leases after the issuance of ASU 2016−02.

We are also interested in the consequences of firms' response to ASU 2016−02 on their shareholders, creditors, and employees. These three groups of stakeholders are frequently mentioned in complaints by managers about the new lease standard. As discussed above, there are concerns that ASU 2016−02 would negatively affect shareholders, creditors, and employees by reducing firm value, increasing risk of debt covenant violation, and decreasing employment. However, if firm performance improves due to an increase in investment efficiency or cost savings, these stakeholders may benefit from the firm reducing its use of operating leases. Therefore, with these contrasting predictions, we state the fourth hypothesis in the null form:

Hypothesis 4.　Other stakeholders (shareholders, creditors, or employees) are not affected by the reduction in operating leases after the issuance of ASU 2016−02.

3. Research design

3.1. Sample selection

The initial sample includes all firm-year observations of U.S. firms from 2011 to 2019 (excluding 2015), a period of eight fiscal years surrounding the issuance of ASU 2016−02 in February 2016. We exclude 2015 from our sample because the issuance was close to many firms' year-end dates in that fiscal year. Our design results in four fiscal years prior to ASU 2016−02 (2011−2014) and four fiscal years after (2016−2019).[12] The new standard applies for fiscal years starting after December 15, 2018, and thus the post-period includes the first year after the actual implementation for most firms. All financial data are from *Compustat*. To provide reliable tests of differences in the pre- and post-periods, we require a firm to have necessary data for at least two years before and two years after the issuance of ASU 2016−02.[13] We further require firms to have at least $100 million sales revenue. After removing observations with missing data for the regression analyses, the final sample includes 12,281 observations (1,742 unique firms). The sample selection process is detailed in Panel A of Table 1.

3.2. Regression model

We use model (1) to test the first hypothesis.

$$NewOpLease_{it} = \alpha_1 Treatment_{it} \times Post_{it} + \alpha_2 Post_{it} + \alpha_3 Lev_{it} + \alpha_4 Size_{it} + \alpha_5 NetIncome_{it} + \alpha_6 OCF_{it} + \alpha_7 stdOCF_{it} + \alpha_8 bCash_{it}$$
$$+ \alpha_9 bCurrent_{it} + \alpha_{10} SalesGrowth_{it} + \alpha_{11} GDPGrowth_{it} + \alpha_{12} \Delta Interest_{it} + Firm\ FEs + \varepsilon_{it} \qquad (1)$$

The dependent variable (*NewOpLease*) is new operating lease commitments for firm *i* in year *t*, scaled by lagged total sales.[14] Firms are required to disclose total operating lease commitments and disaggregate the annual commitment for the next five years. Commitments not due within one year will be carried over to the next year.[15] *NewOpLease* is calculated as total operating lease commitments at the end of year *t* minus operating lease commitments carried over from year *t*−1.

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[12] As a sensitivity test reported in Table 11, we include observations in 2015 as part of the pre-period.

[13] Our results are similar if we require a firm to have data for all eight years in our sample period.

[14] We use lagged total sales instead of lagged total assets as the scalar for most variables because ASU 2016-02 changes the definition of reported assets. Also, firms report more assets if they switch from using operating leases to capital expenditures. Nevertheless, our conclusions are similar when scaling by lagged total assets.

[15] For example, if a firm reports a $10 million commitment that will be due after 2017 in its 2016 financial statements, this $10 million commitment will be carried over to its 2017 financial statements.

Table 1
Sample description.

Panel A: Sample Selection Process	# Observations
All firm-year observations in Compustat from 2011 to 2019	102,467
Drop observations in 2015	(11,487)
Drop observations in financial and regulated industries	(37,837)
Drop observations with missing operating lease information	(25,965)
Drop observations with missing control variables information	(3,352)
Drop firms with fewer than 2 observations in either the pre- or post-period	(8,212)
Drop firms with sales revenue less than $ 100 million	(3,406)
Final Sample	12,281

Panel B: Descriptive Statistics						
Variable	N	Mean	Std.Dev.	Bottom Quartile	Median	Top Quartile
NewOpLease	12,281	0.025	0.048	0.004	0.011	0.027
OpLease	12,281	0.125	0.282	0.025	0.050	0.119
Lev	12,281	0.560	0.242	0.399	0.548	0.689
Size	12,281	7.470	1.854	6.210	7.406	8.691
NetIncome	12,281	0.046	0.159	0.009	0.050	0.106
OCF	12,281	0.145	0.152	0.054	0.110	0.198
stdOCF	12,281	0.053	0.080	0.015	0.029	0.056
bCash	12,281	0.168	0.222	0.033	0.092	0.208
bCurrent	12,281	2.251	1.508	1.287	1.858	2.715
SalesGrowth	12,281	0.088	0.207	−0.017	0.057	0.144
GDPGrowth	12,281	2.210	0.544	1.725	2.325	2.575
ΔInterest	12,281	0.198	0.446	0.000	0.000	0.699

Panel C: Correlation Matrix											
	NewOpLease	Treatment	Post	Lev	Size	NetIncome	OCF	stdOCF	bCash	bCurrent	SalesGrowth	GDPGrowth
Treatment	0.302*											
Post	−0.026*	0.012										
Lev	0.014	0.103*	0.116*									
Size	−0.053*	−0.174*	0.058*	0.042*								
NetIncome	−0.044*	−0.094*	−0.065*	−0.188*	0.277*							
OCF	0.039*	−0.198*	−0.012	−0.105*	0.336*	0.438*						
stdOCF	0.057*	−0.108*	0.020*	−0.051*	−0.048*	−0.132*	0.306*					
bCash	0.097*	−0.073*	−0.024*	−0.197*	0.066*	−0.027*	0.227*	0.435*				
bCurrent	0.001	−0.102*	−0.041*	−0.479*	−0.100*	0.056*	0.129*	0.423*				
SalesGrowth	0.195*	−0.001	−0.064*	−0.061*	0.024*	0.118*	0.298*	0.329*	0.271*	0.075*		
GDPGrowth	0.000	−0.002	0.218*	0.110*	0.028*	0.045*	0.011	−0.002	−0.011	−0.016	−0.005	
ΔInterest	−0.006	0.001	0.447*	0.251*	0.020*	0.041*	0.022*	0.013	0.003	−0.022*	0.049*	0.272*

Notes: This table shows the sample descriptions. Panel A shows the sample selection process. Panel B shows the descriptive statistics, including the number of observations, mean, standard deviations, bottom quartile, median, and top quartile. Panel C shows the Pearson correlation matrix. Variable definitions are in the Appendix. * indicates significance at the 5% level (two−tailed).

To estimate a difference-in-differences model, firms are classified into a treatment group and a control group based on the potential impact of operating lease recognition on their balance sheets. *Treatment* is set to 1 for firms with above median ratio of total operating lease commitments to lagged total assets in 2014.[16] Those firms with ratios below the median are the control group (*Treatment* = 0). The potential impact of the new lease standard on a firm's balance sheet and leverage ratios is expected to relate directly to the level of its total operating lease commitments relative to its lagged total assets in 2014.[17] Thus, the impact of ASU 2016−02 is expected to be greater for treatment firms than control firms. As sensitivity tests we report later, we define treatment and control groups based on (1) the median ratio of total lease commitments to lagged total liabilities, (2) the median ratio of total lease commitments to lagged sales, (3) whether the firm's ratio is above its industry-median ratio, (4) the median ratio being defined in 2011 instead of 2014, (5) the median ratio of total long-term lease commitments to lagged total assets, and (6) top versus bottom tercile of the ratio of total lease commitments to lagged total assets. The purpose for each of these alternatives is explained in more detail later. All conclusions remain.

Post is an indicator for the post-ASU 2016−02 period.[18] We set *Post* = 1 for observations with fiscal years 2016−2019, and *Post* = 0 otherwise. The measurement of *Post* is such that firms have at least one quarter to respond to the new accounting standard.[19] The coefficient on *Post* represents the change in the level of new operating lease commitment for the control

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[16] This classification is defined in 2014 and thus is unaffected by the change in asset definition of ASU 2016−02.

[17] Because model (1) controls for firm fixed effects, we do not include *Treatment* as a main effect in the model.

[18] We do not control for year fixed effects given that *Post* is included. Findings are robust to controlling for year fixed effects.

[19] It is possible that firms anticipate the issuance of ASU 2016-02 before February 2016 and already responded before the issuance date. It is also possible that firms may not respond quickly after the issuance date. Both issues would bias against finding the predicted results. In additional tests discussed below, we use several alternative definitions of the post-issuance period and find similar results.

group. The expectation for this coefficient is unclear. On the one hand, control firms may also want to use fewer operating leases due to the accounting standard change. On the other hand, because the sample period is during economic expansion, they may use more operating leases.

The coefficient on $Treatment \times Post$ (α_1) provides our difference-in-differences test. This coefficient represents the change in new operating lease commitments made by treatment firms in the post- versus pre-period relative to the change for control firms. We predict that treatment firms, relative to control firms, initiate fewer operating lease commitments after the issuance of ASU 2016−02. We expect a negative coefficient on $Treatment \times Post$ ($\alpha_1 < 0$).

The model controls for firm fixed effects and several other firm characteristics. These controls are important in helping to rule out other (economic) explanations for the change in leasing behavior around ASU 2016−02. *Lev* is a firm's financial leverage, calculated as total liabilities divided by total assets. *Size* is the natural logarithm of market value of equity. Net income before extraordinary items scaled by lagged sales (*NetIncome*) and operating cash flows scaled by lagged sales (*OCF*) are used to measure firm financial performance. Firms with higher leverage, smaller size, and lower performance are usually more financially constrained, and prior research suggests that firms with more financial constraints use more leases (e.g., Eisfeldt and Rampini, 2009; Beatty et al., 2010). We further use the volatility of operating cash flows (*stdOCF*) to capture the uncertainty of a firm's operating environment. Firms with more volatile operations may be more likely to lease (e.g., Gavazza, 2011). Further, operating leases require less capital commitment. Thus, firms with less cash holdings (*bCash*) and lower current ratios (*bCurrent*) at the beginning of the year may have fewer liquid assets and therefore use more leases. In addition, firms with more sales growth (*SalesGrowth*) may need more leases to support the expansion of their operations. We also control for macro-level effects of average quarterly GDP growth rate over the prior four quarters (*GDPGrowth*) and the change in Bank Prime Loan Interest Rate during the fiscal year (*ΔInterest*). The Appendix provides variable definitions.

To test the effect of the actual implementation, we also estimate model (2):

$$
\begin{aligned}
NewOpLease_{it} = {} & \alpha_1 Treatment_{it} \times Post_{it} + \alpha_2 Post_{it} + \alpha_3 Treatment_{it} \times Post\text{-}implement_{it} + \alpha_4 Post\text{-}implement_{it} + \alpha_5 Lev_{it} \\
& + \alpha_6 Size_{it} + \alpha_7 NetIncome_{it} + \alpha_8 OCF_{it} + \alpha_9 stdOCF_{it} + \alpha_{10} bCash_{it} + \alpha_{11} bCurrent_{it} + \alpha_{12} SalesGrowth_{it} \\
& + \alpha_{13} GDPGrowth_{it} + \alpha_{14}\, \Delta Interest_{it} + Firm\ FEs + \varepsilon_{it}
\end{aligned}
\tag{2}
$$

Model (2) includes all the independent variables from model (1) and adds *Post-implement*, which is an indicator for the period after the implementation of ASU 2016−02. *Post-implement* is set to 1 for observations with fiscal years starting after December 15, 2018 (i.e., after implementation of ASU 2016−02). The coefficient on $Treatment_{it} \times Post$ becomes the difference-in-differences test in the pre-period versus post-period of ASU 2016-02 before its implementation (i.e., 2011−2014 versus 2016−2018). The coefficient on $Treatment_{it} \times Post\text{-}implement$ is a test of the incremental impact of 2019 on the difference-in-differences test. This model allows an initial test of how issuance versus implementation of ASU 2016−02 may differentially affect firms.[20]

Hypothesis 2 Predicts that managers will increase their capital expenditures after ASU 2016−02. We use capital expenditures (Capex) as the dependent variable in model (3).

$$
\begin{aligned}
Capex_{it} = {} & \alpha_1 Treatment_{it} \times Post_{it} + \alpha_2 Post_{it} + \alpha_3 Lev_{it} + \alpha_4 Size_{it} + \alpha_5 NetIncome_{it} + \alpha_6 OCF_{it} + \alpha_7 stdOCF_{it} + \alpha_8 bCash_{it} \\
& + \alpha_9 bCurrent_{it} + \alpha_{10} SalesGrowth_{it} + \alpha_{11} GDPGrowth_{it} + \alpha_{12} \Delta Interest_{it} + Firm\ FEs + \varepsilon_{it}
\end{aligned}
\tag{3}
$$

Hypotheses 3 and 4 relate to the consequences of the reduction in operating leases after ASU 2016−02 on firm performance and stakeholders other than managers. We use model (4).

$$
Consequence_{it} = \alpha_1 Reduction_{it} \times Post + \alpha_2 Post_{it} + Controls_{it} + Firm\ FEs + \varepsilon_{it}
\tag{4}
$$

For *Consequence* of firm performance, we use four measures: net income before extraordinary items scaled by lagged total sales (*NetIncome*); earnings before interest, taxes, depreciation, and amortization scaled by lagged total sales (*EBITDA*); operating cash flows scaled by lagged total sales (*OCF*); and sales growth (*SalesGrowth*). We adopt several controls from our main test, including *Lev*, *Size*, *bCash*, *bCurrent*, and *stdOCF*.

We use five Consequence variables related to shareholders based on stock price behavior: market-to-book ratio (*MB*), expected return (*ExpRet*), implied cost of equity capital (*ICC*), stock return beta (*Beta*), and return volatility (*RetVol*). Higher *MB* indicates higher firm values, and higher values of *ExpRet*, *ICC*, *Beta*, and *RetVol* suggest greater risks and required returns for shareholders.

For creditors, we use *Credit Rating* and the incidence of debt covenant violation (*Violation*). Credit ratings are an overall measure of creditors' welfare. Following prior literature (e.g., Sharpe and Nguyen, 1995), *Credit Rating* is set to 5 if the credit rating is between AAA and AA, 4 if the credit rating is A+ or A, 3 if the credit rating is A− to BBB−, 2 if the credit rating is BBB−, and 1 if the firm is not rated. *Violation* is an indicator for debt covenant violation. We use data from Greg Nini to identify firms that had debt covenant violations before 2017 [the data were used in Nini et al. (2012) and recently extended by the author].

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[20] We recognize having only the initial year of data in the post-implementation period is a weakness of our test. As more years become available, statistical power will improve. Such tests, however, will be complicated by potential confounding effects that the COVID-19 pandemic had on the economy and firm value and specifically on leasing.

For data on debt covenant violations in 2017−2019, we manually collected this from 10-Ks and 10-Qs using keywords provided by Roberts and Sufi (2009). For employees, we use the change in the number of employees (*ΔEmployment*). For each test, we adopt controls from prior studies (e.g., Alissa et al., 2013; Bonsall and Miller, 2017; Demerjian and Owens, 2016; Ma, 2017; Piotroski and Roulstone, 2004).

4. Empirical analyses

4.1. Descriptive statistics

The descriptive statistics for the primary sample are reported in Table 1, Panel B. The mean of *NewOpLease* is 0.025. The amount of new operating lease commitments that a firm makes every year on average accounts for approximately 2.5 percent of firms' lagged total sales. Further, the mean of *OpLease* is 0.125. The amount of total operating lease commitments on average for firms in our sample is 12.5 percent of lagged total sales. In dollar values, a firm on average has $612 million operating lease commitments and makes another $121 million commitments every year. The total dollar value of operating lease commitments for all 1,742 firms in our sample is $1.066 trillion. These statistics confirm that a large amount of lease financing was off-balance-sheet. Thus, recognition of operating leases will significantly increase firms' leverage ratios. Statistics of other variables are generally consistent with expectations. For example, the mean cash holding (*bCash*) is 0.168, and the mean current ratio (*bCurrent*) is 2.251. Thus, the average firm in the sample has substantial liquid assets. The mean *NetIncome* is 0.046, and the mean of cash flows (*OCF*) is 0.145.

Panel C of Table 1 shows the Pearson correlation matrix. *Post* is negatively correlated with *NewOpLease* (−0.026). The negative correlation is consistent with a decline in new operating lease commitments across the entire sample in the post-period. *Treatment* relates positively to *NewOpLease* (0.302). Treatment firms are those with above median lease commitments in 2014, so it is not surprising to find these firms have more new operating lease commitments across the entire sample period. *Lev* and *bCurrent* have the highest correlation (−0.479).[21]

4.2. Comparative statistics

Table 2 provides bivariate analysis of the time trend of new operating lease commitments by year for the treatment sample versus the control sample. We observe that the mean of *NewOpLease* for the treatment sample generally increases in the first four years and then drops noticeably in the post-period. The opposite trend occurs for control firms. The control firms experience a decrease in the mean of *NewOpLease* during the first four years, and then a slight increase occurs in the post-period. The last two rows of Table 2 demonstrate that for the treatment sample, the change in *NewOpLease* over the entire sample period is −0.008 (−19.6 percent), suggesting a significant decline in new operating lease commitments. In contrast, the mean of *NewOpLease* increased by only 0.001 (8.3 percent) for the control sample. These patterns support Hypothesis 1 that the issuance of ASU 2016-02 decreased treatment firms' use of operating leases. In the next section, we turn to multiple regression results on which to base our conclusions.

To understand the impact of implementation of the new lease standard on firms' financial ratios, Fig. 1 shows how *Treatment* firms' average debt-to-equity ratio (Panel A) and average return on assets (Panel B) change after implementation.

Table 2
Bivariate analyses of new operating lease commitments (*NewOpLease*).

Year	Treatment Sample		Control Sample	
	Mean	Std.Dev.	Mean	Std.Dev.
(1) 2011	0.041	0.053	0.012	0.023
(2) 2012	0.040	0.051	0.010	0.021
(3) 2013	0.044	0.062	0.009	0.020
(4) 2014	0.050	0.078	0.008	0.018
(5) 2016	0.037	0.053	0.011	0.021
(6) 2017	0.035	0.055	0.011	0.023
(7) 2018	0.036	0.056	0.015	0.028
(8) 2019	0.033	0.068	0.013	0.031
Total	0.040	0.061	0.011	0.023
(8) − (1)	−0.008		0.001	
[(8) − (1)]/(1)	−0.196		0.083	
t-tests	−2.384**		0.869	

Notes: The table shows the descriptive statistics (mean and standard deviation) of new operating lease commitments (*NewOpLease*) by year for the sub-sample of treatment firms (*Treatment* = 1) and the subsample of control firms (*Treatment* = 0). The bottom three rows include the change, percentage change, and test of significance of the change in *NewOpLease* from 2011 to 2019. Variable definitions are in the Appendix. ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed).

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[21] The variance inflation factors (VIFs) of all regressions are less than 5.

Impact of Standard Implementation

Panel A. Debt-to-Equity Ratio

Debt to Equity Ratio
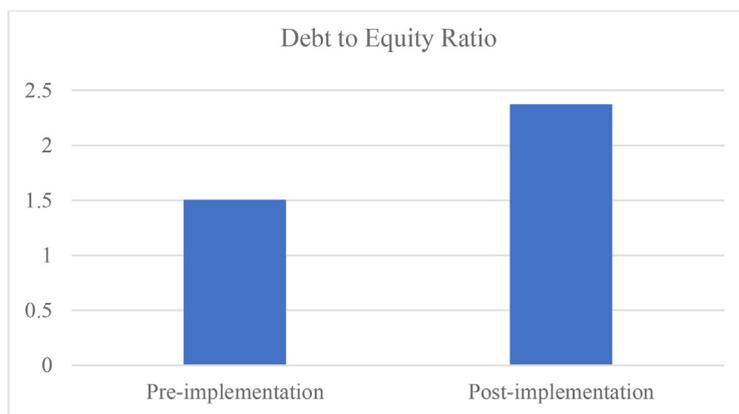
	Mean	Std.Dev.	Bottom Quartile	Median	Top Quartile
Pre-implementation	1.504	9.663	0.587	1.189	2.202
Post-implementation	2.375	9.755	0.746	1.517	2.767

Panel B. Return on Assets

Return on Assets

	Mean	Std.Dev.	Bottom Quartile	Median	Top Quartile
Pre-implementation	0.033	0.109	−0.003	0.039	0.078
Post-implementation	0.018	0.114	−0.013	0.035	0.067

Fig. 1. Impact of standard implementation. **Notes:** This figure shows how *Treatment* firms' average debt-to-equity ratio (Panel A) and average return on assets (Panel B) change after implementation of the new lease standard. Specifically, we identify observations of *Treatment* firms in the first year after the implementation (*Post-implementation*) and observations of these firms in the last year before the implementation (*Pre-implementation*). We also report descriptive statistics of these two variables for the two periods.

Specifically, we identify observations of *Treatment* firms in the first year after implementation (*Post-implement*) and observations of these firms in the last year before implementation (*Pre-implement*). Then, we report the descriptive statistics of these two ratios for both periods. We find the debt-to-equity ratio increases by 58 percent [= (2.375−1.504)/1.504] and return on assets decreases by 45 percent [= (0.018−0.033)/0.033]. These results are consistent with the expectation that implementation clearly affects reported financial ratios for *Treatment* firms. However, a caveat here is that these results could be confounded by changes in firms' leasing behavior or other macro-economic events.

4.3. Test of Hypothesis 1—difference-in-differences tests of new operating leases

The regression results of model (1) are reported in the first two columns of Table 3. In column (1), we include only *Treatment × Post*, *Post*, and firm fixed effects in the regression to estimate the difference-in-differences model. In column (2), we add control variables. The coefficients on *Treatment × Post* are negative in both columns (-0.013 and -0.013, respectively), both of which are significant at the 1 percent level (two-tailed). Thus, new operating lease commitments by treatment firms have significantly declined after ASU 2016−02. The effect is also significant in terms of economic magnitude. The decrease in new operating lease usage for the treatment group is approximately 32.5 percent ($= -0.013/0.040$) of its mean and 21 percent ($= -0.013/0.061$) of its standard deviation.

The coefficients on *Post* are positive and significant, although their magnitudes are much smaller than those on *Treatment* (0.002, *t*-statistic $= 4.27$; 0.003, *t*-statistic $= 4.20$, respectively). Thus, the control sample experiences a slight increase in *NewOpLease*. This result is possibly due to macro-economic growth during 2016−2019 increasing these firms' demand for leases (although we control for growth in GDP) or perhaps more simply the increasing popularity of leasing in general. Overall, the results are consistent with Hypothesis 1. Firms that relied more heavily on operating leases prior to ASU 2016-02 had a significant decrease after issuance of the new standard.

Columns (3) and (4) report the regression results of model (2). Specifically, the regressions further include *Treatment × Post-implement* and *Post-implement*. The coefficients on *Treatment × Post* remain similar to the first two columns. However, the coefficients on *Treatment × Post-implement* are insignificant and close to 0 in the last two columns.[22] Therefore, we conclude that treatment firms began decreasing their use of operating leases after issuance of ASU 2016−02 in preparation for implementation.

Table 3
Tests of Hypothesis 1—difference-in-differences tests of new operating leases.

Dependent Variable = NewOpLease	(1)	(2)	(3)	(4)
Treatment × Post	−0.013***	−0.013***	−0.012***	−0.012***
	(−7.88)	(−8.11)	(−7.50)	(−7.76)
Treatment × Post-implement			−0.005	−0.005
			(−1.33)	(−1.39)
Post	0.002***	0.003***	0.002***	0.005***
	(4.27)	(4.20)	(4.15)	(4.26)
Post-implement			−0.001	−0.003
			(−0.59)	(−1.29)
Lev		0.003		0.003
		(0.58)		(0.67)
Size		0.003***		0.003***
		(2.89)		(2.92)
NetIncome		−0.008*		−0.008
		(−1.65)		(−1.55)
OCF		−0.002		−0.002
		(−0.27)		(−0.30)
stdOCF		−0.002		−0.002
		(−0.14)		(−0.12)
bCash		0.005		0.005
		(0.89)		(0.92)
bCurrent		0.001*		0.001*
		(1.94)		(1.87)
SalesGrowth		0.038***		0.038***
		(12.05)		(12.07)
GDPGrowth		−0.000		−0.004**
		(−0.29)		(−2.18)
ΔInterest		0.000		0.000
		(0.06)		(0.62)
Firm Fixed Effects	Yes	Yes	Yes	Yes
Observations	12,281	12,281	12,281	12,281
R-squared	0.011	0.047	0.012	0.048
Unique Firms	1,742	1,742	1,742	1,742

Notes: The table tests the effect of the lease accounting standard on new operating lease commitment. The dependent variable is *NewOpLease*, which is the new operating lease commitment scaled by lagged total sales. *Post* is an indicator for the period after the issuance of ASU 2016−02. *Post-implement* is an indicator for the period after the implementation of ASU 2016−02. *Treatment* is an indicator for firms with above-median total operating lease commitments, scaled by lagged total assets, in 2014. Both columns control for firm fixed effects. *t*-statistics are reported in parentheses. Standard errors are clustered by firm. Variable definitions are in the Appendix. ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed).

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[22] A caveat for interpreting the insignificant coefficients is that our sample includes only one year in the post-implementation period. Future research could examine whether firms' use of operating leases further declines after several years of implementation.

4.3.1. Term structure of lease commitments

According to ASU 2016−02, operating lease commitments due within one year are not required to be recognized on the balance sheet. This lack of recognition provides an incentive for firms to sign more short-term leases or to modify their existing lease terms and remove lease renewal options (e.g., Weidner, 2017).[23] In contrast, commitments to long-term leases will affect the balance sheet and financial ratios for a longer term. Consequently, we expect firms to switch to more short-term leases after ASU 2016−02.

The results are shown in Table 4. From column (1) to column (5), the dependent variables are the proportion of operating lease commitments that will be due in year $t+1$ to year $t+5$ (*OpLease1%*, *OpLease2%*, *OpLease3%*, *OpLease4%*, and *OpLease5%*). During the transition period (2016−2018), lease commitments due in years $t+1$ and $t+2$ may remain off the balance sheet until the new standard is adopted. In contrast, commitments that are not due within three years will be recognized on the balance sheet. Consistent with expectations, the coefficients on *Treatment* × *Post* are significantly positive in the first two columns (*OpLease1%* and *OpLease2%*) but significantly negative in the last two columns (*OpLease4%* and *OpLease5%*). Thus, the proportion of operating lease commitments that will be due in years $t+1$ and $t+2$ increases, while the proportion that will be due in years $t+4$ and $t+5$ decreases. The findings are consistent with the expected effects of ASU 2016−02, leading firms to reduce their use of longer-term operating leases.

These results are also consistent with anecdotal evidence. International Workplace Group, a global provider of office space leases, suggested in its 2018 annual report that the short-term lease exception under ASU 2016-02 has increased demand for its short-term services (Bloomberg, 2019). Many managers expressed similar beliefs that their firms will shorten lease terms

Table 4
Term structure of leases.

Dependent Variable =	(1) OpLease1%	(2) OpLease2%	(3) OpLease3%	(4) OpLease4%	(5) OpLease5%
Treatment × Post	0.012***	0.005***	−0.001	−0.007***	−0.009***
	(3.51)	(3.68)	(−0.89)	(−4.16)	(−4.75)
Treatment × Post-implement	0.002	−0.001	0.002	−0.000	−0.002
	(0.33)	(−0.52)	(0.86)	(−0.12)	(−0.70)
Post	−0.005	−0.003**	0.001	0.002	0.005***
	(−1.56)	(−2.02)	(0.51)	(1.38)	(3.04)
Post-implement	−0.009	0.001	−0.001	0.005*	0.003
	(−1.42)	(0.45)	(−0.38)	(1.79)	(0.96)
Lev	−0.017*	−0.003	0.002	0.008**	0.010**
	(−1.75)	(−0.65)	(0.38)	(2.13)	(2.12)
Size	−0.011***	−0.001	0.003***	0.004***	0.005***
	(−5.88)	(−1.39)	(3.83)	(5.28)	(5.63)
NetIncome	−0.004	0.003	0.001	−0.001	0.001
	(−0.32)	(0.55)	(0.21)	(−0.25)	(0.25)
OCF	−0.003	−0.016**	0.004	0.009	0.006
	(−0.22)	(−2.06)	(0.55)	(1.26)	(0.73)
stdOCF	−0.004	0.019*	0.010	−0.008	−0.017
	(−0.14)	(1.67)	(0.87)	(−0.63)	(−1.29)
bCash	−0.009	−0.007	0.003	0.010**	0.003
	(−0.98)	(−1.43)	(0.72)	(2.57)	(0.54)
bCurrent	0.002	0.000	−0.001*	−0.001	−0.000
	(1.12)	(0.27)	(−1.72)	(−1.15)	(−0.19)
SalesGrowth	−0.008*	0.003	0.004*	−0.000	0.002
	(−1.82)	(1.26)	(1.72)	(−0.12)	(0.62)
GDPGrowth	−0.000	−0.001	−0.002	0.002*	0.001
	(−0.10)	(−0.96)	(−1.14)	(1.66)	(0.48)
ΔInterest	0.000	−0.000	0.000	−0.001	0.000
	(0.06)	(−0.21)	(0.81)	(−0.81)	(0.17)
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	12,266	12,266	12,266	12,266	12,266
R-squared	0.014	0.005	0.005	0.011	0.013
Unique Firms	1,741	1,741	1,741	1,741	1,741

Notes: The table tests the effect of the lease accounting standard on the term structure of operating lease commitments. The dependent variables are *OpLease1%*, *OpLease2%*, *OpLease3%*, *OpLease4%*, and *OpLease5%*, which are the proportion of operating lease commitments that are due in year $t+1$, $t+2$, $t+3$, $t+4$, and $t+5$, respectively. *Post* is an indicator for the period after the issuance of ASU 2016−02. *Post-implement* is an indicator for the period after the implementation of ASU 2016−02. *Treatment* is an indicator for firms with above-median total operating lease commitments, scaled by lagged total assets, in 2014. All columns control for firm fixed effects. *t*-statistics are reported in parentheses. Standard errors are clustered by firm. Variable definitions are in the Appendix. ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed).

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[23] In accordance with ASC 842-10-30-1(a), if renewal options are reasonably certain to be exercised, periods covered by renewal options should be added to the lease term.

after ASU 2016−02 (Deloitte, 2014). These findings further support our argument that the decline in firms' use of operating leases is attributable to the balance sheet recognition and the elimination of reporting incentives for using operating leases.[24]

4.3.2. Other possible explanations

While our tests point to balance sheet recognition having an impact on managers' operating decisions, it is always possible these results are attributable to other factors changing around ASU 2016−02. Our models control for many firm characteristics, firm fixed effects, and macroeconomic factors, but other factors could exist. For example, the Tax Cuts and Jobs Act of 2017 coincides closely with the issuance of ASU 2016−02. Bonus depreciation provided by the Act may have incentivized firms with higher effective tax rates to reduce their use of operating leases in favor of asset purchases. To test this possibility, we test whether the decline in operating leases is moderated by firms' effective tax rates in 2014. In the first column of Table 5, we find no evidence that the decrease in operating leases varies with firms' effective tax rates. In untabulated tests, we also find no change in results in Table 3 after controlling for firms' effective tax rates.

We also recognize that some firms' operations are more sensitive to changes in general economic conditions. If the decrease in operating leases around ASU 2016−02 was caused by changes in firms' natural business cycle due to changing economic conditions, then we might expect firms in cyclical industries to be more affected. We define cyclical industries as those whose sensitivity of profitability (average ROA) to GDP growth is above the median. In the second column of Table 5, we do not find any evidence that the decline in operating leases differs between firms in cyclical versus non-cyclical industries.

Table 5
Tests of alternative explanations.

Dependent Var. = *NewOpLease*	(1)	(2)	(3)
Interaction=	*Effective Tax Rates*	*Cyclical Industries*	*Internal Control Weakness*
Treatment × Post × Interaction	−0.001	0.001	−0.003
	(−0.08)	(0.15)	(−0.81)
Treatment × Post	−0.013***	−0.013***	−0.012***
	(−3.29)	(−7.77)	(−5.92)
Post	0.002	0.003***	0.002**
	(1.35)	(4.07)	(2.41)
Post × Interaction	0.005	−0.000	0.002*
	(1.55)	(−0.18)	(1.96)
Lev	0.005	0.004	0.003
	(0.99)	(0.89)	(0.58)
Size	0.003***	0.003***	0.003***
	(3.14)	(2.83)	(2.90)
NetIncome	−0.001	−0.010**	−0.008
	(−0.17)	(−2.00)	(−1.64)
OCF	−0.006	−0.004	−0.002
	(−0.83)	(−0.54)	(−0.25)
stdOCF	0.008	0.002	−0.002
	(0.68)	(0.12)	(−0.16)
bCash	0.001	0.004	0.005
	(0.21)	(0.65)	(0.89)
bCurrent	0.000	0.001*	0.001*
	(0.82)	(1.87)	(1.93)
SalesGrowth	0.034***	0.039***	0.038***
	(10.64)	(12.48)	(12.05)
GDPGrowth	−0.001	−0.000	−0.000
	(−0.64)	(−0.16)	(−0.29)
ΔInterest	−0.000	0.000	0.000
	(−0.69)	(0.34)	(0.08)
Firm Fixed Effects	Yes	Yes	Yes
Observations	9,955	12,043	12,281
R-squared	0.044	0.048	0.047
Unique Firms	1,337	1,639	1,742

Notes: The table tests the cross-sectional variation in the effect of the new lease accounting standard on new operating lease commitments. The dependent variable is *NewOpLease*, which is the new operating lease commitments scaled by lagged total sales. *Post* is an indicator for the period after the issuance of ASU 2016−02. *Treatment* is an indicator for firms with above-median total operating lease commitments, scaled by lagged total assets, in 2014. *Effective Tax Rates* is the firm's effective tax rate in 2014. *Cyclical Industries* is an indicator for industries whose sensitivity of profitability to GDP growth is above median. *Internal Control Weakness* is an indicator for firms with internal control material weakness in 2014. All columns use the full sample and control for firm fixed effects. *t*-statistics are reported in parentheses. Standard errors are clustered by firm. Variable definitions are in the Appendix. ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed).

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[24] Despite the requirement in ASU 2016−02 to recognize operating leases, managers' response by shortening lease terms in general will reduce the impact of the new standard on reported liabilities (in comparison to using longer-term operating leases, finance leases, or debt-financed asset purchases). Thus, managers' balance sheet reporting incentives may continue to play a role after ASU 2016−02 (Christensen et al., 2022).

In addition, we consider the possibility that firms may have reduced their use of operating leases because the new standard resulted in an increase in internal information collection and quality. In other words, the decline in operating leases was not because of a decline in their perceived reporting advantage but because the new standard helped managers to better understand their current overuse of operating leases (Chatterjee, 2020; Christensen et al., 2021). To test this idea, we identify firms with internal control weaknesses in 2014. These firms arguably have weaker internal controls over leasing decisions and potentially benefit more from a closer examination of their leasing contracts induced by the new standard. In the third column of Table 5, we find no evidence of a difference in the decline in operating leases for firms with versus without internal control weaknesses. In sum, we find no evidence that the decline in operating leases is due to tax benefits, macro-economic conditions, or internal information collection.

4.4. Tests of Hypothesis 2—change in capital expenditures

The academic literature on the lease-versus-buy decision suggests that firms choose between leasing and capital investment to minimize costs (e.g., Beatty et al., 2010). The implied interest rate embedded in leases is often higher compared with the bank interest rate (e.g., Milano, 2012). As the reporting advantage and private benefit of using operating leases are reduced with ASU 2016−02, we expect to observe a corresponding increase in direct asset purchases. We provide a test for this idea in Table 6, Panel A. The dependent variable is capital expenditures scaled by lagged total sales (*Capex*). Column (1) includes only *Treatment* × *Post*, *Post*, and firm fixed effects in the regression to estimate the difference-in-differences model. In column (2), we add control variables. The coefficients on *Treatment* × *Post* is positive and significant in both columns (0.057, *t*-statistic = 3.49; 0.057, *t*-statistic = 3.42, respectively). Columns (3) and (4) further include *Treatment* × *Post-implement* and *Post-implement*. The coefficients on *Treatment* × *Post-implement* are insignificant in the last two columns. These findings are consistent with treatment firms' reduction in operating leases after ASU 2016−02 reflecting substitution for more asset purchases. The increase in capital expenditures is consistent with views expressed by managers (Deloitte, 2014).

One potential concern is that the decline in new operating lease commitments (Table 3) and the increase in capital expenditures (Table 6, Panel A) may simply reflect concurrent trends in the sample-wide data rather than individual firms substituting capital expenditures for operating leases after ASU 2016−02. To address this possibility, we replace *Capex* in model (3) with the ratio of new operating leases to capital expenditures (*NewOpLease/Capex*). This dependent variable helps to capture the relative proportion of new operating leases to capital expenditures firm-year by firm-year. The results are shown in Panel B of Table 6. In all columns, the ratio of new operating leases to capital expenditures declines in the post period. The results remain consistent with the substitution of operating leases for capital expenditures after ASU 2016−02.

To ensure the increase in capital expenditures is not just a reflection of a change in firms' general investment or risk-taking behavior, we provide a falsification test based on research and development expenditures. We replace *Capex* in model (3) with research and development expenditures scaled by lagged total sales (*R&D*). In untabulated results, we find that the coefficient on *Treatment* × *Post* is negative and insignificant.

4.5. Cross-sectional tests

To further test the reporting effects of the new standard, we provide support for Hypotheses 1 and 2 using cross-sectional tests. We identify firms that were more likely using operating leases at the time of ASU 2016−02 for managers' reporting incentives. For these firms, the shift from operating leases (Hypothesis 1) to capital expenditures (Hypothesis 2) is expected to be stronger. For other firms that were more likely using operating leases due to non-reporting incentives (e.g., financial constraints on asset purchases), the shift from operating leases to capital expenditures is expected to be at least partly mitigated.

We use several measures of reporting incentives for operating leases prior to the issuance of ASU 2016−02. The first measure, *HGrowth*, is a firm's sales growth in 2014. Firms with higher growth are more likely to need external capital to acquire assets and thus enjoy greater potential reporting benefits of using operating leases. These firms are also likely to be those that used operating leases to over-invest. We expect the decline in new operating leases and the increase in capital expenditures to be more pronounced in the subsample with high sales growth.[25]

We also expect a larger substitution between operating leases and capital expenditures for firms whose performance is evaluated to a greater extent by operating cash flows and EBITDA. The discussion of reporting effects of operating leases versus debt-financed capital expenditures (or capital/finance leases) typically focuses on the balance sheet (i.e., recognition of assets and liabilities). However, reporting differences between operating leases and capital expenditures also occur on the income statement and statement of cash flows. All else equal, operating leases lead to a reporting *disadvantage* of lower operating cash flows and lower EBITDA (Spiceland et al., 2020).[26] To the extent balance sheet benefits have been eliminated

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[25] As an additional test, we also used average sales growth during the *post*-ASU 2016−02 period. Conceptually, we believe sales growth *prior* to ASU 2016−02 (i.e., 2014) is appropriate for estimating the extent to which firms use operating leases for their reporting benefits. Nevertheless, the results are similar if we instead use sales growth in the post-ASU 2016−02 period.

[26] For operating leases, the full lease payment is subtracted from operating cash flows. However, capital expenditures have no effect on operating cash flows, and only the interest portion of subsequent debt payments affects operating cash flows. Further, operating lease payments are recorded as an operating expense and therefore reduce EBITDA, while depreciation and interest associated with capital expenditures would have no effect on EBITDA.

Table 6
Tests of Hypothesis 2—difference-in-differences tests of capital expenditures.

Panel A: Level of Capital Expenditures				
Dependent Variable = *Capex*	(1)	(2)	(3)	(4)
Treatment × Post	0.057***	0.057***	0.057***	0.057***
	(3.49)	(3.42)	(3.47)	(3.45)
Treatment × Post-implement			−0.001	0.001
			(−0.07)	(0.05)
Post	−0.066***	−0.058***	−0.063***	−0.023
	(−5.18)	(−3.81)	(−3.91)	(−1.31)
Post-implement			−0.018	−0.039*
			(−1.37)	(−1.71)
Lev		−0.090		−0.085
		(−1.42)		(−1.34)
Size		0.050***		0.053***
		(2.79)		(2.71)
NetIncome		−0.120		−0.113
		(−0.76)		(−0.72)
OCF		0.020		0.008
		(0.09)		(0.04)
stdOCF		−0.355		−0.352
		(−0.90)		(−0.90)
bCash		0.282*		0.287*
		(1.68)		(1.70)
bCurrent		−0.003		−0.004
		(−0.27)		(−0.34)
SalesGrowth		0.215***		0.224***
		(3.87)		(3.79)
GDPGrowth		0.003		0.003
		(0.84)		(0.95)
ΔInterest		−0.012**		−0.027***
		(−2.19)		(−2.64)
Firm Fixed Effects	Yes	Yes	Yes	Yes
Observations	12,280	12,280	12,280	12,280
R-squared	0.005	0.038	0.005	0.040
Unique Firms	1,742	1,742	1,742	1,742

Panel B: Ratio of New Operating Leases to Capital Expenditures				
Dependent Variable = *NewOpLease/Capex*	(1)	(2)	(3)	(4)
Treatment × Post	−0.200***	−0.205***	−0.196***	−0.196***
	(−4.39)	(−4.53)	(−4.22)	(−4.23)
Treatment × Post−implement			−0.020	−0.048
			(−0.21)	(−0.52)
Post	0.038	0.122***	0.076***	0.131
	(0.78)	(4.77)	(3.88)	(1.21)
Post−implement			0.032	−0.007
			(0.63)	(−0.05)
Lev		0.528***		0.509***
		(3.86)		(3.71)
Size		−0.076***		−0.087***
		(−2.99)		(−3.20)
NetIncome		0.173		0.173
		(1.64)		(1.64)
OCF		−0.231		−0.215
		(−1.07)		(−0.99)
stdOCF		−0.056		−0.039
		(−0.18)		(−0.12)
bCash		−0.141		−0.140
		(−1.27)		(−1.26)
bCurrent		0.048**		0.048**
		(2.49)		(2.49)
SalesGrowth		0.666***		0.664***
		(6.50)		(6.37)
GDPGrowth		−0.034		−0.052
		(−1.55)		(−1.57)
ΔInterest		−0.023		−0.078
		(−0.79)		(−0.75)

(continued on next page)

Table 6 (*continued*)

Panel B: Ratio of New Operating Leases to Capital Expenditures

Dependent Variable = *NewOpLease/Capex*	(1)	(2)	(3)	(4)
Firm Fixed Effects	Yes	Yes	Yes	Yes
Observations	12,274	12,274	12,274	12,274
R−squared	0.003	0.016	0.002	0.017
Unique Firms	1,742	1,742	1,742	1,742

Notes: The table tests the effect of the lease accounting standard on capital expenditures. In Panel A (Panel B) the dependent variable is *Capex*, which is capital expenditures scaled by lagged total sales (*NewOpLease/Capex*, which is the ratio of new operating leases to capital expenditures). *Post* is an indicator for the period after the issuance of ASU 2016−02. *Post-implement* is an indicator for the period after the implementation of ASU 2016−02. *Treatment* is an indicator for firms with above-median total operating lease commitments, scaled by lagged total assets, in 2014. Both columns control for firm fixed effects. *t*-statistics are reported in parentheses. Standard errors are clustered by firm. Variable definitions are in the Appendix. ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed).

with ASU 2016−02, firms whose performance is more closely tied to operating cash flows and EBITDA have more incentive to reduce their use of operating leases.

We use the frequency of analyst forecasts to measure the relevance of operating cash flows or EBITDA to investors, creditors, and others (e.g., boards). Analysts are more likely to provide forecasts of amounts that are more relevant (Francis et al., 2003). *#OCF Forecasts* is the industry-average number of analyst operating cash flow forecasts in 2014, and *#EBITDA Forecasts* is the industry-average number of analyst EBITDA forecasts in 2014. In industries with higher *#OCF Forecasts* or *#EBITDA Forecasts*, operating cash flows and EBITDA are more important performance measures. Thus, firms in these industries have lost the perceived advantage of off-balance-sheet reporting of operating leases and are more likely to reduce their use of operating leases to improve the reported performance of operating cash flows and EBITDA.

Our fourth cross-sectional variable is an indicator variable for firms with a ratio of long-term leases to total leases above the sample median in 2014 (*Long Lease Intensity*).[27] As discussed above, short-term operating lease commitments are not required to be recognized on the balance sheet. Thus, firms with more long-term leases are expected to lose more benefits associated with using operating leases. These firms are expected to have a greater reduction in operating leases and increase in capital expenditure.

These four cross-sectional tests are shown in the first four columns of Table 7.[28] Panel A reports the results for operating leases, and Panel B reports the results for capital expenditures. We augment Model (1) by including each of the cross-sectional variables and their interactions with *Post* and *Treatment × Post*. The variable of interest is *Treatment × Post × Interaction*. In Panel A, we find that these coefficients are significantly negative in all four columns. In Panel B, we find that the coefficients are significantly positive in all four columns. Overall, the results are consistent with the switch from operating leases to capital expenditures after ASU 2016-02 being stronger when the off-balance-sheet reporting benefits were perceived to be larger. In untabulated tests, we include *Treatment × Post-implement* and *Post-implement* and their interactions with the cross-sectional variables. We do not find any significant effects for the post-implementation period.

As an alternative cross-sectional test, we examine whether firms that appear to be using operating leases for non-reporting reasons are *less* likely to reduce their use of operating leases. Firms with financial constraints prior to ASU 2016−02 were likely using leases (instead of asset purchases) because of real limitations on their ability to issue debt or equity (Eisfeldt and Rampini, 2009; Beatty et al., 2010). Issuance of ASU 2016-02 does not affect these firms' real financial situation, and therefore the necessity of leasing likely remains. *Financial Constraint* is a composite measure of financial constraints based on firms' operating cash flows, leverage, and current ratio. As shown in the final column of Panel A in Table 7, we find that the decrease in operating leases is mitigated for firms that more likely were using operating leases because they were financially constrained. Panel B of Table 7 shows that the increase in capital expenditures is also mitigated for these firms.

4.6. Tests of Hypotheses 3 and 4—consequences on performance and stakeholders

We next test whether treatment firms that reduced their use of operating leases (*Reduction* = 1) had a change in reported firm performance after the issuance of ASU 2016−02. We examine firm performance using several measures: net income before extraordinary items scaled by lagged total sales (*NetIncome*); earnings before interest, taxes, depreciation, and amortization scaled by lagged total sales (*EBITDA*); operating cash flows scaled by lagged total sales (*OCF*); and sales growth (*SalesGrowth*). We regress each of these measures on *Treatment × Post* and *Post*. The results are in Table 8. *Reduction* firms had a relative *improvement* in net income, operating cash flows, and sales growth following issuance of ASU 2016−02. The coefficient on *EBITDA* is positive but not quite significant at conventional levels (*t*-statistic = 1.62). Overall, these results are not consistent with complaints by managers that the new standard would have a negative consequence on firms' reported performance. As discussed earlier, one possible explanation for the improvement in performance is that operating leases are

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[27] In this test, we consider leases that are due in four or more years (i.e., 2018 and beyond) as long-term leases because our tests in Table 3 show that firms switch away from leases that are due in four or more years.

[28] We construct the cross-sectional variables using data in 2014 within our final sample. Data to calculate these variables in 2014 are missing for some firms. Therefore, the sample is slightly smaller in Table 7 than in our main sample.

Table 7
Cross-sectional variations.

Panel A. Change in Operating Leases

Dependent Var. = NewOpLease	(1)	(2)	(3)	(4)	(5)
Interaction=	HGrowth	#OCF Forecasts	#EBITDA Forecasts	Long Lease Intensity	Financial Constraint
Treatment × Post × Interaction	−0.044***	−0.005*	−0.002***	−0.015***	0.015**
	(−3.56)	(−1.83)	(−2.61)	(−3.74)	(2.49)
Treatment × Post	−0.009***	−0.002	−0.000	−0.006***	−0.006**
	(−5.02)	(−0.30)	(−0.09)	(−3.97)	(−2.16)
Post	0.003***	0.004***	0.003	0.004***	0.004***
	(4.31)	(2.72)	(1.52)	(4.81)	(3.60)
Post × Interaction	−0.005	−0.000	−0.000	−0.005***	0.002
	(−1.13)	(−0.54)	(−0.02)	(−2.68)	(1.29)
Lev	0.005	0.004	0.005	0.004	0.004
	(1.04)	(0.84)	(0.99)	(0.88)	(0.86)
Size	0.004***	0.002**	0.003***	0.003***	0.003***
	(3.83)	(2.44)	(2.72)	(3.00)	(2.96)
NetIncome	−0.010*	−0.011**	−0.010*	−0.010**	−0.011**
	(−1.90)	(−2.15)	(−1.96)	(−2.04)	(−2.08)
OCF	−0.005	−0.004	−0.004	−0.004	−0.004
	(−0.62)	(−0.54)	(−0.53)	(−0.58)	(−0.59)
stdOCF	−0.001	0.004	0.002	0.002	0.002
	(−0.05)	(0.25)	(0.15)	(0.15)	(0.12)
bCash	0.001	0.004	0.004	0.003	0.004
	(0.26)	(0.65)	(0.68)	(0.54)	(0.59)
bCurrent	0.001**	0.001*	0.001*	0.001**	0.001*
	(1.99)	(1.88)	(1.82)	(2.06)	(1.77)
SalesGrowth	0.036***	0.039***	0.039***	0.039***	0.039***
	(11.26)	(12.61)	(12.48)	(12.48)	(12.44)
GDPGrowth	−0.000	0.000	0.000	0.000	0.000
	(−0.10)	(0.47)	(0.33)	(0.37)	(0.35)
ΔInterest	−0.000	−0.000	−0.000	−0.000	−0.000
	(−0.00)	(−0.14)	(−0.17)	(−0.10)	(−0.20)
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	12,043	12,043	12,043	12,043	12,043
R-squared	0.056	0.051	0.049	0.057	0.050
Unique Firms	1,639	1,639	1,639	1,639	1,639

Panel B. Change in Capital Expenditures

Dependent Var. = Capex	(1)	(2)	(3)	(4)	(5)
Interaction =	HGrowth	#OCF Forecasts	#EBITDA Forecasts	Long Lease Intensity	Financial Constraint
Treatment × Post × Interaction	0.365**	0.060**	0.032***	0.164*	−0.092**
	(2.04)	(2.49)	(2.81)	(1.74)	(−2.14)
Treatment × Post	0.026	−0.122**	−0.156**	0.043***	0.009
	(1.44)	(−2.30)	(−2.39)	(3.22)	(0.43)
Post	−0.029*	0.174***	0.159**	−0.036***	−0.008
	(−1.76)	(3.46)	(2.50)	(−3.25)	(−0.41)
Post × Interaction	−0.385**	−0.079***	−0.033***	−0.181*	0.094**
	(−2.36)	(−3.68)	(−2.93)	(−1.92)	(2.10)
Lev	−0.076	−0.115*	−0.093	−0.094	−0.089
	(−1.13)	(−1.74)	(−1.40)	(−1.40)	(−1.34)
Size	0.058***	0.029*	0.048***	0.050***	0.052***
	(3.26)	(1.76)	(2.65)	(2.79)	(2.77)
NetIncome	−0.132	−0.164	−0.132	−0.132	−0.128
	(−0.79)	(−0.98)	(−0.78)	(−0.78)	(−0.76)
OCF	−0.005	−0.047	−0.002	0.008	0.006
	(−0.02)	(−0.19)	(−0.01)	(0.03)	(0.03)
stdOCF	−0.352	−0.256	−0.354	−0.371	−0.374
	(−0.83)	(−0.61)	(−0.83)	(−0.88)	(−0.88)
bCash	0.283	0.299*	0.300*	0.298*	0.300*
	(1.57)	(1.68)	(1.67)	(1.67)	(1.67)
bCurrent	−0.003	−0.001	−0.003	−0.003	−0.004
	(−0.29)	(−0.07)	(−0.25)	(−0.26)	(−0.31)
SalesGrowth	0.198***	0.215***	0.219***	0.221***	0.220***
	(3.31)	(3.75)	(3.74)	(3.74)	(3.74)
GDPGrowth	−0.009*	−0.008*	−0.011**	−0.011**	−0.011**
	(−1.73)	(−1.78)	(−2.05)	(−2.06)	(−2.11)
ΔInterest	0.002	0.007	0.004	0.003	0.003
	(0.40)	(1.62)	(0.95)	(0.81)	(0.67)
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes

Table 7 (*continued*)

Panel B. Change in Capital Expenditures					
Dependent Var. = *Capex*	(1)	(2)	(3)	(4)	(5)
Interaction =	*HGrowth*	*#OCF Forecasts*	*#EBITDA Forecasts*	*Long Lease Intensity*	*Financial Constraint*
Observations	12,043	12,043	12,043	12,043	12,043
R-squared	0.045	0.061	0.042	0.043	0.039
Unique Firms	1,639	1,639	1,639	1,639	1,639

Notes: The table tests the cross-sectional variation in the effect of the new lease accounting standard on new operating lease commitments and capital expenditures. The dependent variable in Panel A is *NewOpLease*, which is the new operating lease commitments scaled by lagged total sales. The dependent variable in Panel B is *Capex*, which is capital expenditures scaled by lagged total sales. *Post* is an indicator for the period after the issuance of ASU 2016−02. *Treatment* is an indicator for firms with above-median total operating lease commitments, scaled by lagged total assets, in 2014. *HGrowth* is sales growth in 2014. *#OCF Forecasts* is the industry-average number of analyst operating cash flow forecasts in 2014. *#EBITDA Forecasts* is the industry-average number of analyst EBITDA forecasts in 2014. *Long Lease Intensity* is the ratio of a firm's long-term operating lease to total lease in 2014. *Financial Constraint* is a composite measure of a firm's financial constraint in 2014. All columns use the full sample and control for firm fixed effects. *t*-statistics are reported in parentheses. Standard errors are clustered by firm. Variable definitions are in the Appendix. ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed).

Table 8
Tests of Hypothesis 3—economic consequences on firm performance.

	(1)	(2)	(3)	(4)
Dependent Variable =	*NetIncome*	*EBITDA*	*OCF*	*SalesGrowth*
Reduction × *Post*	0.017**	0.009	0.014**	0.014***
	(1.98)	(1.62)	(2.17)	(2.85)
Post	−0.016***	−0.018***	−0.029***	−0.009***
	(−3.59)	(−6.07)	(−8.96)	(−3.44)
Lev	−0.240***	−0.053***	−0.050***	−0.061***
	(−10.10)	(−3.17)	(−2.99)	(−4.99)
Size	0.034***	0.041***	0.042***	0.032***
	(6.50)	(13.64)	(12.76)	(11.13)
bCash	−0.015	0.081***	0.051**	0.008
	(−0.55)	(4.15)	(2.55)	(0.52)
bCurrent	−0.003	−0.008***	−0.005**	0.002
	(−1.14)	(−3.31)	(−2.03)	(1.09)
stdOCF	0.083	0.155***	0.058	0.176***
	(1.19)	(2.78)	(1.06)	(3.74)
Firm Fixed Effects	Yes	Yes	Yes	Yes
Observations	12,281	12,280	12,281	12,281
R-squared	0.088	0.088	0.077	0.088
Unique Firms	1,742	1,742	1,742	1,742

Notes: The table tests the effect of the lease accounting standard on various economic performance measures. The dependent variables are net income before extraordinary items scaled by lagged sales (*NetIncome*), earnings before interest, taxes, depreciation, and amortization scaled by lagged sales (*EBITDA*), operating cash flows scaled by lagged sales (*OCF*), and sales growth (*SalesGrowth*) in the four columns, respectively. *Post* is an indicator for the period after the issuance of ASU 2016−02. *Reduction* is an indicator for treatment firms that reduced the use of operating leases in the post-period. All columns control for firm fixed effects. *t*-statistics are reported in parentheses. Standard errors are clustered by firm. Variable definitions are in the Appendix. ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed).

more expensive than debt-financed capital expenditures. Thus, the switch from operating leases to capital expenditures increases firms' earnings. Another explanation for the improvement in performance is a real effect through disciplining managers' over-investment behavior.

Next, we test whether shareholders, creditors, and employees of *Reduction* firms are negatively affected. Table 9 reports these results. In Panel A, we find no significant change in expected returns (*ExpRet*), implied cost of equity capital (*ICC*), or return volatility (*RetVol*). We do find an increase in market-to-book ratio (*MB*) and a decrease in stock return beta (*Beta*). These results are consistent with the improved financial performance of *Reduction* firms (previously shown in Table 8) increasing firm value and reducing firm risk. For example, prior research (e.g., Hao et al., 2011) suggests that stock return sensitivity to macro-level news is lower for firms with better performance. Thus, improved financial performance could translate into lower market risk (*Beta*).

The results for creditors and employees are in Table 9, Panel B. We find that *Reduction* firms do not have relatively more debt covenant violations (*Violation*) or decreases in employment (Δ*Employment*). Contrary to managers' claims, creditors' perceptions (*Credit Rating*) of the firm's economic condition show relative improvement. One explanation for improved credit ratings, in addition to improved financial performance (previously shown in Table 8), is that the increase in capital expenditures may have resulted in more collateralizable assets. Another possibility is that credit analysts did not anticipate the decline in firms' use of operating leases (i.e., their pro forma estimates of lease obligations were too high for the post-ASU 2016−02 period). Thus, even though debt ratios increased following ASU 2016−02, they may have increased less than

Table 9

Tests of Hypothesis 4—economic consequences on stakeholders.

Panel A: Shareholders

Dependent Variable =	(1) MB	(2) ExpRet	(3) ICC	(4) Beta	(5) RetVol
Reduction × Post	0.094**	−0.004	0.637	−0.156**	−0.003
	(2.11)	(−0.64)	(0.16)	(−2.13)	(−1.08)
Post	−0.090***	0.005*	−1.844	−0.013	0.011***
	(−5.61)	(1.83)	(−1.12)	(−0.43)	(11.41)
Lev	1.693***	−0.024***	3.631**	−0.079**	−0.019***
	(17.10)	(−7.36)	(1.98)	(−2.30)	(−17.15)
Size	0.246***	0.027*	−7.118	0.375***	0.031***
	(14.46)	(1.77)	(−0.84)	(2.95)	(6.86)
stdOCF	−0.159	0.025	−9.927	−0.327	0.033***
	(−0.84)	(0.82)	(−0.46)	(−1.04)	(3.17)
Big4	−0.067	0.000	−3.793	0.156	0.002
	(−1.43)	(0.00)	(−0.53)	(1.50)	(0.73)
Beta	−0.013***	0.004***	1.311*		
	(−2.87)	(3.21)	(1.83)		
IVol	−0.695***	−0.043	−12.229		
	(−3.13)	(−0.89)	(−0.43)		
Tangible	−0.146***				
	(−5.46)				
R&D	−0.290				
	(−0.84)				
SalesGrowth	0.268***				
	(6.82)				
MB		−0.018***	−2.494		
		(−5.16)	(−1.32)		
Q				−0.009	
				(−0.44)	
bCurrent				−0.032*	−0.003***
				(−1.95)	(−4.63)
NetIncome					−0.012***
					(−2.60)
OCF					−0.014*
					(−1.93)
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	9,794	9,485	9,254	10,234	10,234
R−squared	0.190	0.024	0.002	0.005	0.115
Unique Firms	1,479	1,471	1,432	1,501	1,501

Panel B: Creditors and Employees

Dependent Variable =	(1) Credit Rating	(2) Violation	(3) ΔEmployment
Reduction × Post	0.103**	0.013	0.023
	(2.07)	(0.57)	(0.92)
Post	−0.558***	0.111***	−0.080***
	(−25.10)	(12.50)	(−3.04)
Lev	0.245***	0.071*	0.138**
	(2.87)	(1.75)	(2.20)
Size	0.042***	−0.007	0.038
	(3.35)	(−0.96)	(1.18)
bCurrent	0.011		
	(1.51)		
stdOCF	−0.387***	0.044	0.724
	(−2.90)	(0.54)	(1.46)
R&D	−0.240		0.682***
	(−1.28)		(3.42)
Tangi	−0.035*	0.001	0.131***
	(−1.92)	(0.08)	(8.16)
MB	−0.030*	−0.010	
	(−1.90)	(−1.26)	
IB	−0.177***	−0.050*	0.105**
	(−3.30)	(−1.87)	(2.21)
OCF	−0.120		0.038
	(−1.40)		(0.16)
Credit Rating		0.010	
		(0.99)	
Firm Fixed Effects	Yes	Yes	Yes

(continued on next page)

Table 9 (*continued*)

Panel B: Creditors and Employees			
Dependent Variable =	(1)	(2)	(3)
	Credit Rating	*Violation*	*ΔEmployment*
Observations	11,639	11,639	12,065
R-squared	0.196	0.086	0.008
Unique Firms	1,717	1,717	1,718

Notes: The table tests the effect of the lease accounting standard on various stakeholders. In Panel A, the dependent variables are market-to-book ratio (*MB*), expected returns (*ExpRet*), implied cost of equity capital (*ICC*), market risk (*Beta*), and return volatility (*RetVol*) in the five columns, respectively. In Panel B, the dependent variables are a firm's credit ratings (*Credit Rating*), an indicator for debt covenant violation (*Violation*), and change in employment (*ΔEmployment*) in the three columns, respectively. *Post* is an indicator for the period after the issuance of ASU 2016−02. *Reduction* is an indicator for treatment firms that reduced use of operating leases in the post-period. All columns control for firm fixed effects. *t*-statistics are reported in parentheses. Standard errors are clustered by firm. Variable definitions are in the Appendix. ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed).

expected. Both explanations for the increase in credit ratings are interesting and provide opportunities for additional research.[29]

In untabulated tests, we examine whether the implementation of the new standard affects the stakeholders of all *Treatment* firms. Similar to those reported in Table 9, we do not find any negative effects of implementation on stakeholders. Instead, we find that relative to control firms, *Treatment* firms experience a decrease in systematic risk, decrease in return volatility, and an increase in credit ratings after implementation of ASU 2016−02. Again, these results are inconsistent with concerns expressed by managers.

Table 10
Pre-existing time trend.

Dependent Variable = *NewOpLease*	(1)	(2)
Treatment × FY2012	−0.001	−0.001
	(−0.22)	(−0.50)
Treatment × FY2013	0.000	−0.000
	(0.12)	(−0.06)
Treatment × FY2014	0.003	0.003
	(1.35)	(1.06)
Lev		−0.001
		(−0.17)
Size		0.003*
		(1.71)
NetIncome		−0.025**
		(−2.49)
OCF		−0.003
		(−0.25)
stdOCF		0.002
		(0.12)
Cash		−0.006
		(−0.76)
Current		0.002**
		(2.41)
SalesGrowth		0.036***
		(8.70)
GDPGrowth		0.001
		(1.12)
ΔInterest		—
Year Fixed Effects	Yes	Yes
Firm Fixed Effects	Yes	Yes
Observations	6,182	6,182
R-squared	0.002	0.035
Unique Firms	1,671	1,671

Notes: The table tests the time trend of our main results. The dependent variable is *NewOpLease*, which is the new operating lease commitments scaled by lagged total sales. *Post* is an indicator for the post-ASU 2016−02 period. *FY201X* is an indicator for fiscal year 201x. *Treatment* is an indicator for firms with above-median total operating lease commitments, scaled by lagged total assets, in 2014. The tests use the sample of observations before 2015 and controls for firm fixed effects. *ΔInterest* is omitted due to no variation. *t*-statistics are reported in parentheses. Standard errors are clustered by firm. Variable definitions are in the Appendix. ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed).

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[29] Chang and Adams Consulting (2012) especially noted the expected impact of the new lease standard on the real estate industry. Our study focuses on the impact of the new standard to non-financial firms. Thus, the real estate lessor industry is not covered in our sample. While this issue is outside the scope of this current study, we encourage future research to further separately examine the consequences to the lessor industry. As another example of research focusing on economic consequences within a specific industry, see Li and Venkatachalam (2022) for the airline industry.

5. Robustness tests

As our first robustness test, we determine whether the decline in operating leases after the new lease standard is part of a preexisting trend. In Table 10, we replace *Treatment* × *Post* with interactions of *Treatment* with indicator variables for years in the pre-period (2012, 2013, and 2014). The sample period includes years before 2015. Thus, 2011 serves as the benchmark year. If the treatment firms started to decrease their use of operating leases prior to the issuance of ASU 2016−02, we would expect significant negative coefficients on the interactions of *Treatment* and *FY2012*, *FY2013*, or *FY2014*. In column (1), we do not include the control variables. Column (2) estimates the full model. We include year and firm fixed effects in both columns. The coefficients on *Treatment* × *FY2012*, *Treatment* × *FY2013*, and *Treatment* × *FY2014* are insignificant.

In the primary tests, the potential impact of ASU 2016−02 on a firm's balance sheet (*Treatment*) is measured using the ratio of operating leases to lagged *total assets* as of 2014. As alternative measures, we redefine the treatment group based on the ratio of operating leases to lagged *total liabilities* or lagged *total sales* as of 2014. The indicator *Treatment_Liab* is set to 1 for all observations whose ratio of total operating lease commitments scaled by lagged total liabilities is above median in 2014, and 0 otherwise. Similarly, the indicator *Treatment_Sale* is set to 1 for all observations whose ratio of total operating lease commitments scaled by lagged total sales is above median in 2014, and 0 otherwise. We estimate our regression model after replacing *Treatment* with *Treatment_Liab* or *Treatment_Sale*. The results are reported in columns (1) and (2) of Table 11, Panel A. Consistent with previous results, the coefficients on *Treatment_Liab* × *Post* and *Treatment_Sale* × *Post* are negative (−0.013 and −0.014, respectively) and significant at the 1 percent level.

Table 11
Other robustness tests.

Panel A: Alternative Definitions of Treatment						
Dependent Variable = *NewOpLease*	(1)	(2)	(3)	(4)	(5)	(6)
Treatment_Liab × *Post*	−0.013***					
	(−8.05)					
Treatment_Sale × *Post*		−0.014***				
		(−8.88)				
Treatment_Ind × *Post*			−0.013***			
			(−8.35)			
Treatment_2011 × *Post*				−0.004**		
				(−2.50)		
Treatment_Long × *Post*					−0.013***	
					(−8.39)	
Treatment_Tercile × *Post*						−0.018***
						(−8.40)
Post	0.003***	0.004***	0.003***	−0.001	0.003***	0.004***
	(3.80)	(5.20)	(3.90)	(−1.06)	(4.61)	(4.02)
Lev	0.004	0.002	0.002	0.001	0.003	0.004
	(0.87)	(0.51)	(0.32)	(0.20)	(0.53)	(0.69)
Size	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***
	(3.07)	(2.75)	(2.79)	(2.68)	(2.94)	(2.69)
NetIncome	−0.009*	−0.009*	−0.009*	−0.009*	−0.008	−0.010*
	(−1.69)	(−1.73)	(−1.76)	(−1.76)	(−1.63)	(−1.74)
OCF	−0.002	−0.003	−0.003	−0.003	−0.002	−0.005
	(−0.30)	(−0.39)	(−0.37)	(−0.35)	(−0.32)	(−0.58)
stdOCF	−0.000	−0.002	−0.001	−0.001	−0.003	−0.006
	(−0.03)	(−0.16)	(−0.10)	(−0.04)	(−0.19)	(−0.35)
Cash	0.005	0.005	0.005	0.005	0.005	0.006
	(0.90)	(0.81)	(0.88)	(0.90)	(0.87)	(0.87)
Current	0.001*	0.001*	0.001**	0.001*	0.001*	0.001
	(1.69)	(1.80)	(1.97)	(1.90)	(1.91)	(1.19)
SalesGrowth	0.038***	0.038***	0.038***	0.038***	0.038***	0.038***
	(12.12)	(12.24)	(12.16)	(12.09)	(12.05)	(9.52)
GDPGrowth	−0.000	0.000	0.000	0.000	0.000	0.001
	(−0.03)	(0.11)	(0.22)	(0.34)	(0.05)	(1.04)
ΔInterest	−0.000	−0.000	−0.000	−0.000	−0.000	−0.002
	(−0.27)	(−0.27)	(−0.30)	(−0.38)	(−0.29)	(−1.17)
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,281	12,281	12,281	12,281	12,281	8,002
R-squared	0.048	0.048	0.048	0.040	0.047	0.050
Unique Firms	1,742	1,742	1,742	1,742	1,742	1,093

Panel B: Alternative Definitions of Post-Period			
Dependent Variable = *NewOpLease*	(1)	(2)	(3)
Treatment × *Post0*	−0.011***		
	(−5.45)		

(continued on next page)

Table 11 (continued)

Panel B: Alternative Definitions of Post-Period

Dependent Variable = NewOpLease	(1)	(2)	(3)
Treatment × Post3		−0.012***	
		(−6.05)	
Treatment × Post6			−0.011***
			(−4.73)
Post0	0.002***		
	(3.05)		
Post3		0.003***	
		(3.21)	
Post6			0.001
			(1.20)
Lev	0.002	0.003	0.003
	(0.35)	(0.61)	(0.56)
Size	0.002	0.002*	0.002
	(1.59)	(1.74)	(1.64)
NetIncome	−0.005	−0.005	−0.005
	(−1.07)	(−1.10)	(−1.08)
OCF	0.013**	0.013**	0.013**
	(2.08)	(2.10)	(2.08)
stdOCF	0.000	0.000	0.000
	(0.11)	(0.12)	(0.11)
Cash	−0.002	−0.002	−0.002
	(−0.40)	(−0.38)	(−0.38)
Current	0.002***	0.002**	0.002**
	(2.63)	(2.46)	(2.46)
SalesGrowth	0.042***	0.042***	0.042***
	(8.79)	(8.82)	(8.82)
GDPGrowth	0.000	0.001	0.001
	(0.60)	(0.74)	(1.30)
ΔInterest	−0.001	−0.001	−0.001
	(−1.04)	(−1.04)	(−0.99)
Firm Fixed Effects	Yes	Yes	Yes
Observations	13,909	13,909	13,909
R-squared	0.041	0.042	0.041
Unique Firms	1,744	1,744	1,744

Notes: The table provides the robustness tests. The dependent variable is *NewOpLease*, which is the new operating lease commitment scaled by lagged total sales. Panel A uses several alternative definitions of treatment firms. *Treatment_Liab* defines treatment firms based on the ratio of lease commitment to lagged total liabilities in 2014. *Treatment_Sale* defines treatment firms based on the ratio of lease commitment to lagged total sales in 2014. *Treatment_Ind* defines treatment firms based on industry-median-adjusted lease commitment scaled by lagged total assets in 2014. *Treatment_2011* defines treatment firms based on the ratio of lease commitment scaled by lagged total assets in 2011. *Treatment_Long* defines treatment firms based on the ratio of long-term lease commitment scaled by lagged total assets in 2014. *Treatment_Tercile* defines treatment firms based on the tercile ranks of the ratio of lease commitment scaled by lagged total assets in 2014. Panel B uses several alternative definitions of post-period. *Post0* (*Post3*) [*Post6*] is an alternative indicator for the post−ASU 2016−02 period, which is set to 1 for observations with fiscal year ending dates after February (May) [August] 2016, and 0 otherwise. *Treatment* is an indicator for treatment firms. Panel A uses the main sample, and Panel B further includes observations in 2015. All the columns control for firm fixed effects. *t*-statistics are reported in parentheses. Standard errors are clustered by firm. Variable definitions are in the Appendix. ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed).

Our main tests define treatment firms as those with the ratio of operating leases to lagged total assets above the sample median in 2014. In column (3), we alternatively define treatment firms as those with the ratio above the industry median in 2014 (*Treatment_Ind*). In column (4), we redefine treatment firms as those with a ratio above the median in 2011, the first year of our sample (*Treatment_2011*). Results remain similar. This helps mitigate the concern about defining treatment firms based on operating leases in 2014. Because short-term leases are not required to be recognized by ASU 2016−02, column (5) further redefines treatment firms as those with the ratio of long-term operating leases to lagged total assets above the median in 2014 (*Treatment_Long*). Finally, in column (6), we identify treatment firms as those with the ratio of total operating leases to lagged total assets in the top tercile in 2014 (*Treatment_Tercile*). The control firms are those with the ratio in the bottom tercile. Firms in the middle tercile are excluded. Results remain similar for these alternative measures.

Another two important research design choices are the exclusion of 2015 from our sample and the definition of the post-treatment period. In columns (1), (2), and (3) of Panel B in Table 11, we include 2015 and use three alternative definitions of the post-treatment period. *Post0*, *Post3*, and *Post6* are set to 1 for observations with fiscal year end dates after February 2016, May 2016, and August 2016, respectively. The coefficients on the interaction of *Treatment* with *Post0*, *Post3*, and *Post6* are −0.011, −0.011, and −0.012, respectively, and significant at the 1 percent level.

6. Conclusion

In accordance with ASU 2016−02 issued in February 2016, U.S. public firms are required to recognize operating lease assets and liabilities on the balance sheet for annual reporting periods beginning after December 15, 2018. We investigate how

lessee firms have responded to the new standard and how their financial performance and stakeholders have been affected by these firms' response to the new standard. We find a reduction in new operating lease commitments around issuance of ASU 2016−02 for firms that rely more heavily on operating leases before issuance. The decline in operating lease commitments is especially pronounced for firms that had greater demand for asset acquisition in the pre-period or that benefited more from higher reported operating cash flows and EBITDA in the post-period. In contrast, the decline in operating leases is mitigated for firms that were facing financial constraints and were likely using operating leases for non-reporting reasons. We do not find any negative consequences of the reduction in operating leases on lessee firms' financial performance. We also do not observe any decrease in firm value, increase in risks to shareholders, increase in violations of debt covenants, or decrease in employment. Overall, the findings suggest that the recognition versus disclosure of operating leases had a significant effect on managers' operating decisions. However, the new standard did not lead to negative economic consequences for lessee firms or their stakeholders.

Our study has important implications for policy makers and future research. Regulators and standard setters faced strong opposition from managers. Our results suggest managers' concerns were likely overblown. Policy makers should be aware that managers' strong opposition to proposed accounting standards may either be in error or affected by other motivations. For example, managers may have been unaware of academic research showing that investors and creditors incorporated operating lease disclosures in their risk assessments. Another possible reason for managers' strong opposition may have been self-serving motivations tied to over-investing. Disentangling these two explanations is outside the scope of our study, but we encourage future research to further explore the reasons for managers' strong ex ante opposition to the new lease standard, despite the lack of ex post evidence of any negative economic consequences. In addition, our study focuses on the economic consequences of the new standard to lessee firms. While understanding the consequences to the lessor industry is beyond the scope of the current study, we encourage future studies to further examine this issue.

Appendix

Variable Definitions

Variable	Definition
Tests of Hypothesis 1	
NewOpLease	New operating lease commitment, calculated as total operating lease commitment at the end of the year (MRCT + MRCTA) less operating lease commitment carried over from the prior year (MRCT + MRCTA−MRC1), scaled by lagged total sales (SALE). Source: Compustat.
OpLease1%	The proportion of operating lease commitment due in year $t+1$, calculated as operating lease commitment due in year $t+1$ (MRC1) scaled by total operating lease commitment (MRCT + MRCTA). Source: Compustat.
OpLease2%	The proportion of operating lease commitment due in year $t+2$, calculated as operating lease commitment due in year $t+1$ (MRC2) scaled by total operating lease commitment (MRCT + MRCTA). Source: Compustat.
OpLease3%	The proportion of operating lease commitment due in year $t+3$, calculated as operating lease commitment due in year $t+1$ (MRC3) scaled by total operating lease commitment (MRCT + MRCTA). Source: Compustat.
OpLease4%	The proportion of operating lease commitment due in year $t+4$, calculated as operating lease commitment due in year $t+1$ (MRC4) scaled by total operating lease commitment (MRCT + MRCTA). Source: Compustat.
OpLease5%	The proportion of operating lease commitment due in year $t+5$, calculated as operating lease commitment due in year $t+1$ (MRC5) scaled by total operating lease commitment (MRCT + MRCTA). Source: Compustat.
Tests of Hypothesis 2	
Capex	Capital expenditures (CAPX) scaled by lagged total sales (SALE). Source: Compustat.
Tests of Hypothesis 3	
NetIncome	Net income before extraordinary items (IB) scaled by lagged total sales (SALE). Source: Compustat.
EBITDA	Earnings before income, taxes, depreciation, and amortization (EBITDA) scaled by lagged total sales (SALE). Source: Compustat.
OCF	Operating cash flows, calculated as cash flows from operations (OANCF) scaled by lagged total sales (SALE). Source: Compustat.
SalesGrowth	Sales growth rate, calculated as annual growth rate of sales (SALE). Source: Compustat.
Tests of Hypothesis 4	
MB	Market-to-Book Ratio, calculated as market value of equity (PRCC_F*CSHO) scaled by common stock equity (CEQ). Source: Compustat.
ExpRet	Future stock return during the following fiscal year. Source: CRSP.
ICC	Implied Cost of Equity Capital calculated using the PEG model as described in Easton (2004). Source: Compustat and IBES.
Beta	Systematic risk calculated following the Capital Assets Pricing Model using monthly return during the fiscal year. Monthly returns are required for 12 months. Source: CRSP.
RetVol	The volatility of monthly return during the fiscal year. Monthly returns are required for 12 months. Source: CRSP.
Credit Rating	An annual measure of S&P credit ratings, which is set to 5 if the firm's credit rating is between AAA and AA, 4 if the firm's credit rating is A+ or A, 3 if the firm's credit rating is A− to BBB−, 2 if the firm's credit rating is BBB−, and 1 if the firm is not rated. Source: Compustat.
Violation	An indicator for debt covenant violation. We use data from Greg Nini to identify firms that had debt covenant violations before 2017 [the data were used in Nini et al. (2012) and recently extended by the author]. For data on debt covenant violations in 2017−2019, we manually collected this from 10-Ks and 10-Qs using keywords provided by Roberts and Sufi (2009).
Employment	The natural logarithm of a firm's number of employees (EMP) at the end of the year. Source: Compustat.
Sample Partitioning Variables:	

(*continued*)

Variable	Definition
Treatment	Indicator for treatment firms, which is set to 1 for all the observations of a firm if the firm's total operating lease commitment (MRCT + MRCTA), scaled by lagged total assets (TA) is above median in 2014, and 0 otherwise. Source: Compustat.
Reduction	Indicator for treatment firms that reduce annual average total operating lease commitment in the post-period. Source: Compustat.
Post	Indicator for the post−ASU 2016−02 period, which is set to 1 for observations from fiscal years 2016−2019, and 0 otherwise. Source: Compustat.
Post-implement	Indicator for the period after the implementation of ASU 2016−02, which is set to 1 for observations from fiscal years starting after December 15, 2018, and 0 otherwise. Source: Compustat.
Cross-Sectional Tests:	
HGrowth	Sales growth in 2014. Source: Compustat.
#OCF Forecasts	The industry-average number of analyst operating cash flow forecasts in 2014. Source: IBES.
#EBITDA Forecasts	The industry-average number of analyst EBITDA forecasts in 2014. Source: IBES.
Long Lease Intensity	An indicator for firms whose ratio of long-term leases (MRC4+MRC5+MRCTA) to total leases (MRCT + MRCTA) is above the median in 2014. Source: Compustat.
Financial Constraint	A composite measure of financial constraint equal to the mean of three indicator variables: one for firms with operating cash flows below the annual median, one for firms with leverage above the annual median, and one for firms with current ratio below the annual median. Source: Compustat.
Control variables (alphabetical order):	
bCash	Cash holding at the beginning of the year, calculated as cash (CH) scaled by lagged total sales (SALE) from the prior year. Source: Compustat.
bCurrent	Current ratio at the beginning of the year, calculated as current assets (CAT) scaled by current liabilities (CLT) from the prior year. Source: Compustat.
Big4	An indicator for Big 4 auditors (AU). Source: Compustat.
Cash	Cash holding, calculated as cash (CH) scaled by lagged total sales (SALE). Source: Compustat.
GDPGrowth	Average quarterly GDP growth percentage over the last four quarters prior to the end of the fiscal year. Source: Bureau of Economic Analysis.
ΔInterest	Change in Bank Prime Loan Interest Rate during the fiscal year. Source: Federal Reserve.
IVol	Idiosyncratic volatility calculated following the Capital Assets Pricing Model using monthly return during the fiscal year. Monthly returns are required for 12 months. Source: CRSP.
Lev	Financial leverage, calculated as total liabilities (LT) scaled by total assets (AT). Source: Compustat.
Q	Tobin's Q, calculated as market value of equity (PRCC_F*CSHO) plus total liabilities (LT) scaled by total assets (AT). Source: Compustat.
R&D	Research and development expenditures (XRD) scaled by lagged total assets (SALE), which is set to zero if missing. Source: Compustat.
Size	Firm size, calculated as the natural logarithm of market value of equity (CSHO*PRCC_F). Source: Compustat.
stdOCF	Three-year standard deviation of operating cash flows (OANCF) scaled by lagged total sales (SALE). Source: Compustat.
Tangible	Asset tangibility, calculated as fixed assets (PPENT) scaled by lagged total sales (SALE). Source: Compustat.
Alternative Sample Partitioning Variables:	
Treatment_Liab	Indicator for treatment firms, which is set to 1 for all the observations of a firm if the firm's total operating lease commitment (MRCT + MRCTA) scaled by lagged total liabilities (LT) is above median in 2014, and 0 otherwise. Source: Compustat.
Treatment_Sale	Indicator for treatment firms, which is set to 1 for all the observations of a firm if the firm's total operating lease commitment (MRCT + MRCTA) scaled by lagged total sales (SALE) is above median in 2014, and 0 otherwise. Source: Compustat.
Treatment_Ind	Indicator for treatment firms, which is set to 1 for all the observations of a firm if the firm's total operating lease commitment (MRCT + MRCTA) scaled by lagged total assets (TA) is above industry-median in 2014, and 0 otherwise. Source: Compustat.
Treatment_2011	Indicator for treatment firms, which is set to 1 for all the observations of a firm if the firm's total operating lease commitment (MRCT + MRCTA) scaled by lagged total assets (TA) is above median in 2011, and 0 otherwise. Source: Compustat.
Treatment_Long	Indicator for treatment firms, which is set to 1 for all the observations of a firm if the firm's long-term operating lease commitment (MRCT + MRCTA-MRC1) scaled by lagged total assets (AT) is above median in 2014, and 0 otherwise. Source: Compustat.
Treatment_Tercile	Indicator for treatment firms, which is set to 1 for all the observations of a firm if the firm's total operating lease commitment (MRCT + MRCTA) scaled by lagged total assets (AT) is in the top tercile in 2014, and 0 for those in the bottom tercile. Source: Compustat.
Post0	Indicator for the post−ASU 2016−02 period, which is set to 1 for observations with fiscal year ending dates after February 2016, and 0 otherwise. Source: Compustat.
Post3	Indicator for the post−ASU 2016−02 period, which is set to 1 for observations with fiscal year ending dates after May 2016, and 0 otherwise. Source: Compustat.
Post6	Indicator for the post−ASU 2016−02 period, which is set to 1 for observations with fiscal year ending dates after August 2016, and 0 otherwise. Source: Compustat.

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