Did the FASB's Simplification Initiative Increase Errors in Analysts' Implied ETR Forecasts? Evidence from Early Adoption of ASU 2016-09

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Abstract:

Part of the FASB's broader simplification initiative, ASU 2016-09 was issued on March 30, 2016 and became effective for all firms for fiscal years beginning after December 15, 2016. ASU 2016-09 simplifies the accounting for the tax effects of stock-based compensation by requiring firms to record all related tax windfalls and shortfalls as components of current income tax expense rather than as direct-to-equity adjustments, as was required under prior guidance. Many observers note that this change may introduce significant volatility and uncertainty into firms' ETRs. Consistent with this concern, we document that errors in analysts' 'clean' ETR forecasts significantly increased among firms reporting a material ETR effect due to early-adopting ASU 2016-09, relative to other firms. Our results suggest that simplification came at the cost of a decrease in the predictive ability of financial information; as such, this study provides timely and important evidence on the economic consequences of ASU 2016-09.

Keywords: ASU 2016-09; FASB Simplification Initiative; Stock-Based Compensation; Excess Tax Benefits and Deficiencies; Effective Tax Rates; Analyst Forecast Accuracy

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INTRODUCTION

On March 30, 2016, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) No. 2016-09, *Improvements to Employee Share-Based Payment Accounting*, as part of its broader initiative to reduce complexity in accounting standards. Among other changes, this new guidance simplifies the accounting for the permanent difference between the tax deduction for stock-based compensation and the corresponding book expense. Many observers note that this simplification may come at the cost of increasing the volatility of firms' tax expense and, consequently, net earnings. Motivated by this concern, we examine the effect of ASU 2016-09 on the predictability of tax expense, in particular whether implementation of the new guidance affected the accuracy of analysts' implied effective tax rate (ETR) forecasts.

ASU 2016-09 requires firms to record all excess tax benefits and deficiencies, commonly known as tax windfalls and shortfalls, related to the settlement of stock-based awards on the income statement as a component current income tax expense. In contrast, under the prior authoritative guidance, these tax windfalls and shortfalls generally bypassed the income statement and were recorded directly to stockholders' equity. Firms expect to benefit from these changes because ASU 2016-09 simplifies the accounting for stock-based compensation (PricewaterhouseCoopers 2016a). However, tax expense under the new standard will be affected by fluctuations in the firm's stock price, the timing of employees' stock option exercises, and the vesting schedules of employees' restricted stock units. Thus, ASU 2016-09 may introduce significant volatility and uncertainty into tax expense (BDO 2016; Ernst & Young 2016;

PricewaterhouseCoopers 2016a,b; KPMG 2016). The overarching objective of the FASB's simplification initiative is to "reduce cost and complexity while maintaining or improving the usefulness of the information provided to users of financial statements" (FASB 2016). Because the FASB considers predictive value a component of the usefulness of accounting information (FASB 2010), it is important to understand whether changes to the accounting for permanent book-tax differences related to stock-based compensation mandated by ASU 2016-09 affect the predictability of firms' ETRs.

To examine this issue, we investigate the effect of ASU 2016-09 on the accuracy of analysts' implied ETR forecasts. We make this research design choice because analysts are highly informed intermediaries (Barth and Hutton 2004) with sophisticated knowledge of tax issues (Baik, Kim, Morton, and Roh 2016; Bratten, Gleason, Larocque, and Mills 2017). Thus, focusing on analysts' forecast errors creates a powerful setting to assess the effect of ASU 2016-09 on the usefulness of accounting information. Moreover, a significant proportion of the analysts following a firm issue forecasts of the company's pretax and after-tax net income, with the difference representing analysts' implied forecasts of firms' tax expense. Therefore, examining the effect of ASU 2016-09 on analysts' implied ETR forecasts allows for better precision and stronger identification in our empirical tests compared to using more general measures of investors' processing of accounting information. Relatedly, because analysts' forecasts may serve as proxies for unobservable investor expectations (Fried and Givoly 1982), studying the accuracy of analysts' implied ETR forecasts can provide insight into the consequences of ASU 2016-09 on the market as a whole.

Forecasting tax expense following the implementation of ASU 2016-09 will require analysts to gather and interpret new information regarding firms' stock returns and employees'

stock-based compensation plans, thereby increasing analysts' costs of information acquisition. Further, prior research suggests that earnings volatility decreases the predictability of earnings (Dichev and Tang 2009) and increases analyst forecast errors (Donelson and Resutek 2015; Behn, Choi, and Kang 2008), while tax rate volatility decreases the predictability of tax expense (Drake, Lusch, and Stekelberg 2017). Collectively, these findings suggest that the volatility and uncertainty introduced into firms' ETRs by ASU 2016-09 will make forecasting tax expense more difficult for analysts. For these reasons, we hypothesize that errors in analysts' implied ETR forecasts will increase following the adoption of ASU 2016-09.

ASU 2016-09 became effective for public entities for fiscal years beginning after December 15, 2016; however, the guidance permitted early adoption in any interim or annual period, allowing public firms to adopt the new standard during 2016. We search firms' 10-Q and 10-K filings for the fiscal year 2016 for references to ASU 2016-09 and, after imposing various data restrictions, we identify 327 firms that early adopted the standard and a control sample of 945 firms that did not. Among the early adopters, 130 firms provided a new line item in their ETR reconciliations associated with net tax windfalls due to early adoption. The mean (median) effect reported in these firms' rate reconciliations is a net ETR decrease of 3.8 (2.0) percentage points. Moreover, we identify an additional 84 firms that separately report the dollar amount of net tax windfalls recorded as a reduction to income tax expense due to early adoption. Among these firms, the mean (median) implied effect on the firm's ETR is a net decrease of 1.5 (0.5) percentage points.

We next provide evidence on the determinants of the decision to early adopt ASU 2016-09. When considering all early adopters, we find that the one-year lag of annual stock returns is the most significant determinant of early adoption, while a number of variables we expect to

predict early adoption are not significantly associated with the adoption decision. In contrast, when we partition early adopters into those that report a material ETR effect due to the new standard and those that do not, we find that contemporaneous and lagged stock returns, reported tax windfalls from stock compensation plans over the prior two years, the GAAP ETR, and firm size are positively associated with the likelihood of early adoption. We also find that GAAP ETR volatility and the book-to-market ratio are negatively related to the early adoption decision. Taken together, these results suggest firms that were more likely to benefit from ASU 2016-09 were more apt to early adopt the standard.

Turning to our primary findings, we first note that we only expect to observe results consistent with our hypothesis among early adopters for which the majority of contributing analysts include net tax windfalls or shortfalls in their implied ETR forecasts. As such, we follow Bratten et al. (2017) and identify firms with actual GAAP ETRs within 0.5 percentage points of the firm's actual ETR reported in I/B/E/S for both fiscal years 2015 and 2016, indicating that the majority of contributing analysts made 'clean' implied ETR forecasts for this particular firm. Clean forecasts suggest that the majority of analysts did not exclude from their forecasts any GAAP items that affect the firm's ETR.

We test our hypothesis that errors in analysts' implied ETR forecasts increased following the adoption of ASU 2016-09 by regressing the annual change in the median analyst's implied ETR forecast error for a particular firm on an indicator variable capturing whether the firm early adopted the standard. Controlling for a number of determinants of analyst forecast accuracy along with predictors of the early adoption decision discussed above, we initially do not document a significant association between the adoption of ASU 2016-09 and the change in analysts' clean implied ETR forecast errors. However, after we focus our analysis on early

adopters that reported a material ETR effect due to the new standard, we provide evidence consistent with our hypothesis that analysts' implied ETR forecast errors significantly increased following the adoption of ASU 2016-09. Regarding the economic magnitude of this effect, our coefficient estimates (reported in Table 6) suggest that errors in analysts' clean implied ETR forecasts increased by approximately 1.3 percentage points among material early adopters relative to other firms, representing an approximately 34.2 percent increase in the average analyst's ETR forecast error compared to the pre-adoption period.

Our findings contribute to the literature by demonstrating that analysts, who are highly informed users of financial information, appear to have significantly more difficulty forecasting ETRs after firms adopt ASU 2016-09. While the new standard may have benefited firms by simplifying the accounting for tax windfalls and shortfalls related to stock-based compensation, our evidence suggests that this simplification came at the cost of a decrease in the predictive ability of the tax information reported in firms' financial statements. Given that the FASB considers predictive value a component of the usefulness of accounting information, our study provides timely and important evidence on the economic consequences of ASU 2016-09.

Our study also extends the broader literature on how financial analysts interpret tax information. Although a number of recent studies suggest that analysts possess sophisticated knowledge of tax issues, our findings indicate that despite this expertise, analysts have difficulty incorporating the requisite information related to tax windfalls and shortfalls from stock-based compensation into their ETR forecasts following the implementation of ASU 2016-09.

Lastly, our findings have implications for the literature on investor valuation of tax expense in general, and book-tax differences related to stock-based compensation (e.g., Brushwood, Johnston, and Kutcher 2017) in particular. To the extent that analysts' forecasts are

a suitable proxy for broader, unobservable market expectations, our findings imply that investors may have difficulty appropriately valuing firms' tax expense in the post-ASU 2016-09 environment.

The remainder of this study proceeds as follows. In the next section, we provide technical background on the accounting for stock-based compensation and develop our hypothesis. The following section describes our sample selection procedure and presents evidence on the determinants of the decision to early adopt ASU 2016-09. Next, we detail the research design and results related to the test of our hypothesis as well as associated supplemental analyses. We provide concluding remarks in the final section.

BACKGROUND AND HYPOTHESIS DEVELOPEMENT

The FASB issued Accounting Standards Update (ASU) No. 2016-09, *Improvements to Employee Share-Based Payment Accounting*, on March 30, 2016.[1] As part of the FASB's broader initiative to reduce complexity in accounting standards, the primary intent of ASU 2016-09 is to simplify the accounting for and presentation of stock-based compensation payments in firms' financial statements relative to the prior guidance provided in Accounting Standards Codification (ASC) 718. Although ASU 2016-09 affects several aspects of the accounting for stock-based compensation, we focus our study on one of the most significant changes: requiring firms to record all tax windfalls and shortfalls related to stock-based payments on the income statement as a component of current tax expense rather than directly to stockholders' equity.[2] We

[1] ASU 2016-09 became effective for public entities for fiscal years beginning after December 15, 2016. However, the guidance allowed for early adoption in any interim or annual period, applied retroactively to the beginning of the fiscal year of adoption. We discuss this issue in more detail in our research design section.

[2] Other implications of ASU 2016-09 for public entities include changes to the following: the classification of tax windfalls and tax payments on behalf of employees on the statement of cash flows, accounting for forfeitures of stock-based compensation awards, the formula used to calculate diluted earnings per share, and statutory share withholding requirements.

discuss the changes to the accounting rules for tax windfalls and shortfalls pursuant to ASU 2016-09 relative to ASC 718, and the potential ramifications of these changes, below.

For financial statement purposes, U.S. GAAP requires public entities to recognize compensation expense in the amount of the grant date fair value of the award (using an option pricing model for stock options, and generally the closing stock price on the grant date for restricted stock units) over the corresponding vesting period. In general, the fair value of the award is not re-measured in subsequent periods to reflect changes in the value of the underlying stock. On the other hand, for tax purposes, firms generally do not receive a deduction for compensation expense related to stock-based compensation until stock option awards are exercised by the employee or until restricted stock units fully vest. Additionally, the amount of the compensation expense deduction for stock option awards is equal to the intrinsic value of the stock option upon exercise, while the deduction for restricted stock unit awards is the stock price on the vesting date. Thus, the amount of the tax deduction related to stock-based compensation is generally different from the grant date fair value recognized as compensation expense for book purposes, resulting in a permanent book-tax difference.

Under the prior guidance of ASC 718, this permanent book-tax difference related to stock-based compensation awards was required to be recognized in a separate stockholders' equity account, often referred to as the APIC tax pool, thus bypassing the income statement. More specifically, firms generally increased the APIC tax pool in the event of a tax windfall (i.e., a tax deduction exceeding the associated book compensation expense) and decreased the APIC tax pool in the event of a tax shortfall (i.e., a tax deduction less than the associated book compensation expense). ASU 2016-09 eliminates this APIC tax pool treatment on a prospective basis. Instead, under the new guidance, firms are now required to recognize tax windfalls and

shortfalls related to stock-based compensation as increases and decreases to current tax expense, respectively. To further illustrate the difference in accounting for the income tax effects of stock-based compensation between ASU 2016-09 and ASC 718, we provide a simplified example in Appendix B.

In addition to harmonizing the accounting for permanent book-tax differences related to stock-based compensation with the treatment of other permanent book-tax differences, these changes are expected to benefit firms by simplifying the accounting for stock-based compensation (PricewaterhouseCoopers 2016a). However, many observers have noted that requiring recognition of the difference between the tax deduction for stock-based compensation and the corresponding book expense on the income statement rather than in stockholders' equity may introduce significant volatility and uncertainty into tax expense, and by extension, net earnings (BDO 2016; Ernst & Young 2016; PricewaterhouseCoopers 2016a,b; KPMG 2016). Summarizing this tradeoff between simplification and volatility in tax expense caused by fluctuations in the firm's stock price, the timing of employees' stock option exercises, and the vesting schedules of employees' restricted stock units, Apple Inc. stated the following in its letter to the FASB during the comment period for ASU 2016-09:

> "While we acknowledge that the proposed changes would reduce the operational burden of tracking an APIC pool, we believe any such benefits would be outweighed by the introduction of increased volatility in earnings and the effective tax rate. This increased volatility would cause confusion amongst financial statement users. An entity's ability to accurately forecast such volatility would be challenged by inherent complexities in estimating future changes in an award's valuation (e.g., changes in an entity's share price) and the timing of the tax benefit realization (e.g., when a share option will be exercised)."

The overarching objective of the FASB simplification initiative is to "reduce cost and complexity while maintaining or improving the usefulness of the information provided to users of financial statements" (FASB 2016). Motivated by this objective and the fact that the FASB

considers predictive value a component of the usefulness of accounting information (FASB 2010), we examine whether changes to the accounting for permanent book-tax differences generated from tax windfalls and shortfalls related to stock-based compensation mandated by ASU 2016-09 affect the predictability of tax expense.

To answer our research question, we focus on the accuracy of analysts' forecasts for two primary reasons. First, analysts are highly informed users of financial information (Barth and Hutton 2004). Although some research suggests that analysts have difficulty fully incorporating the tax information reported in firms' financial statements (e.g., Chen and Schoderbek 2000; Chen, Danielson, and Schoderbek 2003; Plumlee 2003; Shane and Stock 2006; Weber 2009), more recent work suggests that analysts possess sophisticated knowledge of tax issues. For instance, Baik et al. (2016) demonstrate that analysts' ETR forecasts anticipate information contained in tax expense surprise, mitigating the tax expense anomaly documented by Thomas and Zhang (2011). Additionally, Bratten et al. (2017) find that analysts' ETR forecasts actually improve upon management forecasts in the presence of tax complexity. Thus, we believe that examining the accuracy of analysts' forecasts represents a powerful setting to assess the effect of ASU 2016-09 on the usefulness of accounting information.

Second, from a practical research design standpoint, focusing our study on analysts allows us to take advantage of the fact that a significant proportion of analysts issue forecasts of firms' pretax and after-tax net income, with the difference representing analysts' implied forecasts of firms' tax expense. In our opinion, examining the accuracy of analysts' implied ETR forecasts, rather than more general measures of investors' processing of financial information such as share turnover or stock return volatility (e.g., Karpoff 1986; Kim and Verrecchia 1991; Berkman, Dimitrov, Jain, Koch, and Tice 2009; Comprix, Graham, and Moore 2011) allows for

increased precision and stronger identification in our empirical tests. Moreover, to the extent that analysts' forecasts may serve as proxies for unobservable investor expectations (Fried and Givoly 1982), examining the effect of ASU 2016-09 on the accuracy of analysts' implied ETR forecasts can provide insight into the effect of the new guidance on capital market participants.

We posit that the volatility and uncertainty introduced into firms' ETRs following the adoption of ASU 2016-09 will increase analysts' difficulty in forecasting tax expense. Prior studies document that earnings volatility decreases the predictability of earnings (e.g., Dichev and Tang 2009) and that earnings uncertainty is associated with greater analyst forecast errors (Donelson and Resutek 2015; Behn et al. 2008). Other research shows that volatility in firms' tax rates weakens the positive association between contemporaneous and future tax rates (Drake et al. 2017), suggesting that tax rate volatility impairs the predictability of tax expense. As previously mentioned, in order to properly incorporate the effect of tax windfalls and shortfalls into their ETR forecasts, analysts would need to collect and integrate information regarding firms' stock returns, the timing of employees' stock option exercises, and restricted stock units' vesting schedules. This requisite additional information will increase analysts' costs of information acquisition. As it becomes more difficult and costly for analysts to predict firms' tax expense, we expect errors in analysts' implied ETR forecasts to increase. Formally, we state our hypothesis as follows:

H1: Errors in analysts' implied ETR forecasts will increase following the adoption of ASU 2016-09.

Although we make a signed prediction regarding the effect of ASU 2016-09 on the accuracy of analysts' implied ETR forecasts, there are a number of reasons why we might not find support for our hypothesis. For one, the new standard may highlight value relevant

information to financial statement users. Indeed, in its comment letter to the FASB regarding ASU 2016-09, the CFA Institute stated that it was in favor of recognizing excess tax benefits on the income statement rather than the APIC pool, noting that "they [excess tax benefits] are relevant to investors" and that "investors more thoroughly review the income statement than the rollforward of equity." Additionally, practitioner evidence suggests that firms have increased tax disclosures following the implementation of ASU 2016-09 (PricewaterhouseCoopers 2016c); such higher-quality disclosures regarding tax matters may mitigate any negative effects on financial statement users' ETR forecasts (Hutchens 2017). Finally, firms may alter their compensation mix or vesting schedules, and influential employees with economically material stock option award packages may strategically time stock option exercises, in order to minimize the unpredictability of tax expense following the adoption of ASU 2016-09. For these reasons, ASU 2016-09 may not significantly impair the accuracy of analysts' implied ETR forecasts.

SAMPLE SELECTION AND EARLY ADOPTION DECISION ANALYSES

Sample Selection

Our sample selection procedure consists of several phases that we summarize in Table 1. As noted above, ASU 2016-09 became effective for public entities for fiscal years beginning after December 15, 2016; however, the guidance permitted early adoption in any interim or annual period, applied retroactively to the beginning of the fiscal year of adoption. We take advantage of this provision in the standard by constructing a treatment sample of firms that early adopted ASU 2016-09 for the 2016 fiscal year and a control sample of firms that did not.

We begin our sample selection process with the 4,342 firms from the CRSP/Compustat merged database that have 2016 fiscal year-ends of December, January, February, March, or

April.[3] We then eliminate 727 firms that are incorporated outside the United States along with 276 firms missing the necessary Compustat data. Finally, we delete 1,472 firms with GAAP ETRs greater than 100% or less than 0% in either 2015 or 2016. At this stage, we have an initial sample of 1,867 firms for which we hand-collect data regarding the early adoption of ASU 2016-09 from their SEC filings.

[Insert Table 1 here]

Our hand-collection procedure involves searching firms' 10-Q and 10-K filings for the 2016 fiscal year for references to ASU 2016-09. We primarily located information regarding the new standard and its related effects reported in the footnotes concerning significant accounting policies, income taxes, and/or stock-based compensation plans. Based on our review, 434 of the 1,867 firms, or approximately 23 percent, elected to early adopt the standard. For these firms, we then collect the following additional information from the 10-K filings when available: 1) the quarter of early adoption; 2) the impact that the early adoption had on the firm's GAAP ETR, as reported in the ETR reconciliation within the 10-K tax footnote; and 3) the dollar amount of net tax windfalls that the firm recognized in income tax expense during the year as a result of the early adoption.

Our hypothesis test requires analyst forecast data from I/B/E/S. As such, from this initial sample of 1,867 firms, we eliminate 501 firms missing I/B/E/S data in either fiscal year 2015 or 2016 plus another 94 firms with I/B/E/S actual ETRs greater than 100% or less than 0% in either 2015 or 2016. These restrictions yield a final sample of 1,272 firms available for hypothesis testing, of which 327 (approximately 26 percent) are early adopters of ASU 2016-09. We create

[3] Throughout the paper, we use the definition of fiscal year based on the Compustat definition (i.e., the variable FYEAR), rather than the calendar year of the fiscal year end. For instance, the fiscal year ending April 2017 corresponds to the 2016 fiscal year per the Compustat definition.

an indicator variable, *Early*, that is equal to one for firms that early adopted the standard, and zero otherwise.

Table 2, Panel A reports the industry frequency distribution of these 1,272 sample observations, and separately for the 327 firms that early adopted ASU 2016-09 (*Early* = 1) and the 945 firms that did not (*Early* = 0). Most notably, the distribution reveals that the most heavily represented industry is Financial Services (29.40 percent of the full sample), while early adopters appear distributed proportionally across a variety of industries.[4]

[Insert Table 2 here]

In Panel B of Table 2, we present additional descriptive information regarding the 327 firms that elected to early adopt ASU 2016-09. This panel reveals that 119 of these firms adopted the new standard in the first quarter of fiscal year 2016. Of the remaining early adopters, 66, 51, and 91 adopted ASU 2016-09 in the second, third, and fourth quarters of fiscal year 2016, respectively.[5] Further, 130 of the 327 early adopters reported the effect of ASU 2016-09 on income tax expense by providing a new line item in their ETR reconciliations. For these 130 firms, the mean (median) reported effect of the new standard on the GAAP ETR is –3.8 (–2.0) percentage points.

Although a significant percentage of firms that early adopted ASU 2016-09 did not include the effect of the new standard on the GAAP ETR in their rate reconciliations, a number of these firms separately reported the dollar amount of net tax windfalls due to early adoption elsewhere in their 10-K filings. We use these disclosures to calculate an 'implied' ETR effect for an additional 84 of the 327 early adopters by dividing the reported net tax windfalls by pretax

[4] To increase the generalizability of our findings, we include firms that operate in the financial services, insurance, and utility sectors. However, excluding these firms does not materially affect the results that follow.
[5] As previously mentioned, if an entity early adopts ASU 2016-09, it must apply all provisions of the standard retroactively to the beginning of the fiscal year.

income.[6] For these 84 firms, we find that the mean (median) implied GAAP ETR effect of the new standard is –1.5 (–0.5) percentage points.

We infer that ASU 2016-09 did not have a material impact on the ETR for the remaining 113 firms that early adopted the standard. Therefore, we construct an indicator variable, *Material_Early*, that is equal to one for the 214 firms reporting a material ETR effect due to early adoption, and zero otherwise.

Determinants of Early Adoption

Early Adoption Decision Model

We begin our empirical tests by exploring the determinants of a firm's decision to early adopt ASU 2016-09. To carry out this investigation, we model the likelihood of a firm early adopting the standard with the following logistic regression model:

$$\begin{aligned} Prob(Early_{it} = 1) \; &= \delta_0 + \delta_1 Return_{it} + \delta_2 Return_{it-1} + \delta_3 Tax\_Windfalls_{it-1} + \delta_4 GAAP\_ETR_{it-1} \\ &+ \delta_5 VOL\_Return_{it-1} + \delta_6 VOL\_GAAP\_ETR_{it-1} + \delta_7 ROA_{it-1} + \delta_8 Loss_{it} \\ &+ \delta_9 Book\_Market_{it-1} + \delta_{10} Size_{it-1} + \delta_{11} Analysts_{it-1} + Industry\ Indicators + v_{it} \end{aligned} \quad (1)$$

Throughout the paper, the subscript *i* denotes firm and the subscript *t* denotes the 2016 fiscal year. We winsorize all continuous variables at the 1 percent and 99 percent levels and we cluster standard errors by firm. We provide detailed variable definitions in Appendix A and briefly discuss the regression variables below.

Recall that pursuant to ASU 2016-09, tax windfalls (shortfalls) generated by stock compensation plans will decrease (increase) current tax expense. As a result, we predict that a

[6] For example, Merck & Co. (ticker symbol = MRK) early adopted ASU 2016-09 in the second quarter of its 2016 fiscal year. In the 'Summary of Accounting Policies' footnote to its 2016 10-K filing, Merck discloses that the early adoption resulted in the recognition of $79 million of excess tax benefits in income tax expense in 2016. However, Merck's rate reconciliation in its 2016 10-K filing does not separately report this permanent book-to-tax difference. Therefore, we compute an implied ETR effect of −1.7 percent by dividing −$79 million by Merck's 2016 pretax income of $4,659 million.

firm is more likely to early adopt the standard if it believes its stock compensation plans will generate net tax windfalls, thereby increasing its after-tax net income. To this end, we include contemporaneous and lagged annual stock returns (*Return*) as well as the reported excess tax benefits from stock compensation plans over the previous two fiscal years (*Tax_Windfalls*). We also expect that the likelihood of a firm early adopting ASU 2016-09 should be increasing in the firm's GAAP ETR because the standard should yield a net ETR reduction on average and as such, may serve as a means of downwards ETR management. Therefore, we include the one-year lag of the GAAP ETR (*GAAP_ETR*) in equation (1).

In addition to the aforementioned variables, we include the standard deviation of monthly stock returns over the previous three fiscal years (*VOL_Return*), as well as the standard deviation of the firm's annual GAAP ETRs over the previous five fiscal years (*VOL_GAAP_ETR*). Because ASU 2016-09 is predicted to further increase ETR volatility, we expect these variables to be negatively associated with the adoption decision. To capture firm performance, we include pretax return on assets (*ROA*) and an indicator variable set equal to one for firms reporting negative pretax income (*Loss*), and zero otherwise. Next, because Core and Guay (1999, 2001) find that growth opportunities are positively related to the use of stock-based compensation, we include the book-to-market ratio (*Book_Market*). Lastly, we include firm size as measured by the natural logarithm of the market value of equity (*Size*), analyst following (*Analysts*), and industry fixed effects (determined using the Fama-French 12 classification) in equation (1).

Descriptive Statistics: Early Adoption Decision Model

Table 3, Panel A presents the means and medians of the variables included in the early adoption decision model (i.e., equation (1)). We report these descriptive statistics in four columns. Specifically, we present descriptive statistics for firms that did not early adopt ASU

2016-09 in Column A (*Early* = 0) and all firms that did early adopt the standard in Column B (*Early* = 1). We then partition the early adopting firms into those that reported the ETR effect of early adoption in their 2016 10-K filings (*Material_Early* = 1), presented in Column C, and those that did not (*Material_Early* = 0), presented in Column D.

[Insert Table 3 here]

Table 3, Panel B reports univariate tests of the differences in the means and medians across these four groups. In the first column, we compare all early adopters (i.e., Column B from Panel A) to firms that did not early adopt ASU 2016-09 (i.e., Column A from Panel A). The analysis reveals that, on average, early adopters experienced significantly higher stock returns and greater tax windfalls in the period leading up to early adoption. In addition, we find that, on average, early adopters have less volatile stock returns and GAAP ETRs, are less likely to report losses, have greater growth opportunities (i.e., lower book-to-market ratios), are larger, and have greater analyst following than non-adopting firms.

Interestingly, we find that these differences persist, and indeed generally become stronger, when comparing only those early adopters that reported a material ETR impact to non-early adopters (i.e., comparing Column C of Panel A to Column A of Panel A). In stark contrast, the majority of these differences disappear or even reverse when comparing only those early adopters that did not report a material ETR impact to non-early adopters (i.e., comparing Column D of Panel A to Column A of Panel A). In particular, we do not identify significant differences in means for stock returns, GAAP ETRs, GAAP ETR volatility, loss status, book-to-market ratios, size, or analyst following between these subsamples of firms, while we find that tax windfalls are actually *lower* (rather than higher) among early adopters not reporting a material ETR impact compared to non-early adopters. Finally, when comparing early adopters that reported a material

ETR impact to those that did not report such an effect (i.e., comparing Column C of Panel A to Column D of Panel A), we find that the majority of the differences are similar to those that we observe between material early adopters and non-adopting firms.

To summarize, we document numerous differences between firms that early adopted ASU 2016-09 and their non-adopting counterparts. In addition, it appears these differences are more pronounced when focusing on the subsample of early adopters that reported a material effect of the new standard on tax expense. Conversely, the characteristics of 'immaterial' early adopting firms appear more similar to firms that did not early adopt the standard.[7] We incorporate these differences into our empirical tests discussed below.

Results of Early Adoption Decision Model

Table 4 summarizes the results from the estimation of the early adoption decision model (i.e., equation (1)). In Column A of Table 4, we report the results based on our full sample, where the dependent variable is *Early*. In this specification, we find that lagged annual stock returns is the most significant predictor of early adoption. In contrast to expectations, contemporaneous stock returns, tax windfalls, the GAAP ETR, and stock return and GAAP ETR volatility are not significantly associated with the likelihood of early adoption.

Considering the aforementioned differences between material and immaterial early adopters, we estimate two additional variations of equation (1). Specifically, in Column B of Table 4, we use an indicator variable capturing only those early adopters that reported the ETR impact of early adoption as our dependent variable (*Material_Early*). In Column C of Table 4,

[7] We also compare option exercise activity in fiscal year 2016 across the three groups. Untabulated results reveal that the mean and median intrinsic value of options exercised (deflated by market value of equity at the beginning of the year) of the *Material_Early* = 1 subsample are significantly higher than those of the other two subsamples. Moreover, we find that the mean and median intrinsic value of options exercised for the 113 early adopters that did not report the income tax expense effect of ASU 2016-09 is *significantly less* than that of non-adopters. This finding supports the notion that that these firms did not report the effect of early adoption on income tax expense because the amount was immaterial.

we continue to use *Material_Early* as our dependent variable, but we estimate the model on a reduced sample after deleting the 113 firms that early adopted ASU 2016-09 but did not report a related material ETR effect.

[Insert Table 4 here]

As predicted, the results from both specifications reveal that annual stock returns over the current and prior fiscal years are positively associated with the decision to early adopt ASU 2016-09. In addition, we document positive associations between the likelihood of early adoption and tax windfalls as well as the GAAP ETR, suggesting that firms may have early adopted the standard as a means of reducing their ETRs. Also consistent with expectations, the results reveal that the likelihood of a firm early adopting the standard is a negative function of GAAP ETR volatility and the book-to-market ratio. Finally, we find that larger firms are more apt to early adopt ASU 2016-09.

To summarize, the results from Table 4 suggest the variables that we predict to be associated with early adoption of ASU 2016-09 are significant in the expected directions when focusing the analysis on early adopters reporting a material ETR effect due to the new standard. However, many of these predicted determinants become insignificant when including 'immaterial' early adopters in the analysis.

RESEARCH DESIGN AND RESULTS

Regression Model

As discussed above, we hypothesize that errors in analysts' implied ETR forecasts will increase following the adoption of ASU 2016-09. To test this prediction, we estimate the following regression model using ordinary least squares (OLS):

$$\Delta Error\_ETR_{it} = \beta_0 + \beta_1 Early_{it} + \beta_2 Early_{it} * Clean_{it} + \beta_3 Clean_{it} + \beta_4 \Delta Error\_PRE_{it}$$
$$+ \beta_5 \Delta Contrib\_Analysts_{it} + \beta_6 \Delta Horizon_{it} + \lambda' Forecast\_Controls_{it}$$
$$+ \delta' Decision\_Controls_{it} + Industry\ Indicators + \varepsilon_{it} \quad (2)$$

We calculate our dependent variable, $\Delta Error\_ETR_{it}$, in several steps. To begin, we follow Bratten et al. (2017) and Hutchens (2017) and use the I/B/E/S details file to compute the absolute value of the error in analyst *j*'s implied ETR forecast for firm *i* in year *t* as follows:

$$Error\_ETR_{jit} = |IBES\_ETR_{it} - ETR\_Forecast_{jit}| \quad (3a)$$

IBES_ETR is the actual ETR for firm *i* in year *t* based on I/B/E/S actuals (i.e., I/B/E/S actual pretax income minus I/B/E/S actual net income, divided by I/B/E/S actual pretax income). *ETR_Forecast* is the last ETR forecast made by analyst *j* prior to firm *i*'s earnings announcement for year *t*, as implied by the analyst's forecasted values of the company's pretax income and net income.[8]

Next, we compute the annual change in *Error_ETR* for each analyst/firm/year combination as follows:

$$\Delta Error\_ETR_{jit} = Error\_ETR_{jit} - Error\_ETR_{jit-1} \quad (3b)$$

We then measure our dependent variable in equation (2), $\Delta Error\_ETR_{it}$, as the median value of $\Delta Error\_ETR_{jit}$ for firm *i* in year *t*.[9]

Because we are interested in examining how the early adoption of ASU 2016-09 affects analysts' ETR forecast errors, we include the indicator variable *Early* in equation (2). Nevertheless, it is unlikely that all analysts include the effect of net tax windfalls or shortfalls in

[8] Similar to Hutchens (2017), we require the analyst to provide a forecast of both pretax and after-tax income on the same date to be included in the analysis. Moreover, to maintain consistency with the constraints imposed in our sample selection process, we exclude implied ETR forecasts that are greater than 100% or less than 0%.

[9] We obtain qualitatively similar results when use the mean change in $\Delta Error\_ETR_{jit}$ as our dependent variable rather than the median value.

their ETR forecasts for the firms that early adopted the standard. As noted in Doyle, Jennings, and Soliman (2013, pp. 43-44), an analyst's decision to include or exclude certain income items from their earnings forecasts is based on their individual judgment and historical treatment of the item. To our knowledge, descriptions of the specific items that analysts exclude from their earnings forecasts for a particular firm are not available in I/B/E/S. However, I/B/E/S adjusts the company's actual earnings values to reflect the treatment decision elected by the majority of analysts following the firm (Doyle et al. 2013; Bratten et al. 2017). As such, differences between I/B/E/S actuals and GAAP (i.e., Compustat) actuals provide insight into the magnitude of excluded items for a given firm.

In Appendix C, we illustrate how a selection of our sample firms that early adopted ASU 2016-09 are affected by analysts' treatment of net tax windfalls. The first panel presents three firms with relatively large differences between the actual GAAP ETR and the actual ETR reported by I/B/E/S. In all three cases, the difference between the two actuals approximates the reported ETR effect of ASU 2016-09, suggesting that the majority of the contributing analysts excluded the effect of net tax windfalls from their earnings forecasts. In contrast, the second panel presents three firms with relatively small differences between the GAAP ETR and the I/B/E/S ETR, suggesting that the majority of analysts included the effect of net tax windfalls in their earnings forecasts.

Naturally, we only expect to observe results consistent with our hypothesis among early adopters for which the majority of contributing analysts include net tax windfalls or shortfalls in their implied ETR forecasts, because ASU 2016-09 should not meaningfully affect analysts' ETR forecast accuracy for other early adopters. As such, we introduce an indicator variable, *Clean*, into our regression model and interact this variable with *Early*. Specifically, we follow

Bratten et al. (2017) by setting *Clean* equal to one if the firm's actual GAAP ETR is within 0.5 percentage points of the actual ETR reported in I/B/E/S for both fiscal years 2015 and 2016, and zero otherwise.[10] A value of one for this variable suggests that the majority of contributing analysts made 'clean' implied ETR forecasts for this particular firm; that is, these analysts likely did not exclude from their forecasts any GAAP items that affect the firm's ETR. If the results are consistent with our hypothesis, then *Early*Clean* should be positively associated with Δ*Error_ETR;* i.e., $\beta_2 > 0$.[11]

To isolate the relation between *Early*Clean* and Δ*Error_ETR*, we include a number of control variables in equation (2). First, the accuracy of the ETR forecast is likely related to that of the pretax income forecast. Therefore, we include a control for the median of the annual change in the absolute value of each analyst's last forecast of firm *i*'s pretax income for fiscal year *t*, less the actual I/B/E/S pretax income for firm *i* for fiscal year *t*, deflated by market value of equity (Δ*Error_PRE*). We also include controls for the number of analysts contributing to the determination of the annual change in the firm's ETR forecast accuracy (*Contrib_Analysts*) as well as the median of the annual change in the ETR forecast horizon of all contributing analysts (Δ*Horizon*).

In addition, following prior research (e.g., Bratten et al. 2017; Hutchens 2017; Abernathy, Beyer, Gross, and Rapley 2017), we include in equation (2) a number of firm-level control variables that may also explain the change in analysts' implied ETR forecast accuracy. Specifically, we include firm size (*Size*) along with the annual change in the following firm

[10] The results that follow are not materially affected by using cutoffs of 75 basis points and 25 basis points instead of 50 basis points.

[11] An alternative approach is to simply eliminate *Clean* = 0 firm-years from the sample. However, we believe that the inclusion of these observations is important because it provides a useful falsification test of our hypothesis and increases the power of the early adoption decision model. Nevertheless, the results that follow are not materially altered if we restrict the sample to *Clean* = 1 observations.

characteristics: loss status (*ΔLoss*), the book-to-market ratio (*ΔBook_Market*), the existence of pretax foreign income (*ΔForeign*), leverage (*ΔLeverage*), R&D expense (*ΔXRD*), stock compensation expense (*ΔSTKCO*), the number of business and geographic segments (*ΔBUS_Segments* and *ΔGEO_Segments*), the existence of minority interest (*ΔMII*), the reporting of extraordinary items (*ΔXIDO*), the existence of equity method income (*ΔESUB*), and preferred dividend paying status (*ΔDVP*). Lastly, we control for the determinants of the firm's decision to early adopt ASU 2016-09 by including all independent variables from equation (1).[12]

Descriptive Statistics

Table 5 presents descriptive statistics related to our analyst forecast error tests. In Panel A, we report various information regarding firms' GAAP and I/B/E/S actual ETRs (defined as *IBES_ETR*) and the difference between those ETRs (defined as *Diff_ETR*). Most notably, we find that the mean annual change in the GAAP ETR from 2015 to 2016 is significantly greater for the firms that early adopted ASU 2016-09 and reported a material ETR effect (a 3.35 percentage point GAAP ETR reduction), compared to early adopters that did not report a material ETR effect (a 1.49 percentage point GAAP ETR reduction) as well as to non-adopting firms (a 0.23 percentage point GAAP ETR reduction). We also find that the majority of analysts provide clean ETR forecasts in both 2015 and 2016 for 30.90 percent (non-adopters), 30.84 percent (early adopters reporting a material ETR effect), and 25.66 percent (early adopters not reporting a material ETR effect) of our sample firms.

[Insert Table 5 here]

[12] An alternative is to employ a propensity-score matching (PSM) approach, a method that is appropriate if the regression model suffers from functional form misspecification (Shipman, Swanquist, and Whited 2017). We discuss this approach in a subsequent section.

Table 5, Panel B presents descriptive statistics on regression variables included in equation (2), while Panel C presents descriptive statistics on selected variables for the subsample of firms that receive clean ETR forecasts from a majority of analysts. With respect to Panel B, the mean Δ*Error_ETR* of the 214 material early adopters is not significantly different from that of the 945 non-adopting firms. However, when we limit the sample to firms where *Clean* is equal to one in Panel C, we find that, on average, Δ*Error_ETR* is significantly greater among material early adopters (an average increase of 1.05 percentage points) compared to non-early adopters (an average increase of 0.12 percentage points) and immaterial early adopters (an average decrease of 1.53 percentage points).

Results of Hypothesis Test

In Table 6, we present summary regression results from the estimation of three variants of equation (2).[13] In Column A, we report the results using *Early*Clean* as our primary independent variable of interest. In this specification, the coefficient on *Early*Clean* is not significantly different from zero (coefficient = 0.0037, t-statistic = 0.57), a finding that is inconsistent with our hypothesis.

[Insert Table 6 here]

However, it is important to note that in this specification, the definition of *Early* includes firms that early adopted ASU 2016-09, but did not report a resulting material ETR effect. It is intuitive to expect that adoption of ASU 2016-09 would not have a significant impact on analysts' ETR forecast errors for these firms, likely biasing the coefficient on *Early* downwards. Therefore, we re-estimate equation (2) after replacing the variable *Early* with *Material_Early*.

[13] As noted above, we winsorize all continuous variables at the 1 percent and 99 percent levels. Alternatively, in untabulated analyses, we control for influential observations in equation (2) by deleting observations with studentized residuals greater than three in absolute value. The results that follow are not materially impacted by this robustness check.

The results of this regression, presented in Column B of Table 6, provide evidence consistent with our hypothesis. In particular, the coefficient on *Material_Early*Clean* is significantly greater than zero (coefficient = 0.0131, t-statistic = 2.16), suggesting that, for material early adopters with clean ETR forecasts, analysts' implied ETR forecast errors increased following the implementation of ASU 2016-09.[14] In contrast, the statistically insignificant coefficient on the *Material_Early* main effect (coefficient = -0.0001, t-statistic = -0.03) suggests that adoption of ASU 2016-09 did not meaningfully affect analysts' implied ETR forecast errors among firms for which the majority of analysts likely excluded tax windfalls and shortfalls from their ETR forecasts (that is, those that are not 'clean'), as expected.

Regarding the economic interpretation of the results reported in Column B of Table 6, adding the coefficients on *Material_Early + Material_Early*Clean* indicates that errors in analysts' clean implied ETR forecasts increased by 1.3 percentage points among material early adopters following the implementation of ASU 2016-09 relative to other firms. Given that the mean implied ETR forecast error in the previous fiscal year was 3.8 percentage points (untabulated), this represents an approximately 34.2 percent increase in analysts' implied ETR forecast errors. In Column C of Table 6, we find similar results when we estimate equation (2) on a reduced sample after deleting the 113 firms that early adopted ASU 2016-09 but did not report a resulting material ETR effect.

In summary, we provide evidence consistent with our hypothesis that the implementation of ASU 2016-09 significantly increased errors in analysts' clean implied ETR forecasts, but only among firms that reported a material ETR effect due to adopting the new standard. This finding suggests that although ASU 2016-09 has simplified the accounting for the permanent difference

[14] Effectively, this specification treats early adopters that did not report a material ETR effect equivalent to non-adopters.

between the tax deduction for stock-based compensation and the corresponding book expense, this simplification may come at the cost of reducing the predictability and therefore usefulness of tax expense for firms that were most affected by the new standard.

Supplemental Tests

Propensity Score Matching

In the primary test of our hypothesis, we control for the determinants of the decision to early adopt ASU 2016-09 by including the determinants from the early adoption decision model (equation (1)) as additional independent variables in equation (2). However, Shipman et al. (2017) note that if the relation between the dependent variable and these additional independent variables is misspecified, then this approach may lead to biased coefficient estimates. To alleviate this concern, we implement a propensity score matching (PSM) approach using the following three-step process.

First, we obtain the propensity scores from the estimation of equation (1) on the reduced sample of 1,159 firms (214 early adopters reporting a material ETR effect and 945 non-adopters), as reported in Column C of Table 4. Second, using one-to-one matching without replacement and imposing a maximum caliper distance of 0.01, we match each material early adopter with the non-adopting firm with the closest propensity score. Based on this approach, we are able to match 201 of the 214 *Material_Early* = 1 firms with a non-adopting *Material_Early* = 0 counterpart, yielding a matched sample of 402 firms. Finally, using this matched sample, we re-estimate the specification of equation (2) where *Material_Early*Clean* is our independent variable of interest.

[Insert Table 7 here]

In Table 7, we report results from the PSM analyses. Panel A of Table 7 presents differences in means and medians between material early adopters and matched non-adopters on all variables in the determinants model in order to assess covariate balance within our matched sample. With the exception of median *VOL_GAAP_ETR*, which is marginally greater among non-adopters, we find that none of the means or medians are significantly different between these subsamples. Panel B of Table 7 presents summary results of estimating equation (2) using this matched sample. Consistent with our primary hypothesis tests, we find that the coefficient on *Material_Early*Clean* is significantly positive (coefficient = 0.0221, t-statistic = 2.68), providing further evidence that ASU 2016-09 significantly increased errors in analysts' clean implied ETR forecasts among firms reporting a material ETR effect due to early adoption.

We also assess the robustness of our results to entropy balancing (Hainmueller 2012; Hainmueller and Xu 2013). More specifically, we employ the entropy-balancing (EB) procedure to identify weights for the control observations. These weights balance the treatment sample (i.e., the *Material_Early* = 1 firms) and the control sample (i.e., *Material_Early* = 0 firms) on the first, second, and third distributional moments of all variables included in equation (1).[15] We then re-estimate equation (2) using least squares and applying the weights from the EB procedure. The results of this procedure (untabulated) are qualitatively similar to those reported in Table 7.

CONCLUSION

Issued on March 30, 2016 and effective for all firms for fiscal years beginning after December 15, 2016, ASU 2016-09 requires firms to record tax windfalls and shortfalls from stock-based compensation on the income statement as a component of current tax expense rather than in the APIC tax pool within stockholders' equity, as was required under prior guidance.

[15] McMullin and Schonberger (2017) provide a comprehensive overview of the implementation of the EB procedure in Stata as well as the advantages and disadvantages of the EB procedure.

Although the new standard simplifies the accounting for tax windfalls and shortfalls resulting from the settlement of stock-based compensation awards, many observers have noted that this accounting change may introduce significant volatility and uncertainty into tax expense. In this study, we focus on analysts' implied ETR forecast errors as a setting to provide evidence on the effect of ASU 2016-09 on the predictability of income tax expense.

We take advantage of a provision in ASU 2016-09 permitting early adoption in any interim or annual period, allowing public firms to adopt the new standard during fiscal year 2016. Examining a sample of 327 firms that early adopted ASU 2016-09 and a control sample of 945 firms that did not, we find evidence that errors in analysts' 'clean' implied ETR forecasts significantly increased following early adoption among firms that were most affected by the new standard. In particular, our results suggest that among firms reporting a material ETR effect due to early adoption of ASU 2016-09, analysts' ETR forecast errors increased by approximately 1.3 percentage points following early adoption compared to other firms, representing an approximately 34.2 percent increase in ETR forecast errors relative to the pre-adoption period.

The primary contribution of our study is demonstrating that analysts, who are highly informed users of financial information with sophisticated knowledge of tax issues, experienced a decrease in the accuracy of their ETR forecasts following the implementation of ASU 2016-09. As part of the FASB's broader simplification initiative, ASU 2016-09 reduced complexity in the accounting for tax windfalls and shortfalls related to stock-based compensation and harmonized this treatment with that of other permanent book-tax differences. However, our evidence suggests that this simplification came at the cost of a decrease in the predictive ability of the tax information reported in firms' financial statements. Given that the FASB considers predictive value a component of the usefulness of accounting information, our study provides important

evidence on the economic consequences of ASU 2016-09 that may be of interest to standard setters, researchers, and capital market participants.

Finally, we acknowledge that this study should be interpreted with two important caveats in mind. First, as part of our identification strategy, we focus this research on analysts' implied ETR forecasts. Although prior studies suggest that analysts' forecasts may provide insight into unobservable market expectations, our inferences may not generalize to other financial statement users. Second, while examining firms that early adopted ASU 2016-09 allows us to construct a control sample of non-adopters and provide timely evidence on the implications of the new standard, our study does not address the long-term ramifications of ASU 2016-09. To this end, future research might examine whether the effects that we document in this study persist in future periods or whether analysts are able to adjust their ETR forecasts to accurately incorporate the requirements of ASU 2016-09.

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Appendix A
Variable Definitions

Variable	Definition
Key Variables:	
$Clean_{it}$	An indicator variable that equals one if firm *i*'s *GAAP_ETR* and *IBES_ETR* differ by less than 0.5 percentage points in fiscal years 2016 and 2015, and zero otherwise.
$Early_{it}$	An indicator variable that equals one if firm *i* early adopted ASU 2016-09 during fiscal year 2016, and zero otherwise.
$Error\_ETR_{it}$	The median of the absolute value of each analyst's last implied forecast of firm *i*'s effective tax rate for fiscal year *t*, less the implied actual I/B/E/S effective tax rate for firm *i* for fiscal year *t*.
$GAAP\_ETR_{it}$	Firm *i*'s actual effective tax rate for fiscal year *t* per Compustat (TXT/PI).
$IBES\_ETR_{it}$	Firm *i*'s implied actual effective tax rate for fiscal year *t* per I/B/E/S.
$Material\_Early_{it}$	An indicator variable that equals one if: 1) firm *i* early adopted ASU 2016-09 during fiscal year 2016; and 2) firm *i* reported the effect of the early adoption on income tax expense in its 2016 10-K filing, and zero otherwise.
Early adoption decision model variables:	
$Analysts_{it}$	The number of different analysts that forecasted firm *i*'s earnings per share for fiscal year *t*.
$Book\_Market_{it}$	Ratio of firm *i*'s book value of equity (SEQ) to market value of equity (PRCC_F * CSHO).
$Loss_{it}$	An indicator variable that equals one if firm *i*'s pretax income (PI) is less than zero in fiscal year 2016 and/or 2015, and zero otherwise.
$Return_{it}$	Annual stock return for firm *i* over fiscal year *t*.
ROA_{it}	Pretax income deflated by total assets (PI/AT).
$Size_{it}$	Natural logarithm of market value of equity (PRCC_F * CSHO).
$Tax\_Windfalls_{it-1}$	The sum of excess tax benefits from stock-based compensation awards over the previous two fiscal years, deflated by pretax income (TXBCOF/PI).

$VOL\_GAAP\_ETR_{it}$	The standard deviation of firm *i*'s *GAAP_ETR* over the five fiscal years prior to fiscal year *t*.
VOL_Return_{it}	The standard deviation of firm *i*'s monthly stock returns over the 36 months prior to the beginning of fiscal year *t*.

Additional variables from forecast accuracy models:

$Error\_PRE_{it}$	The median of the absolute value of each analyst's last forecast of firm *i*'s pretax income for fiscal year *t*, less the actual I/B/E/S pretax income for firm *i* for fiscal year *t*, deflated by market value of equity.
$BUS\_Segments_{it}$	The number of business segments for firm *i* in fiscal year *t* according to Compustat.
$Contrib\_Analysts_{it}$	The number of analysts contributing to the median value of *Error_ETR* for firm *i*.
DVP_{it}	An indicator variable that equals one if firm *i* has non-zero preferred dividends (DVP) during fiscal year *t*, and zero otherwise.
$ESUB_{it}$	An indicator variable that equals one if firm *i* has non-zero equity method income (ESUB) during fiscal year *t*, and zero otherwise.
$Foreign_{it}$	An indicator variable that equals one if firm *i* has non-zero pretax foreign income (PIFO) in year *t*, and zero otherwise
$GEO\_Segments_{it}$	The number of geographical segments for firm *i* in fiscal year *t* according to Compustat.
$Horizon_{it}$	The median of the forecast horizon of each analyst's last implied forecast of firm *i*'s effective tax rate for fiscal year *t*. Forecast horizon is calculated as the number of days between the forecast date and the earnings reporting date, divided by 365.
$Leverage_{it}$	Leverage of firm *i* as of the end of fiscal year *t*, calculated as long-term debt (DLTT) divided by total assets (AT)
MII_{it}	An indicator variable that equals one if firm *i* has non-zero non-controlling interest income (MII) during fiscal year *t*, and zero otherwise.
$STKCO_{it}$	Firm *i*'s stock-based compensation expense (STKCO) in fiscal year *t*, divided by total assets (AT).
$XIDO_{it}$	An indicator variable that equals one if firm *i* has non-zero extraordinary items and discontinued operations (XIDO) during fiscal year *t*, and zero otherwise.
XRD_{it}	Firm *i*'s R&D expense (XRD) in fiscal year *t*, divided by sales (SALE). The variable is set to one if R&D expense exceeds sales.

Appendix B
Examples of Effect of ASU 2016-09 on Treatment of Excess Tax Benefits and Deficiencies

In this Appendix, we illustrate how ASU 2016-09 changed the accounting treatment of excess tax benefits and deficiencies related to stock-based compensation compared to prior guidance under ASC 718. For these examples, assume that on January 1 of Year 1 the firm granted 10,000 nonqualified options with an exercise price of $50 per share, vesting after one year. Also assume that the estimated grant date fair value of these awards determined using an option pricing model is $15 per share and that the statutory corporate tax rate is 35 percent.

Based on the above assumptions, under both ASU 2016-09 and ASC 718, the firm would record the following journal entries in Year 1:

Stock Option Expense	$150,000	
Additional Paid-in Capital		$150,000
Deferred Tax Asset	$52,500	
Deferred Tax Benefit (Expense)		$52,500

The $150,000 increase to stock option expense and additional paid-in capital represents the 10,000 options multiplied by the $15 per share grant-date fair value of the awards. The $52,500 increase (decrease) to the deferred tax asset (expense) account represents the estimated future tax benefit related to these awards, calculated as the total grant date fair value of $150,000 multiplied by the statutory tax rate of 35 percent. Note that this amount is recorded as a deferred tax asset and corresponding reduction to deferred tax expense because the firm does not receive a tax deduction for these option awards until the options are exercised.

Next, assume that all of the options are exercised upon vesting on January 1 of Year 2 when the stock price is $75 per share. Moreover, assume that the firm has sufficient taxable income to realize the full benefit of any tax deductions in the current year. Under ASU 2016-09,

the firm would record the following journal entry to account for the tax effect of the exercise on January 1 of Year 2:

Taxes Payable	$87,500	
Deferred Tax Asset		$52,500
Current Tax Expense		$35,000

The $87,500 decrease to taxes payable represents the tax benefit arising from the deduction the firm receives upon exercise, which is calculated as the 10,000 options multiplied by the $25 per share difference between the stock price ($75 per share) and exercise price ($50 per share) at the statutory tax rate of 35 percent. The $52,500 reduction to the deferred tax asset account represents a reversal of the amount that was recorded in Year 1. Most importantly, the $35,000 reduction to current tax expense represents the excess tax benefit related to these awards, calculated as the 10,000 options multiplied by the $10 per share difference between the fair value of the awards expensed for book purposes ($15 per share) and the deduction for tax purposes ($25 per share) at the statutory tax rate of 35 percent.

Under the prior guidance of ASC 718 and assuming the same facts as in the prior paragraph, the firm would have recorded the following journal entry on January 1 of Year 2:

Taxes Payable	$87,500	
Deferred Tax Asset		$52,500
APIC Tax Pool		$35,000

Thus, the difference between the accounting under ASU 2016-09 compared to ASC 718 is that under the new guidance, the excess tax benefit of $35,000 is recorded as a reduction to current tax expense instead of a direct-to-equity increase to the APIC tax pool.

The above example considers a scenario in which the exercise of the options yields an excess tax benefit to the firm. To illustrate the accounting treatment for excess tax deficiencies, assume that all facts are the same as above except the stock price upon exercise on January 1 of

Year 2 is $58 per share rather than $75 per share. In this scenario, under ASU 2016-09, the firm would record the following journal entry to account for the tax effect of the exercise:

Taxes Payable	$28,000	
Current Tax Expense	$24,500	
Deferred Tax Asset		$52,500

The $28,000 decrease to taxes payable represents the tax benefit arising from the deduction the firm receives upon exercise, which is calculated as the 10,000 options multiplied by the $8 per share difference between the stock price ($58 per share) and exercise price ($50 per share) at the statutory tax rate of 35 percent. As before, the $52,500 reduction to the deferred tax asset account represents a reversal of the amount that was recorded in Year 1. The $24,500 increase to current tax expense represents the excess tax deficiency related to these awards, calculated as the 10,000 options multiplied by the $7 per share difference between the fair value of the awards expensed for book purposes ($15 per share) and the deduction for tax purposes ($8 per share) at the statutory tax rate of 35 percent.

Under the prior guidance of ASC 718 and assuming the same facts as in the prior paragraph, the firm would have recorded the following journal entry on January 1 of Year 2:

Taxes Payable	$28,000	
APIC Tax Pool	$24,500	
Deferred Tax Asset		$52,500

Thus, as before, the difference between the accounting under ASU 2016-09 compared to ASC 718 is that under the new guidance, the excess tax deficiency of $24,500 is recorded as an increase to current tax expense instead of a direct-to-equity decrease to the APIC tax pool.[16]

[16] This example assumes that the firm has a sufficient APIC tax pool to absorb this reduction. Under ASC 718, to the extent that the excess tax deficiency is greater than the APIC tax pool, the difference is recorded as an increase to current tax expense. We refer the interested reader to Brushwood et al. (2017) for more detailed examples of the accounting for the income tax effects of stock-based compensation awards for this and other scenarios.

Appendix C
Discussion of Differences between GAAP and I/B/E/S ETRs

In this Appendix, we illustrate how a selection of firms in our sample that early adopted ASU 2016-09 are affected by analysts' treatment of net tax windfalls. To do so, we report two 'actual' ETRs for fiscal year 2016: 1) the firm's actual GAAP ETR based on Compustat data (TXT/PI); and 2) the implied ETR based on I/B/E/S actuals (i.e., I/B/E/S actual pretax income minus I/B/E/S actual net income, divided by the former). Examining the difference between the two actuals provides insight into the magnitude of items that the majority of contributing analysts excluded from their implied ETR forecasts.

In the first panel, we present three firms with relatively large differences between the GAAP ETR and the I/B/E/S ETR for fiscal year 2016. In all three cases, the difference between the two actuals approximates the reported ETR effect of ASU 2016-09, suggesting that the majority of the contributing analysts excluded the effect of net tax windfalls from their earnings forecasts.

Company Name and Ticker Symbol	Actual GAAP ETR	Actual I/B/E/S ETR	Difference in Actuals	Reported ETR Effect of ASU 2016-09
Cirrus Logic (CRUS)	0.1709	0.2418	−0.0710	−0.0750
Red Hat (RHT)	0.2076	0.2655	−0.0579	−0.0500
Sherwin Williams (SHW)	0.2899	0.3185	−0.0286	−0.0300

In contrast, the next panel presents three firms with relatively small differences between the GAAP ETR and the I/B/E/S ETR for fiscal year 2016, suggesting that the majority of

analysts likely did not exclude from their forecasts any GAAP items that affect the firm's ETR, including net tax windfalls due to ASU 2016-09.[17]

Company Name and Ticker Symbol	Actual GAAP ETR	Actual I/B/E/S ETR	Difference in Actuals	Reported ETR Effect of ASU 2016-09
3M (MMM)	0.2829	0.2840	−0.0011	−0.0250
Nvidia (NVDA)	0.1255	0.1255	0.0000	−0.0450
Texas Instruments (TXN)	0.2708	0.2712	−0.0004	−0.0300

[17] For all six firms discussed above, untabulated analysis reveals that the difference between the firm's GAAP ETR and its I/B/E/S ETR for fiscal year 2015 was less than 50 basis points, suggesting that in 2016, analysts specifically excluded the effect of the new standard.

Table 1
Sample Selection

Selection phase	Number of firms
Fiscal year (FY) 2016 observations from the CRSP/Compustat merged database with year-ends of December – April	4,342
Remove firms that are not incorporated in the U.S.	(727)
Delete firms with missing Compustat data in FY 2016 or FY 2015	(276)
Delete firms with GAAP effective tax rate ≥ 1 (or ≤ 0) in FY 2016 or FY 2015	(1,472)
Initial sample for hand collection	**1,867**

	Number of firms		
Selection phase	**Total**	***Early* = 1**	***Early* = 0**
Initial sample from above	1,867	434	1,433
Remove firms with missing I/B/E/S data in FY 2016 or FY 2015	(501)	(91)	(410)
Delete firms with IBES effective tax rate ≥ 1 (or ≤ 0) in FY 2016 or FY 2015	(94)	(16)	(78)
Final Sample	**1,272**	**327**	**945**

Early is an indicator variable that equals one if the firm early adopted ASU 2016-09 during fiscal year 2016, and zero otherwise.

Table 2
Sample Composition and Early Adoption Statistics

Panel A: Frequency Distribution of Sample by Industry

Industry Group (based on Fama-French 12)	All firms		*Early = 1* firms		*Early = 0* firms	
	Number	% of Total	Number	% of Total	Number	% of Total
Financial Services	374	29.40%	83	25.38%	291	30.79%
Other	159	12.50%	40	12.23%	119	12.59%
Retail and Wholesale	154	12.11%	27	8.26%	127	13.44%
Business Equipment	144	11.32%	42	12.84%	102	10.79%
Manufacturing	108	8.49%	28	8.56%	80	8.47%
Healthcare	90	7.08%	27	8.26%	63	6.67%
Consumer Non-Durables	62	4.87%	19	5.81%	43	4.55%
Utilities	50	3.93%	21	6.42%	29	3.07%
Energy	36	2.83%	10	3.06%	26	2.75%
Consumer Durables	35	2.75%	11	3.36%	24	2.54%
Telecommunications	31	2.44%	9	2.75%	22	2.33%
Chemicals	29	2.28%	10	3.06%	19	2.01%
Totals	**1,272**	**100.00%**	**327**	**100.00%**	**945**	**100.00%**

Early is an indicator variable that equals one if the firm early adopted ASU 2016-09 during fiscal year 2016, and zero otherwise.

Panel B: The Reported Impact of Early Adoption on the Annual GAAP Effective Tax Rate (ETR)

Fiscal Quarter of Early Adoption	Number of firms	% of Total	Reported ETR Effect from Rate Reconciliation[1]			Implied ETR Effect from Adoption Disclosure[2]		
			Number of firms	Mean	Median	Number of firms	Mean	Median
Quarter 1	119	36.39%	56	–0.035	–0.020	29	–0.011	–0.005
Quarter 2	66	20.18%	26	–0.033	–0.020	16	–0.021	–0.010
Quarter 3	51	15.60%	24	–0.052	–0.020	13	–0.012	–0.005
Quarter 4	91	27.83%	24	–0.041	–0.025	26	–0.018	–0.005
Totals	**327**	**100.00%**	**130**	**–0.038**	**–0.020**	**84**	**–0.015**	**–0.005**

[1] This column represents the effect of the early adoption of ASU 2016-09 on the annual GAAP ETR, as reported in the firm's ETR reconciliation within the tax footnote in the 10-K filing.

[2] This column is equal to the effect of the early adoption of ASU 2016-09 on income tax expense as reported in the footnotes to the 10-K filing, deflated by the firm's pretax income. We only populate this column with firms that disclosed this effect, but did not report the ETR effect in the rate reconciliation.

Table 3
Descriptive Statistics
Variables from Early Adoption Decision Analyses

Panel A: Means and Medians

	Column A: *Early* = 0 firms (N = 945)		*Early* = 1 firms					
			Column B: *Early* = 1 firms (N = 327)		Column C: *Material_Early* = 1 (N = 214)		Column D: *Material_Early* = 0 (N = 113)	
Variable	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**
$Return_{it}$	0.2115	0.2111	0.1890	0.1811	0.1924	0.1753	0.1827	0.1816
$Return_{it-1}$	−0.0481	−0.0313	0.0668	0.0354	0.1152	0.0859	-0.0249	-0.0003
$Tax\_Windfalls_{it-1}$	0.0363	0.0043	0.0443	0.0046	0.0615	0.0193	0.0117	0.0000
$GAAP\_ETR_{it-1}$	0.3002	0.3278	0.3044	0.3209	0.3147	0.3243	0.2849	0.3182
VOL_Return_{it-1}	0.2921	0.2576	0.2649	0.2366	0.2618	0.2372	0.2708	0.2343
$VOL\_GAAP\_ETR_{it-1}$	0.1895	0.0408	0.1593	0.0450	0.1352	0.0413	0.2048	0.0536
ROA_{it-1}	0.0663	0.0547	0.0696	0.0637	0.0866	0.0743	0.0373	0.0465
$Loss_{it}$	0.1153	0.0000	0.0734	0.0000	0.0467	0.0000	0.1239	0.0000
$Book\_Market_{it-1}$	0.5593	0.4747	0.4446	0.3898	0.3872	0.3198	0.5532	0.5117
$Size_{it-1}$	7.5328	7.4664	8.1497	7.9515	8.3758	8.2639	7.7215	7.7552
$Analysts_{it-1}$	9.8603	7.0000	11.3180	9.0000	12.0841	11.0000	9.8673	8.0000

Panel B: Results from Univariate Tests of Differences in Means and Medians

Variable	Col. B – Col. A		Col. C – Col. A		Col. D – Col. A		Col. C – Col. D	
	Diff. in Mean	Diff. in Median	Diff. in Mean	Diff. in Median	Diff. in Mean	Diff. in Median	Diff. in Mean	Diff. in Median
$Return_{it}$	−0.0225	−0.0300	−0.0191	−0.0358	−0.0288	−0.0295	0.0097	−0.0063
$Return_{it-1}$	0.1149***	0.0667***	0.1633***	0.1172***	0.0232	0.0310	0.1401***	0.0862***
$Tax\_Windfalls_{it-1}$	0.0080*	0.0003	0.0252***	0.0150***	−0.0246***	−0.0043***	0.0498***	0.0193***
$GAAP\_ETR_{it-1}$	0.0042	−0.0069	0.0145**	−0.0035	−0.0153	−0.0096*	0.0298**	0.0061*
VOL_Return_{it-1}	−0.0272***	−0.0210***	−0.0303***	−0.0204***	−0.0213**	−0.0233**	−0.0090	0.0029
$VOL\_GAAP\_ETR_{it-1}$	−0.0302*	0.0042	−0.0543***	0.0005	0.0153	0.0128	−0.0696*	−0.0123*
ROA_{it-1}	0.0033	0.0090	0.0203***	0.0196***	−0.0290**	−0.0082	0.0493***	0.0278***
$Loss_{it}$	−0.0419**	0.0000**	−0.0686***	0.0000***	0.0086	0.0000	−0.0772**	0.0000**
$Book\_Market_{it-1}$	−0.1147***	−0.0849***	−0.1721***	−0.1549***	−0.0061	0.0370	−0.1660***	−0.1919***
$Size_{it-1}$	0.6169***	0.4851***	0.8430***	0.7975***	0.1887	0.2888	0.6543***	0.5087***
$Analysts_{it-1}$	1.4577***	2.0000***	2.2238***	4.0000***	0.0070	1.0000	2.2168***	3.0000**

Early is an indicator variable that equals one if the firm early adopted ASU 2016-09 during fiscal year 2016, and zero otherwise. *Material_Early* is an indicator variable that equals one if the firm early adopted ASU 2016-09 and reported an ETR effect due to the early adoption in its 2016 10-K filing, and zero otherwise. All other variables are defined in Appendix A. Year *t* corresponds to fiscal year 2016. We winsorize all continuous variables at the 1st and 99th percentiles.

***, **, * Indicate that the difference in the mean/median between the subsamples is significantly different from zero at the 1 percent, 5 percent, and 10 percent levels, respectively.

Table 4
Summary Regression Results from the Estimation of the Early Adoption Decision Model

Explanatory Variable	Pred. Sign	Col. A: Full Sample Dep. Var. = *Early* Coefficient	Col. A: χ^2-statistic	Col. B: Full Sample Dep. Var. = *Material_Early* Coefficient	Col. B: χ^2-statistic	Col. C: Reduced Sample Dep. Var. = *Material_Early* Coefficient	Col. C: χ^2-statistic
$Return_{it}$	+	0.212	0.61	0.796***	5.70	0.688**	4.23
$Return_{it-1}$	+	1.471***	28.22	1.993***	36.56	2.000***	33.29
$Tax\_Windfalls_{it-1}$	+	0.288	0.15	1.515**	3.55	1.245*	2.37
$GAAP\_ETR_{it-1}$	+	0.667	1.12	1.789**	5.14	1.558**	3.85
VOL_Return_{it-1}	–	−0.853	1.26	−0.632	0.46	−0.660	0.49
$VOL\_GAAP\_ETR_{it-1}$	–	−0.180	0.65	−0.534**	2.97	−0.509*	2.68
ROA_{it-1}	?	−2.665***	8.04	−1.545	1.89	−1.937*	2.84
$Loss_{it}$	?	−0.541	2.43	−0.610	1.79	−0.620	1.84
$Book\_Market_{it-1}$	–	−0.462**	3.21	−0.644**	3.34	−0.692**	3.76
$Size_{it-1}$	?	0.193***	7.15	0.289***	10.86	0.278***	9.87
$Analysts_{it-1}$	?	−0.011	0.67	−0.011	0.50	−0.011	0.51
Industry indicators		Yes		Yes		Yes	
Number of obs.		1,272		1,272		1,159	
Area under the ROC Curve		0.678		0.733		0.733	
Pseudo R^2		0.075		0.097		0.103	

This table presents summary regression results from the logistic estimation of equation (1). All variables are defined in Appendix A. Year *t* corresponds to fiscal year 2016. We winsorize all continuous variables at the 1st and 99th percentiles. For parsimony, we suppress the coefficient estimates on the industry indicator variables. In column C, we delete the 113 firms that early adopted ASU 2016-09, but did not report the effect that the early adoption had on income tax expense. ***, **, * Indicate that the coefficient is significantly different from zero at the 1 percent, 5 percent, and 10 percent levels (one-tailed tests for predicted signs), respectively.

Table 5
Descriptive Statistics
Variables from Forecast Error Analyses

Panel A: Differences between Actual GAAP and I/B/E/S ETRs

				Early = 1 firms (N = 327)					
	Early = 0 firms (N = 945)			*Material_Early* = 1 firms (N = 214)			*Material_Early* = 0 firms (N = 113)		
Variable	**Mean**	**Median**	**Std. Dev.**	**Mean**	**Median**	**Std. Dev.**	**Mean**	**Median**	**Std. Dev.**
$GAAP\_ETR_{it}$	0.2992**	0.3251***	0.1215	0.2826	0.3022	0.0957	0.2700$^{\wedge\wedge}$	0.3069$^{\wedge\wedge}$	0.1192
$GAAP\_ETR_{it-1}$	0.3014*	0.3278	0.1225	0.3162$^{\#\#}$	0.3243$^{\#}$	0.1081	0.2849	0.3182$^{\wedge}$	0.1185
$\Delta GAAP\_ETR_{it}$	−0.0023***	−0.0013***	0.1075	−0.0335$^{\#\#}$	−0.0181$^{\#\#\#}$	0.0932	−0.0149	−0.0054	0.0816
$IBES\_ETR_{it}$	0.3200*	0.3328*	0.1269	0.3081	0.3236	0.0881	0.3183	0.3376	0.1372
$IBES\_ETR_{it-1}$	0.3177	0.3373	0.1198	0.3242	0.3334	0.0867	0.3126	0.3263	0.1320
$\Delta IBES\_ETR_{it}$	0.0023***	−0.0012***	0.0986	−0.0161$^{\#\#}$	−0.0108$^{\#\#\#}$	0.0543	0.0057	−0.0005	0.0909
$Diff\_ETRs_{it}$	−0.0208	0.0000***	0.1237	−0.0255$^{\#}$	−0.0013	0.0697	−0.0482$^{\wedge\wedge}$	−0.0004$^{\wedge\wedge\wedge}$	0.1359
$Diff\_ETRs_{it-1}$	−0.0163	0.0000	0.1190	−0.0080	−0.0010	0.0951	−0.0277	0.0000	0.1209
$\Delta Diff\_ETRs_{it}$	−0.0046*	0.0000	0.1243	−0.0175	0.0000	0.0972	−0.0205	0.0000	0.0981
$Clean_{it}$	0.3090	0.0000	0.4623	0.3084	0.0000	0.4629	0.2566	0.0000	0.4387

Panel B: Regression Variables for Full Sample

	Early = 0 firms (N = 945)			*Early* = 1 firms (N = 327)					
				Material_Early = 1 firms (N = 214)			*Material_Early* = 0 firms (N = 113)		
Variable	**Mean**	**Median**	**Std. Dev.**	**Mean**	**Median**	**Std. Dev.**	**Mean**	**Median**	**Std. Dev.**
$\Delta Error\_ETR_{it}$	0.0050	0.0002	0.0652	0.0026	0.0010$^{\#\#}$	0.0422	−0.0050	−0.0013$^{\wedge\wedge}$	0.0724
$\Delta Error\_PRE_{it}$	−0.0006	−0.0001	0.0200	−0.0002	0.0000	0.0079	−0.0032	−0.0001	0.0208
$Contrib\_Analysts_{it}$	8.4698**	6.0000***	6.8136	9.7523$^{\#\#\#}$	8.0000$^{\#\#}$	6.8258	7.7699	6.0000	5.8033
$\Delta Horizon_{it}$	0.0638***	0.0137**	0.1526	0.0272	0.0055	0.1245	0.0516	0.0151	0.1403
$Size_{it}$	7.7089***	7.6701***	1.6210	8.5353$^{\#\#\#}$	8.4581$^{\#\#\#}$	1.6381	7.8677	7.8491	1.6104
$\Delta Loss_{it}$	−0.0042	0.0000	0.2391	−0.0234$^{\#}$	0.0000	0.1514	0.0000	0.0000	0.2315
$\Delta Book\_Market_{it}$	−0.0806***	−0.0521***	0.1921	−0.0376	−0.0285	0.1352	−0.0767	−0.0559	0.2090
$\Delta Foreign_{it}$	0.0074	0.0000	0.0858	0.0047	0.0000	0.0684	0.0177	0.0000	0.1324
$\Delta Leverage$	0.0081	−0.0001	0.0587	0.0033	−0.0013	0.0586	0.0032	0.0000	0.0497
ΔXRD_{it}	−0.0001	0.0000	0.0073	−0.0005$^{\#\#}$	0.0000	0.0090	0.0012$^{\wedge\wedge}$	0.0000$^{\wedge}$	0.0051
$\Delta STKCO_{it}$	0.0003	0.0000	0.0043	0.0004	0.0001	0.0035	0.0003	0.0000	0.0038
$\Delta BUS\_Segments_{it}$	−0.0709	0.0000	0.4764	−0.0467$^{\#\#}$	0.0000$^{\#}$	0.4919	−0.2212$^{\wedge\wedge}$	0.0000$^{\wedge\wedge}$	0.7988
$\Delta GEO\_Segments_{it}$	−0.0762	0.0000	0.5432	−0.0374	0.0000	0.3192	−0.1062	0.0000	0.6596
ΔMII_{it}	0.0042	0.0000	0.1526	−0.0093	0.0000	0.2165	−0.0354$^{\wedge\wedge}$	0.0000$^{\wedge\wedge}$	0.1856
$\Delta XIDO_{it}$	−0.0190	0.0000	0.2151	−0.0234	0.0000	0.2815	0.0177$^{\wedge}$	0.0000$^{\wedge}$	0.1881
$\Delta ESUB_{it}$	0.0000	0.0000	0.1783	0.0047	0.0000	0.1531	0.0177	0.0000	0.2983
ΔDVP_{it}	−0.0021	0.0000	0.1660	−0.0093	0.0000	0.1367	−0.0088	0.0000	0.1634

Panel C: Selected Regression Variables for *Clean* = 1 Subsample

				***Early* = 1 firms (N = 95)**					
	***Early* = 0 firms (N = 292)**			***Material_Early* = 1 firms (N = 66)**			***Material_Early* = 0 firms (N = 29)**		
Variable	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
$\Delta Error\_ETR_{it}$	0.0012**	−0.0002***	0.0345	0.0105$^{\#\#}$	0.0042$^{\#\#\#}$	0.0357	−0.0153$^{\wedge}$	−0.0013	0.0510
$\Delta Error\_PRE_{it}$	−0.0013	−0.0002	0.0139	0.0003	0.0001	0.0053	0.0037$^{\wedge}$	0.0004	0.0146
$Contrib\_Analysts_{it}$	7.0034*	5.0000*	6.4475	8.5152$^{\#\#}$	6.5000$^{\#\#}$	6.8976	5.6552	4.0000	5.5631
$\Delta Horizon_{it}$	0.0486	0.0027	0.1523	0.0390	0.0055	0.1394	0.0557	0.0027	0.1651
$Size_{it}$	7.1681***	7.1245***	1.4596	8.0533$^{\#\#}$	7.5039$^{\#\#}$	1.7003	7.0667	6.7380	1.4822

All variables are defined in Appendix A. Year *t* corresponds to fiscal year 2016 and Δ denotes annual change. We winsorize all continuous variables at the 1st and 99th percentiles.

***, **, * Indicate that the mean/median of the *Early* = 0 subsample is significantly different from that of the *Material_Early* = 1 subsample at the 1 percent, 5 percent, and 10 percent levels, respectively.

$^{\#\#\#}$, $^{\#\#}$, $^{\#}$ Indicate that the mean/median of the *Material_Early* = 1 subsample is significantly different from that of the *Material_Early* = 0 subsample at the 1 percent, 5 percent, and 10 percent levels, respectively.

$^{\wedge\wedge\wedge}$, $^{\wedge\wedge}$, $^{\wedge}$ Indicate that the mean/median of the *Early* = 0 subsample is significantly different from that of the *Material_Early* = 0 subsample at the 1 percent, 5 percent, and 10 percent levels, respectively.

Table 6
The Effect of Early Adoption of ASU 2016-09 on Analysts' Implied ETR Forecast Errors

Explanatory Variable	Pred. Sign	Column A: Full Sample		Column B: Full Sample		Column C: Reduced Sample	
		Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
$Early_{it}$	?	−0.0017	−0.37	----	----	----	----
$Early_{it}$* $Clean_{it}$	+	0.0037	0.57	----	----	----	----
$Material\_Early_{it}$	?	----	----	−0.0001	−0.03	−0.0003	−0.07
$Material\_Early_{it}$* $Clean_{it}$	+	----	----	0.0131**	2.16	0.0126**	2.02
$Clean_{it}$	?	−0.0032	−0.83	−0.0047	−1.25	−0.0045	−1.17
$\Delta Error\_PRE_{it}$	+	1.0805***	5.91	1.0831***	5.94	0.9996***	5.05
$Contrib\_Analysts_{it}$	?	−0.0003	−0.83	−0.0003	−0.76	−0.0003	−0.70
$\Delta Horizon_{it}$	+	0.0307**	1.94	0.0309**	1.97	0.0270**	1.70
Other forecast error control variables[1]		Yes		Yes		Yes	
Early adopt decision and industry control variables[2]		Yes		Yes		Yes	
Number of observations		1,272		1,272		1,159	
Adjusted R^2		0.1432		0.1449		0.1367	

This table presents summary regression results from the OLS estimation of equation (2). The dependent variable in all regression models is $\Delta Error\_ETR_{it}$. All variables are defined in Appendix A. Year *t* corresponds to fiscal year 2016 and Δ denotes annual change. We winsorize all continuous variables at the 1st and 99th percentiles. For parsimony, we suppress the coefficient estimates and t-statistics on the decision model variables, the industry indicator variables, and certain forecast accuracy control variables. t-statistics are based on standard errors clustered at the firm level.

In column C, we delete firms that early adopted ASU 2016-09, but did not report the effect that the early adoption had on income tax expense.

***, **, * Indicate that the coefficient is significantly different from zero at the 1 percent, 5 percent, and 10 percent levels (one-tailed tests for predicted signs), respectively.

[1] This vector of variables includes the following: $Size_{it}$, $\Delta Loss_{it}$, $\Delta Book\_Market_{it}$, $\Delta Foreign_{it}$, $\Delta Leverage_{it}$, ΔXRD_{it}, $\Delta STKCO_{it}$, $\Delta BUS\_Segments_{it}$, $\Delta GEO\_Segments_{it}$, ΔMII_{it}, $\Delta XIDO_{it}$, $\Delta ESUB_{it}$, and ΔDVP_{it}.

[2] This vector of variables includes the following: $Return_{it}$, $Return_{it-1}$, $Tax\_Windfalls_{it-1}$, $GAAP\_ETR_{it-1}$, VOL_Return_{it-1}, $VOL\_GAAP\_ETR_{it-1}$, ROA_{it-1}.

Table 7
Results from Propensity Score Matching

Panel A: Analysis of Covariate Balance

	***Material_Early* = 0 observations (N = 201)**		***Material_Early* = 1 observations (N = 201)**	
Variable	**Mean**	**Median**	**Mean**	**Median**
$PSCORE_{it}$	0.2539	0.2442	0.2541	0.2437
$Return_{it}$	0.2016	0.1620	0.1957	0.1854
$Return_{it-1}$	0.0836	0.0743	0.0904	0.0575
$Tax\_Windfalls_{it-1}$	0.0536	0.0161	0.0483	0.0168
$GAAP\_ETR_{it-1}$	0.3086	0.3266	0.3143	0.3218
VOL_Return_{it-1}	0.2573	0.2377	0.2597	0.2332
$VOL\_GAAP\_ETR_{it-1}$	0.1061	0.0313*	0.1400	0.0415
ROA_{it-1}	0.0922	0.0832	0.0863	0.0729
$Loss_{it}$	0.0498	0.0000	0.0498	0.0000
$Book\_Market_{it-1}$	0.4130	0.3247	0.4000	0.3440
$Size_{it-1}$	8.2496	8.2800	8.2959	8.1250
$Analysts_{it-1}$	11.8458	9.0000	11.6667	10.0000

Notes to Panel A: *PSCORE* is the estimated probability of the firm early adopting ASU 2016-09 from the logistic estimation of equation (1). All other variables are defined in Appendix A.
***, **, * Indicate that the mean/median of the *Material_Early* = 0 subsample is significantly different from that of the *Material_Early* = 1 subsample at the 1 percent, 5 percent, and 10 percent levels, respectively.

Panel B: Results from Re-estimation of Equation (2) on Matched Sample

Explanatory Variable	**Pred. Sign**	**Coefficient**	**t-statistic**
$Material\_Early_{it}$	?	−0.0109*	−1.71
$Material\_Early_{it}$* $Clean_{it}$	+	0.0221***	2.68
$Clean_{it}$	?	−0.0147**	−2.38
$\Delta Error\_PRE_{it}$	+	1.6019***	2.60
$Contrib\_Analysts_{it}$	?	0.0005	0.80
$\Delta Horizon_{it}$	+	−0.0059	−0.23
Other forecast error control variables[1]		Yes	
Early adopt decision and industry control variables[2]		Yes	
Number of observations		402	
Adjusted R^2		0.210	

Notes to Panel B: This panel presents summary regression results from the OLS estimation of equation (2) on the matched sample. The dependent variable in all regression models is $\Delta Error\_ETR_{it}$. All variables are defined in Appendix A. Year *t* corresponds to fiscal year 2016 and Δ denotes annual change. We winsorize all continuous variables at the 1st and 99th percentiles. For parsimony, we suppress the coefficient estimates and t-statistics on the decision model variables, the industry indicator variables, and certain forecast accuracy control variables. t-statistics are based on standard errors clustered at the firm level.

***, **, * Indicate that the coefficient is significantly different from zero at the 1 percent, 5 percent, and 10 percent levels (one-tailed tests for predicted signs), respectively.

[1] This vector of variables includes the following: $Size_{it}$, $\Delta Loss_{it}$, $\Delta Book\_Market_{it}$, $\Delta Foreign_{it}$, $\Delta Leverage_{it}$, ΔXRD_{it}, $\Delta STKCO_{it}$, $\Delta BUS\_Segments_{it}$, $\Delta GEO\_Segments_{it}$, ΔMII_{it}, $\Delta XIDO_{it}$, $\Delta ESUB_{it}$, and ΔDVP_{it}.

[2] This vector of variables includes the following: $Return_{it}$, $Return_{it-1}$, $Tax\_Windfalls_{it-1}$, $GAAP\_ETR_{it-1}$, VOL_Return_{it-1}, $VOL\_GAAP\_ETR_{it-1}$, ROA_{it-1}.