ECONOMIC IMPACTS OF CAPITALIZATION OF OPERATING LEASES: EVIDENCE FROM JAPAN

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Abstract

The purpose of this study is to investigate the economic impacts of capitalization of operating leases in Japan. Specifically, this study estimates the ex-ante impacts of capitalization of operating leases by comparing pro-forma accounting numbers based on a proposed rule change with reported accounting numbers under an extant rule. Our findings are twofold. First, capitalization of operating leases has significant impacts on financial ratios, including the debt to equity ratio (DER) and the interest coverage ratio (ICR). Second, the impacts of capitalization of operating leases on these financial ratios are more likely to be large after the adoption of Statement No. 13, *Accounting Standard for Lease Transactions*. This study contributes to the literature on economic consequences of capitalizing leases and discussions of global convergence of accounting standards.

Keywords: Constructive Capitalization, Economic Consequences, Lease Accounting, Operating Leases

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1 Introduction

The purpose of this study is to investigate the economic impacts of capitalization of operating leases in Japan. In particular, this study estimates the ex-ante impacts of capitalization of operating leases by comparing pro-forma accounting numbers based on a proposed rule change with reported accounting numbers under an extant rule. Our findings on the economic impacts are twofold. First, capitalization of operating leases has significant impacts on key financial ratios, including the debt to equity ratio (DER) and the interest coverage ratio (ICR). Second, the impacts of capitalization of operating leases on these financial ratios are substantially larger after the adoption of Statement No. 13, *Accounting Standard for Lease Transactions*, which is the extant accounting standard for leases in Japan. These results suggest that capitalizing operating leases has significant effects on Japanese firms.

Currently, the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) have proposed a new lease accounting model that requires lessees to recognize almost all types of leases on their balance sheet (IASB, 2009, 2010, 2013). The current lease accounting models under International Financial Reporting Standards (IFRS) (IAS 17) and U.S. generally accepted accounting principles (GAAP) (ASC 840/SFAS 13) classify leases as either finance (capital) leases or operating leases and account for them differently. Both accounting standard setters assume that operating leases are very similar to finance leases from an economic perspective, but the current accounting standards do not require lessees to recognize operating leases on their balance sheet. Since the existing accounting standards create asymmetry and inaccuracy of information in the market, the IASB and the FASB have criticized them and developed the new lease accounting model (IASB, 2015).

Capitalization of (long-term and/or non-cancelable) operating leases has been proposed for several decades since Myers's (1962) suggestion. The basis for this accounting treatment is that lessees obtain the right to use the leased items and incur

obligations to pay lease payments during the lease term regardless of whether leases are finance leases or operating leases. These leases meet the definitions of assets and liabilities and qualify for the recognition criteria that the IASB and the FASB prescribe in their conceptual frameworks (Lorensen, 1992; McGregor, 1996; Nailor and Lennard, 2000). Therefore, the IASB and the FASB have proposed to recognize almost all types of leases on lessees' balance sheet (IASB, 2009, 2010, 2013).

In these circumstances, prior studies have investigated the economic consequences of capitalization of operating leases (Barone et al., 2014). In particular, some prior studies show that capitalization of operating leases has significant impacts on key financial ratios (Beattie et al., 1998; Goodacre, 2003; Bennett and Bradbury, 2003; Fülbier et al., 2008; Durocher, 2008; Duke et al., 2009; Fitó et al., 2013). These studies find the ex-ante economic impacts of capitalization of operating leases for a sample of firms in Anglo Saxon and European countries.

To the best of our knowledge, none of the literature examines the impacts of capitalization of operating leases on financial ratios using a sample of Japanese firms. The Accounting Standards Board of Japan (ASBJ), which was established as a private standard setter in 2001, has promoted global convergence of accounting standards. Except for some accounting rules, Japanese GAAP is largely similar to IFRS and U.S. GAAP. In fact, Statement No. 13 is very similar to IAS 17 and ASC 840/SFAS 13. That is, leases are classified as either finance leases or operating leases and accounted for differently. Specifically, operating leases are not recognized on lessees' balance sheet. It is necessary to investigate the ex-ante impacts of capitalization of operating leases for Japanese firms. Accordingly, this study analyzes the economic impacts of capitalization of operating leases on accounting numbers and key financial ratios.

Reported accounting numbers are frequently contained in explicit and/or implicit contracts between managers and stakeholders to mitigate agency conflicts (e.g., Watts and Zimmerman, 1986; Bushman and Smith, 2001; Armstrong et al., 2010; Kothari et al., 2010; Shivakumar, 2013). Specifically, Japanese firms use reported accounting numbers in explicit and/or implicit contracts such as debt contracts. In fact, recent empirical evidence on Japanese firms indicates that private debt contracts include accounting-based covenants such as leverage covenants (Okabe, 2010; Inamura, 2012, 2013; Nakamura and Kochiyama, 2013). Furthermore, Japanese firms with higher leverage ratios set more restricted debt covenants in public debt contracts (Suda, 2004). Given that capitalization of leases leads to a change in the amounts of debt on balance sheet and the timing of expenses, capitalizing leases has direct and/or indirect effects on debt contracts. Accordingly, we predict that capitalization of leases will worsen financial ratios, including the DER and the ICR, thereby significantly affecting debt contracts.

The first objective of our research is to investigate whether capitalization of operating leases has significant impacts on accounting numbers, especially financial ratios such as the DER and the ICR. With regard to financial ratios, if a statistically significant difference exists between pre-capitalization and post-capitalization of leases, it is expected that capitalization of leases will have significant economic consequences. This is because accounting policy has effects on the contracts between managers and stakeholders, thereby affecting the wealth of interested parties (Holthausen and Leftwich, 1983). Thus, this study examines whether capitalization of operating leases has significant impacts on key financial ratios.

In April 2008, Statement No. 13 was mandatorily adopted.[1] Japanese firms were exceptionally allowed not to recognize finance leases on their balance sheet until the initial adoption of Statement No. 13. Almost all firms adopted this exceptional treatment. Statement No. 13 abolishes this exceptional treatment and requires Japanese firms to recognize finance leases on their balance sheet. El-Gazzar (1993) shows that capitalization of finance leases has caused significant increases in the tightness of debt covenant restrictions. When capitalization of finance leases has negative economic effects, rational managers choose off-balance-sheet transactions to avoid such negative effects (El-Gazzar et al., 1989). In fact, previous studies indicate that managers arrange their lease contracts with lessors and transfer finance leases to operating leases when finance leases were required to recognize on their balance sheet (Abdel-Khalik, 1981; Imhoff and Thomas, 1988; Yamamoto, 2010; Arata, 2012). Accordingly, we predict the impacts of capitalization of operating leases on key financial ratios to be significantly large after the adoption of Statement No. 13.

The second objective of our research is to investigate whether capitalization of operating leases is more likely to have large impacts on financial ratios, including the DER and the ICR after the adoption of Statement No. 13. Before the initial adoption of Statement No. 13, Japanese firms were more likely to use finance leases than operating leases, because they could avoid capitalizing finance leases on their balance sheet by using the exceptional treatment. Statement No. 13 abolishes the exceptional treatment and requires Japanese firms to recognize finance leases on their balance sheet. Accordingly, they are more likely to use operating leases than finance leases in response to the adoption of Statement No. 13. Considering these circumstances, capitalization of operating leases is more likely to have significant impacts on key financial ratios after the adoption of Statement No. 13.

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[1] Early adoption of Statement No. 13 was permitted for fiscal years beginning on or after April 1, 2007.

This study makes two contributions to the accounting literature and accounting standard setting. First, our research contributes to the literature on the economic impacts of capitalizing leases. Previous studies have investigated both the ex-ante and the ex-post economic consequences of capitalization of leases (Beattie et al., 2006; Barone et al., 2014). However, to the best of our knowledge, no previous ex-ante study analyzes the economic impacts of capitalization of operating leases for Japanese firms. Our research examines the economic impacts of capitalization of operating leases on key financial ratios for a sample of Japanese firms.

Second, this study has implications on discussions of global convergence of accounting standards. Currently, the IASB and the FASB have developed a new lease accounting standard and proposed to recognize almost all types of leases on lessees' balance sheet (IASB, 2009, 2010, 2013). Given this situation, it is necessary to investigate how capitalization of operating leases affects accounting numbers and key financial ratios. Investigating the economic impacts of operating leases is extremely valuable to evaluate the economic consequences of a potential regulatory change in the lease accounting standard.

The remainder of this paper is organized as follows. Section 2 summarizes accounting for leases in Japan and reviews the prior literature. Section 3 explains our research design, including the constructive capitalization method to capitalize operating leases and the research model in this study. Section 4 provides the reasons for selecting the samples and reports the descriptive statistics of the variables of this empirical research. Section 5 shows the economic impacts of capitalization of operating leases using a sample of Japanese firms. Section 6 summarizes the conclusions and discusses the implications of our research.

2 Background

2.1 Accounting for Leases in Japan

In June 1993, the Business Accounting Council (BAC) issued the lease accounting standard, *Statement of Opinions on Accounting Standards for Lease Transactions*. The Statement classified leases as either finance leases or operating leases, and it required the following accounting treatments: finance leases were recognized on lessees' balance sheet, and operating leases were not recognized on their balance sheet. These classification and accounting treatments are similar to IFRS (IAS 17) and U.S. GAAP (ASC 840/SFAS 13).

In Japan, finance leases are classified into two further categories: finance leases that transfer ownership to lessees (FLO) and finance leases that do not transfer ownership to lessees (FLNO).[2] In principle, Japanese firms are required to recognize finance leases on their balance sheet. However, the BAC permitted Japanese firms not to recognize FLNO on their balance sheet if information equivalent to capitalization of finance leases was disclosed in the notes to their financial statements. Almost all Japanese firms chose the exceptional treatment that allowed them not to recognize finance leases on lessees' balance sheet.[3]

In 2002, the ASBJ started considering whether the exceptional treatment should be repealed to implement global convergence of accounting standards. The ASBJ deliberated on this issue for four years and finally issued Statement No. 13 in March 2007. Statement No. 13 requires lessees to recognize all finance leases, that is, both FLO and FLNO, on their balance sheet. However, Statement No. 13 requires lessees not to recognize operating leases on their balance sheet. Accordingly, Statement No. 13 is very similar to IAS 17 and ASC 840/SFAS 13. Statement No. 13 was mandatorily adopted for fiscal years beginning on or after April 1, 2008.

Before the initial adoption of Statement No. 13, Japanese firms often did not use operating leases. One of the reasons is that they were allowed not to recognize finance leases on their balance sheet. However, since Statement No. 13 requires Japanese firms to recognize all finance leases on their balance sheet, they are more likely to use operating leases than finance leases. In fact, some previous studies indicate that Japanese firms transfer leases from finance leases to operating leases in response to the adoption of Statement No. 13 (Yamamoto, 2010; Arata, 2012). Considering this situation, the implementation of capitalization of operating leases would have significant economic consequences on Japanese firms.

2.2 Prior Literature

Prior studies have investigated the economic consequences of a new accounting standard by analyzing archival accounting data using two methods (Schipper, 1994; Beattie et al., 2006; Fülbier et al., 2009; Trombetta et al., 2012). One method constructs

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[2] The Japanese Institute of Certified Public Accountants (JICPA) issued the implementation guidance, *Practical Guidelines on Accounting Standards for, and Disclosure of, Lease Transactions*, in January 1994. The JICPA stated the following criteria to classify leases as either finance leases or operating leases: (a) transfer of the ownership term, (b) grant of the right to purchase term, (c) custom-made or custom-built assets, (d) present value criterion, and (e) useful economic life criterion. When leases satisfy any of the above criteria, they are classified as finance leases. Furthermore, finance leases that meet any of the criteria indicated in (a), (b), or (c) are classified as FLO; they are classified as FLNO otherwise (JICPA, 1994).

[3] The Japan Leasing Association (JAL) found that 99.7% of Japanese listed companies that prepared consolidated financial statements following Japanese GAAP chose the exceptional treatment when they accounted for finance leases (JAL, 2003).

pro-forma accounting numbers based on a proposed rule change and compares these with reported accounting numbers under an extant rule (an ex-ante study). The other compares accounting numbers before and after a change in an accounting rule (an ex-post study). This subsection reviews the previous literature, focusing on ex-ante studies.

Several ex-ante studies examine the impacts of capitalization of finance leases on accounting numbers and financial ratios. For example, Nelson (1963) investigates the impacts of capitalization of leases on the financial ratios of 11 U.S. companies. He finds significant impacts on financial ratios and changes in the rankings. Similarly, Ashton (1985) examines the effects of capitalization of finance leases on six financial ratios using 23 U.K. companies and shows a significant impact on the DER only.

More recent studies focus on capitalization of operating leases because the G4+1 proposed that not only finance leases but also non-cancelable operating leases should be recognized on lessees' balance sheet (McGregor, 1996; Nailor and Lennard, 2000). Capitalizing operating leases has significant impacts on accounting numbers and financial ratios, including leverage ratios. For example, Imhoff et al. (1991) report that capitalization of operating leases results in an average 34% (10%) decline in the return on assets (ROA) and 191% (47%) increase in the DER of high (low) lease usage firms in seven industries (14 firms). Duke et al. (2009) also investigate the economic impacts of capitalization of operating leases on leverage ratios, including the DER and the ICR, and performance ratios (ROA) for U.S. firms in the S&P 500 index. They find that leverage and performance ratios under an extant accounting rule are significant different from those financial ratios after capitalizing operating leases.

Recent studies examine the economic impacts of capitalization of operating leases not only for U.S. firms but also for firms in other countries: the U.K. (Beattie et al., 1998; Goodacre, 2003), New Zealand (Bennett and Bradbury, 2003), Canada (Durocher, 2008), Germany (Fülbier et al., 2008), and Spain (Fitó et al., 2013). These studies report that capitalization of operating leases has significant impacts on financial ratios, including leverage ratios. For example, Durocher (2008) uses the 100 largest Canadian public companies (by revenue) as a sample of firms and shows the impacts of capitalization of operating leases on leverage ratios, including the debt to assets ratio. However, the impacts on profitability ratios, including the ROA, are significant only for three industry segments: merchandising and lodging, oil and gas, and financial services.

In Japan, some ex-ante studies analyze impacts of capitalizing finance leases (the Research Committee on the Effects of New Accounting Standard for Lease Transactions, 2006; Hu, 2007). These studies show the impacts of capitalization of finance leases on the DER and the ROA for Japanese listed companies. However, to the best of our knowledge, no research examines the economic impacts of capitalization of operating leases on accounting numbers and key financial ratios. Accordingly, this study investigates these impacts to fill the gap in the prior literature.

3 Research Design

3.1 Constructive Capitalization Method

It is necessary to estimate the value of the operating lease obligations in investigating the economic impacts of capitalization of operating lease obligations. Many previous studies use the present value method to estimate the value of operating lease obligations. In Japan, with regard to operating leases, future minimum lease payments divided between within one year and more than one year out are only disclosed in the notes to the financial statements. The information on operating leases under Japanese GAAP is insufficient compared to that under IFRS and U.S. GAAP. We use the present value method proposed by Imhoff et al. (1991, 1997) and constructively capitalize operating leases as follows.

First, we estimate the total lease contract lifetime (TL) and the remaining lease contract lifetime (RL) of operating leases. The RL for each firm and each fiscal year is calculated by dividing future minimum lease payments (total) by future minimum lease payments (within one year). We assume that operating leases are single contracts paying the amount of future minimum lease payment (within one year) at each year in estimating the RL. In addition, following Imhoff et al. (1991, 1997), we assume that $RL/TL = 0.5$.

Next, we estimate the values of the operating lease obligations (OLO) and operating lease assets (OLA) at the end of the fiscal year. We assume that there is no lease payment at the inception of the lease term. Capitalizing future minimum lease payments (within one year) (FMLPs) with the RL and the discount rate (r), the value of OLO at the end of the fiscal year is $\frac{FMLP_S}{r} \times [1 - (1 + r)^{-RL}]$.[4] Moreover, the value of OLA at the end of the fiscal year is calculated by multiplying the value of OLO by the

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[4] Following previous studies (e.g., Imhoff et al., 1993; Bennett and Bradbury, 2003; Durocher, 2008; Fülbier et al., 2008; Damodaran, 2009), our research uses the firm-specific discount rate to capitalize operating leases. We calculate the firm-specific discount rate as follows. If we obtain the interest rate of finance leases disclosed in the supplementary statements, we use it as the discount rate. If the interest rate of finance leases is not disclosed in the supplementary statements, we calculate it using the note disclosure as follows: this year's interest expenses of finance leases are divided by the average amounts of last year's and this year's equivalent of year-end balance of lease payment payable. If we cannot obtain the interest rate of finance leases, we use the average interest rate of long-term debts as the discount rate.

certain ratio, $\frac{RL}{TL} \times \frac{[1-(1+r)^{-TL}]}{[1-(1+r)^{-RL}]}$.[5] We assume that OLA is depreciated using the straight-line method and OLO is allocated using the effective-interest method. Thus, the value of OLO is higher than that of OLA during the lease term. The difference between these two values causes a decrease in the book value of equity (retained earnings).

Lastly, we estimate the impacts of capitalization of operating leases on the income statement. With regard to operating leases, we could not directly obtain the information on this year's lease payment, the depreciation expense, and the interest expense in the notes to the financial statements. When we estimate the value of OLO, we assume that lessees pay the amount of future minimum lease payment (within one year) at the end of each year. We assume that this year's lease payment is equal to this year's future minimum lease payments (within one year). In addition, the depreciation expense is calculated by dividing this year's OLA by the RL. The interest expense is also calculated by multiplying OLO at the beginning of this year by this year's discount rate.

3.2 Research Model

First, our research analyzes the economic impacts of capitalizing operating leases by examining the difference in financial ratios between pre-capitalization and post-capitalization of operating leases. Among financial ratios, this study focuses on the DER and the ICR. This is because the previous literature shows that capitalizing leases has caused significant increases in the tightness of debt covenant restrictions (El-Gazzar, 1993). Furthermore, Japanese firms often use the DER and the ICR in debt contracts (Okabe, 2010; Inamura, 2012, 2013; Nakamura and Kochiyama, 2013).[6]

Accordingly, this study investigates the mean differences in the DER and the ICR between pre-capitalization and post-capitalization of operating leases by sector.[7] In addition, this study analyses each quartile difference between them to examine the economic impacts of capitalization of operating leases.[8] This is because extreme values of the

differences in the DER and the ICR would skew mean values, thereby overestimating the economic impacts of capitalization of operating leases. We predict that capitalizing operating leases leads to worsen the DER and the ICR. Thus, the mean and the quartile differences in the DER (ICR) between pre-capitalization and post-capitalization would be significantly positive (negative).

Next, this study examines whether the economic impacts of capitalizing operating leases on financial ratios are more likely to be large after the adoption of Statement No. 13. Because almost all Japanese firms adopted the exceptional treatment that allowed them not to recognize finance leases (JAL, 2003), they were less likely to use operating leases before the adoption of Statement No. 13. However, since Statement No. 13 requires Japanese firms to recognize all finance leases on their balance sheet, they are more likely to increase their use of operating leases. In fact, previous studies indicate that Japanese firms transfer leases from finance leases to operating leases in response to the adoption of Statement No. 13 (Yamamoto, 2010; Arata, 2012).

Accordingly, we predict that capitalization of operating leases is more likely to have large impacts on key financial ratios after the adoption of Statement No. 13. We use the following equations (1) and (2) to examine this prediction:

$$\Delta DER = \alpha_0 + \alpha_1 D + \alpha_2 LEV + \alpha_3 SIZE + \alpha_4 MTB + Industry\ dummy + \varepsilon, \qquad (1)$$

$$\Delta ICR = \beta_0 + \beta_1 D + \beta_2 LEV + \beta_3 SIZE + \beta_4 MTB + Industry\ dummy + \mu, \qquad (2)$$

where ΔDER (ΔICR) is the difference in the DER (ICR) between post-capitalization and pre-capitalization of operating leases; D is an indicator variable that takes the value of 1 if Statement No. 13 is mandatorily adopted, and 0 otherwise; LEV is debt divided by total assets; Size is the natural log of total assets; MTB is market value of equity divided by book value of equity; and Industry dummy is industry dummy variables. If the impacts of capitalizing operating leases are more likely to be large after the adoption of Statement No. 13, the signs of the coefficients of D in the regression models will be positive ($\alpha_1 > 0$) and negative ($\beta_1 < 0$) for the DER and the ICR, respectively. This study includes leverage (LEV), firm size (SIZE), growth opportunity (MTB), and industry dummy as control variables for the impacts of capitalization of operating leases.

4 Sample Selection and Descriptive Statistics

The sample is selected from the period 2001–2013 using the following criteria:
(i) Firms that use Japanese GAAP and are listed on stock exchanges in Japan.

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[5] When lease payments (LP) are constant during the lease term, the value of OLO is $\frac{LP}{r} \times [1-(1+r)^{-RL}]$. Because the value of OLA at the inception of the lease term is $\frac{LP}{r} \times [1-(1+r)^{-TL}]$, and OLA is depreciated using the straight-line method, the value of OLA is written as:

$OLA = \frac{RL}{TL} \times \frac{LP}{r} \times [1-(1+r)^{-TL}] = \frac{RL}{TL} \times \frac{[1-(1+r)^{-TL}]}{[1-(1+r)^{-RL}]} \times OLO.$

[6] This study also analyzes the economic impacts of capitalization of operating leases on the debt to assets ratio. Unreported results show that these results do not change our main results.

[7] Following the guideline for the Nikkei Stock Average Index, we redefine six sectors based on the Nikkei industrial classification of 36 industries. However, as we exclude banks, securities firms, insurance, and other financial firms from our sample, our study does not use the financials sector.

[8] We examine the mean difference in financial ratios between pre-capitalization and post-capitalization of operating leases

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using OLS regression. In addition, we investigate each quartile difference between them using quantile regression.

(ii) Banks, securities firms, insurance, and other financial firms are deleted.

(iii) Fiscal year ends on March 31.

(iv) The accounting period has not changed during the fiscal year.

(v) The necessary data on financial statements and share prices are available from the *Nikkei NEEDS Financial QUEST* database.

The full-fledged data regarding leases in consolidated financial statements are available only after 2000. This study requires the prior year's data to constructively capitalize operating leases.

Accordingly, this study's sample period starts in 2001. Because the data for investigating economic impacts of capitalizing operating leases are necessary, firms that lack data on future minimum lease payments for operating leases and the discount rate to capitalize operating leases are deleted from our sample. In addition, this study excludes observations with negative total assets or a negative book value of equity. Furthermore, in order to control for outliers, continuous variables are trimmed by year at the top and bottom 0.5%. The final sample consists of 9,130 firm-year observations.

Table 1. Descriptive Statistics

	N	Mean	SD	Min	p25	Median	p75	Max
ΔDER	9,130	0.079	0.304	0.000	0.001	0.007	0.036	9.615
ΔICR	9,130	-8.139	44.404	-999.200	-1.055	-0.114	-0.004	33.515
D	9,130	0.442	0.497	0.000	0.000	0.000	1.000	1.000
LEV	9,130	0.249	0.173	0.000	0.102	0.234	0.369	0.764
SIZE	9,130	11.575	1.509	7.718	10.468	11.446	12.557	15.837
MTB	9,130	1.247	0.968	0.027	0.664	0.995	1.510	19.406

Notes:

Continuous variables are trimmed by year at the top and bottom 0.5%.

Pre DER = debt divided by book value of equity before capitalizing operating leases

Post DER = debt divided by book value of equity after capitalizing operating leases

Pre ICR = business income, which sums operating income and financial income (interest income, discount income, and interest on securities), divided by financial expenses (interest expenses and discount on notes) before capitalizing operating leases

Post ICR = business income, which sums operating income and financial income (interest income, discount income, and interest on securities), divided by financial expenses (interest expenses and discount on notes) after capitalizing operating leases

ΔDER = Pre DER subtracted from Post DER

ΔICR = Pre ICR subtracted from Post ICR

D = an indicator variable that takes the value of 1 if Statement No. 13 is mandatorily adopted, and 0 otherwise

LEV = debt divided by total assets

SIZE = natural log of total assets

MTB = market value of equity divided by book value of equity

Table 1 presents the descriptive statistics for the variables used in this study. The mean (median) value of ΔDER, which is the difference between pre-capitalization and post-capitalization of operating leases, is 0.079 (0.007). In addition, the mean (median) value of ΔICR, which is the difference between pre-capitalization and post-capitalization of operating leases, is -8.139 (-0.114). These results show that capitalization of operating leases on average increases the DER by 0.08 and decreases the ICR by 8.14.

Table 2. Correlation Matrix

	ΔDER	ΔICR	D	LEV	SIZE	MTB
ΔDER	1.0000	-0.3136	0.1178	0.2875	0.0668	0.1164
	.	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ΔICR	-0.0006	1.0000	-0.0763	0.5455	-0.0052	-0.1466
	(0.9554)	.	(0.0000)	(0.0000)	(0.6186)	(0.0000)
D	0.0243	-0.0763	1.0000	-0.0476	-0.0411	-0.2809
	(0.0202)	(0.0000)	.	(0.0000)	(0.0001)	(0.0000)
LEV	0.2039	0.2237	-0.0528	1.0000	0.1410	0.0888
	(0.0000)	(0.0000)	(0.0000)	.	(0.0000)	(0.0000)
SIZE	0.0009	0.0169	-0.0373	0.1703	1.0000	0.2957
	(0.9333)	(0.1073)	(0.0004)	(0.0000)	.	(0.0000)
MTB	0.0856	-0.0278	-0.2445	0.1251	0.1596	1.0000
	(0.0000)	(0.0078)	(0.0000)	(0.0000)	(0.0000)	.

Notes:

Pearson (Spearman) correlations are below (above) the diagonal.

Continuous variables are trimmed by year at the top and bottom 0.5%.

Pre DER = debt divided by book value of equity before capitalizing operating leases

Post DER = debt divided by book value of equity after capitalizing operating leases

Pre ICR = business income, which sums operating income

and financial income (interest income, discount income, and interest on securities), divided by financial expenses (interest expenses and discount on notes) before capitalizing operating leases

Post ICR = business income, which sums operating income and financial income (interest income, discount income, and interest on securities), divided by financial expenses (interest expenses and discount on notes) after capitalizing operating leases

ΔDER = Pre DER subtracted from Post DER

ΔICR = Pre ICR subtracted from Post ICR

D = an indicator variable that takes the value of 1 if Statement No. 13 is mandatorily adopted, and 0 otherwise

LEV = debt divided by total assets

SIZE = natural log of total assets

MTB = market value of equity divided by book value of equity

p values for correlation coefficients are reported in parentheses.

Table 2 reports the correlation matrix for the variables used in our regression models. The upper-right-hand area of the table reports the Spearman rank-order correlations, and the lower-left-hand area of the table reports the Pearson correlations. In both correlation analyses, D is positively and significantly associated with ΔDER, and negatively and associated with ΔICR. The results suggest that the economic impacts of capitalizing operating leases are more likely to be large after the adoption of Statement No. 13, as predicted.

5. Results

5.1 Main Results

First, this study analyzes the economic impacts of capitalizing operating leases by examining the mean and the quartile differences in the DER and the ICR between pre-capitalization and post-capitalization of operating leases by sector.[9]

In Table 3, Panel A reports the impacts of capitalization of operating leases on the DER for every sector. Column 2 shows that the mean differences in the DER between pre-capitalization and post-capitalization are positive and substantially different from zero. In particular, for the transportation and utilities sector and the consumer goods sector, capitalization of operating leases on average increases the DER by 0.18 and 0.16, respectively. In addition, the quartile differences in the DER between pre-capitalization and post-capitalization are positive and statistically different from zero for every sector and each quartile (columns 3–5). These results document that capitalizing operating leases has substantial impacts on the DER.

Panel B reports the impacts of capitalization of operating leases on the ICR for every sector. Column 2 shows that the mean differences in the ICR between pre-capitalization and post-capitalization are negative and significantly different from zero. In particular, in the consumer goods sector, capitalization of operating leases on average decreases the ICR by 19.5. Furthermore, the first and second quartile differences in the ICR between pre-capitalization and post-

capitalization are negative and statistically different from zero for every sector (columns 3 - 4). Column 5 reports the results of the third quartile differences, which are negative and statistically significant except for the transportation and utilities sector. Overall, these results report that capitalization of operating leases has significant impacts on the ICR.

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[9] In addition, this study investigates the mean and the quartile differences in the DER and the ICR between pre-capitalization and post-capitalization of operating leases by year. Unreported results show that capitalization of operating leases has significant impacts on the DER and the ICR, as predicted.

Table 3. The Mean and the Quartile Differences in Financial Ratios between Pre-capitalization and Post-capitalization of Operating Leases

Panel A. DER

Sector	Mean	Q(0.25)	Q(0.50)	Q(0.75)	N
Technology	0.0311[***]	0.0015[***]	0.0070[***]	0.0238[***]	2,023
	(12.5550)	(12.5541)	(20.5498)	(20.4746)	
Consumer Goods	0.1607[***]	0.0017[***]	0.0146[***]	0.1089[***]	1,935
	(15.8773)	(10.4017)	(8.6534)	(13.9042)	
Materials	0.0312[***]	0.0008[***]	0.0041[***]	0.0200[***]	2,719
	(10.1640)	(17.4416)	(16.1916)	(18.8718)	
Capital Goods	0.0905[***]	0.0013[***]	0.0068[***]	0.0312[***]	2,028
and Others	(8.6496)	(13.2743)	(14.9405)	(16.6905)	
Transportation	0.1828[***]	0.0032[***]	0.0337[***]	0.1649[***]	802
and Utilities	(12.6724)	(5.2790)	(6.6495)	(7.3552)	

Notes:

We redefine sectors based on the Nikkei industrial classification of 36 industries.

ΔDER is trimmed by year at the top and bottom 0.5%.

Pre DER = debt divided by book value of equity before capitalizing operating leases

Post DER = debt divided by book value of equity after capitalizing operating leases

ΔDER = Pre DER subtracted from Post DER

t statistics are reported in parentheses.

[***] Statistically significant at the 0.01 level of significance using a two-tailed t test

[**] Statistically significant at the 0.05 level of significance using a two-tailed t test

[*] Statistically significant at the 0.10 level of significance using a two-tailed t test

Panel B. ICR

Sector	Mean	Q(0.25)	Q(0.50)	Q(0.75)	N
Technology	-6.6056[***]	-0.9572[***]	-0.1341[***]	-0.0046[***]	1,998
	(-8.3035)	(-10.0440)	(-10.3359)	(-4.0588)	
Consumer Goods	-19.4865[***]	-5.3667[***]	-0.5990[***]	-0.0291[***]	1,918
	(-11.1090)	(-9.7184)	(-8.8024)	(-5.3820)	
Materials	-3.9597[***]	-0.4223[***]	-0.0511[***]	-0.0021[***]	2,715
	(-7.6346)	(-12.4682)	(-10.6353)	(-5.7527)	
Capital Goods	-6.6241[***]	-0.7215[***]	-0.0770[***]	-0.0023[***]	2,044
and Others	(-7.8246)	(-8.2992)	(-9.0531)	(-3.5184)	
Transportation	-3.9886[***]	-0.6031[***]	-0.0508[***]	-0.0003	803
and Utilities	(-4.7865)	(-4.7608)	(-3.9285)	(-1.2582)	

Notes:

We redefine sectors based on the Nikkei industrial classification of 36 industries.

ΔICR is trimmed by year at the top and bottom 0.5%.

Pre ICR = business income, which sums operating income and financial income (interest income, discount income, and interest on securities), divided by financial expenses (interest expenses and discount on notes) before capitalizing operating leases

Post ICR = business income, which sums operating income and financial income (interest income, discount income, and interest on securities), divided by financial expenses (interest expenses and discount on notes) after capitalizing operating leases

ΔICR = Pre ICR subtracted from Post ICR

t statistics are reported in parentheses.

[***] Statistically significant at the 0.01 level of significance using a two-tailed t test

[**] Statistically significant at the 0.05 level of significance using a two-tailed t test

[*] Statistically significant at the 0.10 level of significance using a two-tailed t test

Next, this study uses the equations (1) and (2) to examine whether the economic impacts of capitalizing operating leases on key financial ratios are more likely to be large after the adoption of Statement No. 13.

Table 4. Regression Results on the Economic Impacts of Capitalization of Operating Leases

Panel A. DER

$$\Delta DER = \alpha_0 + \alpha_1 D + \alpha_2 LEV + \alpha_3 SIZE + \alpha_4 MTB + Industry\ dummy + \varepsilon$$

	OLS	QR(0.25)	QR(0.50)	QR(0.75)
	Coefficient (t-value)	Coefficient (t-value)	Coefficient (t-value)	Coefficient (t-value)
Constant	-0.0623	-0.0052***	-0.0160***	-0.0124
	(-1.3710)	(-3.7039)	(-4.4441)	(-1.3614)
D	0.0235**	0.0010***	0.0034***	0.0064***
	(2.4793)	(5.9556)	(5.6713)	(3.6007)
LEV	0.2912***	0.0055***	0.0266***	0.0914***
	(5.6501)	(5.8155)	(6.7041)	(9.3512)
SIZE	-0.0012	0.0003***	0.0010***	0.0004
	(-0.2798)	(3.0909)	(3.4506)	(0.4878)
MTB	0.0153**	0.0005***	0.0018**	0.0047***
	(2.4314)	(3.5155)	(2.4969)	(2.6047)
Industry dummy	Yes	Yes	Yes	Yes
N	9,130	9,130	9,130	9,130
R^2	0.134	0.066	0.083	0.113

Notes:

Continuous variables are trimmed by year at the top and bottom 0.5%.

Pre DER = debt divided by book value of equity before capitalizing operating leases

Post DER = debt divided by book value of equity after capitalizing operating leases

ΔDER = Pre DER subtracted from Post DER

D = an indicator variable that takes the value of 1 if Statement No. 13 is mandatorily adopted, and 0 otherwise

LEV = debt divided by total assets

SIZE = natural log of total assets

MTB = market value of equity divided by book value of equity

t statistics are reported in parentheses. Standard errors are clustered by firm.

*** Statistically significant at the 0.01 level of significance using a two-tailed t test

** Statistically significant at the 0.05 level of significance using a two-tailed t test

* Statistically significant at the 0.10 level of significance using a two-tailed t test

Panel B. ICR

$$\Delta ICR = \beta_0 + \beta_1 D + \beta_2 LEV + \beta_3 SIZE + \beta_4 MTB + Industry\ dummy + \mu$$

	OLS	QR(0.25)	QR(0.50)	QR(0.75)
	Coefficient (t-value)	Coefficient (t-value)	Coefficient (t-value)	Coefficient (t-value)
Constant	1.0715	-1.8635***	-0.0504	0.0811***
	(0.1676)	(-3.6788)	(-0.4923)	(3.0759)
D	-6.3495***	-0.4356***	-0.1023***	-0.0122***
	(-4.8818)	(-4.9299)	(-4.7606)	(-2.6551)
LEV	61.4935***	6.8171***	1.6118***	0.3183***
	(9.3859)	(8.0365)	(7.7843)	(9.2305)
SIZE	-1.2168**	-0.0552	-0.0394***	-0.0133***
	(-2.2344)	(-1.4188)	(-4.1859)	(-5.4219)
MTB	-2.2205***	-0.3604***	-0.0821***	-0.0184***
	(-3.0711)	(-5.9603)	(-5.6984)	(-4.6903)
Industry dummy	Yes	Yes	Yes	Yes
N	9,130	9,130	9,130	9,130
R^2	0.084	0.054	0.074	0.073

Notes:

Continuous variables are trimmed by year at the top and bottom 0.5%.

Pre ICR = business income, which sums operating income and financial income (interest income, discount income, and interest on securities), divided by financial expenses (interest expenses and discount on notes) before capitalizing operating leases

Post ICR = business income, which sums operating income and financial income (interest income, discount income, and interest on securities), divided by financial expenses (interest expenses and discount on notes) after capitalizing operating leases

ΔICR = Pre ICR subtracted from Post ICR

D = an indicator variable that takes the value of 1 if Statement No. 13 is mandatorily adopted, and 0 otherwise

LEV = debt divided by total assets

SIZE = natural log of total assets

MTB = market value of equity divided by book value of equity

t statistics are reported in parentheses. Standard errors are clustered by firm.

*** Statistically significant at the 0.01 level of significance using a two-tailed t test

** Statistically significant at the 0.05 level of significance using a two-tailed t test

* Statistically significant at the 0.10 level of significance using a two-tailed t test

In Table 4, Panel A reports the results of regression model (1). For OLS regression, column 2 shows that the coefficient of D, 0.0235, is positive and statistically significant at the 5% level. The result indicates that ΔDER after the adoption of Statement No. 13 is, on average, 0.02 larger than that before the adoption of Statement No. 13 when we control for LEV, SIZE, MTB, and Industry dummy. In addition, for quantile regression, the coefficients of D are consistent with expected sign and statistically significant at the 1% level for each quartile (columns 3–5). These results show that capitalization of operating leases has significantly profound impacts on the DER after the adoption of Statement No. 13.

Panel B shows the results of regression model (2). For OLS regression, the coefficient of D, -6.3495, is negative and statistically significant at the 1% level (column 2). The result reports that ΔICR after the adoption of Statement No. 13 is, on average, 6.35 smaller than that before the adoption of Statement No. 13 when we control for LEV, SIZE, MTB, and Industry dummy. Further, for quantile regression, columns 3–5 report that the coefficients of D are statistically negative at the 1% level for each quartile. These results indicate that capitalization of operating leases has substantially larger impacts on the ICR after the adoption of Statement No. 13.

5.2 Robustness Test

In the previous subsection, this study found that capitalization of operating leases had significant impacts on key financial ratios. These impacts were significantly larger after the adoption of Statement No.

13. This subsection describes the analysis conducted to determine the robustness of our findings.

First, this study changes the assumptions of the present value method. Following Imhoff et al. (1991, 1997), our research assumes $RL/TL = 0.5$ in constructively capitalizing operating leases. In addition to $RL/TL = 0.5$, this study uses $RL/TL = 0.4$ and $RL/TL = 0.6$ and reexamines the economic impacts of capitalization of operating leases. Unreported results show these economic impacts. That is, the differences in financial ratios between pre-capitalization and post-capitalization of operating leases are significantly different form zero, and the impacts of capitalizing operating leases are more likely to be large after the adoption of Statement No. 13.

Second, this study uses a different present value method to capitalize operating leases. This study assumes that the amount of lease payment is constant during the lease term in constructively capitalizing operating leases. However, when firms have multiple lease contracts made at different periods, the amount of lease payment gradually decreases because each contract expires over time. Assuming that the amount of lease payment is constant during the lease term would overestimate the values of OLA and OLO. Ely (1995) proposes another present value method that assumes the amount of lease payment gradually decreases over time. Accordingly, following Ely (1995), this study reinvestigates the economic impacts of capitalization of operating leases. Unreported results show that the mean and the quartile differences in the DER and the ICR between pre-capitalization and post-capitalization of operating leases by sector are significantly different from zero, as predicted.

Table 5. Regression Results on the Economic Impacts of Capitalization of Operating Leases using Ely (1995) Model

Panel A. DER

$$\Delta DER = \alpha_0 + \alpha_1 D + \alpha_2 LEV + \alpha_3 SIZE + \alpha_4 MTB + Industry\ dummy + \varepsilon$$

	OLS	QR(0.25)	QR(0.50)	QR(0.75)
	Coefficient (t-value)	Coefficient (t-value)	Coefficient (t-value)	Coefficient (t-value)
Constant	-0.0376 (-0.7639)	-0.0051[***] (-3.3536)	-0.0140[***] (-3.6743)	-0.0082 (-0.9488)
D	0.0225[**] (2.4865)	0.0011[***] (5.5073)	0.0034[***] (5.0112)	0.0066[***] (3.6418)
LEV	0.3114[***] (4.8893)	0.0065[***] (5.6238)	0.0296[***] (6.8226)	0.0927[***] (9.8275)
SIZE	-0.0039 (-0.8745)	0.0003[**] (2.5663)	0.0009[***] (2.6580)	-0.0000 (-0.0292)
MTB	0.0175[**] (2.3930)	0.0006[***] (3.5674)	0.0018[**] (2.2644)	0.0052[**] (2.5592)
Industry dummy	Yes	Yes	Yes	Yes
N	8,667	8,667	8,667	8,667
R²	0.117	0.054	0.066	0.093

Notes:
Continuous variables are trimmed by year at the top and bottom 0.5%.
Pre DER = debt divided by book value of equity before capitalizing operating leases

Post DER = debt divided by book value of equity after capitalizing operating leases
ΔDER = Pre DER subtracted from Post DER
D = an indicator variable that takes the value of 1 if Statement No. 13 is mandatorily adopted, and 0

otherwise

LEV = debt divided by total assets

SIZE = natural log of total assets

MTB = market value of equity divided by book value of
      equity

t statistics are reported in parentheses. Standard errors are
clustered by firm.

*** Statistically significant at the 0.01 level of significance
    using a two-tailed t test

** Statistically significant at the 0.05 level of significance
    using a two-tailed t test

* Statistically significant at the 0.10 level of significance
    using a two-tailed t test

Panel B. ICR

$$\Delta ICR = \beta_0 + \beta_1 D + \beta_2 LEV + \beta_3 SIZE + \beta_4 MTB + Industry\ dummy + \mu$$

	OLS	QR(0.25)	QR(0.50)	QR(0.75)
	Coefficient (t-value)	Coefficient (t-value)	Coefficient (t-value)	Coefficient (t-value)
Constant	-6.7498	-2.5373***	-0.1895	0.0561
	(-0.8029)	(-3.9493)	(-1.4895)	(1.4105)
D	-6.8303***	-0.4770***	-0.1325***	-0.0275***
	(-4.6356)	(-4.1219)	(-4.8609)	(-3.8345)
LEV	68.3181***	7.9161***	2.0499***	0.4605***
	(9.2909)	(6.7166)	(7.9193)	(8.0355)
SIZE	-1.1134*	-0.0342	-0.0412***	-0.0151***
	(-1.9573)	(-0.7801)	(-3.7624)	(-4.3021)
MTB	-2.6079***	-0.4284***	-0.1002***	-0.0269***
	(-3.2383)	(-4.0649)	(-4.8674)	(-4.7152)
Industry dummy	Yes	Yes	Yes	Yes
N	8,667	8,667	8,667	8,667
R^2	0.078	0.047	0.066	0.069

Notes:

Continuous variables are trimmed by year at the top and
    bottom 0.5%.

Pre ICR = business income, which sums operating income
    and financial income (interest income, discount
    income, and interest on securities), divided by
    financial expenses (interest expenses and discount on
    notes) before capitalizing operating leases

Post ICR = business income, which sums operating income
    and financial income (interest income, discount
    income, and interest on securities), divided by
    financial expenses (interest expenses and discount on
    notes) after capitalizing operating leases

ΔICR = Pre ICR subtracted from Post ICR

D = an indicator variable that takes the value of 1 if

Statement No. 13 is mandatorily adopted, and 0
    otherwise

LEV = debt divided by total assets

SIZE = natural log of total assets

MTB = market value of equity divided by book value of
      equity

t statistics are reported in parentheses. Standard errors are
clustered by firm.

*** Statistically significant at the 0.01 level of significance
    using a two-tailed t test

** Statistically significant at the 0.05 level of significance
    using a two-tailed t test

* Statistically significant at the 0.10 level of significance
    using a two-tailed t test

Table 5 reports that capitalizing operating leases
has larger impacts after the adoption of Statement No.
13. Panel A shows the results for the DER. For both
OLS regression and quantile regression, the
coefficients of D are consistent with the expected
signs and statistically significant. In addition, Panel B
reports the results for the ICR. For OLS regression
and quantile regression, the coefficients of D are
significantly negative at the 1% level. These results
indicate that capitalizing operating leases has larger
impacts on financial ratios after the adoption of
Statement No. 13.

In summary, even after changing the
assumptions of the constructive capitalization method
and using another constructive capitalization method,
the results do not change our main results. These
results confirm the robustness of our findings.

6 Discussion and Concluding Remarks

This study investigated the economic impacts of
capitalization of operating leases in Japan. Our
research specifically examined whether capitalization

of operating leases had significant effects on financial
ratios. This study provided some useful evidence, as
follows.

First, this study investigated whether
capitalization of operating leases had significant
impacts on financial ratios, including the DER and the
ICR. Our findings showed that the mean and the
quartile differences in the DER between pre-
capitalization and post-capitalization were positive
and significantly different from zero, and the
differences in the ICR between pre-capitalization and
post-capitalization were negative and substantially
different from zero. These results showed the ex-ante
negative impacts of capitalization of operating leases.

Next, this study examined whether the impacts of
capitalizing operating leases on financial ratios were
more likely to be large after the adoption of Statement
No. 13. Since almost all Japanese firms adopted the
exceptional treatment that allowed them not to
recognize finance leases, they did not often use
operating leases before the adoption of Statement No.
13. After the adoption of Statement No. 13, Japanese
firms must recognize finance leases on their balance

sheet, and thus they are more likely to use operating leases. This study found that the impacts of capitalizing operating leases on key financial ratios were significantly larger after the adoption of Statement No. 13.

This study shows that capitalization of operating leases has significant effects on financial ratios. These results provide useful implications for the discussion of global convergence of accounting standards. Our results show that capitalization of operating leases has significant effects on debt contracts. Since firms include reported accounting numbers in debt contracts (e.g., Watts and Zimmerman, 1986; Armstrong et al., 2001; Shivakumar, 2013; Taylor, 2013), capitalization of operating leases has significant impacts on accounting numbers and financial ratios, thereby affecting debt contracts. El-Gazzar (1993) shows that capitalization of finance leases has caused significant increases in the tightness of debt covenant restrictions. It would be possible to extrapolate this result to capitalization of operating leases. In fact, Beattie et al. (2006) show that companies raise concerns about the renegotiation of debt covenants if capitalization of operating leases is implemented. Although the IASB and the FASB suggest that their proposal would not affect the provisions of debt contracts (IASB, 2013, par. BC374), our results suggest that capitalization of operating leases has significant effects on debt contracts.

On the other hand, our results would be consistent with the new lease model that requires lessees to recognize operating leases on their balance sheet. The IASB and the FASB assume that operating leases are very similar to finance leases from an economic perspective. Both accounting standard setters criticize the current accounting standards because they report economically similar lease transactions very differently, thereby reducing comparability and failing to meet the needs of investors and analysts (IASB, 2015). As shown in this study, it is possible to capitalize operating leases using the information disclosed in the notes to the financial statement. However, this would be insufficient for users to make reliable adjustments to lessees' financial statements (IASB, 2009, 2010, 2013). For example, Bratten et al. (2013) report the associations between the costs of debt and equity and recognized finance lease obligations versus disclosed operating lease obligations are different only when disclosures on operating leases are less reliable. Under the assumption of economic similarity between the two types of leases, it would be expected that capitalizing operating leases would increase comparability and improve the decision usefulness of accounting information.

Despite the useful insights with regard to capitalization of operating leases, this study has several limitations. This study investigated the impacts of capitalizing operating leases on key financial ratios. It would be necessary to investigate contract terms including debt covenants to directly analyze the impacts of capitalizing operating leases. Furthermore, our research does not investigate whether operating leases are economically similar to finance leases. It would be necessary to examine whether operating leases are very similar to finance leases from an economic perspective to determine whether capitalizing operating leases improves the decision usefulness of accounting information. Although there are several limitations, this study makes significant contributions to the literature on the economic consequences of capitalizing leases and discussions of the global convergence of accounting standards.

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