Article

The Effects of New Accounting Standards on Firm Value: The K-IFRS 1116 Lease

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Abstract: We examine how the implementation of the K-IFRS No.1116 Lease affects firm value. This new accounting standard mandates capitalization of all leases, resulting in changes in the key accounting leverage ratios and rates of return. The contracting costs hypothesis suggests that changes in accounting techniques have economic consequences because lending contracts are expressed in terms of accounting numbers. We find that capitalizing operating leases, which were off-balance-sheet transactions prior to K-1116 implementation, increases the lease liabilities-to-assets ratio and lease liabilities-to-debt ratio significantly. While a firm's business fundamentals do not change with the K-1116, we show that the value of firms that use high levels of operating leases decreased with the implementation of K-1116. The declines in firm value are significant for the subgroups of firms that are likely to raise external financing, suggesting that the implementation of K-1116 increased the level of financing frictions and decreased the value of future investment opportunities.

1. Introduction

In January 2016, the International Accounting Standards Board (IASB) issued a new accounting standard for leases, IFRS 16 Lease. Accordingly, K-IFRS No. 1116 Lease (K-1116, hereafter) was published in 2017 by the Korean Accounting Standards Board (KASB) and was implemented beginning in 2019. Prior to K-1116, the lease accounting standard classified leases into finance leases and operating leases. Finance leases are purchases of assets in the sense that the lessee has both the risks and the benefits of the ownership of the assets and recognizes the leased assets and related liabilities on its balance sheet. In contrast, the lessor of an operating lease retains the risks and benefits of owning the asset, and the lessee of an operating lease does not recognize assets or liabilities on its balance sheet but expenses operating lease payments on its income statement. Although operating lease transactions are off the balance sheet, they are disclosed in the notes of financial statements.

The lease accounting standard that treats differently finance leases and operating leases raises concerns since it could result in different accounting-based returns and financial positions for economically similar transactions, especially when the classification of a lease as a finance lease or an operating lease could be subjective in practice. Therefore, IFRS 16 and K-1116 were introduced to increase the comparability of firms that use different types of leases. Regardless of the type of lease, K-1116 mandates that the lessee recognize the right-of-use asset, which represents its right to use the underlying asset, and an associated lease liability, which represents its lease payments obligations. K-1116 applies to all leases with a lease term of more than 12 months if the underlying asset does not have low value. Operating lease payments, formerly expensed on income statements, are now recognized as depreciation and interest expenses on the income statement. These changes in the lease accounting model do not alter the business operations of firms, but they do change the

figures on the financial statements, which affects companies' accounting-based performance and capital structure.

Previous studies document the effect of lease capitalization on the accounting value and key accounting ratios (Imhoff and Thomas 1988; Cornaggia et al. 2013; Morales-Díaz and Zamora-Ramírez 2018; Caskey and Ozel 2019; Choi and Kim 2020). According to these studies, K-1116 is expected to increase the amount of leverage while it decreases the current ratios of firms that have operating leases as these firms start to recognize the assets and liabilities related to their operating leases on their balance sheets. Because of their increase in assets, these firms' ROAs and ROICs decrease. On the other hand, some operating performance measures, such as operating profit and EBITDA, improve because operating lease payments are recognized as financial expenses rather than operating expenses. Likewise, operating cash flow increases while financing activity cash flow decreases in the statement of cash flow.

This study examines the effect on firm value of these changes in lease accounting standards. These changes do not change the fundamentals of companies' operations, but they do change the figures on their financial statements. The contracting costs hypothesis argues that such changes in accounting techniques have economic consequences because firms' lending and compensation contracts are stated in terms of accounting numbers. The application of K-1116 worsens the financial soundness indicators, such as accounting leverage ratio and current ratios, of firms that have operating leases, increasing the possibility of covenant violation for these firms. Because the costs of technical violation are material, we expect that K-1116 has had a negative effect on firms' expected cash flows and firm value. Moreover, when firms try to avoid technical violations by offsetting K-1116's effect on leverage, their debt financing activities become restricted, making these firms more likely to bypass valuable investment opportunities or finance them at a higher cost.

We find that the lease-to-assets ratio and lease-to-debt ratio significantly increased with the application of K-1116 lease. The firm value of firms that experienced increases in lease liabilities after applying K-1116 decreased compared to the value of firms in the control group. Among the firms that experienced increased lease liabilities, those that were more likely to raise external capital and to have high growth potential realized significant declines in firm value, while firms that were less likely to raise funds did not suffer from such declines. The evidence shows that the market reflects the effect of K-1116 on firms' value prior to its actual application, as the value of the affected firms during the period after K-1116's application is significantly lower than it was before publication of its enactment exposure draft, but not significantly lower than it was during the period between the publication of K-1116's enactment exposure draft and its application.

Section 2 provides a literature review on firms' choice to use leases and the impact of their lease capitalization. Section 3 explains the research hypothesis and model. Section 4 documents the results of the empirical analysis. Section 5 discusses the implications and limitation of the results, and Section 6 concludes.

2. Literature Review

Studies on leasing show that leases and debt can have a substitute and/or a complementary relationship. Ang and Peterson (1984) provide empirical evidence that leases and debt have a complementary relationship that use of lease is positively associated with use of debt. Rampini and Viswanathan (2013) develop a model of investment, capital structure, leasing, and risk management and show that using a lease allows a firm to increase its leverage. Schallheim et al. (2013) analyze sale-and-lease-back (SLB) transactions by dividing their samples into two subsets based on whether leases and debt have a complementary or substitute relationship. They find that the relationship between leasing behavior and firm size, marginal tax rate, and Z-score differ depending on the relationship between lease and debt.

Firms choose to use leases for several reasons. Eisfeldt and Rampini (2009) argue that leasing has the advantage of easier repossession of assets than debt does, although it

has higher agency costs because of the separation of ownership and control of the leased asset. They provide evidence that financially constrained firms rely more on leases than unconstrained firms do. Sharpe and Nguyen (1995) show that because leasing has lower financial contacting costs than debt, financially constrained firms are more likely than unconstrained firms are to use leases to reduce financial contracting costs. Caskey and Ozel (2019) examine the use of operating leases and find that non-reporting incentives that are due to bankruptcy and tax laws are key drivers of the choice to use operating lease.

Accounting techniques that can be applied to lease transactions differ: Leases are either capitalized and recognized on the balance sheet or disclosed off the balance sheet. In their review of research questions regarding the economic consequences of accounting choices, Holthausen and Leftwich (1983) argue that the contracting costs hypothesis predict that changes in accounting techniques have economic consequences because such changes alter the distribution of firms' expected cash flows and various parties' claims to those cash flows. For example, lending contracts are based on accounting numbers and impose restrictions on corporate activities. Several studies investigate the economic consequences of changes in lease accounting techniques. Statement of Financial Accounting Standard (SFAS) No. 13 mandates the capitalization of finance leases when operating leases are disclosed off the balance sheet. Imhoff and Thomas (1988) examine how firms offset the changes in key accounting ratios that result from SFAS No. 13. Based on contracting costs arguments, they hypothesize that the cost of using finance leases increases with the change in accounting technique and that firms change their capital structure to offset that effect. They provide empirical evidence consistent with their hypothesis. El-Gazzar (1993) investigated the stock market's reaction to firms' capitalizing finance leases because of SFAS No. 13 and found that SFAS No. 13 tightened covenant restrictions and was associated with negative stock market reactions to lessees on SFAS No. 13 event dates.

The literature on the effect of IFRS 16, which mandates capitalization of all leases, is also growing. Cornaggia et al. (2013) show that, as off-balance-sheet (OBS) operating leases are used more widely, conventional risk and performance measures such as leverage, Z-scores, levered beta, return on capital, and asset utilization measures mislead investors regarding the risk and performance of firms that use operating leases heavily. Morales-Díaz and Zamora-Ramírez (2018) find that IFRS 16 significantly affects the leverage ratios of the sectors that rely heavily on operating leases, such as European retail, hotels, and transportation firms. On the other hand, their analysis on IFRS 16's effect on profitability ratios shows mixed results. While these studies report a significant effect of lease capitalization on accounting ratios, Paik et al. (2015) argue that changes in leverage ratios that are due to operating lease capitalization may have limited effects on covenant violation since creditors ex ante take the use of OBS leases into account when they determine the terms of covenant contracts. Their analysis of covenant contracts shows that industries that use OBS leases heavily are likely to use income-statement-based covenants instead of balance-sheet-based contracts. Our findings contradict their conclusion. We report that operating lease capitalization is negatively associated with the value of firms that rely heavily on operating leases.

A related line of the literature examines whether the market perceives information that is disclosed off the balance sheet differently from how it perceives information recognized on the balance sheet. Cotten et al. (2013) compare actual ratings and synthetic ratings to examine whether credit ratings incorporate OBS operating leases, concluding that credit ratings account for OBS operating leases. Bratten et al. (2013) find that the cost of debt and equity have similar associations with as-if recognized operating leases and recognized capital leases if OBS lease information is reliable. Giner and Pardo (2018) use Spanish-listed firms to find that the market incorporates OBS operating lease information into price as if OBS operating lease is recognized in assets and liabilities, even in code-law countries with less developed markets and weak enforcement. Altamuro et al. (2014) document that banks and credit rating agencies reflect OBS leases in their credit assessments; they find that rating agencies tend to capitalize all leases mechanically and that for retail industry, banks

incorporate economic differences between operating leases and finance leases. They suggest that IFRS 16 should provide information on the economic differences of the different types of leases.

In sum, empirical evidence shows that the market, in general, is largely indifferent to lease information disclosed off the balance sheet and information that is recognized on the balance sheet. This suggests that the market will not realize "new" information regarding the cash flow of lease transactions from operating lease capitalization. However, this does not rule out the contracting costs hypothesis that changes in accounting techniques have economic consequences if debt contracts are based on accounting numbers.

Previous studies on Korean firms find that firms with high leverage ratios are more likely to use leases than are those with low leverage ratios, and if operating leases are disclosed off the balance sheet, financially constrained firms are more likely to use operating leases than are those that are not financially constrained (Yi 2001; Shawn and Lee 2015; Shin 2015). As K-1116 mandates operating lease capitalization, accounting leverage ratios and return measures worsened (Choi and Kim 2020; Kim and Choi 2021), but these changes did not alter firms' credit ratings (Kim and Choi 2021). Consistent with the contracting costs hypothesis, studies report that managers attempt to offset K-1116's effect on their balance sheets (Choi and Kim 2020) and on earnings (Choi et al. 2022).

3. Hypothesis and Model

3.1. Hypothesis Development

Firms have a choice between using debt and using a lease, and if they choose to use a lease, they have a choice between using an operating lease and using a finance lease. Prior to OBS operating lease capitalization, previous studies suggest that one reason for a firm to choose an operating lease over a finance lease is to ease financial constraints if debt contracts are based on accounting numbers (Holthausen and Leftwich 1983; Imhoff and Thomas 1988). Since debt contracts are frequently expressed in terms of accounting numbers, firms use OBS operating leases to secure debt capacity and reduce the possibility of covenant violation. With the application of K-1116, firms can no longer enjoy the OBS feature of operating leases, as operating leases are recognized as lease liabilities on the books, and the leverage ratio increases accordingly even if the firm's business is the same as before. As a result, the possibility of covenant violation increases when K-1116 is applied. Studies show that the costs of covenant violation are material, and technical violations impose restrictions on such firm activities as paying dividends, issuing new debt, consummating mergers, and disposing of assets in place (Beneish and Press 1993; Chava and Roberts 2008; Dichev and Skinner 2002; Smith 1993). Managerial endeavors such as renegotiating the terms of debt covenants to offset the effects of K-1116 on the leverage ratio and accounting rates of return involve costs. Therefore, the expected cash flows and firm value of firms that use operating leases heavily decrease after the application of K-1116, and we derive the following hypothesis (H1):

Hypothesis 1 (H1). *The application of K-1116 has a negative effect on the firm value of firms that have high operating leases-to-assets ratios.*

While applying K-1116 affects both the value of existing assets and the growth opportunities of firms that use operating leases heavily, we suggest that most of the decline in firm value is due to the decline in the value of growth opportunities. Technical violations have relatively little impact on existing assets but distort future investments because debt covenants often impose restrictions on firms' future financing or investment activities to prevent wealth transfers from debtholders to shareholders. Furthermore, Cohen et al. (2019) show that financially healthy firms limit their use of debt and investment to avoid breach of covenant even before they violate covenants. We expect that firms further restricted their use of debt as debt covenant slack reduces with the application of K-1116. Therefore, firms that use operating leases heavily are more likely to bypass valuable future growth

opportunities or to finance them at a higher cost when K-1116 is implemented, which results in a decrease in the value of growth opportunities. In sum, we expect that firms that use operating leases heavily and need external financing for their growth opportunities suffered from substantial decreases in firm value when K-1116 was implemented. Therefore, we derive the following hypothesis (H1-1):

Hypothesis 1-1 (H1-1). *Applying K-1116 has a negative impact on firm value if a firm that has a high operating lease-to-assets ratio needs external financing to pursue its growth opportunities.*

3.2. Data

We use data from FnGuide for non-financial firms listed on KOSPI and KOSDAQ whose fiscal years end in December. The enactment exposure draft of K-1116 ("K-1116 draft" hereafter) was published in December 2016, while K-1116 was issued in 2017 and became effective in 2019. After the publication of the K-1116 draft, managers could respond to the expected changes, and the market could predict the amendment's effect and reflect it on price even before its application in 2019. Accordingly, we divide our sample periods into three phases to analyze the effect of K-1116 on firm value: 2013–2015, the period prior to publication of the K-1116 draft; 2016–2018, the period between publication of the K-1116 draft and the application of K-1116; and 2019–2020, the period after K-1116 became effective. (These periods are referred to by their dates hereafter.). The pre-treatment periods are 2013–2015 and 2016–2018, and the post-treatment period is 2019–2020. Since the market could start reflecting the effect of applying K-1116 after the publication of the K-1116 draft, we compare the 2013–2015 pre-treatment period with the 2019–2020 post-treatment period in our main analysis. Under the assumption that the market and managers did not respond to the effect of applying K-1116 in advance, we compare the 2016–2018 pre-treatment period with the 2019–2020 post-treatment period as our sub-analysis. The variables are winsorized at the 1% level to mitigate the effect of outliers at both ends.

3.3. Model

We apply the difference-in-differences (DID) approach to analyze (H1) and use the following OLS (ordinary least squares) regressions to examine the effect of applying K-1116:

$$
\begin{aligned}
Tobin's\ q_{i,t} = \beta_0 \quad &+\beta_1 HighLease_i \times NewStandard_t + \beta_2 NewStandard_t \\
&+\beta_3 HighLease_i + \beta_4 Size_{i,t-1} + \beta_5 SalesGrowth_{i,t-1} \\
&+\beta_6 Leverage_{i,t-1} + \beta_7 ROA_{i,t-1} + \beta_8 Tangibility_{i,t-1} + \beta_9 R\&D_{i,t-1} \\
&+\beta_{10} Foreign_{i,t-1} + \beta_{11} Owner_{i,t-1} + \sum_j Industry\ dummies_{i,j} + \varepsilon_{i,t}
\end{aligned}
\tag{1}
$$

The model's dependent variable, *Tobin's q*, which we use as a proxy for firm value, is calculated as the sum of the market value of equity and the book value of liabilities, divided by the book value of assets. The model's main explanatory variable, *HighLease × NewStandard*, is an interaction variable between the *HighLease* dummy and the *NewStandard* dummy. The application of K-1116 had a particularly substantial impact on companies that owned a high proportion of operating leases, so *HighLease × NewStandard* measures how the firm values of these companies changed compared to the firm values before K-1116. *HighLease* is a dummy variable that takes the value of 1 for firms in the top 25 percentiles of the distribution of the difference between their 2019 lease liabilities and their 2018 lease liabilities relative to 2018 total assets, and 0 otherwise. Companies that had a large proportion of operating leases before K-1116 experienced large increases in lease liabilities in 2019, as operating leases that existed off the balance sheet until the end of 2018 were recognized as finance leases in 2019. Therefore, *HighLease* is a variable that proxies for firms that were substantially affected by the application of K-1116. *HighLease* controls for the differences in firm value between these firms and the other firms, if any, regardless of K-1116. *NewStandard* is a dummy variable that takes the value of 1 in the 2019–2020 period and 0 in all other years. *NewStandard* controls the effect of any structural change in firm value after 2019 compared to before 2019.

The following variables and industry dummies which potentially affect firm value are also controlled in the model:

Size: ln(Total assets). Total assets adjusted for inflation using the 2015 GDP deflator

SalesGrowth: (Sales in year t – Sales in year $t-1$)/(Sales in year $t-1$), in percent.

Leverage: Total liabilities/Total assets

ROA: Net income/Total assets

Tangibility: Fixed assets/Total assets

R&D: R&D expenses/Sales

Foreign: Percent of foreign ownership

Owner: Percent of large shareholders' ownership (the sum of the stakes of the largest shareholder and related parties)

To test hypothesis (H1-1), which proposes a relationship between external financing needs and the effect on firm value of applying K-1116, we need a proxy for the firm's external financing needs. We use the external financing needs (EFN) measure that Demirgüç-Kunt and Maksimovic (1998) and Durnev and Kim (2005) use: the difference between a firm's actual growth rate and its sustainable growth rate. A firm's actual growth rate is measured as its assets' annual growth rate, and its sustainable growth rate is defined as the maximum growth rate that it could achieve without raising equity capital while retaining all its earnings, not paying dividends, and using debt to maintain a constant debt ratio. Under this assumption, the sustainable growth rate is calculated as $ROE/(1-ROE)$, where ROE is net income divided by the book value of equity. If a firm's actual growth rate is greater than its sustainable growth rate, it needs additional external financing to achieve a high actual growth rate, and EFN is positive. Conversely, if its actual growth rate is smaller than its sustainable growth rate, such additional external financing is not required, and EFN has a negative value. The dummy variable *EFN dummy* is defined as having a value of 1 when EFN has a positive value and 0 otherwise. In addition, the dummy variable *HighEFN* is defined as having a value of 1 for the firms in the top 25 percentiles of the annual EFN distribution and 0, otherwise.

Firms need external financing for their growth opportunities. The market-value-to-book ratio (M/B) is a proxy variable for growth opportunities and is calculated as the market value of equity divided by the book value of equity. A dummy variable *HighM/B* takes a value of 1 for the firms in the top 25 percentiles of the annual M/B distribution and 0 otherwise. The dummy variable *LowM/B* takes a value of 1 for the companies in the bottom 25 percentiles of the annual M/B distribution and 0 otherwise.

We investigate (H1-1) by constructing subgroups based on the dummy variables *EFN dummy* and *HighEFN*. We also compare the subgroup with *HighM/B*=1 and the subgroup with *LowM/B* =1 to examine whether the effects of K-1116 on firm value differ across subgroups.

4. Results of the Empirical Analysis

4.1. Operating Lease, Leverage Ratio, and K-1116 Application

Table 1 reports the average lease liabilities-to-assets ratios, total liabilities-to-assets ratios (debt-to-assets ratios hereafter), and lease liabilities-to-total liabilities ratios from 2013 to 2020. Before 2019, the average lease liabilities-to-assets ratio was 0.15 percent or less of assets, but after 2019, the average ratio rose to 1.35 percent of assets, which is a statistically significant increase compared to the previous period. The sample firms' average debt-to-assets ratio was about 40 percent, and there was no significant difference in the debt-to-assets ratio before and after 2019. However, in terms of the composition of liabilities, the average ratio of lease liabilities to total liabilities increased significantly from 0.2 percent before 2019 to 3.2 percent after 2019.

Table 1. The average lease liabilities-to-assets ratios (Lease/Assets), total liabilities-to-assets ratios (Debt/Assets), and lease liabilities-to-total liabilities (Lease/Debt) by year. *** denote statistical significance at the 1% level.

Year	Lease/Assets	Debt/Assets	Lease/Debt
2013	0.15%	44.79%	0.22%
2014	0.13%	43.85%	0.20%
2015	0.13%	42.15%	0.21%
2016	0.12%	41.35%	0.20%
2017	0.12%	41.35%	0.19%
2018	0.10%	41.79%	0.17%
2019	1.36%	42.38%	3.17%
2020	1.35%	41.44%	3.21%
t-test (2013–2018 vs. 2019–2020)	1.23% ***	−0.56%	3.00% ***

Table 2's documentation of the changes in the lease liabilities-to-assets ratio and debt-to-assets ratio by industry in our sample before and after 2019 shows that the effect of applying K-1116 on lease liabilities varied by industry. In the transportation and storage and accommodation and food service activities industries, the lease liabilities-to-assets ratios increased by more than 10 percentage points in 2019, but in industries such as manufacturing and construction, the increase in the ratio was less than 1 percentage point. The transportation and storage industry, to which typical users of operating leases, such as airline companies, belong, experience about an 8 percentage point increase in the lease liabilities-to-assets ratio as the ratio increased from 4.17 percent to 12.08 percent, while the debt-to-assets ratio increases from 54.79 percent to 61.78 percent. In this case, we observed that an increase in the lease-to-assets ratio led directly to a substantial increase in the debt-to-assets ratio. Like the transportation and storage industry, the accommodation and food service activities industry's lease-to-assets ratio and debt-to-assets ratio increased by 6–7 percentage points after 2019.

Table 2. Changes in the average lease liabilities-to-assets ratios (Lease/Assets) and total liabilities-to-assets ratios (Debt/Assets) by industry before and after K-1116 application.

	Industry	Lease/Assets			Debt/Assets	
		2018	2019 (Lease/ 2018 Assets)	2019 (Lease/ 2019 Assets)	2018	2019
A	Agriculture, forestry, and fishing	0.00%	1.18%	1.08%	39.57%	41.23%
B	Mining and quarrying	0.00%	0.08%	0.15%	45.55%	24.55%
C	Manufacturing	0.03%	0.78%	0.69%	41.73%	42.01%
D	Electricity, gas, steam, and air conditioning supply	0.41%	1.65%	1.55%	58.24%	59.13%
E	Water supply; sewage, waste management, materials recovery	0.00%	0.27%	0.19%	40.06%	40.08%
F	Construction	0.00%	1.00%	0.96%	52.26%	52.33%
G	Wholesale and retail trade	0.03%	2.84%	2.32%	42.72%	45.67%
H	Transportation and storage	4.17%	18.56%	12.08%	54.79%	61.78%
I	Accommodation and food service activities	0.00%	11.33%	7.29%	53.83%	59.77%
J	Information and communication	0.03%	2.89%	2.12%	36.84%	37.14%
L	Real estate activities	0.00%	0.77%	0.83%	66.92%	53.35%
M	Professional, scientific, and technical activities	0.11%	1.32%	1.23%	40.70%	40.18%
N	Business facilities management and business support services; rental and leasing activities	0.33%	6.31%	4.89%	47.42%	50.64%
P	Education	0.00%	6.27%	4.57%	40.60%	49.22%
R	Arts, sports, and recreation related services	0.00%	3.10%	2.83%	26.30%	29.55%
S	Membership organizations, repair, and other personal services	0.00%	0.69%	0.57%	54.28%	62.27%
	Average	0.10%	1.62%	1.29%	41.79%	42.38%

Table 3 shows the distribution of firms that were most affected by the application of K-1116 by industry. In firms that had a large proportion of operating leases that were subject to K-1116, lease liabilities increased significantly in 2019 as K-1116 was applied.

Table 3 reports the number of firms for which *HighLease* = 1, the number of total firms, and the proportion of *HighLease* = 1 firms by industry in 2019. The firms with heavy use of operating leases comprised more than 30 percent of the major industries (those to which more than 100 firms belonged), with the exception of manufacturing. Those industries include the information and communication industry, wholesale and retail trade industry, and professional, scientific and technical activities industry. In the manufacturing industry, where more than 1300 companies are distributed, the proportion of firms with heavy use of operating leases is as low as 16 percent. On the other hand, in the transportation and storage and education industries, firms with heavy use of operating leases account for more than 80 percent of the firms in the industry.

Table 3. Distribution of firms relied heavily on operating leases (*HighLease* = 1) by industry in 2019. *HighLease* is a dummy variable that takes the value of 1 for firms in top 25 percentiles of the distribution of the difference between their 2019 lease liabilities and their 2018 lease liabilities relative to 2018 total assets, and 0 otherwise.

	Industry	*HighLease*=1	*N*	Proportion
A	Agriculture, forestry, and fishing	3	5	60.00%
B	Mining and quarrying	0	2	0.00%
C	Manufacturing	223	1329	16.78%
D	Electricity, gas, steam, and air conditioning supply	8	12	66.67%
E	Water supply; sewage, waste management, materials recovery	0	6	0.00%
F	Construction	10	53	18.87%
G	Wholesale and retail trade	59	156	37.82%
H	Transportation and storage	26	30	86.67%
I	Accommodation and food service activities	3	5	60.00%
J	Information and communication	88	236	37.29%
L	Real estate activities	1	3	33.33%
M	Professional, scientific, and technical activities	40	130	30.77%
N	Business facilities management and business support services; rental and leasing activities	7	16	43.75%
P	Education	10	12	83.33%
R	Arts, sports, and recreation related services	5	9	55.56%
S	Membership organizations, repair, and other personal services	0	1	0.00%
	Total	483	2005	24.09%

4.2. The Effect of K-1116 Application on Firm Value

Table 4 reports the summary statistics. The average of the dependent variable *Tobin's q* is greater than 1 (1.425), indicating that on average, the market value of a firm is greater than the replacement cost of its assets. The averages of the firm size, leverage, tangibility, and large shareholder's ownership variables are close to their medians. The average ROA is −0.002, but the median is greater than 0.020; the average R&D is 0.026, while the median is lower (0.003); and the average foreign ownership is 6.922 percent, but the median is 2.549 percent. Sales growth has mean of 6.828 percent, median of 2.591 percent, and a large standard deviation of 34.517 percent.

Table 4. Summary statistics ($N = 13,048$).

Variables	Mean	Median	Stdev.	Min	Max
Tobin's q	1.425	1.075	1.099	0.448	7.828
Size	23.861	23.581	1.474	21.107	28.728
SalesGrowth	6.828	2.591	34.517	−65.092	207.835
Leverage	0.427	0.427	0.206	0.052	0.909
ROA	−0.002	0.020	0.115	−0.564	0.221
Tangibility	0.303	0.291	0.190	0.003	0.777
R&D	0.026	0.003	0.066	0.000	0.569
Foreign	6.922	2.549	10.396	0.000	52.946
Owner	39.312	38.700	16.735	6.360	78.920

Next, we use the DID approach to examine (H1), the effect of K-1116's application on firm value. Table 5 documents model (1)'s estimation results. Although the K-1116 draft was published in 2016, it was not applied until 2019, giving firms time to prepare for its application and the market time to reflect its effect on firm value. Thus, columns (1) and (2) analyze the effect of operating lease capitalization on firm value, measured by *Tobin′s q*, comparing the 2013–2015 period and the 2019–2020 period. The coefficients of the variable of our interest, *HighLease × NewStandard*, are negative and significant, suggesting that the firm values of firms that relied heavily on operating leases decreased significantly after 2019, as expected. Table 5 also shows the results comparing the 2016–2018 period and the 2019–2020 period (columns (3) and (4)). We find that the firm value of firms that used operating leases heavily decreased, but the magnitude of decrease was less than the decrease between the 2013–2015 period and the 2019–2020 period observed in columns (1) and (2). The decrease is not statistically significant in the analysis without controls in column (3) but is significant at the 10% level in column (4) when we control for other variables. Our results suggest that the decline in firm value because of the application of K-1116 had already started after the publication of the K-1116 draft when the market began to predict the effect of applying K-1116 and reflect it in firms' market value. We also find that the variables *NewStandard* and *HighLease* are positive and significant in all analyses, suggesting that firm value after 2019 was significantly higher than it was before 2019 and that the firm value of firms that used operating leases heavily was significantly higher than that of other firms.

Table 5. The effect of K-IFRS 1116 on firm value. This table documents the effect of K-IFRS 1116 on firm value. The dependent variable is *Tobin′s q*. Standard errors are clustered at the firm level and are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Variables	2013–2015 vs. 2019–2020		2016–2018 vs. 2019–2020	
	(1)	(2)	(3)	(4)
HighLease × NewStandard	−0.119 **	−0.145 **	−0.021	−0.069 *
	(0.055)	(0.056)	(0.042)	(0.041)
NewStandard	0.192 ***	0.145 ***	0.067***	0.053 **
	(0.027)	(0.026)	(0.021)	(0.021)
HighLease	0.182 ***	0.247 ***	0.104*	0.196 ***
	(0.039)	(0.054)	(0.063)	(0.053)
$Size_{t-1}$		−0.184 ***		−0.198 ***
		(0.015)		(0.018)
$SalesGrowth_{t-1}$		0.003 ***		0.003 ***
		(0.000)		(0.000)
$Leverage_{t-1}$		0.109		0.066
		(0.093)		(0.112)
ROA_{t-1}		−0.321		−0.417 **
		(0.200)		(0.212)
$Tangibility_{t-1}$		−0.257 ***		−0.308 ***
		(0.086)		(0.091)
$R\&D_{t-1}$		5.014 ***		5.868 ***
		(0.427)		(0.453)
$Foreign_{t-1}$		0.013 ***		0.011 ***
		(0.002)		(0.003)
$Owner_{t-1}$		−0.006 ***		−0.004 ***
		(0.001)		(0.001)
Constant	3.350 ***	7.661 ***	3.155 ***	7.969 ***
	(0.476)	(0.313)	(0.009)	(0.372)
Industry FE	Yes	Yes	Yes	Yes
Observations	8067	8067	8738	8738
R-squared	0.037	0.242	0.023	0.281

4.3. Subsample Analysis: External Financing Needs and Growth Opportunity

Tables 6 and 7 investigate whether the effect of K-1116 on firm value differs with firms' external financing needs and growth opportunities. In Table 6, we proxy firms'

external financing needs with the EFN measure Demirgüç-Kunt and Maksimovic (1998) use. We categorize firms by their external financing needs based on the dummy variables *EFN dummy* and *HighEFN*, and analyze model (1) in terms of three subgroups: firms in the top 25 percentiles of annual EFN distribution ($HighEFN = 1$), firms with positive EFN ($EFN\ dummy = 1$), and firms with negative EFN ($EFN\ dummy = 0$). We compare the 2013–2015 period with the 2019–2020 period in columns (1)–(3) of Table 6. In the subgroup with largest EFN and positive EFN, firms that used operating leases heavily showed significant decreases in firm value after 2019, as expected. On the other hand, the coefficient on $HighLease \times NewStandard$ for the subgroup with negative EFN is positive but not statistically significant. We see similar results in the analysis that compares the 2016–2018 period with the 2019–2020 period in columns (4)–(6) and find that the firm values of the firms that use operating leases heavily significantly decreased after 2019 in the subgroups with the largest EFN (10% significance) and those with positive EFN (5% significance). However, in the subgroup of firms with negative EFN, the firm value of the firms that used operating leases heavily increased significantly at the 5% level. As in the result shown in Table 4, if firms needed external financing, the decline in firm value of firms that used operating leases heavily was larger between the 2013–2015 period and the 2019–2020 period than it was between the 2016–2018 period and the 2019–2020 period. We also find that the coefficients on *NewStandard* and *HighLease* are positive and statistically significant, except for the subsample analysis of firms with negative EFN comparing the 2016–2018 period and the 2019–2020 period in column (6).

Table 6. External financing needs (EFN) and the effect of K-IFRS 1116 on firm value. This table documents the effect of K-IFRS 1116 on firm value for the subsamples categorized by the EFN. The dependent variable is $Tobin's\ q$. Standard errors are clustered at the firm level and are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Variables	2013–2015 vs. 2019–2020			2016–2018 vs. 2019–2020		
	(1)	(2)	(3)	(4)	(5)	(6)
	HighEFN=1	*EFN Dummy*=1	*EFN Dummy*=0	*HighEFN*=1	*EFN Dummy*=1	*EFN Dummy*=0
$HighLease \times NewStandard$	−0.300 **	−0.248 ***	0.081	−0.213 *	−0.215 ***	0.213 **
	(0.127)	(0.070)	(0.097)	(0.112)	(0.057)	(0.088)
NewStandard	0.257 ***	0.152 ***	0.137 ***	0.222 ***	0.130 ***	−0.036
	(0.073)	(0.033)	(0.035)	(0.065)	(0.029)	(0.042)
HighLease	0.285 ***	0.252 ***	0.213 ***	0.211 **	0.233 ***	0.108
	(0.110)	(0.067)	(0.068)	(0.102)	(0.069)	(0.084)
$Size_{t-1}$	−0.238 ***	−0.194 ***	−0.161 ***	−0.256 ***	−0.205 ***	−0.157 ***
	(0.034)	(0.018)	(0.018)	(0.037)	(0.023)	(0.024)
$SalesGrowth_{t-1}$	0.005 ***	0.004 ***	0.003 ***	0.003 ***	0.003 ***	0.002 ***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Leverage_{t-1}$	−0.151	0.138	0.165	−0.080	0.197	−0.042
	(0.183)	(0.109)	(0.135)	(0.202)	(0.124)	(0.209)
ROA_{t-1}	0.232	0.089	−0.963 ***	0.220	0.235	−1.354 ***
	(0.403)	(0.279)	(0.249)	(0.306)	(0.245)	(0.362)
$Tangibility_{t-1}$	−0.235	−0.219 **	−0.329 ***	−0.265	−0.171	−0.504 ***
	(0.195)	(0.107)	(0.106)	(0.191)	(0.106)	(0.141)
$R\&D_{t-1}$	5.103 ***	5.575 ***	4.142 ***	6.500 ***	6.821 ***	5.327 ***
	(0.631)	(0.530)	(0.600)	(0.589)	(0.573)	(0.632)
$Foreign_{t-1}$	0.021 ***	0.015 ***	0.009 ***	0.019 ***	0.014 ***	0.002
	(0.005)	(0.003)	(0.003)	(0.005)	(0.003)	(0.003)
$Owner_{t-1}$	−0.005 **	−0.006 ***	−0.006 ***	−0.001	−0.004 **	−0.003
	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)	(0.002)
Constant	8.078 ***	7.398 ***	7.944 ***	8.633 ***	7.591 ***	5.316 ***
	(0.749)	(0.383)	(0.360)	(0.778)	(0.467)	(0.505)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1948	5245	2822	1739	4685	2494
R-squared	0.236	0.237	0.279	0.317	0.298	0.302

Table 7. Growth opportunity and the effect of K-IFRS 1116 on firm value. This table documents the effect of K-IFRS 1116 on firm value for the subsamples categorized by the M/B. The dependent variable is *Tobin′s q*. Standard errors are clustered at the firm level and are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Variables	2013–2015 vs. 2019–2020		2016–2018 vs. 2019–2020	
	(1)	(2)	(3)	(4)
	HighM/B=1	*LowM/B*=1	*HighM/B*=1	*LowM/B*=1
HighLease × *NewStandard*	−0.324 **	0.008	−0.089	0.014
	(0.162)	(0.014)	(0.135)	(0.013)
NewStandard	0.440 ***	−0.001	0.214 ***	−0.023
	(0.085)	(0.010)	(0.077)	(0.016)
HighLease	0.264 **	0.005	0.015	−0.000
	(0.125)	(0.011)	(0.151)	(0.014)
$Size_{t-1}$	−0.167 ***	−0.023 ***	−0.065	−0.033 ***
	(0.041)	(0.005)	(0.059)	(0.008)
$SalesGrowth_{t-1}$	0.004 ***	0.000	0.002 **	0.000
	(0.001)	(0.000)	(0.001)	(0.000)
$Leverage_{t-1}$	−1.994 ***	0.578 ***	−2.137 ***	0.606 ***
	(0.189)	(0.030)	(0.283)	(0.054)
ROA_{t-1}	−0.724 **	−0.625 ***	−0.601 *	−1.116 **
	(0.306)	(0.221)	(0.337)	(0.437)
$Tangibility_{t-1}$	−0.345	−0.113 ***	−0.715 ***	−0.110 ***
	(0.236)	(0.037)	(0.276)	(0.039)
$R\&D_{t-1}$	2.432 ***	−0.004	3.627 ***	0.084
	(0.468)	(0.269)	(0.564)	(0.461)
$Foreign_{t-1}$	0.017 ***	0.001 ***	0.011 **	0.002 ***
	(0.005)	(0.000)	(0.005)	(0.001)
$Owner_{t-1}$	−0.004	−0.001 ***	−0.001	−0.000
	(0.003)	(0.000)	(0.003)	(0.001)
Constant	8.020 ***	0.706 ***	5.514 ***	1.321 ***
	(0.950)	(0.092)	(1.324)	(0.182)
Industry FE	Yes	Yes	Yes	Yes
Observations	1841	2124	1646	1896
R-squared	0.240	0.387	0.263	0.377

Table 7 reports whether the effect of applying K-1116 varies with a firm's growth potential. We proxy firms' growth opportunities using M/B and classify the subgroups of firms based on the M/B into those firms in the top 25 percentiles of the annual M/B distribution ($HighM/B = 1$; high growth potential) and those in the bottom 25 percentiles of the annual M/B distribution ($LowM/B = 1$; low growth potential). We first compare the 2013–2015 period and the 2019–2020 period. In the subgroup of firms that had high growth potential, the firm value of those that used operating leases heavily decreased significantly after 2019, as expected, while in the subgroup of firms that had low growth potential, firm value did not decrease. Next, we compare the 2016–2018 period with the 2019–2020 period. The coefficient of *HighLease × NewStandard* in the subgroup of firms with high growth potential is negative but not significant, and it is positive but not significant in the subgroup of firms with low growth potential.

The coefficient on *NewStandard* is significant and positive in the subgroup with high growth potential, suggesting that the firm value of firms in the subgroup with high growth potential after 2019 is significantly higher than it was in the previous periods. However, there was no significant difference between the firm value before and after 2019 in the subgroup of firms with low growth potential. The coefficient on *HighLease* is positive and significant only in the subsample of firms with high growth potential comparing the 2013–2015 period and the 2019–2020 period in column (1). It is not significant in the other analyses.

5. Discussion

This study contributes to the literature on the contracting costs hypothesis. We shed light on the economic consequences of the change in accounting standards by showing that OBS operating lease capitalization has greater impact on the value of future investment opportunities than on the value of existing assets. While previous studies find that high leverage ratios or financially constraints are determinants of OBS operating lease usage (Yi 2001; Shawn and Lee 2015; Shin 2015), our evidence implies that even the firm value of moderately leveraged and not constrained firms is negatively affected by operating lease capitalization. Therefore, policymakers should take this effect on financing frictions and firm value into account when they consider a change in accounting standards that has potential to change key accounting ratios used as indicators of financial soundness.

One caveat of the study is that while we set the pre-treatment period to be as early as the 2013–2015 period, which is prior to the publication of K-1116 draft, the discussion on the operating lease capitalization started earlier than the publication of K-1116 draft. Therefore, firms may have started preparing for the operating lease capitalization and the market also may have started reflecting the effect on price even in the pre-treatment 2013–2015 period. This is biased against our findings, and we have the potential to find stronger results. Another limitation is that we do not directly observe the firms' covenant contracts. We assume that debt covenant slack for balance-sheet-based covenants is reduced with operating lease capitalization. However, if firms that use operating leases heavily are more likely to have income-statement based covenant contracts than balance-sheet-based contracts, as Paik et al. (2015) document, our argument on financing frictions would become stronger if we could identify firms with balance-sheet based covenant contracts or directly observe debt covenant slack.

Since IFRS 16 is implemented internationally, we suggest future research using international data comparing the economic consequences of IFRS 16 between developed markets and emerging markets. Our findings implied that the Korean financial market started to reflect the effect of operating lease capitalization before its application in 2019, but less developed financial markets have potential to realize IFRS 16 implementation in 2019 as a shock to the market. An examination of the changes in the level of financing frictions and its impact on the value of future investment opportunities around the world would further advance our understanding. Future works that use covenant contract data could also directly address the effect of operating lease capitalization on firms' covenant slack and financing conditions.

6. Conclusions

As the lease accounting standards changed with the application of K-1116, for firms that had previously enjoyed the OBS property of operating leases, the accounting numbers on financial statements changed even when business operations remained the same. Therefore, for these firms, the application of K-1116 worsened key accounting ratios such as the leverage ratio, used as indicators of financial soundness. Since corporate debt contracts are often made based on these indicators, changes in accounting techniques have economic consequences. The application of K-1116 is likely to decrease the firm value of firms that engage in operating leases since it alters the cost of avoiding technical violations and raises the level of restrictions on financing future growth opportunities. In this study, we empirically analyze the effect of the changes in lease accounting standards that mandate capitalization of operating leases on the value of firms that use operating leases and find results that are consistent with the contracting costs hypothesis. We also find that, compared to a control group, the values of firms that used operating leases were significantly lower after 2019 than they were before the publication of the K-1116 draft. In addition, we provide evidence that firms that used operating leases experienced a greater decline in firm value if they had external financing needs or high growth potential. This implies that the impact of the change in lease accounting standards had a greater effect on the value of growth opportunities that require new financing than it did on the value of existing assets. Overall,

our results suggest that firm value varied with the changes in accounting standards in a world with financing frictions.

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