Real effects of accounting for leases*

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January 25, 2018

Abstract

In response to the criticism that firms keep a significant amount of financing off-balance sheet through operating leases, the Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB) have worked together to produce a new set of standards that will require firms to capitalize most leases starting in 2019. Exploiting intertemporal variations in lease accounting rules in 41 countries over the 1995-2015 period, we show that lease capitalization rules negatively affect firm-level investment. This result does not seem to be driven by pre-treatment differences between treatment and control firms and is robust to a long list of sensitivity checks and alternative design choices. We also find that lease capitalization rules negatively impact firm-level profitability. Our results are stronger for lease-intensive firms suggesting that our results are due to lease capitalization rules rather than concurrent accounting changes or macroeconomic shocks. Finally, the impact of lease capitalization rules on investment and profitability is more pronounced for financially distressed firms consistent with the notion that our results are driven, at least in part, by a financing channel. Taken together, our findings provide support for the argument that lease capitalization rules may have negative consequences for firm investment and profitability.

* We appreciate helpful comments and suggestions from Aleksander Aleszczyk, Andy Bauer, Karthik Balakrishnan, Darren Bernard, Bill Bosco, Stefano Cascino, Valentin Dimitrov, Aytekin Ertan, John Hepp, David Koo, Laura Li, Shiva Shivakumar, Li Zhang, and workshop participants at London Business School, Rutgers University, and University of Illinois at Urbana-Champaign. We thank Ryan Erhard, Lauren Fan, Alexander Gu, and Jared Kahl for excellent research assistance. Chen and Urcan gratefully acknowledge financial support from the Accountancy Department at the University of Illinois at Urbana-Champaign.

1. Introduction

Operating leases represent an important source of financing for public firms. Cornaggia et al. (2013) estimate that the present value of operating leases represented 712% of an average U.S. public firm's book debt in 2007.[1] The United States Securities Exchange Commission (SEC) published a report in 2005, which estimated SEC registrants to have a total of $1.5 trillion of off-balance sheet operating lease commitments and recommended changes to lease accounting rules. In response to this report, the Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB) have worked together to produce a new set of standards (ASC 842 and IFRS 16, respectively) that require firms to recognize an asset and a liability for most leases (hereafter, we will refer to the requirement to recognize an asset and a liability as the requirement to "capitalize" leases or lease capitalization rules). These standards will come into effect in 2019.[2] The standards have been the subject of extensive consultation. The IASB has received more than 1,700 comment letters surrounding an initial discussion paper published in 2009, and two exposure drafts were published in 2010 and 2013. While there was general support for the recognition of assets and liabilities on the balance sheet, particularly from users of financial statements, regulators, standard-setters and accounting firms (IASB, 2014), some parties questioned the benefits of reporting all leases on the balance sheet, and, instead, emphasized potentially sizeable costs. For example, the Center for Capital Markets Competitiveness (CCMC), affiliated with the U.S. Chamber of Commerce, lobbied heavily against the requirement to

[1] In contrast, capital leases represented only 6% of an average U.S. public firm's book debt in 2007.

[2] For public companies, ASC 842 will be effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2018. For all other organizations, it is effective for fiscal years beginning after December 15, 2019 and for interim periods within fiscal years beginning after December 15, 2020. IFRS 16 will be effective in January 2019, although early application is permitted for companies that also apply IFRS 15, Revenue from Contracts with Customers.

capitalize all leases. The CCMC produced a study in collaboration with Chang and Adams Consulting highlighting a potential decrease in corporate spending, and the resulting elimination of U.S. jobs (in this report, U.S. job losses are estimated to range from 190,000 jobs in the best-case scenario to 3.3 million jobs in the worst-case scenario).[3]

In this paper, we investigate the real effects of lease accounting rules. Since the new lease accounting standards will soon be effective, it is important to understand the potential economic consequences of these accounting rule changes. To implement the study, we exploit changes in lease accounting standards taking place from 1995 to 2015 in a sample of 35 Organization for Economic Co-operation and Development (OECD) countries and 6 European Union (EU) countries that are not members of the OECD. We are particularly interested in examining potential economic consequences of the requirement to "capitalize" all leases on firm investment and profitability. Over the last 20 years, several countries have switched from a lease accounting treatment with no requirement to capitalize lease arrangements (hereafter, "the operating lease model"), to a lease accounting treatment like the one currently prescribed by U.S. GAAP and IFRS (hereafter, "the hybrid lease model"). We exploit this setting to shed light on the possible consequences of countries' switching from the hybrid lease model to a lease accounting system where all leases (longer than one year) are treated as capital leases (hereafter, "the capital lease model").

Different countries have introduced the requirement to capitalize finance leases at different points in time. For example, while the requirement to capitalize finance leases has been in place in France throughout our sample period, Turkey has introduced this requirement in 2003, and Italy

[3] http://www.centerforcapitalmarkets.com/wp-content/uploads/2010/04/2012-02-08-IASB-FASB-CA-Report-FINAL-v-3-_2_.pdf

and Greece upon IFRS adoption in 2005 (please see Table 1). The staggered introduction of lease accounting changes is a key feature of our research design and enables us to better identify, using a difference-in-differences design, potential economic consequences of mandatory finance lease capitalization.

We first validate our setting by documenting an increase in firm leverage in countries that switched from the operating lease model to the hybrid lease model. An increase in firm leverage is the expected outcome of this switch and is the hypothesized channel (i.e., the financing channel) through which lease capitalization rules affect firm-level investment. We then test our main hypothesis and find that firms experience economically significant decreases in capital expenditures (CAPEX) and employment levels, following the switch from the operating lease model to the hybrid lease model. In terms of economic significance, capital expenditures (employment) decrease by 14.0% (8.2%) on average for firms switching from the operating lease model to the hybrid lease model. This result is robust to alternative research designs, various sensitivity analyses, and controlling for business cycle effects. We further document that lease capitalization rules decrease operating performance, as measured by the volume of sales and return on sales. Our results for investment and profitability are stronger for lease-intensive firms suggesting that our results are due to lease capitalization rules rather than concurrent accounting changes or macroeconomic shocks. We also predict and find that the effect of the lease capitalization rules on capital expenditures, employment, and profitability is stronger for financially constrained firms suggesting that our results are driven, at least in part, by a financing channel. Finally, our evidence is consistent with an increase in the cost of borrowing at the firm and country levels following the adoption of the hybrid lease model further supporting the idea that our results are explained by the financing channel.

Our findings are of interest to accounting regulators, firms and investors, and can inform the current debate on the real consequences of lease capitalization. Our evidence suggests that lease capitalization standards may result in decreased firm-level investment, employment and profitability.

Assessing the effect of the upcoming change in lease rules using the above research design is challenging, and therefore our results are subject to two important caveats. First, while the new standards replace the hybrid lease model with the capital lease model (i.e., the requirement to capitalize all leases with terms greater than 12 months), we examine the switch from the operating lease model to the hybrid lease model. In the hybrid lease model, firms have the option to structure leases to ensure that capitalization indicators are not met to bypass the capitalization requirement, and therefore, the effect of the capitalization requirement on investment and employment may be attenuated. In contrast, in the capital lease model it is harder to bypass the capitalization requirement, other than using discretion in setting the length of the lease period. Therefore, our analysis potentially underestimates the effects of the upcoming change in lease accounting standards.

Second, while countries in our sample required firms to disclose future lease obligations, it is possible that many of the firms did not disclose these amounts prior to the change to the hybrid lease model (namely due to lax enforcement of accounting rules). For this reason, the change to the hybrid lease model may represent not only a change in how information is presented (specifically, from a disclosure to recognition regime), but also an increase in the lease information available to investors. By the same token however, it is possible that operating lease obligations remain undisclosed following the adoption of the hybrid lease model, and therefore the adoption of the capital lease model may also represent an increase in the information available to investors.

To investigate whether this could be the case, we conduct an analysis of the content of annual reports for a subsample of firms in our sample both before and after the adoption of the hybrid lease model. We find that in 2001-2002 for at least 93 percent of observations in this subsample firms do not provide enough information for users to reliably estimate the present value of future operating lease obligations. The percentage of firms that do not disclose enough information to reliably estimate the present value of future operating lease obligations remains high in 2015 (43 percent). This suggests that while the lack of disclosure on the magnitude of operating leases may be one possible explanation for our main results, it is also likely to play a role in the change from the hybrid lease model to the capital lease model. Nonetheless, it is possible that for some countries the upcoming lease accounting standards merely represents a change from a disclosure to a recognition regime, in which case our analysis, based on a broad cross-section of countries, may over-estimate the effects of the change in lease rules in countries with stronger enforcement and higher disclosure quality.

Third, our paper is silent on the potential benefits of lease capitalization rules, which may include an increase in the informativeness and comparability of financial statements across firms. We leave these important questions for future studies.

The remainder of our paper proceeds as follows: Section 2 discusses the prior literature and develops our hypotheses; Section 3 describes the research design and sample selection; Section 4 presents the results from the empirical analysis and Section 5 concludes.

2. Prior literature and hypotheses development

Several studies examine how debt and equity investors perceive off-balance sheet lease commitments. While early studies (e.g., Abdel-Khalik et al., 1978; El-Gazzar, 1993) suggest that creditors do not take into account future operating lease rents in defining debt covenants and bond risk premia, more recent studies broadly support the idea that operating leases are regarded as debt by market participants (e.g., Wilkins and Zimmer, 1983; Imhoff et al., 1993; Ely, 1995; Dhaliwal et al., 2011; Altamuro et al., 2014; Kraft, 2015; Lim et al., 2017). Specifically, lending officers surveyed by Wilkins and Zimmer (1983) indicate that they perceive term loans, capital leases and footnoted leases to be similar when making lending decisions. Imhoff et al. (1993) and Ely (1995) find that leverage ratios adjusted to reflect off-balance sheet leases exhibit a stronger association with shareholder risk than unadjusted ratios. Consistently, Dhaliwal et al. (2011) further document a positive association between adjustments to financial and operating leverage as a result of the capitalization of off-balance sheet operating leases and ex-ante cost of capital. However, the impact of operating leases on a firm's perceived financial leverage is smaller than the impact of capital leases. In line with prior survey evidence (e.g., Wilkins and Zimmer, 1983), Altamuro et al. (2014) find that banks on average consider operating leases in setting loan spreads. Similarly, Kraft (2015) documents that the capitalization of operating leases is one of the most frequent adjustments made by Moody's when assigning credit ratings. Despite this, Lim et al. (2017) find that while in the U.S. operating leases have the same impact on the yields of new bond issues as balance sheet debt, they are significantly less important for debt ratings. These findings are consistent with several studies that compare the extent to which recognized / disclosed numbers can explain variation in stock / bond pricing and returns, and which often document differences in the way in which investors treat recognized (as opposed to disclosed) numbers (e.g., Aboody, 1996; Davis-Friday et al., 1999; Ahmed et al., 2006; Muller et al., 2015).

Evidence on the real effects of changes in lease rules is sparse, and focuses on the impact of lease standards changes on firms' financing choices. Imhoff and Thomas (1988) document that following the adoption of SFAS 13, which made it harder for firms to keep leases off-balance sheet by adding the 90% of fair value criterion, there was a substitution from capital leases to operating leases and non-lease sources of financing, and a reduction in leverage ratios. Similarly, Altamuro (2006) documents an increase in the use of synthetic leases following FASB Interpretation No. 46 (FIN 46) required these leases to be reported on the balance sheet.

The debate surrounding the new FASB and IASB lease standards has raised substantial controversy regarding the economic impact of the requirement to capitalize all material leases with terms above 12 months. U.S. Congressmen Brad Sherman and Peter King claimed that "Because the new accounting rules would fabricate trillions of new debt, they would trigger widespread violations of (…) covenants. Banks could then pull the loan, demand higher interest, or require new collateral or guarantees."[4] Citing research by Chang and Adams Consulting, they added that this could, in the worst-case scenario result in 3.3 million of job losses and $ 400 billion in lost economic growth per year. The IASB chairman, Hans Hoogervorst, described these statements as "complete nonsense," adding that "it was certainly a relief to see that it's not just in Europe that we have sometimes politicians breathing down our neck."[5]

Whether lease accounting rules have an impact on firm investment is an open empirical question that has not, to the best of our knowledge, been addressed by prior research. To the extent that equity and debt investors do not (fully) reflect operating leases in their assessments of the company's risk and valuation, the change from the operating lease model to the hybrid lease model

[4] https://sherman.house.gov/media-center/opinion-editorials/a-sure-fire-way-to-harm-the-economy
[5] http://www.theaccountant-online.com/features/hoogervorst-us-congressmens-letter-on-lease-accounting-a-complete-nonsense-4454770/

may increase firm's cost of capital and thereby decrease investment and employment levels. On the other hand, to the extent that investors fully impound future operating lease payments in their risk and value assessments, it is unclear that the change in lease rules would have an effect on firm investment and employment. This is even more so the case given that firms can restructure lease contracts in order to minimize the impact of the rule change (e.g., Imhoff and Thomas, 1998). The above discussion leads to our first hypothesis:

H1: Lease capitalization rules do not affect firm-level investment.

In the cross-section, we expect lease capitalization to have a larger impact on firm-level investment for firms that exhibit higher reliance on lease financing (i.e., firms with high lease intensity). Public criticisms of lease capitalization standards highlight a financing channel through which the new lease standards may affect firm investment. Therefore, we expect the effect of lease capitalization rules on investment to be stronger for firms with higher financial constraints whose investment levels are likely to be more sensitive to the availability and costs of external financing. This discussion leads to our second set of hypotheses:

H2a: The effect of lease capitalization standards on firm-level investment is stronger for firms with high lease intensity.

H2b: The effect of lease capitalization standards on firm-level investment is stronger for firms with high financial constraints.

3. Research design and sample selection

3.1 Research design

Our empirical analysis exploits the fact that our sample countries enacted lease capitalization rules at different points in time. This staggered adoption enables us to estimate the before-after effect of the lease capitalization standard changes in treated countries (the treatment group) vis-à-

vis the before-after effect in countries where there is no such lease standard change (the control group). This is a difference-in-differences design with multiple treatment groups and multiple time periods as in Betrand, Duflo, and Mullainathan (2004) and Imbens and Wooldridge (2009). We implement this approach by employing the following model:

$$INVESTMENT_{it+1} = \alpha_0 + \alpha_1 LEASE_{kt} + Control\ variables_{it} + Firm\ fixed\ effects + Industry * Year\ fixed\ effects + \varepsilon_{it+1} \quad (1)$$

where *k* denotes a country, *i* denotes a firm, and *t* denotes a year. Detailed variable definitions are provided in the Appendix. Our dependent variable of interest is investment of a firm *i* in year *t+1*. Firm-level investment is proxied by either CAPEX defined as the logarithm of capital expenditures in U.S. dollars[6] or EMPLOY defined as the logarithm of total number of employees. Our main independent variable of interest is LEASE which is an indicator variable taking the value of one if country *k* uses a hybrid lease model in year *t* and zero if it uses an operating lease model. Our empirical specification is thus designed to estimate the impact of lease capitalization standards on firm-level investment.

We follow Polk and Sapienza (2009) and include in our model the logarithm of total assets in U.S. dollars (SIZE) to control for firm size, Tobin's Q (Q) calculated as the market value of assets (i.e., the book value of assets plus market value of common stock less the sum of book value of common stock and balance sheet deferred taxes) scaled by the book value of assets to control for growth opportunities, and cash flows from operations (CFO) calculated as the sum of earnings before extraordinary items and depreciation scaled by total assets to control for profitability. In

[6] We use total capital expenditures, rather than capital expenditures scaled by total assets or property, plant, and equipment (PP&E) because by increasing PP&E and total assets, lease capitalization will lead to a mechanical reduction in the scaled capital expenditures.

addition, the vector of control variables includes the logarithm of Gross Domestic Product (GDP) per capita in U.S. dollars (GDP_CAPITA) as well as the annual percentage growth of GDP per capita (GDP_GROWTH) to control for macroeconomic factors at the country level. We include firm fixed-effects to control for time-invariant firm characteristics and other confounding factors that could cause a correlation between country-level lease accounting standards and future investment. Additionally, industry*year fixed effects are included to soak up the effect of time-varying industry investment cycles. As explained by Imbens and Wooldridge (2009), the inclusion of these fixed effects leads to α_1 being estimated as the within-country differences in the dependent variable ($INVESTMENT_{it+1}$) before and after lease capitalization standard changes *vis-à-vis* similar before-after differences in countries that did not experience lease accounting standard changes within the sample period. All continuous variables are winsorized at the 1 and 99 percent level. We cluster standard errors at the country-level because lease accounting standards change at the country-level.[7]

3.2 Sample selection

Our sample consists of firm-year observations pertaining to 35 Organization for Economic Co-operation and Development (OECD) countries as well as 6 European Union (EU) countries that do not belong to the OECD in years between 1995 and 2015.[8] We focus on these countries because information about lease accounting standards in countries that do not belong to the OECD or to the EU is at best patchy. Collectively, these countries represent approximately 63% of global GDP in 2015 (The World Bank, 2016).[9] We start our data collection process in 1995 because

[7] Our results are qualitatively unchanged if we double cluster at country and year levels.
[8] The EU countries not in the OECD are Bulgaria, Croatia, Cyprus, Lithuania, Malta, and Romania.
[9] http://data.worldbank.org/data-catalog/GDP-ranking-table

information on lease accounting standards before 1995 is often missing and inconsistent. We hand collect information about lease accounting standards in these countries from the webpages of various governmental agencies, national accounting bodies and securities regulators.

Our sample includes firm-year observations pertaining to 861 country-years (41 countries * 21 years). A hybrid lease model is used in 628 out of these 861 country-years (i.e., approximately 82% of the sample country-years). Firms are required to treat all leases as operating in 50 country-years (i.e., approximately 7% of the sample country-years). These pertain to six countries (Cyprus, Czech Republic, Greece, Italy, Slovak Republic, and Turkey) which changed their lease standards from an operating lease model to a hybrid lease model in later sample years. Specifically, Cyprus and Turkey changed their lease accounting rules in 2003, and Czech Republic, Greece, Italy, and Slovak Republic in 2005. Firms are recommended but not required to capitalize finance leases in 38 country-years (approximately 5% of the sample country-years) and required to treat all leases as operating unless the title of property of the leased items is transferred to the lessee in 6 country-years (approximately 1% of the sample). We classify these last two sets of country-year observations as using a hybrid lease model. However, we obtain qualitatively similar results if we remove these two groups of observations from our sample. There is no specific lease accounting rule for 47 country-years and we are unable to find any information about lease accounting rules for 92 country-years (these mostly pertain to small EU countries prior to IFRS adoption in 2005). We exclude these country-years from our final sample.

In sum, our sample includes two types of countries: (i) countries that use the hybrid lease model throughout the sample period and (ii) six countries that use the operating lease model at the beginning of the sample period but switch to the hybrid lease model later in the sample period. Therefore, in our research design, firms from these six countries (i.e., Cyprus, Czech Republic,

Greece, Italy, Slovak Republic, and Turkey) are the treatment firms, and firms from all other countries are the control firms.

3.3 Data description and descriptive statistics

We source our firm-level data from Compustat North America and Compustat Global. We obtain data on macroeconomic variables from the World Bank, OECD, and the Penn World Tables websites. We restrict our sample to observations from countries for which we are able to obtain lease accounting rule information. We exclude financial and utilities companies as well as observations with missing values of investment or control variables. The final sample consists of 199,360 firm-year observations (corresponding to 22,596 unique firms from 41 countries). Table 1 provides the distribution of firm-year level observations by country. U.S. observations constitute about 41% of the final sample. In order to alleviate a potential concern that our results could be driven by the heavy representation of U.S. firms in our sample, we replicate our analyses after excluding U.S. observations, and find similar results.

Table 2 reports descriptive statistics for the main variables in Panel A and pair-wise correlations in Panel B. The average value of $LEASE$ is 0.994 suggesting that that 99.4% of the firm-year observations are from country-years in which a hybrid lease model is used (i.e., both operating and capital leases are allowed). This high percentage reflects that fact that most the sample countries have required the hybrid lease model from the beginning of the sample period.

The mean value of $CAPEX$ is 0.792, suggesting that an average firm in our sample exhibits \$6.19 million dollars of capital expenditures. Similarly, the mean value of $EMPLOY$ is -0.126, which translates into 748 employees for the average firm. The average firm $SIZE$ in our sample is 2.339 or \$218 million dollars. The mean Tobin's Q is 1.866 indicating high presence of growth

firms. The average (median) CFO is -0.3% (6.2%) and the average GDP per capita (GDP growth) is $42,462 (about 1.3%).

Panel B of Table 2 reports the correlation matrix. There is a strong negative correlation between lease capitalization ($LEASE$) and both firm capital expenditures ($CAPEX$) and number of employees ($EMPLOY$). These correlations provide initial evidence that supports the conjecture that the use of the hybrid lease accounting model may be associated with lower capital investment and employment.

4. Empirical findings

4.1 Lease capitalization and leverage

We start our empirical analyses by investigating the association between lease capitalization rules and firm leverage. This test serves as a validation of our empirical setting. We argue that our setting will be valid only if there is a significant increase in leverage after countries switch from the operating lease model to the hybrid lease accounting model.

To this end, we estimate the following difference-in-differences model:

$$LEVERAGE_{it+1} = \alpha_0 + \alpha_1 LEASE_{kt} + Control\ variables_{it} + Firm\ fixed\ effects + Industry * Year\ fixed\ effects + \varepsilon_{it+1} \quad (2)$$

where *k* denotes a country, *i* denotes a firm, and *t* denotes a year. This model is similar to equation (1) except we replace investment with leverage of a firm *i* in year *t*+1 as the dependent variable. Firm-level leverage is proxied by either $TOTAL\ DEBT$ defined as total debt over average total assets or $LONG-TERM\ DEBT$ defined as the ratio of long-term debt over average total assets. Panel A of Table 2 shows that the mean (median) values of $TOTAL\ DEBT$ and $LONG-$

$TERM\ DEBT$ are 0.226 (0.185) and 0.142 (0.081), respectively. Leverage ratios are positively correlated with $LEASE$ (Table 2, Panel B), but the Spearman correlation between $TOTAL\ DEBT$ and $LEASE$ is positive and statistically insignificant.

Table 3 reports the results from the estimation of equation (2). We find that lease capitalization rules have a positive and significant impact on firm-level leverage regardless of the leverage proxy we employ. The coefficient estimates suggest that switching from the operating lease accounting model to the hybrid lease accounting model increases the $TOTAL\ DEBT$ ($LONG-TERM\ DEBT$) leverage ratios by 4.3% (3.0%). These estimates are economically significant and translate into 19.0 % (21.1%) increase in total debt (long-term debt) for an average firm in our sample. These findings provide strong support for our conjecture that switching from the operating lease model to the hybrid lease model results in increases in leverage. This provides us with reassurance that our setting is suitable to draw inferences on the investment implications of countries' switching from the hybrid lease model to the capital lease model.

4.2 Lease capitalization, investment, and employment

Figure 1 presents graphically the within-firm variation in the logarithm of capital expenditures ($CAPEX$), surrounding changes in lease accounting standards. It plots the average $CAPEX$ in years t = -2 to t = +2 separately for the treatment firms (firms from countries that switched from an operating lease model to a hybrid lease model) and the control firms (firms that use the hybrid lease model throughout the sample period), while controlling for firm- and country-specific characteristics, as well as firm and industry*year fixed effects that remove the effect of firm- and country-specific time-invariant characteristics and time-varying industry investment

cycles, respectively.[10] Figure 1 shows that the treated firms have relatively higher capital expenditures before the change in the lease accounting standards and relatively lower capital expenditures after the change, as compared to their long-run average. However, we do not observe such a pattern for control firms. If anything, there is an increase in capital expenditures around lease capitalization standard changes for the control firms. Figure 2 presents the similar graph for the log of total number of employees (i.e., $EMPLOY$). Consistent with the capital expenditures graph, the treated firms have relatively higher employment before the change in lease accounting standards and relatively lower employment after the change. Employment levels remain stable around lease capitalization rules changes for the control firms. These graphs provide initial visual evidence that lease capitalization rules lead to a reduction in capital expenditures and employment.

Table 4 reports the baseline results from the estimation of equation (1). $CAPEX$ is the dependent variable in Column 1, and $EMPLOY$ is the dependent variable in Column 2. In both specifications, the coefficient on the lease indicator variable is negative and statistically different from zero. Since the dependent variable in our regressions is the logarithm of investment, the interpretation of the independent variable of interest ($LEASE$) is straightforward and represents the percentage change in investment induced by the change from the operating lease model to the hybrid lease model. The coefficient in Column 1 (-0.140) suggests that on average there is a 14.0% decline in capital expenditures following the introduction of the hybrid lease model. The coefficient estimate translates to a reduction of $0.87 million in capital expenditures for the average firm in our sample. Similarly, the coefficient in Column 2 (-0.082) suggests that

[10] Our treatment countries change the lease accounting standards in either 2003 or 2005. For countries switching their lease accounting standards in 2003, we include observations from 2001-2002 (two years before switch) and 2004-2005 (two years after switch). Similarly, for countries switching their lease accounting standards in 2005, we include observations from 2003-2004 and 2006-2007. Control firms include observations from all other countries in 2001-2007.

employment on average decreases by 8.2% following the switch from the operating lease model to the hybrid lease model. For the average firm in our sample, this corresponds to a reduction of 61 employees. The coefficients on $SIZE$, Q, and CFO are all significantly positive consistent with Polk and Sapienza (2009). GDP_GROWTH is positively related to both proxies of investment suggesting that firms increase the size of their operations during periods of macroeconomic growth. Finally, we do not find any relationship between a country's GDP per capita and future investment.

4.3 Dynamic effects, matching, business-cycle, and correlated omitted variables

The empirical identification in the difference-in-differences approach presented in Table 4 comes from the comparison of the change in investment ($CAPEX$ and $EMPLOY$) in firms that are subject to a change in lease accounting standards (treated firms) with the change in investment in firms that do not experience such a change (control firms). One concern with this approach is that the estimated treatment effect could be due to differences in the underlying characteristics of treated and control firms. We address this concern in two ways: (i) we examine the dynamic effects of changes in lease accounting standards on firm's investment and (ii) we employ a propensity-score matching methodology and match treatment and control firms according to their observable characteristics.

We start by examining the dynamic effects of lease accounting changes on firms' investment in Panel A, Table 5. Following Bertrand and Mullainathan (2003), we replace the $LEASE$ indicator variable with five variables: $BEFORE^{-2}$ is a dummy variable that equals one for firms incorporated in a country that will change lease accounting standards two years later and zero otherwise, $BEFORE^{-1}$ is a dummy variable that equals one for firms incorporated in a country that will change lease accounting standards next year and zero otherwise, $BEFORE^{0}$ is a

dummy variable that equals one for firms incorporated in a country that changes lease accounting standards in that year and zero otherwise, $AFTER^{1}$ is a dummy variable that equals one for firms incorporated in a country that changed lease accounting standards last year and zero otherwise, and $AFTER^{2+}$is a dummy variable that equals one for firms incorporated in a country that changed lease accounting standards at least two years ago and zero otherwise. We estimate a similar specification to that presented in Table 4, with firm fixed effects, industry*year fixed effects, firm-specific control variables, and country-specific control variables. The coefficients on $BEFORE^{-2}$ and $BEFORE^{-1}$ allow us to assess whether any investment effects can be found prior to the change in lease accounting standards. Finding such an effect could be due to pretreatment trends in firm-level investment. In both Columns 1 and 2, we find that the estimated coefficients on $BEFORE^{-2}$ and $BEFORE^{-1}$ are economically and statistically insignificant. Moreover, we find that the coefficients on $AFTER^{1}$ and $AFTER^{2+}$ are negative and statistically significant at least in one-tailed tests. Our results are especially strong for $AFTER^{2+}$ presumably because year t and t+1 investment and financing policies have already been set as of year t and lease capitalization rules can therefore mostly impact investment starting with year $t + 2$. Overall, these findings support our causal interpretation of the baseline results.[11]

[11] One might argue that our results are driven by the recent financial crisis because (i) lease capitalization rules impact investment patterns of the firms from the treatment countries starting in year t+2 which closely aligns with the onset of the recent financial crisis and (ii) our treatment countries include Greece and Italy, which are highly impacted by the crisis. We address this issue in three ways. First, our regression models include industry*year fixed effects. To the extent that the financial crisis impacts all firms in the same industry similarly, these fixed effects mitigate the impact of the financial crisis on our results. Second, to control more directly for the impact of the financial crisis, we create a crisis indicator variable taking the value of one for years 2007, 2008, and 2009 and zero otherwise and included it as an additional control variable in equation (1). While the coefficient on the crisis indicator variable is negative but statistically insignificant, we still find that lease capitalization rule negatively impacts firm-level investment. Finally, in Section 4.4., we exploit the intuition that the financial crisis should impact both public and private firms similarly within a country. We find that while lease capitalization rules negatively impact the investment of public firms, private firms' investment on average increases following the introduction of a hybrid lease model.

Furthermore, we match treated and control firms using a multivariate propensity score methodology to address the concern that treatment and control firms may differ in terms of firm-specific characteristics.[12] We estimate a probit model of the probability of being treated as a function of firm-level characteristics (size, Tobin's Q, operating cash flows, and industry) as well as country-level characteristics (GDP per capita and growth in GDP per capita). For each observation in our sample, we compute a propensity score as the predicted value of the probability of being treated according to the probit model. For each treated firm observation, we select a control firm observation that has the closet probability and estimate equation (1) in this matched sample. We report the results in Columns 1 and 5 of Table 5, Panel B. The coefficient on the $LEASE$ indicator remains negative and statistically significant regardless of whether we use capital expenditures or number of employees as the dependent variable. In addition, and despite the large decrease in sample size, the economic magnitude of the coefficient is comparable to that reported in Table 4.

Another important concern with the causal interpretation of our results is that there may be other concurrent regulatory changes (e.g., labor reforms, tax code changes) in the treatment countries. These may result in a correlated omitted variable problem and we may incorrectly attribute the results to changes in lease standards. We address this issue in three different ways: (i) we include region fixed effects in our empirical specifications to control for shocks that are common to neighboring countries, (ii) we control for a long list of time-varying country-specific characteristics to absorb the effect of changes in local macroeconomic conditions, and (iii) we employ a placebo test to control for macroeconomic shocks that are common to neighboring countries.

[12] In addition to propensity score matching, we match on firm size and industry and obtain similar results.

We start by controlling for geographical differences between treated and control firms (e.g., an Italian firm may be quite different from a U.S. firm, even if they are in the same industry, but may be similar in many aspects to a French firm). The best way to control for geographical differences is to include country*year fixed effects in the empirical specifications. These fixed effects soak up time-varying country-specific macroeconomic conditions as well as concurrent reforms. However, our main independent variable of interest (i.e., $LEASE$) is also defined at the country-year level and thus this approach is not feasible. Instead, we define twelve regions of countries that share common borders. For example, the United States and Canada are in one region. In Columns 2 and 6 of Table 5, Panel B, we add region*year fixed effects to the specifications estimated in Table 4. These fixed effects control for shocks that are common to neighboring countries. The coefficients on the lease indicator variable in both columns remain negative and statistically significant at the 1% level.

Second, to further alleviate concerns that changes in macroeconomic conditions may drive our results, we add a long list of country-specific time-varying variables to control for other factors that vary at the country level in Columns 3 and 7 of Table 5, Panel B. In particular, we include the logarithm of a country's population ($POPULATION$), human capital index (HC), consumer price inflation (CPI), unemployment rate ($UNEMPLOYMENT$), interest rate ($INTEREST\_RATE$), tax revenue as a percentage of GDP (TAX_REV), and union intensity ($UNION\_INTENSITY$). Detailed descriptions of these additional control variables are included in the Appendix. Controlling for these additional variables has little impact on the negative documented association between lease capitalization rules and future capital expenditures and employment.

We also use information on geography to develop a placebo test that further addresses the concern that our results are driven by changes in local macroeconomic conditions. For each

country k and year t, we compute the average of the $LEASE$ indicator in year *t* for the neighboring countries ($LEASE\_OTHER$). To the extent that local economic shocks also affect neighboring countries, we would expect to find a negative and significant coefficient on $LEASE\_OTHER$. In Columns 4 and 8 of Table 5, Panel B, we add $LEASE\_OTHER$ to the baseline specification, and find that this variable is not statistically different from zero, whereas the coefficient on the $LEASE$ indicator for country k remains statistically and economically significant. Taken together, these results suggest that the effect of lease capitalization accounting rules on capital expenditures and employment is unlikely driven by business-cycle factors, concurrent macroeconomic shocks, or correlated omitted variables.

4.4 Private versus public firms

In this section, we conduct an additional robustness test to increase our confidence that our results are driven by lease capitalization rules rather than concurrent macroeconomic shocks or other concurrent country-level regulatory changes. Our analysis builds on the idea that (i) lease capitalization rules are only applicable to public firms, and (ii) if there is a concurrent omitted macroeconomic shock (e.g., recent financial crisis), it should equally impact investment behavior of public and private firms. In other words, if we can document different investment behavior of public versus private firms in response to lease capitalization rules, this would provide us further reassurance that our results are driven by lease capitalization rules rather than some other correlated omitted variables.

To test this conjecture, we obtain private firms' financial statement information from Amadeus database and combine this dataset with our public firm dataset from Compustat. We then run a model similar to equation (1). Due to data availability, we are only able to examine changes

in the logarithm of the total number of employees (i.e., $EMPLOY$). Our results are reported in Table 6. We find that lease capitalization rules reduce employment of public firms by 13.6% (0.029 – 0.165). Interestingly, we find that lease capitalization rules *increase* employment of private firms by 2.9%. If our results were purely driven by the recent financial crisis, we would expect private firms to exhibit similar decreases in employment levels. On the contrary, our evidence suggests that private firms partially fill the investment void created by lower investment of public firms in response to lease capitalization rules.

4.5 Shorter sample period and U.S. firms

In this section, we perform two additional sensitivity checks to ensure that our baseline results are robust to different sample periods and sample compositions. First, we restrict our sample period to the five-year period around the year of the change in lease accounting standards (i.e., two years before the change, the year of the change, and two years after the change).[13] Since Cyprus and Turkey change the accounting for leases in year 2003, and Czech Republic, Greece, Italy, and Slovak Republic experience such a change in year 2005, our sample period for treatment firms is between 2001 and 2007. We include all control observations in this time period for comparison purposes.[14] If lease capitalization rules have a causal impact on firm-level capital expenditures and number of employees, this effect should be present and potentially strong around lease accounting rule changes. This test tightens the estimation window and allows us to causally attribute changes in firm-level capital expenditures and number of employees to lease capitalization rule changes. Columns 1 and 3 of Table 7 document that there is still a negative and

[13] We repeat our analyses using 7-year period that includes three years before the change, the year of the change, and three years after the change and find qualitatively similar results.
[14] Our results are similar if we include all control observations in our analyses.

significant relationship between lease capitalization rule changes and capital expenditures and number of employees even after we restrict the sample period to the two years before and after the change in lease capitalization rules.

As mentioned before, U.S. firms represent approximately 41 percent of our main sample (see Table 1). In our next sensitivity analysis, we drop these firms to mitigate the concern that our results are due to the large representation of U.S. firms in the control group. We report the results from this analysis in Columns 2 and 4 of Table 7. The coefficient on the lease indicator remains negative and statistically different from zero at the 1% level in both columns. Thus, our results are unlikely to be driven by the large representation of U.S. firms in our sample.

4.6 The impact of mandatory IFRS adoption

As we report in Table 1, six countries in our sample change their lease accounting standards. These changes are concentrated in years 2003 and 2005. Specifically, Czech Republic, Greece, Italy, and Slovak Republic changed their lease accounting standards in 2005 as part of their adoption of International Financial Accounting Standards (IFRS). One might argue that IFRS adoption can be a confounding event that drives our main results. The effect of IFRS adoption on investment and employment is unclear. On the one hand, the adoption of IFRS may lead to increases in firms' leverage ratios that are unrelated lease capitalization rule change (namely as a result of changes in the accounting for financial instruments and derivatives). On the other hand, it may increase firm capital expenditures and number of employees because by providing high quality and more comparable financial reporting thus facilitating firms' access to foreign capital markets (Covrig et al. 2007; DeFond et al. 2011; Florou and Pope 2012). In other words, IFRS adoption may work us finding the results reported in Table 4. Nevertheless, we conduct three tests

to address this concern. First, we add an indicator variable IFRS_POST to Equation (1). IFRS_POST is equal to one for firm-years after a country has mandatorily adopted IFRS reporting and zero, otherwise.[15] If our main results are driven by mandatory IFRS adoption, we expect IFRS_POST to subsume the effect of the lease indicator variable. The results in Columns 1 and 4 of Table 8 show that the lease indicator variable remains negative and statistically significant in both columns, suggesting that our main results are not driven by the worldwide adoption of IFRS reporting.[16]

Second, we restrict our sample to countries that mandatorily adopted IFRS in 2005.[17] This research design tests the impact of lease capitalization rules on firm-level investment within IFRS adopting countries. We run the same analyses as in Table 4 using this restricted sample and report the results in Columns 2 and 5 of Table 8. The coefficients on the lease indicator variable remain to be negative and statistically different from zero at the 5% level regardless of the investment proxy we employ.

Third, we restrict our treatment observations to firm-years from Turkey which switched its lease accounting standards in 2003 and mandatorily adopted IFRS in 2008. The five-year period between lease accounting standards change and IFRS adoption should provide cleaner evidence of lease capitalization rules on firm-level investment free of the impact of IFRS adoption. We remove observations from Czech Republic, Greece, Italy, and Slovak Republic because these countries

[15] Countries in the European Union mandatorily adopted IFRS in 2005, and other countries adopted IFRS in different years including Canada (2011), Chile (2009), Israel (2008), Korea (2011), Mexico (2012), New Zealand (2007), and Turkey (2008). Japan and United States have not adopted IFRS.

[16] In unreported analyses, we also consider voluntary IFRS adopters. In particular, we follow Ahmed, Neel and Wang (2013) and code firm-years with Compustat item acctstd = 'DI', 'DA", or 'DT' from countries which adopted IFRS mandatorily as IFRS_POST = 1. We then run analyses similar to the ones in Panel A, Table 8. Our results are qualitatively similar.

[17] These countries include Australia, Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovak, Spain, Sweden, Switzerland, and United Kingdom.

have changed their lease capitalization standards in 2005 as a part of IFRS adoption. Although Cyprus has changed its lease accounting standards in 2003, we exclude observations from Cyprus because lease capitalization rules impact investment patterns of the firms from the treatment countries starting in year t+2 which closely aligns with the onset of mandatory IFRS adoption in Europe. We run the same analyses as in Table 4 using this restricted sample and report the results in Columns 3 and 6 of Table 8. The coefficients on the lease indicator variable remain to be negative and statistically different from zero regardless of the investment proxy we employ. Based on the results in Table 8, we conclude that our main findings are unlikely to be driven by the mandatory IFRS adoption.

4.7 Cross-sectional heterogeneity

The previous section focuses on identifying the effect of the change in lease capitalization rules on average capital expenditures and employment. This effect is likely to exhibit strong cross-sectional variation. First, all other things equal, firms reporting higher amounts of rent expense (and thus with higher levels of operating leases) are more likely to be impacted from switching to the hybrid lease accounting model.[18], In order to test this conjecture, we estimate the following model:

$$INVESTMENT_{it+1} = \alpha_0 + \alpha_1 LEASE_{kt} + \alpha_2 LEASE_{kt} * HRE_{it} + \alpha_3 HRE_{it} + Control\ variables_{it} + Firm\ fixed\ effects + Industry * Year\ fixed\ effects + \varepsilon_{it+1} \quad (3)$$

[18] We use Compustat item xrent to proxy for rent expense under operating leases. According to Compustat, this item represents all costs charged to rental, lease, or hire of space and/or equipment.

where k denotes a country, i denotes a firm, and t denotes a year. HRE is an indicator variable taking the value of one if rent expense scaled by total sales is in the highest quartile and zero otherwise. As before, we include the full set of firm-level and country-level control variables as well as firm and industry*year fixed effects in the model. Results reported in Columns 1 and 3 of Table 9 suggest that lease capitalization rules negatively and significantly (at least in one-tailed tests) impact capital expenditures and number of employees for firms with moderate amount of rent expense. More importantly, we find that these rules have a statistically significant (at least in one-tailed tests) and negative incremental impact on capital expenditures and number of employees for firms with high level of rent expense. In Columns 2 and 4 of Table 9, we also control for country*year fixed effects. In such a specification, we cannot estimate the direct effect of $LEASE$ on investment, but we can estimate the differential effect of a change in lease accounting standards on firms that are more likely to be affected by lease capitalization (i.e., the interaction term). One benefit of adding country*year fixed effects is to control for other macroeconomic factors and concurrent financial reforms that vary at the country-year level. This addresses the concerns that there could be other changes at the country level, such as fiscal tightening or tax law changes, which can impact firms' investment and coincide with the changes in lease accounting standards. In both Columns 2 and 4 of Table 9, the coefficient on the interaction term is negative and statistically significant at the 1% level even after including country*year fixed effects in empirical specifications.

Second, the public pushback against lease capitalization rules emphasizes a financing channel through an increase in cost of borrowing due to capitalization of operating leases. If this concern has any merit, we expect our results to be stronger in settings where firms are more likely to experience financial constraints. To this end, we estimate the following model:

$$INVESTMENT_{it+1} = \alpha_0 + \alpha_1 LEASE_{kt} + \alpha_2 LEASE_{kt} * HSA_{it} + \alpha_3 HSA_{it} + Control\ variables_{it} + Firm\ fixed\ effects + Industry * Year\ fixed\ effects + \varepsilon_{it+1} \quad (4)$$

where k denotes a country, i denotes a firm, and t denotes a year. HSA is an indicator variable taking the value of one if SA index of Hadlock and Pierce (2010) is in the highest quartile and zero otherwise. The SA index is our proxy for financial constraints and is calculated as (-0.737 * $Size$) + (0.043 * $Size^2$) – (0.040 * Age), where $Size$ equals to the logarithm of total assets in U.S. dollars, and Age is the number of years the firm is listed on Compustat. Results in Columns 5 and 7 of Table 9 shows that lease capitalization rules have a statistically significant and negative incremental impact on capital expenditures and number of employees for firms with high level of financial constraints. This evidence suggests that our results are more pronounced for firms with financial constraints. As an additional analysis, we add country*year fixed effects to the empirical specification in equation (4) to control for time varying macroeconomic factors and concurrent reforms at the country level. In both Columns 6 and 8 of Table 9, the coefficient on the interaction term is negative and statistically significant at the 1% level suggesting that our results are unlikely to be explained by concurrent macroeconomic shocks or reforms.

4.8 Lease capitalization and firm operating performance

One important caveat of our analysis is that we do not speak to whether the documented reduction in investment and employment levels affects firm profitability. On the one hand, these reductions can negatively impact firm operating performance because firms may not invest in all value maximizing projects. On the other hand, these reductions can improve firm operating

performance because lease capitalization rules make firms' investment policies more transparent and incentivizes managers to invest only in value maximizing projects. The second explanation follows from an agency theory perspective where managers build empires by investing in value destroying projects when investors are unlikely to monitor their investments.

We test the relation between lease capitalization rules and future operating performance with the following model:

$$OPERATING\ PERFORMANCE_{it+1} = \alpha_0 + \alpha_1 LEASE_{kt} + Control\ variables_{it} + Firm\ fixed\ effects + Industry * Year\ fixed\ effects + \varepsilon_{it+1} \quad (5)$$

where k denotes a country, i denotes a firm, and t denotes a year. This model is similar to equation (1) except we replace investment with operating performance of a firm i in year $t+1$ as the dependent variable. Firm-level operating performance is proxied by either $SALES$ defined as the log of total sales in U.S. dollars or ROS defined as earnings before extraordinary items divided by total sales. When calculating ROS, we require firms to report at least 1 million U.S. dollars of sales number. We employ these operating performance proxies instead of traditional measures such as the return on assets to ensure that lease capitalization rules do not impact the operating performance measures mechanically. For example, there will be a mechanical decrease in return on asset after lease capitalization rules due to increase in total assets.[19] Panel A of Table 2 shows that the mean (median) value of $SALES$ is 2.25 (2.30), translating into the average (median) total sales in our sample is \$178 (\$197) million dollars. The mean value of ROS is -0.175, while the

[19] Note that the change in lease accounting rules could also have a direct mechanical effect on earnings and hence the return on sales. In fact, the amounts of lease expenses taken to the income statement for the same lease in a given year could be different depending on the accounting treatment. The direction of the difference will depend on the pattern of operating lease obligations and the age of the lease, but there is no reason to ex ante expect expenses to be on average higher under capital leases as compared to operating leases.

median value is 0.024. Panel B of Table 2 documents that these operating performance proxies are significantly and negatively correlated with $LEASE$.

Results from estimating equation (5) are reported in Table 10. We find that lease capitalization rules significantly and negatively affect future operating performance regardless of the operating performance proxy we employ. The coefficient on the $LEASE$ variable in Column 1 is -0.080 suggesting that total sales decrease by 8.0% for firms that use the hybrid lease model as compared to operating lease model. Similarly, the coefficient on the $LEASE$ variable in Column 2 is -0.123, which suggests 12.3% reduction in return on sales due to lease capitalization rules for an average firm in our sample.

In Table 11, we conduct tests to examine cross-sectional variation in negative effects of lease capitalization rules on firms' operating performance. These tests mirror our analyses in Table 9 and use the same conditioning variables: rent expense and SA index to proxy for financial constraints. We find that the impact of lease capitalization rules on future operating performance is more pronounced when firms are more likely to be affected by lease capitalization (i.e., firms that report high rent expense) and when firms have financial constraints. In Columns 2, 4, 6, and 8 of Table 11, we include country*year fixed effects, and we continue to find a negative and statistically significant coefficient (at the 10% level or better) on the interaction term between LEASE and our cross-sectional variable, suggesting that time-varying country-specific factors are unlikely to explain the results in Table 10 and Table 11.

4.9 Lease capitalization and cost of borrowing

In this section, we provide direct evidence for the conjecture that firms have higher financing costs after switching from the operating lease model to the hybrid lease model by examining cost of borrowing. We test this prediction using a sample of syndicated loans from

DealScan. Our measure of cost of borrowing, $LOAN\_SPREAD$, is defined as the spread quoted in percentages over a floating benchmark (typically LIBOR). We control for the same set of firm- and country-level characteristics as well as firm and industry*year fixed effects in our prior analyses. In addition, we control for a long list of loan-level controls including loan rating, life of the loan, amount of the loan, indicator variables for whether the loan is primarily for debt repayment, investment, or working capital needs, number of general covenants in the loan agreement, indicator for whether the loan is a revolver, term mix of the loan, indicator variables for whether the loan is senior or secure. Detailed descriptions of these additional control variables are included in the Appendix. We report the results in Panel A, Table 12. We find that cost of borrowing increases by 0.36% after firms switch from operating lease model to the hybrid lease model. This effect is economically meaningful because average loan spread in our sample is about 1.9%

Due to potential data limitations on cost of debt for international firms, we also examine country-level lending rates in alternative analyses. We measure cost of borrowing using three variables: $SPREAD$ is the interest rate charged by banks on loans to private sector customers (the lending interest rate) minus the interest rate paid by commercial or similar banks for demand, time, or savings deposits, $RISK\_PREMIUM$ is the lending interest rate minus risk-free rate, and $REAL\_RATE$ is the lending interest rate adjusted for inflation. We control for GDP_CAPITA, GDP_GROWTH, country fixed effects, and year fixed effects in our regression models. Panel B, Table 12 reports the results. The coefficient on $LEASE$ indicator is positive and significant at the 10% level or better in all three columns, suggesting an increase in the cost of borrowing after countries adopt the hybrid lease model. Overall, these results support the notion that capitalization

of operating leases increases cost of debt, which is likely a channel through which lease capitalization negatively affects firm investment and firm operating performance.

Florou and Kosi (2015) find that firms pay lower bond yields but not lower loan spreads after mandatory IFRS adoption. In unreported tests, we examine the impact of mandatory IFRS adoption on firm-level loan spreads and country-level interest rates by including *IFRS_POST* indicator variable, which equals one for firm-years after a country has mandatorily adopted IFRS and zero otherwise, in our empirical specifications. We find that *IFRS_POST* is negative and significant only in analysis where the dependent variable is $REAL\_RATE$. In other analyses, the coefficient on *IFRS_POST* is statistically and economically insignificant. More importantly, the coefficient on *LEASE* is negative and significant in both firm-level loan spread analysis and all country-level interest rate analyses. This evidence supports the conclusion that our cost of debt analyses are unlikely to be explained by mandatory IFRS adoption.

Lenders typically have access to private information about borrowers through their lending and monitoring activities (Harvey et al., 2004), and therefore it might be surprising why lenders would extend credit to firms with high operating leases with favorable credit terms before lease capitalization rules are passed. Incentives for bank loan officers might shed light on this question. Baker (2000) argues that

"*The typical incentive plan for loan officers in a bank involves paying for "originations": the loan officer receives a bonus for lending money. The puzzle about this type of incentive is that it gives the loan officer no incentive to search for and write "good" loans, that is, high-interest-rate loans that are likely to be repaid. Instead, loan officers have incentives to make any loan, and banks typically have credit committees (made up of higher-level bank officers) whose job it is to determine the creditworthiness of the potential debtor and to approve or deny the loan.*"

Loan officers might be aware of high operating leases but may not reflect this in their leverage calculations and loan decisions to be able to originate the loan. It will be hard to justify the loan with favorable credit terms to a firm with high leverage to credit committees within the bank and to secondary market participants after loan securitization.

4.10 Operating lease disclosures

In this section, we investigate one plausible source of the negative effects of lease capitalization rules on firm investment and firm operating performance. We conjecture that if the financial statement lease disclosures are of high quality such that financial statement users can easily calculate present value of future operating lease obligations from financial statement information, then lease capitalization rules might not have a material impact on lending decisions and hence firm-level investments. This is because financial statement users can calculate the present value of future operating lease obligations and can adjust riskiness of borrowers accordingly. On the other hand, if lease disclosures are of poor quality such that financial statement users do not have enough information to calculate the present value of future operating lease obligations, we expect them to reduce funding and / or increase cost of funding when firms start capitalizing their operating leases.

To investigate these conjectures, we search for annual reports of 20 firms from each of the six treatment countries immediately before these countries adopted hybrid lease model.[20] In particular, we focus on years 2001 and 2002 because our treatment countries started to adopt the hybrid model of lease accounting in 2003. We search for whether firms provide present value of their future operating lease obligations in their annual reports. Moreover, lenders are able to

[20] We select 20 largest firms from each country based on firm size and the amount of rent expenses reported by the firm.

calculate a good estimate of present value of future operating lease obligations in the absence of this amount disclosed in financial statements if they have information on (1) annual breakdown of future minimum operating lease payments and (2) operating lease interest rate (discount rate). In the absence of annual breakdown of future minimum operating lease payments, lenders can still calculate a reasonable present value of future operating lease obligations if they know current year operating lease expense and total future minimum operating lease payments. Similarly, a reasonable present value of future operating lease obligations could be calculated in the absence of operating lease interest rate by using current market interest rates or interest rates of the competitors.

Our findings are documented in Panel A, Table 13. Due to the non-availability of old annual reports, we have 68 annual reports in our sample. We find that only 15 percent of the observations provide separate lease footnote disclosures. More importantly, our sample firms never disclose annual breakdown of future minimum operating lease payments and they disclose lease interest rate in only one instance. There are only five cases where firms disclose the amount of current year operating lease expenses and total future minimum operating lease payments. Therefore, we conclude that financial statement users did not have enough information from financial statements to reliably estimate the present value of future operating lease obligations when treatment countries switched from the operating lease model to the hybrid lease model. This is presumably the reason why firm- and country-level lending interest rates (our proxy for the cost of borrowing) increased around lease capitalization rule changes.

What is the relevance of these findings when firms switch from the hybrid lease model to the capital lease model? One might argue that our results are not relevant anymore because firms around the world greatly improved their operating lease disclosures due to factors such as

globalization, IFRS adoption, global institutional investors and, therefore, lenders can now reliably estimate the present value of future operating lease obligations. To address this question, we examine firms' lease disclosures in 2015. Specifically, we follow our earlier data collection procedure and read annual reports of 20 firms from each of the sample countries (we have 41 countries in our sample). Our findings are documented in Panel B, Table 13. We find that 66 percent of our sample annual reports include a separate lease footnote. This number is definitely higher that what we find in 2001-2002 time period but is still considerably less than 100 percent. Interestingly 43 percent of annual reports still do not provide annual breakdown of future minimum operating lease payments, making it difficult for financial statement users to reliably estimate the present value of future operating lease payments. Similarly, only 58 percent of annual reports provide future total minimum operating lease payments. When we take a closer look at the country-level variation in our findings, firms from the following countries do not provide, for example, the annual breakdown of future minimum operating lease payments in more than 50 percent of sample observations: Chile, France, Italy, Japan, Latvia, Lithuania, Malta, Poland, Romania, Slovenia, South Korea, Spain, Turkey. Taken together, these descriptive statistics suggest that our findings are still relevant when firms switch from the hybrid lease model to the capital lease model because capital market participants do not always have enough information from financial statements to calculate the present value of future operating lease payments.

5. Conclusion

Lease accounting standards in the U.S. and in countries around the world using IFRS will change starting in 2019. The new standards will require capitalization of almost all operating leases and hence end the practice of keeping a major source of financing off-balance sheet. While this

change is expected to increase transparency of financing and facilitate credit risk evaluation by capital market participants, opponents argue that lease capitalization rules will have negative consequences, including increase in cost of financing and reduction in investment and employment levels. In this paper, we examine whether there is any merit to these arguments against lease capitalization rules.

Exploiting intertemporal variations in lease accounting rules in 41 countries over the 1995-2015 period, we show that lease capitalization rules negatively affect firm-level investment. We then conduct a battery of sensitivity checks to rule out alternative explanations and potential contemporaneous macroeconomic shocks driving the main results. Furthermore, we show that lease capitalization rules not only negatively affect firm-level investment but also firm-level profitability. Finally, we find investment and profitability results to be more pronounced when firms have higher reliance on operating lease financing and when firms have financial constraints. We conclude that the new lease capitalization rules may have negative consequences to economy-wide investment and employment levels.

Our findings are of interest to accounting regulators, firms and investors, and can inform the current debate on the real consequences of lease capitalization. However, we caution readers that we do not examine, in this paper, the impact of upcoming lease capitalization rules on investment directly. Instead, we use the setting where some countries switched from the operating lease model to the hybrid lease model to shed light on the question of what might happen when firms switch from the hybrid lease model to the capital lease model. While we undertake various tests to validate our setting, it is possible that the change from the hybrid lease model to the capital lease model will produce different effects than the change from the operating lease model to the hybrid lease model we examine. We leave it to future research to test actual real effects of

switching from the hybrid lease model to the capital lease model when data become available starting with 2019.

References

Abdel-Khalik, A. R.., Thomson R.B., Taylor, R.E., 1978. The impact of reporting leases of the balance sheet on bond risk premiums: two exploratory studies. Economic consequences of financial reporting standards: selected papers.

Aboody, D., 1996. Recognition versus disclosure on the oil and gas industry. Journal of Accounting Research 34: 21-32.

Ahmed, A., Kilic, E., Lobo, G., 2006. Does recognition versus disclosure matter? Evidence from value-relevance of banks' recognized and disclosed derivative financial instruments. The Accounting Review 81: 567-588.

Ahmed, A., Neel, M., Wang, D., 2013. Does mandatory adoption of IFRS improve accounting quality? Preliminary evidence. Contemporary Accounting Research 30: 1344-1372.

Altamuro, J., 2006. The determinants of synthetic lease financing and the impact on the cost of future debt. Working paper.

Altamuro, J., Johnston R., Pandit, S. Zhang, H., 2014. Operating leases and credit assessments. Contemporary Accounting Research 31: 551-580.

Baker, G., 2000. The use of performance measures in incentive contracting. The American Economic Review 90: 415-420.

Betrand, M., Duflo, E., Mullainathan, S., 2004. How much should we trust differences-in-differences estimates? Quarterly Journal of Economics 119: 249-275.

Betrand, M., Mullainathan, S., 2003. Enjoying the quiet life? Corporate governance and managerial preferences. Journal of Political Economy 111: 1043-1075.

Cornaggia, K., Franzen, L., Simin, T., 2013. Bringing leased assets onto the balance sheet. Journal of Corporate Finance 22: 345-360.

Covrig, V., DeFond, M., Hung., M., 2007. Home bias, foreign mutual fund holdings, and the voluntary adoption of international accounting standards. Journal of Accounting Research 45: 41-70.

Davis-Friday, P., Folami, B., Liu, C., Mittelstaedt, F., 1999. The value relevance of financial statement recognition vs. disclosure: Evidence from SFAS No. 106. The Accounting Review 74: 403-423.

DeFond, M., Hu, X., Hung, M., Li, S., 2011. The impact of mandatory IFRS adoption on foreign mutual fund ownership: The role of comparability. Journal of Accounting and Economics 51: 240-258.

Dhaliwal, D., Lee, H.S, Neamtiu, M., 2011. The impact of operating leases on firm financial and operating risk. Journal of Accounting, Auditing and Finance 26: 151-197.

El-Gazzar, S., 1993. Stock market effects of the closeness to debt covenant restriction resulting from capitalization of leases. The Accounting Review 68: 258-272.

Ely, K., 1995. Operating lease accounting and the market's assessment of equity risk. Journal of Accounting Research 33: 397-415.

Florou, A., Pope, P.F., 2012. Mandatory IFRS adoption and institutional investment decisions. The Accounting Review 87: 1993-2025.

Florou, A., Kosi, U., 2015. Does mandatory IFRS adoption facilitate debt financing? Review of Accounting Studies 20: 1407-1456.

Hadlock, C.J., Pierce, J.R., 2010. New evidence on measuring financial constraints: Moving beyond the KZ Index. Review of Financial Studies 23: 1909-1940.

Harvey, C. R., Lins, K.V., Roper, A.H., 2004. The effect of capital structure when expected agency costs are extreme. Journal of Financial Economics 74: 3-30.

Imbens, G., Wooldridge, J., 2009. Recent developments in the econometrics of program evaluation. Journal of Economic Literature 47: 5-86.

Imhoff, E., Lipe, R., Wright, D., 1993. The effects of recognition versus disclosure on shareholder risk and executive compensation. Journal of Auditing, Accounting and Finance 8: 335-368.

Imhoff, E., Thomas, J., 1988. Economic consequences of accounting standards: The lease disclosure rule change. Journal of Accounting and Economics 10: 277-310.

International Accounting Standards Board (IASB), 2014. Leases: Project update. Available at http://www.ifrs.org/Current-Projects/IASB-Projects/Leases/Documents/Project-Update-Leases-August-2014.pdf

Kraft, P., 2015. Rating agency adjustments to GAAP financial statements and their effect on ratings and credit spreads. The Accounting Review 90: 641-674.

Lim, S., Mann, S., Mihov, V., 2017. Do operating leases extend credit capacity? Evidence from borrowing costs and credit ratings. Journal of Corporate Finance 42: 100-114.

Muller, M., Riedl, E., Sellhorn, T., 2015. Recognition versus disclosure of fair values. The Accounting Review 90: 2411-2447.

Polk, C., Sapienza, P., 2009. The stock market and corporate investment: A test of catering theory. Review of Financial Studies 22: 187–217.

Wilkins, T., Zimmer, I., 1983. The effect of leasing and different methods of accounting for leases on credit evaluations. The Accounting Review 58: 749-764.

Appendix
Variable definitions

Main variables:	
LEASE	An indicator variable equal to one if capital lease is part of the lease accounting standards for country *k* in year *t*, and zero otherwise;
TOTAL DEBT	Total debt (dltt + dlc), scaled by average total assets (at) (Source: Compustat);
LONG-TERM DEBT	Long-term debt (dltt), scaled by average total assets (at) (Source: Compustat);
CAPEX	The log of capital expenditure (capx) in U.S. dollars (Source: Compustat);
EMPLOY	The log of total number of employees (emp) (Source: Compustat);
SALES	The log of total sales (sale) in U.S. dollars (Source: Compustat);
ROS	Earnings before extraordinary items (ib) divided by total sales (sale) (Source: Compustat);
Control variables:	
SIZE	The log of total assets (at) in U.S. dollars (Source: Compustat);
Q	The market value of assets divided by the book value of assets (at); market value of assets equals the book value of assets (at) plus the market value of common stock less the sum of book value of common stock (ceq) and balance sheet deferred taxes (txdb) (Source: Compustat);
CFO	The sum of earnings before extraordinary items (ib) and depreciation (dpc), scaled by total assets (at) (Source: Compustat);
GDP_CAPITA	The log of GDP per capita in thousands of U.S. dollars (source: World Bank);
GDP_GROWTH	The annual percentage growth rate in GDP per capita (source: World Bank);
POPULATION	The log of a country's population in millions (source: Penn World Table 9.0);
HC	Human capital index, based on years of schooling and returns to education (source: Penn World Table 9.0);
CPI	Consumer price index (source: World Bank);
UNEMPLOYMENT	Unemployment rate, the ratio of unemployment divided by labor force (source: World Bank);
INTEREST_RATE	Deposit interest rate (source: World Bank);

(continued)

Variable definitions *(continued)*

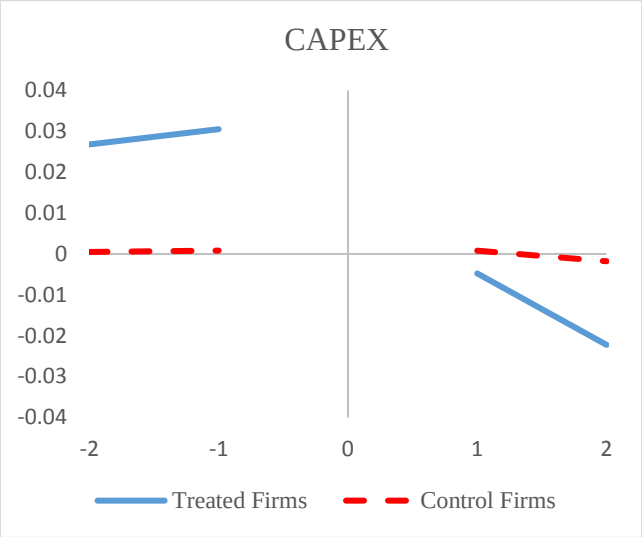
TAX_REV	Tax revenue as a percentage of country GDP (source: World Bank);
UNION_INTENSITY	The ratio of union membership divided by employment (source: OECD);
Cross-sectional variables:	
RENT EXPENSE	Rent expense (xrent) scaled by total sales (sale);
SA INDEX	Proxy for financial constraints. Following Hadlock and Pierce (2010), the SA index is calculated as: -0.737 * (Size) + 0.043 * ($Size^2$) – 0.040 * (Age), where Size equals the logarithm of total assets in U.S. dollars, and Age is the number of years the firm is listed on Compustat (Source: Compustat);
Country-level interest rates:	
SPREAD	The interest rate charged by banks on loans to private sector customers (lending interest rate) minus the interest rate paid by commercial or similar banks for demand, time, or savings deposits (source: World Bank);
RISK_PREMIUM	Lending interest rate minus the risk-free treasury bill interest rate (source: World Bank);
REAL_RATE	Lending interest rate adjusted for inflation (Source: World Bank).
Loan-level variables:	
LOAN_SPREAD	Loan's spread quoted in basis points over a floating benchmark, multiplied by 100 (Source: DealScan).
RATING	Numerical credit rating of the loan issue where lower values mean higher credit quality. We use RATING orthogonal to change in lease rules in the empirical analysis (Source: Compustat).
LIFE	Loan's maturity in years (Source: DealScan).
AMOUNT	Total dollar face value of the loan issue (Source: DealScan).
PURPOSE_REPAYMENT	Indicator variable equal to one if the loan is taken to repay existing debt, and zero otherwise (Source: DealScan).
PURPOSE_INVESTMENT	Indicator variable equal to one if the loan is taken for corporate investment purposes, and zero otherwise (Source: DealScan).
PURPOSE_WC	Indicator variable equal to one if the loan is taken to finance working capital needs, and zero otherwise (Source: DealScan).

(continued)

Variable definitions *(continued)*

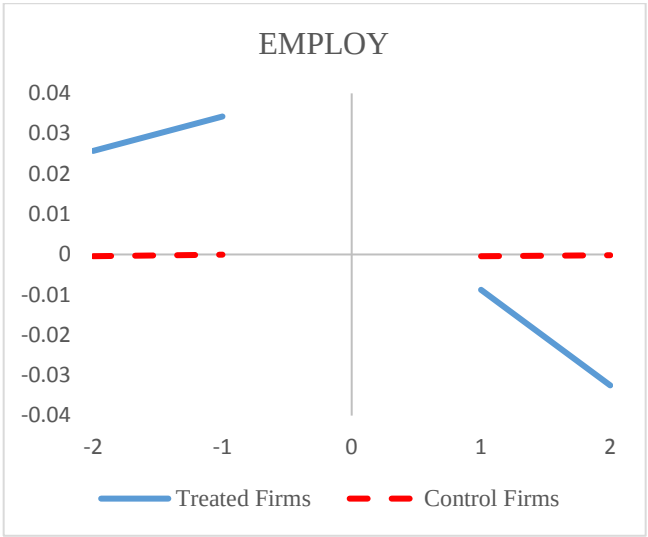
GENERAL_COV	Number of general covenants in the loan contract (Source: DealScan).
NUM_LENDER	Number of individual banks that participate in the loan (Source: DealScan).
REVOLVER	Indicator variable equal to one if the loan is revolving, and zero otherwise (Source: DealScan).
TERM_MIX	Percentage of individual loans in the loan package with a specified repayment schedule and maturity (Source: DealScan).
SENIOR	Indicator variable equal to one if the loan is senior, and zero otherwise (Source: DealScan).
SECURE	Indicator variable equal to one if the loan is secured, and zero otherwise (Source: DealScan).

Figure 1
Firm investment around lease accounting standard changes



This figure plots the within-firm variation in capital expenditures (CAPEX), as a function of changes in lease accounting standards, net of firm-specific and country-specific characteristics, as well as firm and industry*year fixed effects that remove the effect of firm-specific time-invariant characteristics and time-varying industry investment cycles, respectively. The average annual CAPEX for the group of treated firms (solid line) in years t = -2 to t = +2 is compared to the ones for control firms (dotted line). t = 0 corresponds to the year of the change.

Figure 2
Firm employment around lease accounting standard changes



This figure plots the within-firm variation in employment (EMPLOY), as a function of changes in lease accounting standards, net of firm-specific and country-specific characteristics, as well as firm and industry*year fixed effects that remove the effect of firm-specific time-invariant characteristics and time-varying industry investment cycles, respectively. The average annual EMPLOY for the group of treated firms (solid line) in years t = -2 to t = +2 is compared to the ones for control firms (dotted line). t = 0 corresponds to the year of the change.

Table 1
Distribution of observations by country and changes in lease standards

Country	Number of firm-year observations	Percentage	Number of firms	Percentage	Year of change
Australia	4,008	2.01	755	3.34	-
Austria	417	0.21	58	0.26	-
Belgium	981	0.49	103	0.46	-
Bulgaria	39	0.02	11	0.05	-
Canada	9,598	4.81	1,381	6.11	-
Chile	49	0.02	13	0.06	-
Croatia	193	0.10	31	0.14	-
Cyprus	130	0.07	20	0.09	2003
Czech Republic	118	0.06	17	0.08	2005
Denmark	1,236	0.62	137	0.61	-
Estonia	131	0.07	16	0.07	-
Finland	1,456	0.73	133	0.59	-
France	5,653	2.84	742	3.28	-
Germany	5,497	2.76	694	3.07	-
Greece	689	0.35	110	0.49	2005
Hungary	165	0.08	19	0.08	-
Iceland	43	0.02	7	0.03	-
Ireland	939	0.47	99	0.44	-
Israel	483	0.24	69	0.31	-
Italy	1,811	0.91	250	1.11	2005
Japan	52,008	26.09	4,140	18.32	-
Latvia	208	0.10	29	0.13	-
Lithuania	305	0.15	40	0.18	-
Luxembourg	223	0.11	44	0.19	-
Malta	90	0.05	14	0.06	-
Mexico	280	0.14	42	0.19	-
Netherlands	1,921	0.96	226	1.00	-
New Zealand	347	0.17	67	0.30	-
Norway	1,621	0.81	221	0.98	-
Poland	262	0.13	56	0.25	-
Portugal	208	0.10	32	0.14	-
Romania	85	0.04	24	0.11	-
Slovak Republic	37	0.02	7	0.03	2005
Slovenia	139	0.07	17	0.08	-

(continued)

Table 1 *(continued)*

Country	Number of firm-year observations	Percentage	Number of firms	Percentage	Year of change
South Korea	3,564	1.79	698	3.09	-
Spain	816	0.41	118	0.52	-
Sweden	2,304	1.16	296	1.31	-
Switzerland	2,481	1.24	225	1.00	-
Turkey	924	0.46	127	0.56	2003
United Kingdom	16,100	8.08	1,956	8.66	-
United States	81,801	41.03	9,552	42.27	-
Total	199,360	100.00	22,596	100.00	

This table reports the distribution of observations in our sample across countries (Column 1), the number of unique firms across countries (Column 3), and their percentages relative to the whole sample (Column 2 and Column 4, respectively). Column 5 of the table reports the years of changes in lease accounting standards.

Table 2
Summary statistics and correlations

Panel A. Summary statistics

VARIABLES	N	Mean	S.D.	25th	Median	75th
LEASE	199,360	0.994	0.0786	1	1	1
TOTAL DEBT	191,991	0.226	0.215	0.035	0.185	0.349
LONG-TERM DEBT	191,991	0.142	0.173	0.002	0.081	0.221
CAPEX	199,360	0.792	1.110	0.051	0.824	1.558
EMPLOY	199,360	-0.126	0.882	-0.717	-0.143	0.478
SIZE	199,360	2.339	0.913	1.742	2.316	2.926
Q	199,360	1.866	2.044	0.933	1.218	1.885
CFO	199,360	-0.003	0.291	0.015	0.062	0.106
SALES	188,192	2.250	1.008	1.674	2.295	2.909
ROS	182,779	-0.175	2.153	-0.015	0.024	0.064
GDP_CAPITA	199,360	1.628	0.102	1.604	1.640	1.678
GDP_GROWTH	199,360	1.342	1.935	0.610	1.626	2.423

Panel B. Correlations

	LEASE	TOTAL DEBT	LT DEBT	CAPEX	EMPLOY	SALES	ROS	SIZE	Q	CFO	GDP CAPITA	GDP GROWTH
LEASE		***0.008***	***0.017***	***-0.032***	***-0.027***	***-0.016***	***-0.015***	***-0.030***	***0.027***	***-0.020***	***0.105***	***-0.006***
TOTAL DEBT	0.002		***0.827***	***0.166***	***0.106***	***0.114***	***0.010***	***0.143***	***-0.020***	***-0.096***	***-0.019***	***0.021***
LT DEBT	***0.007***	***0.849***		***0.284***	***0.189***	***0.181***	***0.029***	***0.245***	***-0.032***	0.001	***0.054***	***0.037***
CAPEX	***-0.034***	***0.255***	***0.383***		***0.765***	***0.811***	***0.200***	***0.872***	***-0.142***	***0.319***	***0.029***	***-0.013***
EMPLOY	***-0.029***	***0.205***	***0.310***	***0.771***		***0.880***	***0.269***	***0.826***	***-0.177***	***0.311***	***0.022***	***-0.025***
SALES	***-0.017***	***0.216***	***0.302***	***0.809***	***0.882***		***0.375***	***0.926***	***-0.227***	***0.378***	***0.041***	***-0.074***
ROS	***-0.021***	***-0.107***	0.002	***0.278***	***0.226***	***0.257***		***0.220***	***-0.232***	***0.688***	***-0.064***	0.002
SIZE	***-0.031***	***0.233***	***0.341***	***0.866***	***0.825***	***0.929***	***0.264***		***-0.214***	***0.318***	***0.053***	***-0.087***
Q	***0.035***	***-0.090***	***-0.045***	***-0.009***	***-0.053***	***-0.096***	***0.173***	***-0.103***		***-0.221***	***0.086***	***0.092***
CFO	***-0.014***	***-0.089***	***0.027***	***0.308***	***0.266***	***0.270***	***0.835***	***0.203***	***0.224***		***-0.059***	***0.025***
GDP_CAPITA	***0.121***	***-0.035***	***0.026***	***0.063***	***0.015***	***0.053***	***-0.009***	***0.085***	***0.158***	***-0.011***		***-0.161***
GDP_GROWTH	0.003	***0.019***	***0.033***	***-0.024***	***-0.027***	***-0.089***	***0.061***	***-0.106***	***0.139***	***0.087***	***-0.168***	

This table reports summary statistics (Panel A) and correlations (Panel B) for variables used in the analysis. Panel B presents the Pearson (above diagonal) and Spearman (below diagonal) pairwise correlation coefficients. Pairwise correlations that are statistically significant at the 1% (5%) level are denoted in ***bold-italics*** (*italics*). All continuous variables are winsorized at 1% and 99% level. The sample consists of 199,360 firm-years for all non-financial and non-utility firms in Compustat North America and Compustat Global for the forty-one countries in our sample. It covers the period 1995 – 2015. All variables are defined in the Appendix.

Table 3
Lease capitalization and firm leverage

	TOTAL DEBT	LONG-TERM DEBT
	(1)	(2)
LEASE	**0.043*** **	**0.030*** **
	(3.46)	**(2.87)**
SIZE	0.020	0.028***
	(0.97)	(3.55)
Q	0.002**	0.002***
	(2.57)	(2.85)
CFO	-0.109***	-0.050***
	(-13.06)	(-16.27)
GDP_CAPITA	0.047	-0.015
	(0.88)	(-0.32)
GDP_GROWTH	-0.002**	0.000
	(-2.02)	(0.54)
Firm FE	Yes	Yes
Industry * Year FE	Yes	Yes
Cluster	Country	Country
Adjusted R-squared	0.696	0.661
Observations	191,991	191,991

This table reports the results of regressions of leverage on the LEASE indicator. In Column 1, the dependent variable is total debt scaled by average total assets, and in Column 2, the dependent variable is long-term debt scaled by average total assets. The dependent variables are measured at year $t + 1$. The regressions control for size, Tobin's Q, cash flow, and country-level controls (GDP per capita and growth in GDP per capita). Firm and industry/year fixed effects are included in all columns. Robust t-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the country level. All continuous variables are winsorized at the 1% tails. All variables are defined in the Appendix.

Table 4
Lease capitalization, capital expenditures, and employment: Baseline results

	CAPEX	EMPLOY
	(1)	(2)
LEASE	**-0.140*** **	**-0.082** **
	(-2.99)	**(-2.10)**
SIZE	0.767***	0.578***
	(35.86)	(61.68)
Q	0.056***	0.020***
	(20.98)	(8.50)
CFO	0.203***	0.006
	(9.31)	(1.18)
GDP_CAPITA	0.215	0.106
	(0.22)	(0.15)
GDP_GROWTH	0.024***	0.015***
	(4.89)	(3.47)
Firm FE	Yes	Yes
Industry * Year FE	Yes	Yes
Cluster	Country	Country
Adjusted R-squared	0.804	0.858
Observations	199,360	199,360

This table reports the results of regressions of investment on the LEASE indicator. In Column 1, the dependent variable is capital expenditures (CAPEX), and in Column 2, the dependent variable is employment (EMPLOY). The dependent variables are measured at year $t + 1$. The regressions control for size, Tobin's Q, cash flow, and country-level controls (GDP per capita and growth in GDP per capita). Firm and industry/year fixed effects are included in all columns. Robust t-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the country level. All continuous variables are winsorized at the 1% tails. All variables are defined in the Appendix.

Table 5
Dynamic effects, matching, business-cycle effects, and correlated omitted variables

Panel A. Dynamic effects of changes in lease accounting standards

	CAPEX	EMPLOY
	(1)	(2)
BEFORE^{-2}	**-0.016**	**-0.012**
	(-0.65)	**(-0.63)**
BEFORE^{-1}	**-0.030**	**-0.012**
	(-1.24)	**(-0.95)**
BEFORE^{0}	**-0.001**	**0.008**
	(-0.01)	**(0.26)**
AFTER^{1}	**-0.170**	**-0.090**
	(-1.41)	**(-1.59)**
AFTER^{2+}	**-0.163*****	**-0.104****
	(-3.16)	**(-2.28)**
SIZE	0.768***	0.578***
	(36.20)	(61.55)
Q	0.056***	0.020***
	(21.36)	(8.53)
CFO	0.203***	0.006
	(9.32)	(1.16)
GDP_CAPITA	0.176	0.075
	(0.18)	(0.10)
GDP_GROWTH	0.024***	0.015***
	(4.84)	(3.42)
Firm FE	Yes	Yes
Industry * Year FE	Yes	Yes
Cluster	Country	Country
Adjusted R-squared	0.804	0.858
Observations	199,360	199,360

Panel B. Matching, business-cycle effects, and correlated omitted variables

	CAPEX				EMPLOY			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LEASE	**-0.142*** **	**-0.136*** **	**-0.130** **	**-0.138*** **	**-0.115*** **	**-0.114*** **	**-0.073* **	**-0.084** **
	(-6.00)	**(-4.06)**	**(-2.58)**	**(-2.94)**	**(-3.09)**	**(-4.44)**	**(-1.85)**	**(-2.08)**
LEASE_OTHER				**0.023**				**-0.008**
				(0.86)				**(-0.44)**
SIZE	0.778***	0.741***	0.748***	0.767***	0.683***	0.555***	0.565***	0.578***
	(11.05)	(31.71)	(28.60)	(35.88)	(13.76)	(55.35)	(47.05)	(61.95)
Q	0.023***	0.055***	0.055***	0.056***	0.006	0.018***	0.020***	0.020***
	(2.86)	(17.66)	(18.81)	(20.98)	(1.14)	(6.79)	(7.54)	(8.43)
CFO	0.843***	0.204***	0.206***	0.204***	0.213	0.003	0.010**	0.006
	(6.36)	(10.00)	(8.99)	(9.33)	(1.40)	(0.78)	(2.17)	(1.16)
GDP_CAPITA	0.836	0.265	0.957	0.315	-0.085	-0.251	0.692	0.070
	(0.82)	(0.54)	(0.89)	(0.31)	(-0.14)	(-0.72)	(0.88)	(0.09)
GDP_GROWTH	0.023***	0.008	0.022***	0.024***	0.014*	0.006	0.013***	0.015***
	(2.89)	(1.21)	(4.88)	(4.94)	(1.85)	(1.15)	(2.87)	(3.46)
POPULATION			3.776**				2.260*	
			(2.42)				(2.03)	
HC			-0.093				-0.068	
			(-0.28)				(-0.24)	
CPI			-0.043***				-0.034**	
			(-2.80)				(-2.62)	
UNEMPLOYMENT			-0.013**				-0.008	
			(-2.58)				(-1.67)	
INTEREST_RATE			0.015				0.012	
			(1.48)				(1.56)	

(continued)

Panel B (continued)

	CAPEX				EMPLOY			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TAX_REVENUE			0.002				-0.005	
			(0.18)				(-0.78)	
UNION_INTENSITY			0.006				0.003	
			(0.89)				(0.60)	
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry * Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region * Year FE	No	Yes	No	No	No	Yes	No	No
Cluster	Country	Country	Country	Country	Country	Country	Country	Country
Adjusted R-squared	0.714	0.857	0.807	0.804	0.756	0.910	0.860	0.858
Observations	7,394	199,360	194,708	199,360	7,394	199,360	194,708	199,360

This table reports the results of regressions of investment on the LEASE indicator. Panel A reports results from the dynamic analysis. In this analysis, we replace the LEASE dummy with five dummy variables: $BEFORE^{-2}$ is a dummy variable that equals one for firms incorporated in a country that will change lease accounting standards two years later, $BEFORE^{-1}$ is a dummy variable that equals one for firms incorporated in a country that will change lease accounting standards next year, $BEFORE^{0}$ is a dummy variable that equals one for firms incorporated in a country that changes lease accounting standards in that year, $AFTER^{1}$ is a dummy variable that equals one for firms incorporated in a country that changed lease accounting standards last year; and $AFTER^{2+}$ is a dummy variable that equals one for firms incorporated in a country that changed lease accounting standards at least two years ago. In Panel A, Column 1, the dependent variable is capital expenditures (CAPEX), and in Column 2, the dependent variable is employment (EMPLOY). The dependent variables are measured at year $t + 1$. The regressions control for size, Tobin's Q, cash flow, and country-level controls (GDP per capita and growth in GDP per capita). Panel B reports results from propensity-score matching, business cycle effects, and correlated omitted variables. In Columns 1 - 4, the dependent variable is capital expenditures (CAPEX), and in Columns 5 - 8, the dependent variable is employment (EMPLOY). The dependent variables are measured at year $t + 1$. The regressions control for size, Tobin's Q, cash flow, and country-level controls (GDP per capita and growth in GDP per capita). Firm and industry/year fixed effects are included in all columns. Columns 1 and 5 match treated and control firms using a multivariate propensity score methodology. Columns 2 and 6 also include region/year fixed effects. Columns 3 and 7 include additional country-level controls (population, human capital index, inflation, unemployment rate, interest rate, tax revenue as a percentage of GDP, and union density). Columns 4 and 8 also include LEASE_OTHER indicator. LEASE_OTHER is computed as the average LEASE indicator in year *t* for the neighboring countries. We call neighboring countries those which share common borders. Robust t-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the country level. All continuous variables are winsorized at the 1% tails. All variables are defined in the Appendix.

Table 6
Lease capitalization and employment: Private versus public firms

	EMPLOY
	(1)
LEASE	0.029**
	(2.14)
LEASE * PUBLIC	-0.165***
	(-8.57)
SIZE	0.310***
	(18.94)
Q	0.002**
	(2.19)
CFO	0.066***
	(5.33)
GDP_CAPITA	-0.038
	(-0.29)
GDP_GROWTH	-0.000
	(-0.06)
Firm FE	Yes
Industry * Year FE	Yes
Cluster	Country
Adjusted R-Squared	0.945
Observations	1,274,700

This table reports the results of regressions of investment on the LEASE indicator. The dependent variable is employment (EMPLOY) and is measured at year $t + 1$. We include all private and public firms from Amadeus database universe and Compustat database universe, respectively, in our sample. PUBLIC is an indicator variable equal to one if the firm is publicly traded and, zero otherwise. The regression controls for size, Tobin's Q, cash flow, and country-level controls (GDP per capita and growth in GDP per capita). Firm and industry/year fixed effects are included in all columns. Robust t-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the country level. All continuous variables are winsorized at the 1% tails. All variables are defined in the Appendix.

Table 7
Shorter sample period and dropping U.S. firms

	CAPEX		EMPLOY	
	(1)	(2)	(3)	(4)
LEASE	**-0.125***	**-0.126*****	**-0.096***	**-0.103*****
	(-1.78)	**(-3.21)**	**(-1.87)**	**(-2.78)**
SIZE	0.609***	0.707***	0.448***	0.574***
	(28.48)	(21.93)	(30.67)	(22.56)
Q	0.045***	0.052***	0.018***	0.016***
	(12.02)	(9.96)	(5.27)	(4.58)
CFO	0.164***	0.262***	0.013*	0.006
	(7.01)	(5.29)	(1.71)	(0.40)
GDP_CAPITA	-4.948***	-0.450	-3.11***	-0.483
	(-3.23)	(-0.60)	(-3.20)	(-0.87)
GDP_GROWTH	0.029**	0.021***	0.022**	0.013***
	(2.50)	(4.05)	(2.31)	(3.10)
Firm FE	Yes	Yes	Yes	Yes
Industry * Year FE	Yes	Yes	Yes	Yes
Cluster	Country	Country	Country	Country
Adjusted R-squared	0.871	0.779	0.928	0.833
Observations	71,152	117,504	71,152	117,504

This table reports the results of regressions of investment on the LEASE indicator. In Columns 1 and 2, the dependent variable is capital expenditures (CAPEX), and in Columns 3 and 4, the dependent variable is employment (EMPLOY). The dependent variables are measured at year $t + 1$. In Columns 1 and 3, we restrict the sample period to two years before and two years after the change in lease accounting standards (i.e., five-year window including the year of change). In Columns 2 and 4, we drop U.S. firms. The regressions control for size, Tobin's Q, and cash flow. In addition, they include country-level controls (GDP per capita and growth in GDP per capita). Firm and industry/year fixed effects are included in all columns. Robust t-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the country level. All continuous variables are winsorized at the 1% tails. All variables are defined in the Appendix.

Table 8
Confounding event: Mandatory IFRS adoption

	CAPEX			EMPLOY		
	(1)	(2)	(3)	(4)	(5)	(6)
LEASE	**-0.105****	**-0.112****	**-0.202****	**-0.078***	**-0.099****	**-0.182*****
	(-2.04)	**(-2.33)**	**(-2.57)**	**(-1.72)**	**(-2.45)**	**(-2.94)**
IFRS_POST	-0.043			-0.012		
	(-1.02)			(-0.47)		
SIZE	0.770***	0.746***	0.769***	0.579***	0.610***	0.578***
	(35.94)	(36.93)	(37.64)	(62.27)	(26.21)	(60.65)
Q	0.056***	0.048***	0.056***	0.020***	0.018***	0.020***
	(20.99)	(12.07)	(21.41)	(8.34)	(6.89)	(8.67)
CFO	0.203***	0.204***	0.202***	0.006	0.005	0.006
	(9.25)	(4.00)	(9.58)	(1.18)	(0.22)	(1.10)
GDP	0.372	0.819	-0.748	0.151	0.226	-0.466
	(0.38)	(1.00)	(-0.76)	(0.20)	(0.33)	(-0.56)
GDP_GROWTH	0.023***	0.009	0.025***	0.015***	0.001	0.016***
	(4.85)	(1.19)	(5.21)	(3.35)	(0.21)	(3.86)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Country	Country	Country	Country	Country	Country
Adjusted R-squared	0.804	0.814	0.805	0.858	0.862	0.859
Observations	199,360	49,325	196,620	199,360	49,325	196,620

This table reports the results of regressions of investment on the LEASE indicator. In Columns 1 and 4, we add an indicator variable IFRS_POST to the regression model to mitigate the confounding effect of IFRS adoption in our results. IFRS_POST is equal one for firm-years after a country has mandatorily adopted IFRS and zero, otherwise. In Columns 2 and 5, we restrict our sample to firm-years from countries that mandatorily adopted IFRS in 2005. In Columns 3 and 6, the treatment sample is restricted only to observations from Turkey. The dependent variables are measured at year $t + 1$. The regressions control for size, Tobin's Q, and cash flow. In addition, they include country-level controls (GDP per capita and growth in GDP per capita). Firm and industry/year fixed effects are included in all columns. Robust t-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the country level. All continuous variables are winsorized at the 1% tails. All variables are defined in the Appendix.

Table 9
Lease capitalization and investment: Cross-sectional heterogeneity

	CS = HRE				CS = HSA			
	CAPEX		EMPLOY		CAPEX		EMPLOY	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LEASE	**-0.134*** **		**-0.072**		**-0.114** **		**-0.067**	
	(-2.74)		**(-1.55)**		**(-2.10)**		**(-1.41)**	
LEASE * CS	**-0.027**	**-0.057*** **	**-0.071** **	**-0.080*** **	**-0.065*** **	**-0.062*** **	**-0.034*** **	**-0.041*** **
	(-1.42)	**(-3.18)**	**(-2.58)**	**(-2.77)**	**(-3.47)**	**(-3.44)**	**(-3.35)**	**(-3.52)**
CS	0.002	0.033	0.054**	0.065**	-0.023	-0.022	0.024*	0.025**
	(0.10)	(1.48)	(1.96)	(2.21)	(-1.06)	(-0.96)	(1.94)	(2.32)
Firm-level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-level Controls	Yes	No	Yes	No	Yes	No	Yes	No
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry * Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country * Year FE	No	Yes	No	Yes	No	Yes	No	Yes
Cluster	Country	Country	Country	Country	Country	Country	Country	Country
Adjusted R-squared	0.804	0.822	0.858	0.876	0.803	0.823	0.851	0.871
Observations	199,360	199,360	199,360	199,360	199,360	199,360	199,360	199,360

This table reports the results of regressions of cross-sectional heterogeneity on the relationship between lease capitalization and investment. The dependent variables are measured at year $t + 1$. The cross-sectional variable, HRE, is equal to one if firm *i* has rent expense / sales in the highest quartile, and 0 otherwise. HSA is equal to one if firm *i* has an SA index of Hadlock and Pierce (2010) in the highest quartile, and 0 otherwise. The regressions control for size, Tobin's Q, and cash flow. In addition, Columns 1, 3, 5, and 7 include country-level controls (GDP per capita and growth in GDP per capita). Firm and industry/year fixed effects are included in all columns. Columns 2, 4, 6, and 8 also include country/year fixed effects. Robust t-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the country level. All continuous variables are winsorized at the 1% tails. All variables are defined in the Appendix.

Table 10
Lease capitalization and firm performance

	SALES	ROS
	(1)	(2)
LEASE	**-0.080*** **	**-0.123*** **
	(-3.23)	**(-3.44)**
SIZE	0.628***	-0.093***
	(88.67)	(-9.80)
Q	0.021***	0.013***
	(13.15)	(6.21)
CFO	0.096***	0.396***
	(12.05)	(15.05)
GDP_CAPITA	-0.058	0.059
	(-0.12)	(0.06)
GDP_GROWTH	0.005***	0.000
	(2.98)	(0.09)
Firm FE	Yes	Yes
Industry * Year FE	Yes	Yes
Cluster	Country	Country
Adjusted R-squared	0.914	0.490
Observations	188,192	182,779

This table reports the results of regressions of firm performance on the LEASE indicator. In Column 1, the dependent variable is total sales (SALES), and in Column 2, the dependent variable is return on sales (ROS). The dependent variables are measured at year $t + 1$. The regressions control for size, Tobin's Q, cash flow, and country-level controls (GDP per capita and growth in GDP per capita). Firm and industry/year fixed effects are included in all columns. Robust t-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the country level. All continuous variables are winsorized at the 1% tails. All variables are defined in the Appendix.

Table 11
Lease capitalization and firm performance: Cross-sectional heterogeneity

	CS = HRE				CS = HSA			
	SALES		ROS		SALES		ROS	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LEASE	**-0.062****		**-0.093****		**-0.067*****		**-0.109*****	
	(-2.44)		**(-2.68)**		**(-2.76)**		**(-3.28)**	
LEASE * CS	**-0.081*****	**-0.084*****	**-0.109*****	**-0.101*****	**-0.047*****	**-0.030****	**-0.047*****	**-0.053***
	(-3.35)	**(-3.36)**	**(-3.43)**	**(-3.16)**	**(-4.25)**	**(-2.16)**	**(-3.89)**	**(-1.71)**
CS	0.026***	0.027***	0.044**	0.022*	0.025***	0.014	0.058***	0.064**
	(4.52)	(4.53)	(2.65)	(1.80)	(2.14)	(0.89)	(4.39)	(2.03)
Firm-level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-level Controls	Yes	No	Yes	No	Yes	No	Yes	No
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry * Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country * Year FE	No	Yes	No	Yes	No	Yes	No	Yes
Cluster	Country	Country	Country	Country	Country	Country	Country	Country
Adjusted R-squared	0.914	0.917	0.491	0.505	0.914	0.917	0.491	0.504
Observations	188,192	188,192	182,779	182,779	188,192	188,192	182,779	182,779

This table reports the results of regressions of cross-sectional heterogeneity on the relationship between lease capitalization and firm performance. The dependent variables are measured at year $t + 1$. The cross-sectional variable, HRE, is equal to one if firm *i* has rent expense / sales in the highest quartile, and 0 otherwise. HSA is equal to one if firm *i* has an SA index of Hadlock and Pierce (2010) in the highest quartile, and 0 otherwise. The regressions control for size, Tobin's Q, and cash flow. In addition, Columns 1, 3, 5, and 7 include country-level controls (GDP per capita and growth in GDP per capita). Firm and industry/year fixed effects are included in all columns. Columns 2, 4, 6, and 8 also include country/year fixed effects. Robust t-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the country level. All continuous variables are winsorized at the 1% tails. All variables are defined in the Appendix.

Table 12
Lease capitalization and cost of debt

Panel A. Loan-level evidence

	LOAN_SPREAD
	(1)
LEASE	0.355***
	(5.07)
SIZE	-0.397***
	(-6.81)
Q	-0.127***
	(-11.44)
CFO	-1.355***
	(-10.89)
GDP_CAPITA	0.428
	(0.34)
GDP_GROWTH	-0.089***
	(-3.35)
Loan-level Controls	Yes
Firm FE	Yes
Industry * Year FE	Yes
Cluster	Country
Adjusted R-Squared	0.680
Observations	21,281

Panel B: Country-level evidence

	SPREAD	RISK_PREMIUM	REAL_RATE
	(1)	(2)	(3)
LEASE	**1.297*** **	**1.022***	**1.159***
	(2.28)	**(1.79)**	**(1.73)**
GDP_CAPITA	-1.843**	-0.901	3.582*
	(-2.34)	(-0.74)	(1.91)
GDP_GROWTH	-0.101***	-0.100***	-0.441***
	(-4.92)	(-2.88)	(-8.29)
Year FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Cluster	Country	Country	Country
Adjusted R-squared	0.761	0.671	0.419
Observations	404	476	476

This table examines the relationship between lease capitalization rules and cost of debt. Panel A reports the results of the regression of loan spread (LOAN_SPREAD) on LEASE indicator. LOAN_SPREAD is loan's spread over a floating benchmark in percentages. The regression controls for size, Tobin's Q, cash flow, and country-level controls (GDP per capita and growth in GDP per capita). In addition, the model has loan-level controls including rating of the firm, life of the loan, amount of the loan, loan purpose indicators, number of general covenants, number of lenders, revolving loan indicator, term mix of the loan, senior loan indicator, and secured loan indicator. Firm and industry/year fixed effects are included in all columns. Panel B reports the results of regressions of country-level interest rates (SPREAD, RISK_PREMIUM, and REAL_RATE) on the LEASE indicator. SPREAD is the interest rate charged by banks on loans to private sector customers (the lending rate) minus the interest rate paid by commercial or similar banks for demand, time, and savings deposit. RISK_PREMIUM is the lending interest rate minus risk-free rate. REAL_RATE is the lending interest rate adjusted for inflation. The regressions control for GDP per capita and growth in GDP per capita. Year and country fixed effects are included in all columns.Standard errors are clustered at the country level. Robust t-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. All continuous variables are winsorized at the 1% tails. All variables are defined in the Appendix.

Table 13
Operating lease disclosures

Panel A. Operating lease disclosures for treatment countries in 2001-2002

	Observations	Frequency
Is there a separate lease footnote?	68	10
Does the firm disclose the amount of current year operating lease expense?	68	5
Does the firm disclose total future minimum operating lease payments?	68	5
Does the firm disclose an estimate of the present value of future operating lease payments?	68	2
Does the firm disclose the annual breakdown of future minimum operating lease payments?	68	0
Does the firm mention lease interest rate?	68	1
Does the firm provide lease disclosures in a tabular format?	68	5

Panel B. Operating lease disclosures for sample countries in 2015

	Observations	Frequency
Is there a separate lease footnote?	767	506
Does the firm disclose the amount of current year operating lease expense?	767	243
Does the firm disclose total future minimum operating lease payments?	767	447
Does the firm disclose an estimate of the present value of future operating lease payments?	767	3
Does the firm disclose the annual breakdown of future minimum operating lease payments?	767	435
Does the firm mention lease interest rate?	767	7
Does the firm provide lease disclosures in a tabular format?	767	439

This table presents descriptive statistics on quality of operating lease disclosures for treatment countries (i.e., Cyprus, Czech Republic, Greece, Italy, Slovak Republic, and Turkey) in 2001-2002 in Panel A and for all 41 sample countries in 2015 in Panel B.