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The economic implications of the earnings impact from lease capitalization

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ABSTRACT

We observe a substantial earnings impact from capitalizing the operating leases for firms on Compustat over 1996–2010. This earnings impact is derived from the disclosed lease information and is similar to the earnings difference that arises from applying the accelerated versus the straight-line model, two alternative models proposed by the Financial Accounting Standards Board and the International Accounting Standards Board (the Boards) in 2013 to account for lease expense for lessees. Our focus is on the economic implications of this earnings impact. Applying a one-year cash flow prediction model, we observe a significant relationship between the negative impact and future operating cash flows. Using a return-earnings model, we find that both negative and positive impacts possess an incremental explanatory power for contemporaneous stock returns beyond reported earnings. Our findings provide timely empirical evidence for the Boards to evaluate two alternative models for lessees' expenses as they are in the midst of redeliberations of accounting for leases.

1. Introduction

According to the extant accounting standards for leases (i.e., Accounting Standards Codification (ASC) 840), companies have two options in reporting leases: reporting them as operating leases or as capital leases. Operating lease reporting is usually preferred by companies as it keeps both the leased assets and liabilities off the balance sheet, with future lease liabilities disclosed only in footnotes. Capital lease reporting, on the other hand, requires both leased assets and liabilities to be reported on the balance sheet. Prior studies not only report that significant lease liabilities have been kept off the balance sheet via operating lease reporting (Beattie, Edwards, & Goodacre, 1998; Bennett & Bradbury, 2003; Duke, Hsieh, & Su, 2009; Imhoff, Lipe, & Wright, 1991),[3] but they also find that the disclosed operating lease liabilities, through the process of constructive operating lease capitalization, are positively associated with equity risk (Bratten, Choudhary, & Schipper, 2013; Dhaliwal, Lee, & Neamtiu, 2011; Ely, 1995; Imhoff, Lipe, & Wright, 1993), the cost of debt (Bratten et al., 2013) and bond ratings (Sengupta & Wang, 2011), despite the off-balance sheet nature of these liabilities.[4]

In addition to the liability impact, the alternative lease reporting can also have a different impact on reported earnings. For a capital lease, the lessee's expense includes depreciation on the leased asset(s) and interest expense on the remaining lease liability, whereas it is only the lease payment for an operating lease. Although the total expenses charged under operating versus capital leases are the same over the lease term, the capital lease expense is often greater than the operating lease expense in the early part of a lease term. This is because depreciation plus interest expense (i.e., the capital lease expense) usually exceeds the lease payment (i.e., the operating lease expense) in the early part of a lease term with a reversed phenomenon later on. The difference in lease expense between the capital and the operating lease reporting is referred to as *the earnings impact* from operating lease

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[3] Duke et al. (2009), for example, report that the top 25% users of operating leases (91 firms) in their sample have an average of $1.04 billion in off-balance sheet lease liabilities (or equivalent to 34% of their reported total liabilities) and $808 million of unreported leased assets (or 11% of the reported assets) as a result of operating lease reporting.

[4] Even though reporting leases as operating leases exempts companies from recognizing leased assets and liabilities arising from the lease contract on their financial reports, future lease payments are required disclosures by ASC 840-20-50-2. Given an appropriate discount rate (i.e., the incremental borrowing interest rate of the lessee), the present value of these future lease payments can be readily derived and therefore, the lease liabilities, leased assets, and the earnings impact from reporting operating leases as capital leases can also be calculated. The approach employed to derive all these financial variables is referred to as constructive operating lease capitalization (Imhoff et al., 1991), which has been used in many empirical research studies (Beattie, Goodacre, & Thomson, 2000; Bratten et al., 2013; Duke et al., 2009; Ely, 1995; Imhoff, Lipe, & Wright, 1997; Imhoff et al., 1993; Lim, Mann, & Mihov, 2003; Sengupta & Wang, 2011, etc.).

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capitalization. This impact can be derived using the operating lease information disclosed in footnotes.

Although the risk relevance of the liability impact from operating lease capitalization has been well studied (e.g., Beattie et al., 2000; Bratten et al., 2013; Dhaliwal et al., 2011; Ely, 1995; Imhoff et al., 1993), to the best of our knowledge, no academic study has investigated whether the earnings impact from operating lease capitalization is as informative as off-balance sheet operating lease liabilities even though the magnitude of this impact can be substantial.[5] Our study extends the extant research on the value relevance of off-balance sheet operating lease liabilities by investigating the economic implications of this earnings impact. Specifically, we examine whether the earnings impact from operating lease capitalization possesses incremental predictive value on future cash flows beyond reported earnings (i.e., information relevance) and whether it is associated with contemporaneous stock returns (i.e., value relevance).

2. Accounting for leases and motivation of the study

The manipulative nature of the current rules-based accounting standards for leases (i.e., ASC 840) allows companies to effectively structure lease provisions to qualify as operating leases. For example, a company can ensure operating lease status by setting the present value of future lease payments equal to 89% or less of the fair value of the leased asset, among other conditions.[6] This reporting flexibility in the current lease accounting rules causes a lack of comparability in lease reporting. It also provides easy access to off-balance sheet financing for many companies.

In an attempt to curtail this form of off-balance sheet financing, the Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB) (hereafter, the Boards) began a joint project in July 2006 to develop standards for leases to ensure that assets and liabilities arising from lease contracts are accounted for in the balance sheet. In August 2010, the Boards issued an exposure draft (hereafter, 2010 ED) in which a new approach treating all lease contracts as acquiring the right-of-use assets and incurring obligations for lease payments was proposed. Thus, based on the 2010 ED, both leased assets and liabilities will be recognized on the balance sheet. In addition, the lease expense for lessees will be determined by a single *accelerated model*, a model resulting in the lessee's expense being similar to that of the *capital lease expense*. The accelerated model's front-loaded pattern of expense for lessees spurred many negative comments from firms, which may have contributed to the FASB's support of a dual model in a joint meeting with the IASB in June 2012. The dual model allows companies to adopt either the accelerated model or a straight-line model (which results in a lease expense similar to the operating lease expense) to estimate lease expenses for lessees based on the consumption/nature of the leased assets (PWC, 2012). Although the IASB favored the single accelerated model, it compromised and accepted the "dual" model on the convergence ground (KPMG, 2012). In May 2013, the Boards issued a revised exposure draft for leases (hereafter, the revised ED) in which the Boards maintained their position on the balance sheet reporting of leased assets and lease liabilities but proposed the dual model for lease expense calculation. Depending on the lease type, either the accelerated or the straight-line model would be applied to calculate the lease expense.[7] While the estimated lease expense under the accelerated model is similar to the capital lease expense, it is equivalent to the operating lease expense under the straight-line model. Therefore, our study of the earnings impact from operating lease capitalization is equivalent to studying the differential earnings impact of the proposed accelerated versus straight-line models. As the Boards are in the midst of redeliberations for the accounting standards for leases, our findings provide timely empirical evidence for the Boards to evaluate alternative expense models under consideration. Our study is especially relevant since the IASB changed its position and supported the single accelerated model while the FASB continued to favor the dual model in their separate Board meetings in 2014.[8]

We find evidence that market participants incorporate the negative earnings impact from operating lease capitalization in both cash flow predictions and stock returns/firm valuation. However, the positive earnings impact is only assimilated by investors in firm valuation. Our findings, in part, complement the findings of Bratten et al. (2013). They conclude that both as-if recognized disclosed operating lease liabilities and the reported capital lease liabilities are associated with the costs of debt and equity with similar degree of association.

The remainder of the paper is organized as follows: Section 3 reviews related literature. Section 4 formulates hypotheses and presents the research design. Section 5 describes derivations of the variables used in hypotheses testing, sample selection, and data collection procedures. Empirical analyses and results are reported in Section 6. Section 7 provides the conclusion.

3. Related literature

Prior studies have investigated whether the market incorporates off-balance sheet operating lease liabilities in assessing equity risk (Beattie et al., 2000; Bratten et al., 2013; Ely, 1995; and Imhoff et al., 1993), the cost of debt (Bratten et al., 2013), and the ex-ante cost of capital (Dhaliwal et al., 2011). In addition, Lim et al. (2003) and Sengupta and Wang (2011) examine whether bond rating agencies consider these liabilities when setting bond ratings. Using firms in the airline (29 firms) and grocery (59 firms) industries, Imhoff et al. (1993) apply a model to regress equity risk on the reported and adjusted debt-to-assets ratio (to include the as-if recognized operating lease liabilities) with no control of the asset risk. They find that equity risk is more correlated with the adjusted debt-to-assets ratio than with the reported ratio. Ely (1995) applies a model[9] to study the association between equity risk (σ_E) with financial risk (D/E) and asset risk (σ_A),

[5] For the 215 sample firms in Duke et al. (2009), the average negative earnings impact from the operating lease capitalization ranges from a moderate −3.59% (or $21.99 million) of the reported earnings to a significant −11.08% (or $58.88 million) for top quartile firms ranked by the impact. For the 151 positive earnings impact firms, Duke et al. (2009) report that the average impact is 5.12% (or $18.66 million) of the reported earnings while the percentage rises to a substantial 18.11% (or $30.21 million) for top quartile firms.

[6] Based on ASC 840-10-25-1, the other three criteria to report a lease as a capital lease are: 1) the lease provision contains a transfer of ownership at the end of lease term, 2) the lease includes a bargain purchase option, and 3) the lease term is equal to or greater than 75% of the leased asset life. As long as the lease contract meets one of these three criteria or the 90% rule, the lease is reported as a capital lease.

[7] The *accelerated model* will apply to a Type A lease if the underlying asset is not property (e.g. equipment) unless 1) the lease term is insignificant relative to the total economic life of the leased asset, or 2) the present value of the lease payments is insignificant compared to the fair value of the leased asset (Proposed Accounting Standards Update (ASU) (Revised) 842-10-25-6). On the other hand, the *straight-line model* will apply to a Type B lease if the leased asset is property (e.g. building) unless 1) the lease term covers a significant portion of the remaining economic life of the leased asset, or 2) the present value of the lease payments considerably represents all of the fair value of the leased asset (Proposed ASU (Revised) 842-10-25-7).

[8] The Boards resumed their redeliberations on the revised ED in January 2014 and continued their discussion in July 2014. While the FASB reconfirmed its support of the *dual* model (and proposed to require a lessee to apply the accelerated (straight-line) model to the existing capital (operating) leases) in its August 2014 Board meeting, the IASB decided to support the *single* accelerated model to account for a lessee's expense during its Board meeting in the first half of 2014 (Project Update, September 2014, FASB and Project Update, August 2014, IASB). Although the IASB expects to issue a new leases standard in 2015, its U.S. counterpart did not indicate when that would occur.

[9] This model is derived by Modigliani and Miller (1958 and 1963) and applied by Bowman (1979) to the accounting data. The model is expressed as: $\sigma_E = (1 + (1 - t)\, D/E)\, \sigma_A$, in which t is the marginal tax rate. Ely (1995) defines σ_E as the standard deviation of stock returns while Bowman defines it as the systematic risk of levered firms. σ_A is defined by Ely (1995) as the standard deviation of return on assets while it is defined by Bowman (1979) as the systematic risk of an unlevered firm.

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respectively. She investigates whether the disclosed operating lease information is reflected in equity risk.[10] By controlling the asset risk, Ely (1995) uses firms across various industries (i.e., manufacturing, wholesale, and retail). Based on her finding of a significant correlation between disclosed lease liabilities and equity risk, Ely (1995) concludes that disclosed operating liabilities are reflected in equity risk. Beattie et al. (2000) use a model similar to Ely's (1995) to investigate whether investors in 156 U.K. companies incorporated operating lease liabilities in their assessment of equity risk. Their findings are similar to those of Ely (1995). Both studies conclude that disclosed operating lease obligations are reflected in equity risk, despite a slight difference in the models used. Using the ex-ante implied cost of capital instead of equity risk, Dhaliwal et al. (2011) find that the as-if recognized operating lease liabilities are associated with the cost of capital, although the correlation is not as strong as that of the reported capital lease liabilities.[11] Bratten et al. (2013) apply the firm-specific implied interest rate[12] as the discount rate in deriving the operating lease obligations and conclude that both capital lease liabilities and as-if recognized operating lease liabilities are associated with the costs of debt and equity. Moreover, the magnitudes of these associations are similar, implying that market participants impound both recognized and disclosed lease information indifferently in assessing the costs of debt and equity.

Lim et al. (2003) study whether bond rating agencies considered disclosed operating lease liabilities in their bond rating process. They find that both the debt-to-firm-value ratio and the disclosed operating-lease-liabilities-to-firm-value ratio have a significant negative impact on bond ratings. However, the coefficient of the disclosed operating-lease-liabilities-to-firm value ratio is not as significant as that of the reported debt ratio. This finding implies that operating lease liabilities are not as relevant as reported debt in bond ratings. Sengupta and Wang (2011), on the other hand, find that off-balance sheet liabilities arising from operating leases are negatively associated with bond ratings; they also find a similar association for both disclosed operating lease obligations and reported capital lease liabilities.

Although prior studies have found that lease liabilities are relevant in assessing equity risk, the cost of debt, the implied cost of capital, and bond ratings, such research did not focus on the economic implications of the earnings impact from operating lease capitalization. With the sizable earnings impact from lease capitalization for operating leases and the pervasive usage of operating leases,[13] the market's response to this impact should not be overlooked, especially in the midst of the Boards' redeliberations of accounting for leases.

4. Hypothesis development and research design

4.1. Hypothesis development

According to Statement of Financial Accounting Concept No. 8 (SFAC 8), predictive value is an ingredient of information relevance, one of two fundamental qualities of accounting information. Based on this rationale, accounting information is considered relevant if it possesses predictive value. Thus, if the earnings impact has an incremental contribution to the prediction of future cash flows beyond reported earnings,[14] it would suggest that this earnings impact is information relevant and possesses economic implications. Moreover, SFAC 8 states that the objective of financial reporting is to provide information for users to make investment decisions. It further points out that assessing future cash flows is necessary for users to form expectations about their investment returns and to make financial decisions. Thus, if the earnings impact has an incremental predictive value on future cash flows, it implies that the earnings impact is relevant in the decision-making process of users and, therefore, contributes to achieving the objective of financial reporting in the context of SFAC 8.

Consequently, to assess the economic implications of the earnings impact, we first study whether this earnings impact possesses an incremental predictive value on cash flows from operating activities (hereafter, CFO) beyond reported earnings. Our first hypothesis is:

H1. The earnings impact from operating lease capitalization has an incremental predictive value for CFO beyond reported earnings.

In addition to the association with cash flow predictions, earnings have been empirically demonstrated to be value relevant through their association with returns (i.e., Dhaliwal & Reynolds, 1994; Easton & Harris, 1991; Easton, Harris, & Ohlson, 1992; Freeman, Koch, & Li, 2011; Hayn, 1995; Keung, Lin, & Shih, 2010; Wilson, 2008, etc.). As a result, if the earnings impact from operating lease capitalization is value relevant, it should be impounded in stock prices by market participants. A significant association between the earnings impact and stock returns would support the notion that investors assimilate the earnings impact and take it into consideration in valuing share prices. Accordingly, our second hypothesis in assessing the economic implications of the earnings impact is:

H2. The earnings impact from operating lease capitalization is used by investors in valuing share prices, and is therefore associated with contemporaneous stock returns.

Studying whether the earnings impact is reflected in stock returns would not only contribute to understanding how the market processes this earnings impact, but also would provide insightful and timely empirical evidence for the Boards to contemplate the appropriate model to account for lessees' lease expenses.

4.2. Research design

4.2.1. Cash flow models

To study the economic implications of the earnings impact on cash flow predictions (i.e., studying information/decision relevance of earnings impact), we use the following specifications of cash flow predictions:

$$CFO_{i,t+1} = \delta_0 + \delta_1 E^R_{i,t} + e_{i,t+1} \quad \text{(CF1)}$$

$$CFO_{i,t+1} = \delta_0 + \delta_1 E^R_{i,t} + \delta_6 E^L_{i,t} + e_{i,t+1} \quad \text{(CF2)}$$

Where:

$CFO_{i,t+1}$ net cash flow from operating activities (OANCF, A308) minus the accrual portion of extraordinary items and discounted operations reported on the statement of cash flows (XIDOC, A124) for firm i in year $t+1$;
$E_{i,t}$ reported earnings for firm i in year t;
$E^L_{i,t}$ earnings impact from reporting operating leases as capital leases for firm i in year t,

[10] Equity risk is measured as the standard deviation of stock returns, financial risk is measured as the ratio of debt over the market value of equity, and asset risk is measured as the standard division of the return on assets.

[11] Dhaliwal et al. (2011) conduct sensitivity analyses with respect to the estimations of operating lease liabilities and assets (e.g. based on Moody's method, Imhoff et al.'s (1993) method, etc.) and conclude that the results based on different estimations are similar to their main results.

[12] Bratten et al. (2013) also use a uniform discount rate of 8% (the average implied interest rate of their sample firms) and find similar results.

[13] Frecka (2008) indicates that Revsine, Collins, and Johnson (2005) report that the average payment ratios of operating leases versus capital leases are 27.5 to 1 for supermarkets and 25.8 to 1 for airlines, suggesting most leases are structured as operating leases in these industries.

[14] The predictive value of earnings on CFO has been empirically demonstrated in several studies (i.e., Barth, Cram, & Nelson, 2001; Dechow, Kothari, & Watts, 1998, etc.). Consequently, we expect the earnings impact from operating lease capitalization to possess incremental predictive value on CFO beyond reported earnings if it has economic implications.

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$e_{i,t+1}$ error term of the regression; and
t 1996–2010.[15]

All variables are deflated by total assets of year t to control for any potential size effect. Model CF1 is the basic model used to study the predictive value of the reported earnings (i.e., E^R) for CFO. The earnings impact of lease capitalization (i.e., E^L) is added to Model CF2 to examine the marginal predictive value of the earnings impact on CFO. To study the predictive value of reported earnings and the earnings impact on CFO, we test the significance level of δ1 and δ6, respectively.

Barth et al. (2001) demonstrate that the predictive power of earnings on future CFO is masked by the aggregation of CFO and accrual components of earnings. This is evident from their finding that future CFO is not only associated with current earnings but also with the components of earnings such as CFO and earnings accruals.[16] Following the cash flow prediction models of Barth et al. (2001), we disaggregate the reported earnings to CFO and earnings accruals. The cash flow prediction models with CFO and accruals as the explanatory variables are specified as follows[17]:

$$CFO_{i,t+1} = \delta_0 + \delta_2 CFO_{i,t} + \delta_3 TACC_{i,t} + \delta_6 E^L_{i,t} + e_{i,t+1} \quad \text{(CF3)}$$

$$CFO_{i,t+1} = \delta_0 + \delta_2 CFO_{i,t} + \delta_4 WACC_{i,t} + \delta_5 OACC_{i,t} + \delta_6 E^L_{i,t} + e_{i,t+1} \quad \text{(CF4)}$$

where:
$CFO_{i,t+1}$, $E^L_{i,t}$, and $e_{i,t+1}$ are as defined above;

$CFO_{i,t}$ Same as $CFO_{i,t+1}$ except for year t;
$TACC_{i,t}$ total accruals for firm i in year t, calculated as $E^R_{i,t}$ minus $CFO_{i,t}$;
$WACC_{i,t}$ working capital accruals for firm i in year t, calculated as the negative sum of (RECCH, INVCH, APALCH, TXACH, AOLOCH)[18]; and
$OACC_{i,t}$ other accruals for firm i in year t, calculated as $TACC_{i,t}$ minus $WACC_{i,t}$.

As in previous cash flow models, all variables are deflated by the total assets of year t to control for potential size effect. Model CF3 disaggregates the reported earnings into CFO and total accruals (TACC) while Model CF4 further decomposes total accruals into working capital accruals (WACC) and other accruals (OACC). The coefficient of each accrual (i.e., δ_3, δ_4, and δ_5 for TACC, WACC, and OACC, respectively) is tested to see whether it has an incremental contribution to cash flow predictions.

4.2.2. Positive and negative earnings impact

Although the total expenses charged under operating versus capital lease reporting are the same over the lease term, the capital lease expense is greater than the operating lease expense in the early part of a lease term with a reversed phenomenon later on (Imhoff et al., 1991). This is because depreciation plus interest expense is greater than the lease payment in the early part of a lease term. Consequently, the constructive lease capitalization's impact on earnings for a given year could be either *negative* or *positive* depending on whether the test year is before or after the break-even year, which usually occurs when the lease asset is about 53% to 63% depreciated (Imhoff et al., 1991).[19] To examine the predictive value of negative versus positive earnings impact on cash flows, we insert variable D as an indicator variable in Model CF5 to partition the earnings impact into negative and positive subgroups. This model is specified as follows:

$$CFO_{i,t+1} = \delta_0 + \delta_2 CFO_{i,t} + \delta_4 WACC_{i,t} + \delta_5 OACC_{i,t} + \delta_6 E^L_{i,t} + \delta_7 * D + \delta_8 D * E^L_{i,t} + e_{i,t+1}. \quad \text{(CF5)}$$

Indicator variable D equals *one* when the earnings impact is *positive* and zero otherwise. All other variables are as defined above. Therefore, while the predictive value of cash flows for negative earnings impact is reflected in δ_6, that of positive earnings impact is captured by the sum of δ_6 and δ_8.

Barth et al. (2001) report that the depreciation component of accruals is *positively* associated with future cash flows. This is because depreciation represents a match between the costs and benefits of investments in tangible assets such as an increase in future productions, sales, and cash flows.[20] Based on this rationale, we predict both negative (reflected in δ_6) and positive earnings impact (captured by δ_6 plus δ_8) from accounting the leased asset as an investment to have a *positive* contribution to future cash flows. Thus, a negative δ_6 is expected for negative earnings impact (to result in positive contribution to future cash flows) whereas a positive δ_8 is expected since we expect a positive contribution for positive earnings impact.

4.2.3. Return-earnings models

We use a return-earnings model to study H2 since this model has been used extensively to study the value relevance of earnings with respect to stock returns in many prior studies. The return-earnings models employed to study H2 are specified as:

$$R_{i,t} = \delta_0 + \delta_1 E^R_{i,t-1} + \delta_2 \Delta E^R_{i,t} + \delta_6 BM_{i,t-1} + \delta_7 R_{i,t-1} + e_{i,t} \quad \text{(RE1)}$$

$$R_{i,t} = \delta_0 + \delta_1 E^R_{i,t-1} + \delta_2 \Delta E^R_{i,t} + \delta_3 E^L_{i,t} + \delta_6 BM_{i,t-1} + \delta_7 R_{i,t-1} + e_{i,t} \quad \text{(RE2)}$$

where:

$R_{i,t}$ 3-month lagged annual stock return (the return over the 12 months extending from 9 months prior to the fiscal year-end to 3 months after the fiscal year-end) of firm i for fiscal year t from CRSP;
$E^R_{i,t-1}$ reported earnings for firm i in year $t-1$, deflated by the market value of $t-1$;
$\Delta E^R_{i,t}$ change in earnings for firm i in year t, deflated by the market value of $t-1$ and is derived as $(E^R_{i,t} - E^R_{i,t-1})$; this variable is used to proxy for the earnings surprise;
$E^L_{i,t}$ earnings impact from reporting operating leases as capital leases for firm i in year t, deflated by the market value of $t-1$;
$BM_{i,t-1}$ book-to-market ratio for firm i in year $t-1$, a control variable[21];

[15] The lease disclosure data needed to derive the earnings impact from lease capitalization (i.e., E^L) are not available on Compustat until 1995. The data of t − 1 (t is the testing year) are required to derive the lease capitalization impact on earnings for a given year t. As a result, the first year of our testing period is 1996.

[16] Barth et al. (2001) report that the components of earnings (i.e., the CFO and various accruals) have a greater predictive ability for future CFO than the aggregate earnings.

[17] Barth et al. (2001) indicate that disaggregating earnings to CFO and aggregate accruals in predicting next period cash flow increases the adjusted R^2 from 0.11 (with aggregate earnings only) to 0.27 (with CFO and aggregate accruals), which is a significant improvement in adjusted R^2. Since our research focuses on the incremental predictive value of the earnings impact from operating lease capitalization, not the impact of various accruals on cash flow predictions, we disaggregate the reported earnings to CFO and aggregate accruals instead of CFO and various accrual components.

[18] $RECCH_{i,t}$ = the change in accounts receivable (Compustat DATA302 or A302); $INVCH_{i,t}$ = the change in inventory (A303); $APALCH_{i,t}$ = the change in accounts payable and accrued liabilities (A304); $TXACH_{i,t}$ = the change in accrued income taxes (A305); $AOLOCH_{i,t}$ = the change in other assets and liabilities (A307).

[19] The constructive lease capitalization's impact on retained earnings is always negative or zero due to the cumulative nature of retained earnings.

[20] Companies invest in tangible assets if these assets are expected to generate more future cash flows than their current tangible assets (Barth et al., 2001).

[21] Fama and French (1992) document that book-to-market ratio is a predictor of future returns among others; hence, this ratio is included in the return-earnings models as a control variable.

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$R_{i,t-1}$ 3-month lagged annual stock return of firm *i* for fiscal year $t-1$ from CRSP to proxy for momentum in stock prices[22];
$e_{i,t}$ error term; and
t 1996–2010.

As in the analysis of the predictive value of the earnings impact on cash flows, we insert an indicator variable D, a proxy for the sign of the earnings impact, into Model RE3 as follows:

$$R_{i,t} = \delta_0 + \delta_1 E^R_{i,t-1} + \delta_2 \Delta E^R_{i,t} + \delta_3 E^L_{i,t} + \delta_4 * D + \delta_5 D * E^L_{i,t} + \delta_6 BM_{i,t-1} + \delta_7 R_{i,t-1} + e_{i,t} \quad \text{(RE3)}$$

D equals one for a positive earnings impact on stock returns and zero otherwise. All other variables are as defined above. While δ_3 captures the association between returns and E^L for firms with *negative* earnings impact, the sum of δ_3 and δ_5 reflects the correlation between returns and E^L for firms with *positive* earnings impact. Similar to the earnings impact on future cash flows, we expect a positive association for both negative and positive earnings impact with contemporaneous returns. Consequently, we expect δ_3 to be negative and δ_5 to be positive.

To reduce the effects of outliers, the top and bottom 1% of all variables are Winsorized. In addition, the two-way cluster-robust standard errors suggested in Gow, Ormazabal, and Taylor (2010) are employed to correct the cross-sectional and time-series dependence in the analysis for both cash flow and return-earnings models.[23]

5. Variable derivations, sample selection, and data collection

5.1. Variable derivations

We derive the variables necessary to estimate the earnings impact from lease capitalization for the testing models based on the procedures suggested in Imhoff et al. (1991, 1997).[24] The following table provides the descriptions and derivations of these variables whereas the detailed discussions of these variables are included in Appendix A.

Variable derivation	Variable description
$PV(X_i)$	The present value of lease payment X at year *i* using an appropriate discount rate (e.g.10%).
$URL_t = \sum_{i=t+1}^{t+15} PV(X_i)$	URL_t is the unrecorded lease liabilities of year *t* as if all operating leases were reported as capital leases. It is calculated as the sum of the present values of all future lease payments.
$URA_t = 70\%{*}URL_t$	URA_t is the unrecorded leased assets of year *t* from operating lease capitalization.
$RE^L_t = URL_t - URA_t$	RE^L_t is the impact on retained earnings of year *t* from operating lease capitalization.
$IN^L_t = RE^L_t - RE^L_{t-1}$	IN^L_t is the pre-tax earnings impact of year *t* from operating lease capitalization.
$TR_t = \frac{\text{Tax expense of year } t}{\text{Pretax income of year } t}$	TR_t is the tax rate of year *t*.
$Net\ RE^L_t = (1 - TR_t) * RE^L_t$	$Net\ RE^L_t$ is the impact on retained earnings of year *t* from operating lease capitalization, net of cumulative tax savings.
$E^L_t = (1 - TR_t) * IN^L_t$	E^L_t is the earnings impact of year *t* from operating lease capitalization.

5.2. Sample selection and data collection

Firms with operating lease data available on Compustat during the period of 1996–2010 are selected as the sample for this study. Data required for the models (i.e., the reported earnings, CFO, TACC, etc.) are obtained from Compustat. In addition, the disclosed future operating lease liabilities necessary to derive the unrecorded lease liabilities, leased assets, and the earnings impact from operating lease capitalization are obtained from Compustat lease footnote disclosures. This selection process results in 36,427 firm-year observations with varying numbers of sample firms over the 15-year study period (i.e., 1996–2010).[25]

Panel A of Table 1 provides a distribution of sample firms by year. It indicates that the number of sample firms with operating leases ranges from 796 firms in 1996 to 2673 firms in 2010. An upward trend in the number of firms with operating leases is observed with a significant surge from year 2000 (1736 firms) to 2001 (3460 firms). Panel B of Table 1 presents the distribution of firm-year observations by industry. Of the 36,427 firm-year observations, a strong concentration (17,079 or 47%) is found in the manufacturing industry, followed by 4561 (or 12.5%) in the information industry, 2192 (or 6%) in the retail trade industry, 1932 (or 5%) in the professional, scientific and technical services industry, and 1860 (or 5%) in the finance and insurance industry. 6602 of the remaining 6803 firm-year observations are scattered over 13 different industries, leaving 201 without industry classification.

Moreover, the annual stock return for the return-earnings models is obtained from Center for Research in Security Prices (CRSP). The requirement of return information further reduces firm-observations from 36,427 to 31,410 for the return-earnings models.

6. Empirical analyses

6.1. Descriptive statistics and correlations of variables in cash flow models

Table 2 presents descriptive statistics (Panel A) and Pearson correlations (Panel B) for variables used in the cash flow prediction models. Following the procedures in Barth et al. (2001), all variables are deflated by total assets of *t*. The means (median) of CFO_t and E^R are 0.041 (0.076) and −0.041 (0.030), respectively.[26] The mean (median) of total

[22] Jegadeesh and Titman (1993) document that significant abnormal returns can be obtained with trading strategies of buying stocks performing well and selling stocks doing poorly in the past over a 3–12 month holding period. Additional evidence also indicates that these abnormal profits are associated with delayed price reactions to firm-specific risk. Their findings demonstrate that there is a price momentum on stock returns such that the prior period return is a predictor of future returns. Consequently, the prior period return is included in the return-earnings model to control for momentum in stock prices. We would like to thank an anonymous reviewer for this suggestion.

[23] Gow et al. (2010) point out that empirical accounting studies often use data which are cross-sectionally and time-serially correlated. They examine 121 studies that use cross-sectional and time-series data in regression models and find that 25% of these studies do not address such dependence issue in the error terms of their regressions while the remaining 75% studies address either cross-sectional or time-series dependence but not both. They conclude that without correcting both forms of dependence, the empirical studies produce misspecified test statistics and inferences. In light of their study, we use two-way cluster-robust standard errors to correct both cross-sectional and time-series dependence in our analyses.

[24] As pointed out by Gonedes and Dopuch (1979), the change in the accounting technique may induce managerial decision changes. Consequently, the derived earnings impact from capitalized operating leases may not be the true impact. This is due to the fact that lease activities may differ if the managers were required to report these operating leases as capital leases. This inherent limitation applies to our study as well as other studies that use the constructive lease capitalization technique in deriving the "as if" recognized lease liabilities for operating leases (e.g. Bratten et al., 2013; Duke et al., 2009; Ely, 1995; Imhoff et al., 1993; Lim et al., 2003, and Sengupta & Wang, 2011, etc.).

[25] Even though the data collection period covers 1995–2011, the testing period is only from 1996–2010. This is because the cash flow of year $t+1$ (t is the testing year) is needed for cash flow prediction models and the retained earnings impact from operating lease capitalization of year $t-1$ is necessary to derive the earnings impact.

[26] Our study period (1996–2010) covers two stock market downturns (i.e., the dot-com bubble of 2001 and the financial market crisis of 2008). The impact of the market downturns on earnings is evident in Panel A of Table 2. The minimum E^R (deflated by total assets) is a substantial −1.649, implying that the loss is more than1.6 times the company's total assets, while the maximum E^R is only 0.277. The impact of two stock market downturns may have contributed to the negative mean E^R in our sample.

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Table 1
Sample selection and distribution of sample firms.

Panel A: Distribution of sample firms by fiscal year

Fiscal year	Firms with negative earnings impact	Firms with positive earnings impact	Total firms
1996	282	514	796
1997	301	593	894
1998	311	653	964
1999	317	657	974
2000	747	989	1736
2001	1746	1714	3460
2002	1787	1570	3357
2003	1757	1523	3280
2004	1518	1646	3164
2005	1575	1596	3171
2006	1388	1657	3045
2007	1324	1671	2995
2008	1604	1403	3007
2009	1765	1146	2911
2010	1489	1184	2673
Total	17911	18516	36427

Note: The 17,911 negative earnings subgroup firms represent firms whose earnings would have been reduced had their operating leases been reported as capital leases. The 18,516 firms in the positive earnings subgroup represent firms whose earnings would have been increased under operating lease capitalization.

Panel B: Distribution of sample firms by industry

Description	Industry classification based on NAICS	Firms with negative income subgroup	Firms with positive income subgroup	Total firms
Firms reporting operating lease data on Compustat		11,791	18,516	36,427
• Agriculture, forestry, fishing and hunting	11	58	47	105
• Mining	21	688	726	1414
• Utilities	22	62	47	109
• Construction	23	200	229	429
• Manufacturing	31–33	8868	8211	17,079
• Wholesale trade	42	610	685	1295
• Retail trade	44–45	764	1428	2192
• Transportation and warehousing	48–49	512	546	1058
• Information	51	2273	2288	4561
• Finance and insurance	52	900	960	1860
• Real estate and rental and leasing	53	530	450	980
• Professional, scientific, and technical services	54	927	1005	1932
• Management of companies and enterprises	55	0	0	0
• Administrative and support and waste management and remediation services	56	452	484	936
• Education services	61	76	147	233
• Health care and social assistance	62	322	462	784
• Arts, entertainment, and recreation	71	102	115	217
• Accommodation and food services	72	369	507	876
• Other services, except public administration	81	86	89	175
• Public administration	92	0	0	0
• Unclassified	99	112	89	201

Note: NAICS = North American Industry Classification System Codes. The 17,911 negative earnings subgroup firms represent firms whose earnings would have been reduced had their operating leases been reported as capital leases. The 18,516 firms in the positive earnings subgroup represent firms whose earnings would have increased under operating lease capitalization.

accruals (i.e., TACC = E^R − CFO), as expected, is negative (i.e., −0.081 (−0.054)). This is because depreciation and amortization expenses are subtracted from E^R, but not from CFO, since depreciation and amortization have no impact on cash flows (Barth et al., 2001). Moreover, the average earnings impact (E^L) over the reported earnings (E^R) (i.e., E^L/E^R) is an immaterial 1.48% for all firm-year observations over the testing period of 1996–2010. However, when firm-year observations are partitioned based on the sign of E^L, the average for positive E^L/E^R increases to a substantial 9.14% with 20,714 firm-year observations. The mean of negative E^L/E^R plunges to −8.63% with 15,713 firm-year observations.

Panel B reveals that the reported earnings (E^R), consistent with the findings of Barth et al. (2001), are significantly and positively correlated with CFO_t and all accruals (i.e., TACC, WACC and OACC). Similar correlations are also found for CFO_{t+1} with E^R and all accruals. In addition, although the earnings impact from lease capitalization (E^L) is significantly and positively correlated with CFO_t (CFO_{t+1}), the correlation coefficient of 0.14 (0.10) is relatively small compared to 0.81 (0.68) of the reported earnings (E^R).

6.2. Empirical results of cash flow models

Table 3 reports the results from applying firm-year observations over the period of 1996–2010 to various cash flow models. The results of Models CF1 and CF2 are reported in Columns 3 and 4, respectively. As in previous studies, the results of Model CF1 indicate that E^R, the reported earnings, is highly associated with next period cash flow predictions. With the E^L added in Model CF2, the coefficient of E^R continues to be significant at the 0.01 level, but the coefficient of the earnings impact, E^L, is not.

Following Barth et al. (2001), we disaggregate E^R to CFO and total accruals (TACC) in Model CF3. The coefficients of CFO and TACC are both significant at the 0.01 level and the adjusted R^2 surges from 47% in Model CF2 to 61% in Model CF3. However, the coefficient of E^L remains

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Table 2
Descriptive statistics and pearson correlations of variables in cash flow models.

Panel A: Descriptive statistics

Variable	N	Mean	Median	Std	Minimum	Maximum
CFO_{t+1}	36,427	0.0567	0.0822	0.1871	−0.9306	0.4516
E^R	36,427	−0.0410	0.0304	0.2623	−1.6493	0.2774
CFO_t	36,427	0.0410	0.0763	0.1944	−1.0982	0.3512
TACC	36,427	−0.0812	−0.0543	0.1468	−0.9689	0.2608
WACC	36,427	0.0055	0.0043	0.0700	−0.2959	0.2909
OACC	36,427	−0.0865	−0.0570	0.1222	−0.8873	0.1226
E^L	36,427	0.0007	0.0000	0.0073	−0.0302	0.0360
D^*E^L	36,427	0.0022	0.0000	0.0056	0.0000	0.0360
E^L/E^R	36,427	0.0148	0.0023	0.2265	−1.1606	1.2128
$E^L/E^R > 0$	20,714	0.0914	0.0198	0.2076	0.0000	1.2128
$E^L/E^R <= 0$	15,713	−0.0863	−0.0158	0.2101	−1.1606	0.0000

Panel B: Pearson correlations

	E^R	CFO_t	TACC	WACC	OACC	E^L	D^*E^L
CFO_{t+1}	0.6838**	0.7734**	0.1856**	0.0467**	0.1904**	0.1049**	0.0117*
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0259
E^R		0.8070**	0.6515**	0.1360**	0.6786**	0.1570**	−0.0066
		<.0001	<.0001	<.0001	<.0001	<.0001	0.2095
CFO_t			0.1118**	−0.1831**	0.2491**	0.1355**	0.0013
			<.0001	<.0001	<.0001	<.0001	0.8058
TACC				0.5013**	0.8442**	0.0975**	−0.0151**
				<.0001	<.0001	<.0001	0.0027
WACC					0.0001	0.0294**	0.0172**
					0.9917	<.0001	0.0010
OACC						0.1010**	−0.0260**
						<.0001	<.0001
E^L							0.8412**
							<.0001
D^*E^L							

Notes:
[a.] **, * indicate that the correlation coefficient estimate is significant at the 1% and 5% level, respectively.
[b.] p-value is presented below the coefficient estimates.
[c.] Variable Definitions:
$CFO_{i,t+1}$ = the net cash flow from operating activities (OANCF, A308) minus the accrual portion of extraordinary items and discounted operations reported on the statement of cash flows (XIDOC, A124) for firm i in year $t+1$; $CFO_{i,t}$ same as $CFO_{i,t+1}$ except is for year t; $E^R_{i,t}$ = the reported earnings for firm i in year t; $E^L_{i,t}$ = the earnings impact from reporting operating leases as capital leases for firm i in year t; $TACC_{i,t}$ = the total accruals for firm i in year t, calculated as $E^R_{i,t}$ minus $CFO_{i,t}$; $WACC_{i,t}$ = the working accruals for firm i in year t, calculated as the negative sum of (RECCH, INVCH, APALCH, TXACH, AOLOCH); $OACC_{i,t}$ = the other accruals for firm i in year t, calculated as $TACC_{i,t}$ minus $WACC_{i,t}$. All variables are deflated by the total assets of year t.
D = an indicator variable which equals one when earnings impact is positive and zero otherwise.

insignificant. This substantial improvement in the adjusted R^2 suggests that the aggregate earnings mask the predictive power of earnings for cash flows.[27] The total accruals are further decomposed into working capital accruals (WACC) and other accruals (OACC) in Model CF4. Similar to the results of Model CF3, the coefficients of CFO and WACC are significant at the 0.01 level with moderate improvement in the adjusted R^2 (i.e., a 3% increase to 64%). The coefficient for the earnings impact (E^L) remains insignificant in Model CF4.

Since the earnings impact from operating lease capitalization could be either negative (i.e., prior to the break-even point) or positive, we further partition E^L into positive and negative E^L. An indicator, D, is added to Model CF5 to proxy for the sign of this impact. D equals one for positive E^L and zero otherwise. Consequently, the predictive value of negative earnings impact is reflected in the coefficient of E^L (i.e., δ_6 in CF5) while that of positive earnings impact is captured by the sum of the coefficients of E^L (i.e., δ_6) and D^*E^L (i.e., δ_8). An F-test is conducted to test the significance level of the sum of δ_6 and δ_8 in assessing the association between the positive earnings impact and cash flow predictions.

Column 7 of Table 3 reports the results of Model CF5. The coefficients of CFO and WACC continue to be significant at the 0.01 level as in previous model specifications (i.e., CF3 and CF4). In addition, the coefficient for the negative earnings impact (i.e., δ_6) equals −1.804, which is significant at the 0.01 level. This result is consistent with our expectation that the negative earnings impact contributes positively to future cash flows. The coefficient for D^*E^L (i.e., δ_8) equals 1.959 which is also in line with our expectation. However, the F-test for the sum of δ_6 and δ_8 (i.e., $-1.804 + 1.959 = 0.155$) reveals an F-value of 0.98, which is not statistically significant. This finding indicates that the negative earnings from operating lease capitalization contribute positively to future cash flows beyond reported earnings, but the positive earnings do not.

Our findings provide moderate evidence to support H1 that the earnings impact from operating lease capitalization possesses an incremental predictive value for CFO beyond reported earnings and therefore has economic implications with respect to the prediction of future cash flows. Moreover, the users of financial statements often rely on future cash flow information to form their expectations on investments in order to make financial decisions (SFAC 8). Our finding of the negative earnings impact possessing an incremental predictive value on cash flows suggests that the negative earnings impact is relevant to achieving the primary objective of financial reporting in the context of SFAC 8.

[27] This result is consistent with that reported by Barth et al. (2001) in which the adjusted R^2 rises from 15% to 35% when the earnings are disaggregated to CFO and accrual components. One reason for the improved adjusted R^2 for the disaggregate model is that the aggregate model forces the coefficients of CFO and accruals to be equal while the disaggregate model allows different coefficients for CFO and various accruals.

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Table 3
Results of cash flow models (pooled data with two-way cluster-robust standard errors).

$$CFO_{i,t+1} = \delta_0 + \delta_2 CFO_{i,t} + \delta_4 WACC_{i,t} + \delta_5 OACC_{i,t} + \delta_6 E^L_{i,t} + \delta_7 * D + \delta_8 D * E^L_{i,t} + e_{i,t+1}.$$

Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7
Variables	Prediction	CF1	CF2	CF3	CF4	CF5
Year		1996–2010	1996–2010	1996–2010	1996–2010	1996–2010
N		36,427	36,427	36,427	36,427	36,427
Intercept	?	0.077 (24.33)**	0.077 (24.28)**	0.037 (17.42)**	0.020 (6.73)**	0.014 (5.46)**
E^R	+	0.487 (12.32)**	0.489 (12.44)**			
CFO	+			0.735 (28.87)**	0.783 (35.02)**	0.788 (36.31)**
TACC	+			0.129 (5.50)**		
WACC	+				0.524 (21.70)**	0.525 (22.01)**
OACC	?				-0.017 (−0.72)	−0.010 (−0.43)
E^L	–		−0.064 (−0.29)	−0.214 (−1.03)	−0.254 (−1.38)	−1.804 (−4.93)**
D*Intercept	?					0.008 (3.94)**
D^*E^L	+					1.959 (6.65)**
Adj R^2		0.47	0.47	0.61	0.64	0.64

Notes:
[a.] **, * indicate that the coefficient estimate is significant at the 1% and 5% level, respectively. A one-tailed test is applied if a direction is predicted.
[b.] t-statistics are presented in the parentheses.
[c.] The F-test for the sum of the coefficients of E^L and $D^* E^L$ is 0.98 which is insignificant at the 5% level.
[d.] The condition indices for all models are less than 6, suggesting a collinearity problem is not present.
[e.] Variable Definitions:
$CFO_{i,t+1}$ = the net cash flow from operating activities (OANCF, A308) minus the accrual portion of extraordinary items and discounted operations reported on the statement of cash flows (XIDOC, A124) for firm *i* in year *t* + *1*; $CFO_{i,t}$ same as $CFO_{i,t+1}$ except is for year *t*; $E^R_{i,t}$ = the reported earnings for firm *i* in year *t*; $E^L_{i,t}$ = the earnings impact from reporting operating leases as capital leases for firm *i* in year *t*; $TACC_{i,t}$ = the total accruals for firm *i* in year *t*, calculated as $E^R_{i,t}$ minus $CFO_{i,t}$; $WACC_{i,t}$ = the working accruals for firm *i* in year *t*, calculated as the negative sum of (RECCH, INVCH, APALCH, TXACH, AOLOCH); $OACC_{i,t}$ = the other accruals for firm *i* in year *t*, calculated as $TACC_{i,t}$ minus $WACC_{i,t}$. All variables are deflated by the total assets of year *t*. *D* = an indicator variable which equals one when earnings impact is positive and zero otherwise.

Table 4
Descriptive statistics and pearson correlations of variables in return-earnings models.

Panel A: Descriptive statistics

Variable	N	Mean	Median	Std	Minimum	Maximum
R_t	30,232	0.1960	0.0595	0.7555	−0.8965	3.6218
$E^R_{i,t-1}$	30,232	−0.0636	0.0329	0.3399	−2.1928	0.2634
$\Delta E^R_{i,t}$	30,232	0.0328	0.0067	0.2698	−0.8914	1.5420
E^L	30,232	0.0004	0.0000	0.0122	−0.0637	0.0599
D^*E^L	30,232	0.0028	0.0000	0.0083	0.0000	0.0599
BM_{t-1}	30,232	0.6052	0.4500	0.6211	−0.5447	3.7175
R_{t-1}	30,232	0.1932	0.0460	0.7836	−0.8965	3.6218
E^L/E^R	30,232	0.0155	0.0026	0.2273	−1.1209	1.2041
$E^L/E^R > 0$	17,282	0.0930	0.0204	0.2085	0.0000	1.2041
$E^L/E^R <= 0$	12,950	−0.0878	−0.0165	0.2095	−1.1209	0.0000

Panel B: Pearson correlations

	$E^R_{i,t-1}$	$\Delta E^R_{i,t}$	E^L	D^*E^L	BM_{t-1}	R_{t-1}
R_t	−0.2043**	0.2867**	−0.0356**	0.0698**	0.1938**	−0.1396**
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
$E^R_{i,t-1}$		−0.6898**	0.2391**	−0.0151**	−0.2451**	0.1819**
		<.0001	<.0001	0.0075	<.0001	<.0001
$\Delta E^R_{i,t}$			−0.1456**	0.0051	0.0805**	−0.0291**
			<.0001	0.3704	<.0001	<.0001
E^L				0.7533**	−0.1082*	0.0779**
				<.0001	<.0001	<.0001
D^*E^L					0.1090**	0.0248**
					<.0001	<.0001
MB_{t-1}						−0.4917*
						<.0001

Notes:
[a.] **, * indicates that the correlation coefficient estimate is significant at the 1% and 5% level, respectively.
[b.] p-value is presented below the coefficient estimates.
[c.] Variable Definitions:
$R_{i,t}$ = 3-month lagged market return of firm i for fiscal year *t*; $E^R_{i,t-1}$ = the reported earnings for firm i in year t − 1; $\Delta E^R_{i,t}$ = the change in earnings in year t; $E^L_{i,t}$ = the earnings impact from reporting operating leases as capital leases for firm i in year *t*; $R_{i,t-1}$ = 3-month lagged market return of firm i for fiscal year *t* − *1*. All variables are deflated by the market value of t − 1. *D* = an indicator variable which equals one when earnings impact is positive and zero otherwise. $BM_{i,t-1}$ = book-to-market ratio for firm i in year t − 1.

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6.3. Descriptive statistics and correlations of variables in return-earnings models

Table 4 reports the descriptive statistics (Panel A) and correlations (Panel B) of variables used in the return-earnings models. All explanatory variables are deflated by the market value at the beginning of the period. Panel A reveals that the means (medians) of E^R_{t-1} and ΔE^R_t are −0.064 (0.033) and 0.033 (0.007), respectively. In addition, the mean of the earnings impact as a percentage of the reported earnings (i.e., E^L/E^R) is 1.55% for all firm-year observations (N = 30,232). However, it surges to 9.30% for the positive earnings impact observations (N = 17,282) and plummets to −8.78% for negative earnings impact observations (N = 12,950). Panel B reports Pearson correlations of the variables. As expected, stock returns are significantly and positively correlated with the earnings surprise (ΔE^R_t). However, they are negatively associated with the prior year's reported earnings (E^R_{t-1}).

6.4. Empirical results of return-earnings models

Columns 3 and 4 of Table 5 report the results of Models RE1 and RE2, respectively. The coefficients of $\Delta E^R_{i,t}$ (proxy for earnings surprise) is significant at the 1% level but that of $E^R_{i,t-1}$ is not. This result indicates that the return is positively associated with earnings surprise but not with the prior year's earnings. The positive association between the earnings surprise and returns is consistent with the view that earnings surprise is the trigger of stock trading which leads to price/return changes. Our finding also suggests that the impact of earnings surprise outweighs the prior year's earnings on the association with returns. In addition, consistent with prior studies (Fama & French, 1992; Pontiff & Schall, 1998), the coefficient for the book-to-market ratio (BM_{t-1}) is positively correlated with the one-year ahead stock returns at the 1% significance level. However, the coefficient of E^L in RE2 is not significant (t = 1.32), suggesting that the earnings impact from lease capitalization (E^L) is not associated with contemporaneous returns.

Similar to the cash flow models, an indicator, D, is added to Model RE3 to proxy for the difference between the negative and positive earnings impact. D equals one for positive E^L and zero otherwise. While the association of negative earnings impact with returns is reflected in the coefficient of E^L (i.e., δ_3), it is captured by the sum of the coefficients of E^L (i.e., δ_3) and $D^* E^L$ (i.e., δ_5) for the positive earnings impact. An F-test is conducted to test the significance level of the sum of δ_3 and δ_5 in assessing the association between the positive earnings impact and cash flow predictions. The coefficient for the negative earnings impact (i.e., δ_3) equals −4.097, which is negatively significant at the 0.01 level (t = −5.07) and is consistent with our prediction. Furthermore, the coefficient of D^*E^L, δ_5, equals 9.104, which is also consistent with our expectation. The sum of δ_3 and δ_5 (i.e., −4.097 + 9.104 = 5.007), capturing the association of the positive earnings impact and returns, is significant at the 0.01 level (i.e., F-value = 11.75). This result suggests that the market incorporates both the negative and positive earnings impact into stock returns.

The significant negative coefficient for the negative earnings impact indicates that the *negative* earnings impact from operating lease capitalization is *positively* associated with contemporaneous stock returns. Even though this finding appears to be counterintuitive, it is consistent with our earlier finding of a *positive* incremental contribution of *negative* earnings impact on future cash flows. When the negative earnings impact contributes positively to future cash flows, we expect this negative impact to also be positively associated with contemporaneous stock returns since stock returns reflect future cash flows (Brigham & Houston, 2012, p304–21).

Moreover, as in our study of the earnings impact on cash flow predictions, this association of earnings impact with returns is not detectable when the earnings impact was not disaggregated into negative and positive earnings impacts. Our finding that investors incorporate both negative and positive earnings impact in assessing share prices supports H2.

6.5. Sensitivity analyses

In studying whether the as-if recognized operating lease liabilities are associated with the costs of debt and equity and whether the magnitude of the association is indifferent to the recognized capital lease liabilities and the as-if recognized operating obligations, Bratten et al. (2013) find that their empirical results are similar regardless of whether they use firm-specific implied interest rates or the average implied interest rate

Table 5
Results of return-earnings models (pooled data with two-way cluster-robust standard errors).

$$R_{i,t} = \delta_0 + \delta_1 E^R_{i,t-1} + \delta_2 \Delta E^R_{i,t} + \delta_3 E^L_{i,t} + \delta_4 * D + \delta_5 D * E^L_{i,t} + \delta_6\, BM_{i,t-1} + \delta_7\, R_{i,t-1} + e_{i,t}.$$

Col 1	Col 2	Col 3	Col 4	Col 5
Variables	Prediction	RE1	RE2	RE3
Year		1996–2010	1996–2010	1996–2010
N		30,232	30,232	30,232
Intercept	?	0.074 (0.88)	0.073 (0.58)	0.059 (0.65)
$E^R_{i,t-1}$	?	0.189 (1.24)	0.179 (1.17)	0.221 (1.46)
$\Delta E^R_{i,t}$	+	0.927 (10.92)**	0.926 (10.99)**	0.930 (11.09)**
E^L	–		1.121 (1.32)	−4.097 (−5.07)**
D*Intercept	?			0.011 (0.58)
D^*E^L	+			9.104 (5.54)**
BM	+	0.205 (5.04)**	0.206 (5.07)**	0.187 (4.71)**
$R_{i,t-1}$	?	−0.109 (−1.74)	−0.109 (−1.74)	−0.112 (−1.79)
Adj R^2		0.127	0.127	0.131

Notes:
[a.] **, * indicate that the coefficient estimate is significant at the 1% and 5% level, respectively. A one-tailed test is applied if a direction is predicted.
[b.] t-statistics are presented in the parentheses.
[c.] The F-test of the sum of the coefficients of $E^L + D^*E^L$ for CF3 is 11.75 which is significant at the 1% level.
[d.] The condition indices for all models are less than 6, suggesting a collinearity problem is not present.
[e.] Variable Definitions:
$R_{i,t}$ = 3-month lagged market return of firm *i* for fiscal year *t*; $E^R_{i,t-1}$ = the reported earnings for firm *i* in year t − 1; $\Delta E^R_{i,t}$ = the change in earnings in year *t*; $E^L_{i,t}$ = the earnings impact from reporting operating leases as capital leases for firm *i* in year *t*; $R_{i,t}$ = 3-month lagged market return of firm i for fiscal year *t* − 1;. All variables are deflated by the market value of *t* − 1. *D* = an indicator variable which equals one when earnings impact is positive and zero otherwise. $BM_{i,t-1}$ = book-to-market ratio for firm i in year *t* − 1.

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Table 6
Results of cash flow models — with yearly data and 5-year sub-period data.

$$CFO_{i,t+1} = \delta_0 + \delta_2 CFO_{i,t} + \delta_4 WACC_{i,t} + \delta_5 OACC_{i,t} + \delta_6 E^L_{i,t} + \delta_7 * D + \delta_8 D * E^L_{i,t} + e_{i,t+1}.$$

Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
Year	N	E^L	D^*E^L	F-Test	Adj R^2
1996	796	−0.053	0.522	0.88	0.55
		(−0.05)	(0.46)		
1997	894	−3.708	4.898	7.16**	0.47
		(−2.65)**	(3.33)**		
1998	964	2.478	−1.880	1.86	0.45
		(2.22)	(−1.57)		
1999	974	−0.501	0.478	0.01	0.55
		(−0.49)	(0.43)		
2000	1736	−2.171	1.955	0.24	0.55
		(−2.56)**	(2.02)*		
2001	3460	−2.337	2.244	0.07	0.63
		(−5.00)**	(3.79)**		
2002	3357	−2.444	2.134	0.65	0.67
		(−5.49)**	(3.57)**		
2003	3280	−1.193	1.920	3.20	0.67
		(−2.36)**	(2.93)**		
2004	3164	−0.215	0.481	0.48	0.66
		(−0.36)	(0.68)		
2005	3171	−1.909	1.081	4.39**	0.68
		(−3.09)**	(1.47)		
2006	3045	−0.879	0.785	0.05	0.66
		(−1.12)	(0.87)		
2007	2995	−1.035	1.039	0.01	0.67
		(−1.58)	(1.33)		
2008	3007	−0.502	1.327	3.33	0.65
		(−0.88)	(1.79)*		
2009	2911	−3.729	3.393	0.25	0.57
		(−6.09)**	(3.68)**		
2010	2673	−0.296	0.153	0.06	0.68
		(−0.47)	(0.18)		
1996–2000	5364	−0.929	1.311	1.82	0.53
		(−1.07)	(1.75)*		
2001–2005	16,432	−1.806	1.757	0.04	0.65
		(−4.21)**	(6.11)**		
2006–2010	14,631	−1.749	1.884	0.33	0.64
		(−2.23)*	(2.80)**		

Notes:
a. *,* indicate that the coefficient estimate is significant at the 1% and 5% level, respectively, using a one-tailed test.
b. See note e of Table 3 for variable definitions.

Table 7
Results of return-earnings models — with yearly data and 5-year sub-period data.

$$R_{i,t} = \delta_0 + \delta_1 E^R_{i,t-1} + \delta_2 \Delta E^R_{i,t} + \delta_3 E^L_{i,t} + \delta_4 * D + \delta_5 D * E^L_{i,t} + \delta_6 BM_{i,t-1} + \delta_7 R_{i,t-1} + e_{i,t}.$$

Col 1	**Col 2**	Col 3	Col 4	Col 5	Col 6
Year	**N**	E^L	D^*E^L	F-Test	Adj R^2
1996	**756**	3.287	2.571	9.27**	0.060
		(1.17)	(0.74)		
1997	**827**	−20.260	33.293	32.22**	0.102
		(−3.03)**	(4.65)**		
1998	**903**	7.643	−5.798	0.64	0.017
		(1.65)	(−1.10)		
1999	**848**	15.274	−27.987	9.30	0.072
		(1.52)	(−2.53)		
2000	**1400**	−4.204	7.253	2.71	0.130
		(−1.59)	(2.17)*		
2001	**2810**	−6.420	11.090	12.54**	0.165
		(−4.28)**	(5.35)**		
2002	**2794**	−2.547	6.872	14.97**	0.111
		(−2.30)**	(4.21)**		
2003	**2719**	−0.332	10.942	30.90**	0.194
		(−0.17)	(4.01)**		
2004	**2600**	−7.873	12.878	19.27**	0.169
		(−5.73)**	(7.03)**		
2005	**2566**	2.227	4.011	15.95**	0.057
		(0.99)	(1.45)		
2006	**2478**	−4.282	9.761	2.69**	0.115
		(−2.38)**	(4.23)**		
2007	**2440**	−0.220	0.476	0.03	0.082
		(−0.13)	(0.21)		
2008	**2454**	−0.643	−0.816	1.31	0.119
		(−0.57)	(−0.47)		
2009	**2419**	−7.186	11.630	2.96	0.328
		(−4.23)**	(3.62)**		
2010	**2218**	1.992	−2.487	0.06	0.042
		(1.30)	(−0.97)		
1996–2000	**4734**	−1.896	5.641	0.93	0.047
		(−0.42)	(0.71)		
2001–2005	**13,489**	−3.945	10.149	31.37**	0.126
		(−3.11)**	(30.68)**		
2006–2010	**12,009**	−4.896	7.689	3.55	0.198
		(−2.22)*	(2.20)*		

Notes:
a. **,* indicate that the coefficient estimate is significant at the 1% and 5% level, respectively, using a one-tailed test.
b. See note e of Table 5 for variable definitions.

of 8% in deriving the as-if recognized operating lease liabilities. Following their study, we use 8%, in addition to the 10% used in our main tests, as the discount rates in deriving the as-if recognized operating lease liabilities for both cash flows models and return-earnings models. We also expand our sensitivity analysis on discount rate to apply a rate greater than 10% such as 12%. The untabulated results indicate that the empirical results of using either an 8% or 12% discount rate are similar to those applying a 10% rate. Thus, we conclude that our findings are robust to the assumption of the discount rate.

Due to the unique industry characteristics of the finance and insurance industry, we also perform the cash-flow (return-earnings) models by excluding the 1860 firm-year observations from the total firm-year observations of 36,427 (30,232). The untabulated results provide evidence that our findings are robust to the composition of industries. Moreover, to ensure our results are not biased by firm-year observations with extreme values, we conduct cash flow and return-earnings models by applying a 2.5% Winsorization as well as a 2.5% exclusion on our firm-year observations. The untabulated results are similar to those reported using 1% Winsorization. This finding suggests that the firm-year observations used in our models do not contain extreme values to dominate the results.[28]

Dyckman and Zeff (2014) question the stability of a sample period (i.e., whether it is stable and representative of the surrounding periods). They are also concerned with the empirical results being distorted by a factor related to the period selected. They suggest dividing the sample period into several sub-periods and see whether regressions using data from these sub-periods yield similar coefficients. Consequently, we perform three sub-period regressions (i.e., 1996–2000, 2001–2005 and 2006–2010) for both cash flow and return-earnings models. In addition, the results using data of an extensive period may be driven by the observations from one or two outlier years. To address this issue,

[28] When applying a 2.5% exclusion on firm-year observations, the coefficient of $E^R_{i,t-1}$ is significant while it is not under either a 1% or 2.5% Winsorization. However, the coefficients for the earnings surprise and E^L are robust to data Winsorization (or exclusion). We conclude that some extreme data can affect the significance level of the prior year's earnings, but not that of the earnings surprise or the earnings impact from operating lease capitalization.

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we also conduct regressions using annual data. Tables 6 and 7 present the results of the annual and sub-period regressions of the cash flow and return-earnings models, respectively.

Table 6 indicates that the coefficient of E^L has the expected negative sign for 14 of the 15 study years. In addition, seven are significant at the 1% level and one is significant at the 10% level (i.e., 2007). For the 5-year sub-period tests, the coefficient of E^L in two of the three sub-periods (i.e., 2001–2005 and 2006–2010) is significant at either the 1% or 5% level. These results indicate that the finding reported in our paper (i.e., the coefficient of the negative earnings impact is negatively significant) using 1996–2010 data is not driven by data of a few outlier years. In addition, the F-tests indicate that only two of the 15 test years are significant at the 1%, two are significant at the 10% level, and none of the 5-year sub-period F-tests is significant. This is also comparable to that reported in our paper in which the F-test is insignificant. Consequently, we conclude that the results of the cash flow models reported using the data of 1996–2010 are not dominated by the observations of any specific year or sub-period.

Table 7 reports that a majority (i.e., 10 of 15 years) of the coefficients of E^L in the return-earnings model has the expected negative sign. Six of these negative coefficients are significant at the 1% level and one is significant at the 10% level (i.e., 2000). The coefficient of E^L for two of the three 5-year sub-period tests is also significant at either the 1% or 5% level. Similar to the cash flow prediction models, these results also suggest that the finding reported in our paper using 1996–2010 data is not biased by a few outlier years. The F-tests for the sum of the coefficients of E^L and D^*E^L indicate that eight of the 15 study years are significant at the 1% level and two are significant at the 10% level (i.e., 2000 and 2009). Moreover, two of the three sub-period tests are either significant at the 1% level (i.e., 2001–2005) or marginally significant at the 5% level (i.e., 2006–2010). These results are also consistent with those reported in our paper using the data of 1996–2010.

Based on these findings, we conclude that the results from the return-earnings models using the data of 1996–2010 are not distorted by the data of any specific year or sub-period.

7. Conclusion

We study the economic implications of the earnings impact from operating lease capitalization with respect to cash flow predictions and the association with contemporaneous stock returns. Employing one-year cash flow prediction models, we find that this earnings impact possesses incremental predicative value for future cash flows beyond reported earnings but only for the negative earnings impact. Since cash flow forecasts are used in credit risk assessments, debt repayments, and cash dividend distributions (Lore & Dillinger, 2011; Mills & Yamamura, 1998),[29] our finding of the incremental cash flow predictive value of the negative earnings impact beyond reported earnings suggests that an oversight of this impact would reduce the accuracy of cash flow predictions and undermine the effectiveness of applying cash flow forecasts to financial decisions. To maximize the predictive power and fully capture the benefits of cash flow prediction models, the earnings impact from operating lease capitalization should be included in cash flow prediction models. Moreover, even though our finding of a predictive value of the negative earnings impact on cash flows validates the information relevance of the negative earnings impact in the context of SFAC No. 8, the lack of a predictive value of the positive earnings impact signifies the market's inability to fully exploit the earnings impact from operating lease capitalization in cash flow prediction models.

Earnings have been theoretically (i.e., Ohlson, 1995) and empirically proven (i.e., Easton & Harris, 1991; Easton et al., 1992; Freeman et al., 2011; Keung et al., 2010, etc.) to be relevant in firm valuation. To further study the economic implications of the earnings impact from operating lease capitalization, we apply a return-earnings model with two-way cluster-robust standard errors to assess the association of the earnings impact with contemporaneous stock returns. Our empirical results reveal that the earnings impact is positively associated with contemporaneous stock returns for both negative and positive earnings impact. As in the cash flow prediction study, this impact was only uncovered when the negative impact was separated from the positive impact.

The complexity and costs involved in deriving the earnings impact from operating lease disclosures can add a financial burden to investors and deter the use of this information in cash flows prediction and return-earnings models. Therefore, even though the market incorporates both negative and positive earnings impact in firm valuation and negative impact in cash flow predictions, it is economical for market participants if the lease expense for all leases is determined based on capital leases; that is the accelerated model as proposed by the Boards in the revised ED for leases. This mandate would not only avoid the considerable costs of performing operating lease capitalization, but also enhance the information and value relevance of earnings for firms financed extensively with operating leases.

As the Boards are in the midst of redeliberations of the accounting for leases, our findings provide timely empirical evidence to evaluate the information and value relevance of alternative lessee's expense models that are currently under consideration. Our findings are especially pertinent since 1) the dual model proposed by the Boards in the revised ED for leases has been heavily criticized for being too complex and may result in different lease expense models being applied to leases with similar economic substance,[30] and 2) the IASB reverted its support to the single accelerate model for lessee expenses in 2014.

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Appendix A. Variable derivations and descriptions

A.1. The unrecorded lease liabilities

We derive the unrecorded lease liabilities of year t (hereafter, URL_t) by summing the present values of all future lease payments with an assumed discount rate of 10%.[31] [32] The footnote disclosure of operating lease payments provides five subsequent years of lease payments with one lump-sum payment for the remaining years. As in Imhoff et al.

[29] The usefulness of the cash flow predictions is also documented in the studies of bankruptcy predictions. For example, the cash flow/total debt ratio is empirically proven to be a good predictor of business failures (Beaver, 1966; Blum, 1974; Khumawala, Polhemus, & Liao, 1981, etc.).

[30] Many comment letters (e.g. Gap Inc., FedEx, and Walmart) received by the FASB on the revised ED for leases indicate that the dual model is complex, hard to implement, and subject to accounting similar leases with different lease expense models.

[31] Dhaliwal et al. (2011) also adopt the 10% discount rate assumption.

[32] We realize that some studies subsequent to Imhoff et al. (1991) use firm-specific assumptions for lease lives and the discount rate in addition to the uniform assumptions in applying the Imhoff et al. (1991) procedures to estimate the unrecorded lease liabilities (e.g. Beattie et al., 1998; Bennett & Bradbury, 2003; Bratten et al., 2013; Ely, 1995; Imhoff et al., 1993; Imhoff et al., 1997). In our study, we choose to use the firm-specific assumption only for tax rates due to the data required to estimate the tax rates being available on Compustat. As for other assumptions (i.e., lease lives and discount rates), we use uniform assumptions for two reasons: 1) due to the unavailability of firm-specific data for the remaining lease lives and the implicit discount rates for US firms, the uniform assumptions are used to ensure the maximum numbers of firms included in our study, 2) the conclusion of prior studies performing sensitivity analyses on these assumptions is that both uniform and firm-specific assumptions result in similar estimates of the unrecorded lease liabilities (Beattie et al., 1998; Bennett & Bradbury, 2003; Bratten et al., 2013; Ely, 1995).

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(1991), we assume that the lease term is 30 years, half-expired and the lump-sum payment is equally paid in 10 years.

A.2. The unrecorded leased asset

The *URL* equals the unrecorded leased asset (hereafter, *URA*) at the inception of a lease term. While the *URA* is reduced by a straight-line depreciation expense, the *URL* is decreased by the lease payment net of interest expense. Since the lease payment is mostly comprised of interest expense in the early part of a lease term, the *URA* is therefore declining at a faster rate than the *URL*. Consistent with the assumptions used in Imhoff et al. (1991), we assume that for a half-expired 30-year lease contract, the URA_t is 70% of the URL_t for the test year t.[33]

A.3. The operating lease capitalization impact on retained earnings

The impact of lease capitalization on retained earnings is equal to the excess of cumulative capital lease expenses over operating lease expenses up to the test year. This cumulative excess expense can be calculated as [(depreciation expense + interest expense) − (lease payment)], in which (depreciation expense + interest expense) is the expense charged under a capital lease while (lease payment) is the expense charged under an operating lease. This calculation can be rearranged as [depreciation expense − (lease payment − interest expense)]. Since URA_t is reduced by the depreciation expense while URL_t is reduced by (lease payment − interest expense), the cumulative excess expense of a capital lease over an operating lease (or *the impact of lease capitalization on retained earnings*) is equivalent to the difference between URL_t and URA_t. Consequently, the impact of lease capitalization on retained earnings for year t (hereafter, RE_t^L), in the absence of tax effects, equals $(URL_t - URA_t)$.

A.4. The pre-tax earnings impact of a given year

To calculate the lease capitalization impact on pre-tax earnings of a given year t (hereafter, IN_t^L), we subtract the excess of cumulative capital lease expenses over operating lease expenses of year $t-1$ from those of year t. This derivation is expressed as $IN_t^L = RE_t^L - RE_{t-1}^L$. A positive (negative) result would indicate that capital lease expenses are greater (less) than operating lease expenses for year t and the constructive lease capitalization would therefore have a *negative (positive)* pre-tax earnings impact for year t.

A.5. Cumulative tax savings, net impact on retained earnings and earnings

Since a capital lease incurs additional expenses during the early part of a lease term, lease capitalization would result in tax savings and, therefore, reduce the negative impact of lease capitalization on retained earnings. The cumulative tax savings are calculated as TR_t (i.e., the tax rate of year t) [34] times the cumulative excess expense or $[TR_t \times (URL_t - URA_t)]$. Therefore, the net of tax impact on retained earnings from the lease capitalization is calculated as $(1 - TR_t) * RE_t^L$. The tax savings should also be subtracted from the pre-tax earnings impact to obtain the earnings impact E_t^L as $(1 - TR_t) * IN_t^L$.

[33] Bratten et al. (2013) assume that the leased asset values are equal to 100% of the lease liability for their tests but also conduct a sensitivity analysis based on 90%. They conclude that the results are not affected by different value assumptions.

[34] For our sample firms, we estimate the tax rate as tax expense (*TXA*) divided by pre-tax income (*PI*). This results in estimated tax rates varying from 1% to 35%. When tax credit is involved (either for domestic or foreign losses), it could result in the tax expense being greater than the pretax income. For example, IBM has an income tax expense of $685 million with a pretax income of only $121 million for its 2001 fiscal year. We cap the tax rate at 35% in this case since the effective tax rate is about 35% during our sample years. Moreover, we apply the effective tax rate of 35% instead of the calculated negative tax rate for firms with pretax losses. Equity Office Properties exhibits a 1% tax with a tax payment of $5.37 and a pretax income of $636.77, or a tax rate of 0.008 (rounded to 1%).

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