Rules-based vs. Principles-based Accounting Standards: Earnings Quality and the Role of Earnings in Contracting (An Analysis Employing the Adoption of ASC 606)

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Abstract: We examine the effect of the adoption of the new revenue recognition standard (ASC 606) on earnings quality and the role of earnings in the debt market. We find that ASC 606, a transition from a rules-based to a principles-based accounting standard, decreases earnings predictability, which is demonstrated by increased absolute analyst forecast error and analyst forecast dispersion, and increases the use of discretion in preparing earnings numbers, which is demonstrated by increased discretionary accruals. In addition, the use of earnings-based covenants decreases in debt contracting, while the use of capital-based covenants increases, which indicates a decrease in the usefulness of earnings numbers in contracting. In terms of the stock market response, overall, the earnings response coefficient (ERC) does not change after the new rule. However, following the adoption, the ERC has increased for firms with high institutional holdings and decreased for firms with low institutional holdings. Our analysis supports the idea that this is due to monitoring from institutional investors curbing the use of discretionary accruals.

Keywords: ASC 606, principles-based accounting standard, rules-based accounting standard, earnings quality, debt covenant, analyst forecasts, institutional investors

JEL Classifications: G18, M41, M48

1. Introduction

Accounting Standard Codification (ASC) 606, Revenue from Contracts with Customers, is a new revenue recognition rule effective in all annual reporting periods beginning after December 15, 2017. The new standard supersedes virtually all legacy revenue recognition requirements (i.e., ASC 605 and most transaction- and industry-specific revenue recognition guidance) and provides a single, simplified standard that is universally applicable. The standard describes principles an entity must apply in measuring and recognizing revenue and related cash flows, rather than providing rules tailored to specific transactions. ASC 606 focuses on the transfer of control rather than the satisfaction of obligations prescribed by ASC 605. Additionally, ASC 606 requires entities to disclose sufficient information to enable users of financial statements to understand the nature, amount, timing, and uncertainty of revenue and cash flows arising from contracts with customers. In this paper, we examine how the adoption of ASC 606, which represents a transition from a rules-based approach to a principles-based approach, affects earnings quality, as well as the role of earnings in debt contracting.

The question of whether or not a principles-based approach is superior to a rules-based approach has been a topic of many academic and practitioner debates. The Securities and Exchange Commission (SEC) recommended the shift toward principles-based accounting in its 2003 report (SEC, 2003), as the rules-based standard was identified as one of the reasons for a series of large accounting scandals (Benston et al., 2006). However, principles-based standards have both pros and cons. For example, Herz (2003) explains that principles-based standards may allow more room for interpretation by managers and thus render the accounting numbers less objective and enforcement by the regulatory agencies more difficult. At the same time, this discretion can enhance the informativeness of financial statement numbers, and the principle can reduce opportunistic behaviors in preparing accounting numbers. Schipper (2003) describes other bright sides of the rules-based approach, such as increased comparability and verifiability and reduced litigation costs. This paper attempts to shed light on this debate of rules-based

vs. principles-based accounting standards by empirically examining a plausibly exogenous shock: the adoption of ASC 606.

For our empirical analyses, we obtained data pertaining to the adoption of ASC 606 for Russell 3000 firms from AuditAnalytics, which provides adoption-related information and the effect on revenue stream, along with firm identification information. ASC 606 changes the revenue/cost recognition, especially for contracts with customers, and the impact of this new rule will vary among firms. To estimate the impact, we employ a difference-in-difference design. Our treatment group consists of firms that disclosed a material impact from the adoption of the new revenue standard in their financial statements. The rest, which are firms that are not materially affected by ASC 606, belong to our control group. For our main analysis, the sample period spans between one year before and one year after the adoption.

We begin our analysis by textually comparing 10-Ks of the treatment group and the control group before and after the adoption of ASC 606. ASC 606 requires additional disclosures regarding contracts with customers. Thus, as a first step, we expect to see more disclosure regarding the contracts and associated revenue in the treatment group. Our results confirm this hypothesis. The length of textual content of 10-Ks has increased after the adoption of ASC 606 overall, but it has increased more for the treatment group, which disclosed a material impact from the adoption of ASC 606. Moreover, the newly added texts in the post-ASC 606 10-Ks include more ASC 606-related keywords for the treatment group than the control group, which suggests that ASC 606-related disclosure increases more significantly for the treatment group. These textual differences provide additional assurance regarding our identification of the treatment vs. the control group.

Next, we examine how earnings predictability changes following the adoption of ASC 606. Specifically, we look at absolute analyst forecast error and analyst forecast dispersion, as firms with less predictable earnings are characterized by larger absolute analyst forecast error and larger analyst forecast dispersion (Affleck et al., 2002). Since managers have greater discretion in reporting earnings numbers

with ASC 606, especially for contracts with customers, on the one hand, it is likely that earnings predictability decreases because it becomes more difficult to forecast discretionary choices of managers. On the other hand, as Folsom et al. (2016) argue, greater latitude under principles-based standards can be used to enhance the predictive abilities of earnings. Our results show that both absolute analyst forecast error and analyst forecast dispersion have increased after the adoption of ASC 606, thus decreasing earnings predictability.

To additionally examine and separate the effect of the rule change itself and the additional disclosure requirements, we split the post-adoption period into two separate periods – first quarter after the adoption, and the remaining quarters – and reexamine both absolute analyst forecast error and analyst forecast dispersion. We utilize the fact that the first earnings announcement after the adoption is made before the first financial statement that includes disclosures regarding ASC 606 is issued. Our results show that increased absolute analyst forecast error does not decrease with the disclosure related to ASC 606, suggesting that the effect of additionally disclosed information on absolute earnings forecast error is not significant, and that analyst forecast dispersion does not decrease after the disclosure, suggesting that the increased disclosure does not help analysts to converge on their earnings forecasts.

We then turn our eyes to abnormal accruals, which is another dimension of earnings quality, and examine whether it is affected by the adoption of ASC 606.[1] Our results show that discretionary noncash working capital accruals (Dechow et al., 2012) increase after the adoption of ASC 606 and are robust to different controls and fixed effects. This indicates that earnings after the adoption are of lower quality. Together with the earnings predictability results, our analyses are consistent with the idea that increased flexibility and discretion stemming from the adoption of ASC 606 are associated with arbitrary and opportunistic use of such discretion.

[1] See Dechow et al. (2010) for discussions of earnings quality proxies. Although they intend to capture the same concept, they are not perfect substitutes. Earnings quality has several dimensions and the question of which proxy is superior is dependent upon the manner in which a decision maker uses it.

We also examine how ASC 606 affects the role of earnings in debt contracts. Specifically, we focus on earnings-based debt covenants. Earnings-based debt covenants work as a tripwire ex-post when their claims are at risk (Aghion and Bolton, 1992; Christensen and Nikolaev, 2012), and lenders might be less willing to include an earnings-based covenant as a part of the contract because of the increased discretion in preparing earnings numbers and the related difficulties in predicting future earnings numbers from previous earnings numbers (lower earnings predictability). The increased discretion would also make it easier for borrower firms to manage earnings to avoid possible debt covenant violations (Debt Covenant Hypothesis)[2], and this is another reason why lenders would be less willing to include an earnings-based covenant in the contract. Consistent with our expectation, we find that the use of earnings-based debt covenants decreases after the adoption of ASC 606. In relation to the decrease in the use of earnings-related debt covenants, we additionally examine the use of capital-based covenants, which is another type of debt covenant that is used to alleviate agency problems ex-ante (Aghion and Bolton, 1992; Christensen and Nikolaev, 2012). Although capital-based covenants and earnings-based covenants are not perfect substitutes, when contractible accounting information becomes relatively unreliable and unpredictable, firms would rely more heavily on capital-based covenants (Christensen and Nikolaev, 2012). Consistent with our expectation, we find that the use of capital-based debt covenants increases after the adoption of ASC 606. In addition, the ratio of the number of earnings-based debt covenants to the number of earnings-based plus capital-based debt covenants, or to the entire number of covenants, decreases after the adoption of ASC 606.

Finally, we investigate whether the stock market changes its interpretation of earnings numbers following the adoption of ASC 606 using the earnings response coefficient (ERC). The effect of ASC 606 on the ERC can go either way. On the one hand, the increased discretion accorded to managers may lead to a lower ERC because of concerns about unreliable earnings numbers and predictability (Schipper, 2003). On the other hand, the ERC may increase as a result of the shift to a principles-based accounting

[2] See Dichev and Skinner (2002) for large-sample evidence on the hypothesis

standard which, in general, lowers the possibility of serious fraud in financial statement numbers. This is because the complex rules-based accounting standards enable managers to find loopholes and exploit them (Maines et al., 2003; Agoglia et al, 2011). Moreover, the increased discretion accorded to managers may be used to report earnings that better capture the reality, thus increasing earnings informativeness (Subramanyam, 1996; Srivastava, 2014). We find that overall, there is no significant change in terms of the ERC following the adoption of ASC 606.

However, we find that changes in the ERC after ASC 606 are dependent upon the presence of institutional investors. Specifically, the ERC of a firm increases at a greater rate when there are more institutional investors holding the shares. There are two potential explanations for this positive effect of institutional investors on changes in ERC: monitoring from institutional investors, and varying interpretations of ASC 606 disclosures between institutional and retail investors. To shed light on what drives this result, we conduct two additional tests.

First, we examine the effect for the first quarter and the remaining quarters following the adoption of ASC 606 separately, utilizing the fact that the first earnings announcement after the adoption is made before issuance of the first financial statement which includes disclosures regarding ASC 606. We find that the institutional investor effect for increasing the ERC after the adoption of ASC 606 is significant in both time periods, and that in terms of magnitude, the effects are comparable. This finding lends support to the idea that monitoring from institutional investors is a driving force behind the result. Prior literature has argued that the interpretation of disclosures can vary among investors with different levels of sophistication (Hirshleifer and Teoh, 2003; Kalay, 2015). Since the first ASC 606-related disclosure becomes available only after the first earnings announcement, if differences in interpretation and utilization of information drive the results, the magnitude of the effect for the first quarter and the quarter beyond should be different.

Next, we examine whether the effect of ASC 606 on abnormal accruals is dependent upon institutional holdings and find that the increase in abnormal accruals is smaller for firms with higher

institutional holdings. This is consistent with the monitoring story, which says that the presence of institutional investors constrains earnings manipulation (Rajgopal and Venkatachalam, 2002; Mitra and Cready, 2005). Taken together, our results suggest that institutional investors' monitoring affects the use of discretion in financial reporting, and thus affects the informativeness of earnings numbers and, ultimately, affects the ERC following the adoption of ASC 606.

As an additional test, we examine the long-term effect of the ASC 606 adoption, revisiting the above-mentioned tests with a longer time horizon of the data. Two things are worth noting. First, earnings predictability, as measured by absolute analyst forecast errors and analyst forecast dispersion, has improved in the second year of the adoption with no statistical differences from the pre-adoption period. Considering the fact that discretionary noncash working capital continues to be heightened in the long run, we can interpret the analyst results as a learning curve in terms of how to interpret earnings numbers in the new regime, and thus improvements in their predictability. Second, the institutional investor effect on discretionary accruals, and also on the ERC, disappear in the second year, suggesting institutional investors have weakened attention toward ASC 606-related issues as time passes.

Our paper has policy implications since we are among the first to empirically examine the effect of the adoption of ASC 606. Standard setters should keep in mind that the increased discretion accorded companies may lead to a decrease in earnings predictability, at least in the early stages of the adoption, an increase in discretionary accruals, and decreases in the usefulness and reliability of earnings numbers in contracting. Moreover, in addition to the standard itself, of interest to policymakers may be the fact that institutional investors play an important role in implementing the standard. Thus, when evaluating a standard, monitoring from institutional investors should be considered an important factor, as it affects how firms implement the standard, especially in a transition from a rules-based to a principles-based accounting standard, or vice versa. A concurrent study by Ferreira (2020) examines the liquidity effect of the adoption of ASC 606, and Chung and Chuwonganant (2020) examine the role of ASC 606 in the impact of earnings announcements on market quality and trading activities.

From a broader perspective, our paper contributes to the literature on the discussion surrounding principles-based vs. rules-based accounting standards. Our paper is unique from prior studies that compare the two concepts in accounting standards, either using different environments (e.g., an international setting with different countries) – such as Henderson and O'Brien (2017) and Collins et al. (2012) – or using different accounting rules that serve different goals – such as Donelson et al. (2012) and Folsom et al. (2016). Although they strive to make comparisons in the fairest possible manner, our examination on the effects of the adoption of the ASC 606 enables us to compare the two standards that regulate the same topic of revenue recognition within the same company. This study documents that on the whole, earnings quality deteriorates after the adoption of a principles-based revenue recognition standard.

In addition, this study contributes to the broad stream of literature on the role of disclosure requirements in financial reporting.[3] ASC 606 not only represents a transition from a rules-based to a principles-based accounting standard, but also a stricter standard in terms of disclosure requirements. Our results suggest that although the increased disclosure requirements enhance the amount of information in financial statements regarding contracts with customers and related revenue recognition covered by ASC 606, they do not seem to help stakeholders in penetrating the new earnings numbers, at least in the early stage of transition. Our results show that absolute analyst forecast errors and analyst forecast dispersions do not decrease and ERC does not increase after the first disclosure regarding ASC 606.

Finally, this study contributes to the stream of literature on the choice of covenant in debt contracting, including the work of Demerjian (2007, 2011, and 2017) and Christensen and Nikolaev (2012). In particular, our study supports the findings of Christensen and Nikolaev (2012) regarding the choice between performance covenants and capital-based covenants using a unique shock to the quality of

[3] e.g., Bushee and Leuz (2005), Cheng et al. (2013), Campbell et al. (2014).

earnings numbers. Our results reveal that the decreased predictability and increased discretionary components of earnings decrease the usefulness of earnings numbers in debt contracting.

The remainder of this paper is organized as follows. Section 2 provides the background for ASC 606 and the rules-based and principles-based accounting standards. Section 3 develops our hypotheses. Section 4 explains the empirical research design. Section 5 explains the data and descriptive statistics. Section 6 provides the empirical findings. Section 7 concludes.

2. Background Information

2.1 ASC 606

On May 28, 2014, the Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB) issued converged guidance on revenue recognition in contracts with customers, and the FASB released Accounting Standards Update No. 2014-09.[4] It is a component of the Accounting Standards Codification (ASC) as Topic 606: Revenue from Contracts with Customers (ASC 606), and it supersedes the previous revenue recognition rules in ASC 605 and most transaction- and industry-specific revenue recognition guidance. It represents a transition from a rules-based standard, which includes hundreds of revenue-recognition prescriptions specific to industries, to a principles-based standard which, as a uniform standard,[5] applies to almost all firms. The main principle is that an entity should recognize revenue when the transfer of promised goods or services to customers is made in an amount that the entity expects to be entitled to in return for goods and services provided for the period. In contrast, ASC 605 does not recognize revenue when there is delivery risk, because performance

[4] The boards subsequently issued multiple amendments to the new revenue standard in 2015 and 2016. The amendments made by the FASB and the IASB are not identical. However, with the exception of a few discrete areas, the revenue standard is converged, eliminating most differences between the U.S. GAAP and the IFRS in accounting for revenue from contracts with customers.

[5] Except for leases, insurance contracts, contractual obligations within certain financial instrument guidance, guarantees other than product or service warranties, and nonmonetary exchanges between entities within the same line of business used to facilitate sales to customers (ASC 606-10-15-2).

obligation is not usually broken down into multiple smaller performance obligations. ASC 606 is effective for public entities for the first interim period within annual reporting periods beginning after December 15, 2017; non-public companies are allowed an additional year.

ASC 606 adheres to the following five-step process: 1) identify the contract with a customer, 2) identify the performance obligations in the contract, 3) determine the expected transaction price, 4) allocate the performance obligations from the transaction price, and 5) recognize that revenue as performance obligations (transfer of control over goods and services) is satisfied, which requires matching specific circumstances of revenue transactions to concepts, criteria, and assessment factors dispersed throughout the standard. Thus, it frequently requires considerable judgment and discretion in its application.[6] In addition, the new standard requires firms to disclose the nature, amount, timing and uncertainty of revenue and cash flows in detail.

The new guidance resulted from efforts to improve financial reporting and is considered to be the largest accounting change after the Sarbanes–Oxley Act of 2002. Specifically, the new standard aims to remove inconsistencies and weaknesses in revenue requirements; provide a more robust framework for addressing revenue issues; improve the comparability of revenue recognition practices across entities, industries, jurisdictions, and capital markets; provide more useful information to users of financial statements through improved disclosure requirements; and simplify the preparation of financial statements by reducing the number of requirements to which an entity must adhere (ASU 2014-09). Among industries, software and services companies are expected to be most affected.

2.2 Principles-Based and Rules-Based Accounting Standards

[6] Its complexity also arises from the large volume of the principle – close to 150 pages of authoritative content related to revenue, and an additional 500 pages of changes to other topics and background material.

Rules-based accounting standards and principles-based accounting standards are two extremes on the continuum. A rules-based accounting standard involves a list of detailed, specific, and verifiable rules and procedures that must be followed when preparing financial statements. The primary example of a rules-based accounting standard is the U.S. Generally Accepted Accounting Principles (GAAP). It is characterized by detailed guidance and numerous exemptions, because the rules should cover all possible cases for different industry settings. Many accountants and comptrollers prefer a rules-based system because if their financial statements ever end up as the subject of a court or arbitration case, they can point to the specific rules they followed to calculate the figures. Donelson et al. (2012) demonstrate that rules-based standards are associated with a lower incidence of litigation. On the negative side, a rules-based system can create needless complexities and can encourage an opportunistic interpretation of the rules, exploiting loopholes in the system (Agoglia et al., 2011). The rules-based accounting system was blamed as one of the reasons for a series of large-scale accounting scandals in the early 2000s (Benston et al., 2006).

A principles-based accounting standard requires a company to adhere to principles rather than specific rules. The international financial reporting standards (IFRS) system follows a principles-based approach and is used widely around the world. A principles-based accounting system is employed as conceptual footing for comptrollers and accountants. It aims to create guidelines – rather than rigorous rules – to help accountants create financial documents. Under the principles-based approach, accounting principles are adjusted to a company's transactions, rather than adjusting a company's operations to accounting rules. The key to a principles-based accounting system is that the system allows for flexibility, which helps preparers to better communicate the underlying economic reality of firms. One negative side of principles-based standards is that the reported information can be subjective or inconsistent, which leads to difficulties in terms of the comparability and predictability of financial statements. Additionally, managers can exploit their expanded discretion to engage in opportunistic reporting, and the reliability of earnings numbers may decrease as a result.

The information above explains the general characteristics of rules-based and principles-based accounting standards from a conceptual standpoint. However, whether a specific accounting standard represents rules-based or principles-based accounting is not clear. Accounting standards usually contain both rules-based and principles-based elements, which determine their place along the continuum (e.g., Maines et al., 2003; Benston et al., 2006).

3. Hypotheses Development

We develop our hypotheses based on the following two features: 1) ASC 606 is a transition from a rules-based accounting standard to a principles-based accounting standard regarding revenue from contracts with customers, which provides greater discretion in recognizing revenue and related costs, and 2) ASC 606 requires enhanced disclosure of the details surrounding the nature, amount, timing and uncertainty of revenue and cash flows associated with the topic. We focus on earnings quality because revenue recognition and the related costs ultimately affect earnings numbers, and earnings numbers are one of the most important components of financial information about which the market truly cares.

There is no consensus regarding the effects on earnings following the transition from a rules-based accounting standard to a principles-based accounting standard. Some studies emphasize the positive attributes associated with principles-based accounting standards, such as providing more accurate information to the users of financial statements, using flexibility and discretion to best design the venue through which to communicate the company's current economic situation (Subramanyam 1996; Srivastava, 2014). Others are concerned about the decreased predictability and comparability of earnings numbers because of the inconsistency in applying the regulations, stemming from increased discretion (Schipper, 2003; Sunder, 2009).

Our first set of hypotheses pertains to the predictability of earnings. We test the predictability of earnings using absolute analyst forecast error and analyst forecast dispersion, as the predictability of

earnings is negatively correlated with absolute analyst forecast errors and analyst forecast dispersions (Affleck et al., 2002).[7] Increased discretion introduced by ASC 606 may decrease the predictability of earnings numbers because analysts are less clear about both how firms will apply the principle in deriving earnings numbers, and whether firms will apply exactly the same methods from period to period (Schipper, 2003; Sunder, 2009). On the other hand, the discretion given to firms may help them report earnings in a manner that better predicts future earnings (Folsom et al., 2016). We expect that the former effect will be stronger than the latter.

H1: Absolute analyst forecast error increases after the adoption of ASC 606.

H2: Analyst forecast dispersion increases after the adoption of ASC 606.

We then examine discretionary noncash working capital accruals (Dechow et al., 2012) as another dimension of earnings quality. We expect discretionary accruals, after considering estimated nondiscretionary accruals using the Modified Jones model (Dechow et al., 1995), to increase as firms can exercise greater discretion and judgment following the adoption of ASC 606.

H3: Discretionary noncash working capital accrual increases after the adoption of ASC 606.

Next, we examine the usefulness of earnings in debt contracting. More specifically, we test how the use of earnings-based covenants in debt contracting changes after the adoption of ASC 606, and in turn, how this change affects the use of capital-based covenants in debt contracting. We expect to see decreases in the use of earnings-based covenants for two reasons. First, the decrease in earnings predictability (H1 & H2) indicates that predicting future earnings numbers from previous earnings numbers becomes more difficult, which in turn makes earnings less useful as a tripwire. Second, the increase in abnormal accruals (H3) means the idea of the Debt Covenant Hypothesis (managers make accounting choices to reduce the probability of a debt covenant violation) is more likely to be applied

[7] To directly estimate earnings predictability, several years of data before and after the adoption are required. To take advantage of the difference-in-difference design, we focus on short periods before and after the shock. Analyst forecast measures do not require long-term panel data.

after the adoption. Instead, as a substitution, we expect to see increases in the use of capital-based covenants as earnings information becomes less informative in contracting (Christensen and Nikolaev, 2012).

H4: The use of an earnings-based covenant in debt contracting decreases after the adoption of ASC 606.

H5: The use of a capital-based covenant in debt contracting increases after the adoption of ASC 606.

Our last set of hypotheses pertains to the stock market's interpretations of earnings numbers. First, we examine whether the stock market interprets earnings numbers differently after the adoption of ASC 606 using the ERC. If overall the stock market believes that the increased discretion facilitates better communication with the market through earnings numbers, then the ERC will increase (Folsom et al., 2016). However, if overall the market believes that managers apply the principles opportunistically and inconsistently in deriving earnings, the ERC may decrease. We do not predict ex-ante which effect will be stronger empirically.

H6: The ERC does not change after the adoption of ASC 606.

We then examine whether there is any institutional investor effect in interpreting earnings numbers after the adoption of ASC 606. This stems from the idea of monitoring by institutional investors, which prior literature documents. A different level of monitoring based on the existence of the institutional investor will affect the use of discretion, quality of earnings, and, in turn, the interpretation of earnings numbers. We expect higher ERC for firms with higher institutional investor holdings.

H7: Reactions to earnings announcements (ERC) following the adoption of ASC 606 are higher for firms with larger institutional investor pools.

4. Research Design

We examine the effect of the transition to ASC 606 using difference-in-difference analyses. Our main independent variable throughout the study is *ASC606,* which is an indicator variable that equals 1 if a quarter falls after ASC 606 adoption and ASC 606 has a material impact on a firm's financial statement (i.e., the effect of ASC 606 adoption is disclosed as material in its financial statement). In other words, we use firms that report a material impact of ASC 606 as a treatment group,[8] and all other firms in the sample as a control group. The composition of firms in the treatment group and the control group is roughly half and half. We include firm- and year*quarter-fixed effects to capture time-invariant firm characteristics and time trends. In each subsection, we specify the regression models we use to test each hypothesis.

4.1 Textual Analysis of the ASC 606 Disclosure

Before the main analyses, which follow from the next subsection, we first examine whether the adoption of ASC 606 actually increases disclosure regarding revenue recognition from contracts with customers. We also examine whether the treatment group, which discloses a material impact from ASC 606 adoption in financial statements, and the control group, which does not disclose a material impact from ASC 606 adoption, are significantly different in terms of the disclosure. To do so, we compare 10-K texts right before and after the adoption of ASC 606.

More specifically, all of the texts excluding numbers are extracted from the 10-Ks, and we make the following comparisons between the treatment and the control groups. First, we count the number of words that changed between pre- and post-10-Ks and scale it by the pre-10-K number of words to measure the change in disclosure length between pre- and post-10-Ks. Second, we extract and count the number of sentences that newly appear in the post-10-Ks (but not in the pre-10-Ks) and scale it by the

[8] We use whether the company disclosed a *material impact* from the adoption of the new revenue standard to identify firms included in the treatment group instead of using whether the company disclosed a financial impact in numbers. In other words, whether the company disclosed any accounting policy impacts due to the adoption of the new revenue recognition standard matters. There are a handful of examples in which a company did not disclose a material impact from the adoption of the standard, but the financial impact in numbers is disclosed. These types of changes are usually due to the reclassification of revenues/expenses from a gross/net basis. We thank AuditAnalytics for providing clarification on this matter.

pre-10-K number of sentences to measure the amount of information added in the post period. Third, using the extracted newly added sentences, we calculate the ratio of the sentences that include the key words[9] associated with ASC 606. These three measures potentially capture textual disclosure amounts associated with ASC 606. We then make a univariate firm-level pairwise comparison to determine if the treatment group is different from the control group, presenting evidence suggestive of the differences in textual disclosure between the two groups after the adoption of ASC 606.

4.2 The Effect of ASC 606 on Analyst Forecasts

We examine the effect of ASC 606 on absolute analyst forecast error (H1) and analyst forecast dispersion (H2), which are proxies for earnings predictability, in this section. We estimate the following regression.

$$|ForecastErr|_{it}\ (ForecastDisp_{it}) = \beta_1 ASC606_{it} + \sum_k \beta_k\, Controls_{it} + FEs + \varepsilon_{it} \quad (1)$$

$|ForecastErr|_{it}$ is measured as the absolute value of the difference between the actual EPS and the latest median analyst EPS forecast consensus prior to earnings announcement. $ForecastDisp_{it}$ is measured as the natural log of the standard deviation of the latest analyst EPS forecasts before earnings announcement.[10] For both regressions, we include the log of the absolute value of mean EPS forecast as a control, to take into account the possibility that the effect we are attempting to identify is dependent upon how the dependent variables are scaled. Based on H1 and H2, we expect that it will be more difficult for analysts to forecast earnings after the adoption, because managers can exercise greater discretion. Thus, we expect $\beta_1 > 0$ for both regressions.

[9] Keywords include ASC 606, ASU 2014-09, revenue, performance obligation, contract with customers, revenue disaggregation, contract balance, revenue uncertainty, revenue recognition, remaining implementation, breakdown the impact, and variations thereof. We ignore case, tense, and singular/plural in the search.
[10] Since some observations are zero, we add a constant that minimizes the sum of absolute value of skewness and absolute value of excess kurtosis before taking the log, following Berry (1987).

We add the following additional control variables for $|ForecastErr|$ regression: log of the number of analysts following, whether an observation belongs to pre fiscal quarter end, whether a firm reports a loss, firm size, book-to-market ratio, whether a firm reports R&D expenses, standard deviation of monthly stock returns during the past year, EPS volatility over the past eight quarters, stock return over the current fiscal quarter, standard deviation of the firm's monthly stock returns over the previous 12 months, number of segments, number of management forecasts issued during the past year, percentage of institutional investors, and fiscal quarter indicators. Firm- and year*quarter-fixed effects are included.

For $ForecastDisp$ regression,[11] we add the following controls: log of the number of analysts following, whether a firm reports a loss, firm size, book-to-market ratio, whether a firm reports R&D expenses, debt-to-equity ratio, sales turnover ratio, deseasonalized EPS change, EPS volatility over the past eight quarters, CAPM Beta, standard deviation of residuals from CAPM regression, cumulative return over the past 13 months excluding the most recent two months before the earnings announcement, share turnover, log of the stock price, and fiscal quarter indicator variables. Firm- and year*quarter-fixed effects are included.

Next, we rerun the regressions with granular subperiod indicators. $1Q$ ($From2Q$) takes the value of 1 if an observation belongs to a firm in the treatment group and is in the first quarter (second quarter or beyond) after the firm adopts ASC 606. We estimate the following regression:

$$|ForecastErr|_{it}\ (ForecastDisp_{it}) = \beta_1 1Q_{it} + \beta_2 From2Q_{it} + \sum_k \beta_k\, Controls_{it} + FEs + \varepsilon_{it} \quad (2)$$

Since the first ASC 606 disclosure is issued after the first-quarter earnings announcement (but before the second-quarter earnings announcement), the difference between β_2 and β_1 captures the effect of the additional disclosure requirements of the ASC 606. If the disclosure helps analysts better understand and predict earnings as a whole, β_2 should be significantly less positive than β_1.

[11] Most control variables are from Liu and Natarajan (2012).

4.3 The Effect of ASC 606 on Abnormal Accruals

Next, we examine abnormal accruals, measured by discretionary noncash working capital accruals, as another measure of earnings quality. We use the Modified Jones model (Dechow et al., 1995) to estimate nondiscretionary accruals.[12] Specifically, we estimate the following regression:

$$WCA_{it} = \beta_1 ASC606_{it} + \beta_2 \Delta Cash\_Sales_{it} + \beta_3 PPE_{it} + \beta_4 ROA_{it} + FEs + \varepsilon_{it} \quad (3)$$

Our dependent variable, WCA, is working capital accruals, which is equal to $[(\Delta Current\ Assets - \Delta Cash) - (\Delta Current\ Liabilites - \Delta Current\ portion\ of Debt)]$ divided by total assets. We control for $\Delta Cash\_Sales$, which is $(\Delta Revenue - \Delta Receivables)$ divided by total assets, PPE, which is gross property, plant, and equipment divided by total assets, and *ROA* as a control for performance. We estimate the regression with 1) industry[13]- and year*quarter-fixed effects and 2) firm- and year*quarter-fixed effects. Additionally, to allow for greater flexibility in the regression, we interact each of our control variables, $\Delta Cash\_Sales, PPE$, and *ROA* with: 1) industry- and year-quarter fixed effects, respectively, and 2) firm- and year*quarter-fixed effects, respectively. Based on H3, we expect $\beta_1 > 0$, as managers have greater discretion after the adoption of ASC 606.

4.4 The Effect of ASC 606 on Debt Covenants

We now turn our eyes to the use of debt covenants in debt contracts. Specifically, we focus on earnings-based debt covenants, because ASC 606 is about revenue recognition or, in general, earnings. Additionally, we examine the use of capital-based debt covenants as a substitute for earnings-based covenants. To compare the use of earnings-based and capital-based covenants in debt contracts before and after the adoption of ASC 606, we estimate the following regression:

$$EarnCov(CapCov)Num(Binary)_{it} = \beta_1 ASC606_{it} + \sum_k \beta_k Controls_{it} + FEs + \varepsilon_{it} \quad (4)$$

[12] We do not use the Dechow and Dichev (2002) model because our data consists of firm-quarter samples, and a quarter might be too short for the reversal of accruals to occur.
[13] The industry fixed effects are based on the 2-digit SIC categories.

The left-side variable, $EarnCov$, refers to financial covenants that use earnings (coverage-type ratios, EBITDA, and debt to EBITDA ratios). $EarnCovNum$ is the number of earnings-based covenants in a debt contract, and $EarnCovBinary$ is a binary variable that equals 1 if a debt contract includes at least one earnings-based covenant. $CapCov$ stands for financial covenants that are formulated in terms of balance sheet information only (quick ratio, current ratio, debt-to-equity ratio, leverage ratio, senior leverage, equity-to-asset ratio, net debt to assets, total debt, loan to value, debt to tangible net worth, net worth to total asset, and long-term investment to net worth). $CapCovNum(Binary)$ is defined in the same manner as $EarnCovNum(Binary)$. We expect $\beta_1 < 0$ for $EarnCovNum(Binary)$, because greater discretion given to managers is likely to: 1) decrease earnings predictability and in turn, usefulness of earnings as a tripwire, and 2) increase the possibility of managing earnings to avoid debt convent violation. In contrast, we expect $\beta_1 > 0$ for $CapCovNum(Binary)$, because capital-based covenants can be used more extensively in debt contracts as a substitute for earnings-based covenants (H5).

We add the following controls:[14] earnings volatility, whether a firm reports a loss for the past four consecutive quarters, operating ROA, ratio of market value of assets to book value of assets, average maturity of a debt contract, materiality (amount of deal issued divided by assets), whether a debt contract includes performance pricing, leverage, and Z-score (Altman, 1968). Regarding fixed effects, we run regressions with 1) industry- and year*quarter-fixed effects, and 2) firm- and year*quarter-fixed effects.

We additionally test the effect of ASC 606 on the choice of earnings-based vs. capital-based covenants in debt contracts using the proportion of each covenant used. The structure of the regressions is the same as above, except that the dependent variable is *EarnCovRatio,* which is the ratio of earnings-based covenants to (earnings-based covenants + capital-based covenants) or *EarnTotalRatio* (*CapTotalRatio*), which is the ratio of earnings (capital)-based covenants to the total number of covenants in a loan package.

[14] Most of the controls are from Demerjian (2007).

4.5 The Effect of ASC 606 on Stock Market Reaction (ERC)

We also examine how the stock market responds to the new revenue recognition standard, ASC 606. Specifically, we focus on the earnings response coefficient (ERC). In Subsection 4.5.1, as a baseline regression, we compare the ERC before and after the adoption of ASC 606 (H6). Subsection 4.5.2 explores how institutional investors affect the change in the ERC surrounding the adoption of ASC 606 (H7).

4.5.1 Baseline Regression

As a first step, we examine how the ERC changes after ASC 606 is adopted. We estimate the following regression:

$$UR_{it} = \beta_1 UE_{it} + \beta_2 ASC606_{it} + \beta_3 UE_{it} ASC606_{it} + \sum_k \beta_k \, Controls_{it} + \sum_l \beta_l \, UE_{it} Controls_{it} + FEs + \varepsilon_{it} \quad (5)$$

The left-side variable, UR, is a firm's return minus CRSP value-weighted market return over a three-day window surrounding the earnings announcement. UE, which stands for unexpected earnings, is the actual EPS minus the latest median EPS forecast consensus before the earnings announcement divided by the price at the end of the fiscal quarter.[15] β_3 captures the effect of ASC 606 on the ERC. Whether β_3 is positive or negative is an empirical question, as presented in H6. Accordingly, we do not predict the sign of β_3 in advance.

We include a set of control variables as well as interactions between the controls and UE. Controls include $UE * |UE|$ to capture the nonlinearity in the price-earnings relation, market-to-book ratio of equity and its interaction with UE, market beta and its interaction with UE, size,[16] loss indicator and its interaction with UE, variance of the absolute values of unexpected earnings over the past eight quarters

[15] Following Wilson (2008) and Chen et al., (2014), we delete EPS forecasts that are more than 60 days old at the time of earnings announcement.
[16] Based on Collins and Kothari (1989), we do not include UE * size as a control.

prior to the earnings announcement and its interaction with UE, the persistence of earnings from Foster's (1977) earnings model and its interaction with UE,[17] and the fourth fiscal quarter indicator and its interaction with UE.[18]

Next, we split $ASC606$ into two granular subperiod indicators and rerun the regression (5). $1Q$ ($From2Q$) takes the value of 1 if an observation belongs to a firm in the treatment group and is in the first quarter (second quarter or beyond) after the firm adopts ASC 606. We estimate the following regression:

$$UR_{it} = \beta_1 UE_{it} + \beta_2 1Q_{it} + \beta_3 From2Q + \beta_4 UE_{it} 1Q_{it} + \beta_5 UE_{it} From2Q_{it} + \sum_k \beta_k \, Controls_{it}$$

$$+ \sum_l \beta_l \, UE_{it} Controls_{it} + FEs + \varepsilon_{it} \quad (6)$$

Our coefficients of interest are β_4 and β_5. If ASC 606-related disclosure affects how market interprets earnings, since the first ASC 606 disclosure is issued after the first-quarter earnings announcement (but before the second-quarter earnings announcement), β_5 should be significantly different from β_4.

4.5.2 Effect of Institutional Investors on the ERC

Next, we take a step further and test whether there is any institutional investor effect in responding to earnings following the adoption of ASC 606. We interact the institutional investor variable with *ASC606* and *UE,* extending our baseline regression (5) in Subsection 4.5.1. Specifically, we estimate the following regression:

[17] Kormendi and Lipe (1987) and Easton and Zmijewski (1989) show a positive relationship between ERC and persistence.
[18] Mendenhall and Nichols (1988) and Salamon and Stober (1994) show that fourth fiscal quarter earnings are less informative.

$$UR_{it} = \beta_1 UE_{it} + \beta_2 ASC606_{it} + \beta_3 PINST_{it} + \beta_4 UE_{it} ASC606_{it} + \beta_5 ASC606_{it} PINST_{it} + \beta_6 UE_{it} PINST_{it} + \beta_7 UE_{it} ASC606_{it} PINST_{it} + \sum_k \beta_k Controls_{it} + \sum_l \beta_l UE_{it} Controls_{it} + FEs + \varepsilon_{it} \quad (7)$$

$PINST$ is defined as the percentage of a firm's stock held by institutional investors. Prior literature has demonstrated that institutional investors monitor firms they invest in, and this monitoring curbs managers' use of discretion. In turn, earnings quality is higher for firms with larger institutional investor pools (Rajgopal and Venkatachalam, 2002; Mitra and Cready, 2005). Therefore, we expect the change in the ERC surrounding the adoption of ASC 606 to be higher for the firms with higher institutional investor holdings; that is, $\beta_7 > 0$.

4.5.3 The Channel of the Institutional Investor Effect on the ERC

In this section, we examine the channels through which institutional investors generate different market reactions to earnings. This can be due to monitoring by institutional investors, as explained in the previous section, but another plausible interpretation is that intuitional investors interpret ASC 606 disclosures in a manner that differs from other investors. To disentangle these two explanations, we conduct the following two tests.

First, we rerun the regression (7) with more granular subperiod indicators. Specifically, we divide $ASC606$ into $1Q$ and $From2Q$, as the first ASC 606-related disclosure comes after the first earnings announcement subsequent to the adoption. Specifically, the following regression model is estimated:

$$UR_{it} = \beta_1 UE_{it} + \beta_2 1Q_{it} + \beta_3 From2Q_{it} + \beta_4 PINST_{it} + \beta_5 UE_{it} 1Q_{it} + \beta_6 UE_{it} From2Q_{it} + \beta_7 UE_{it} PINST_{it} + \beta_8 1Q_{it} PINST_{it} + \beta_9 From2Q_{it} PINST_{it} + \beta_{10} UE_{it} 1Q_{it} PINST_{it} + \beta_{11} UE_{it} From2Q_{it} PINST_{it} + \sum_k \beta_k Controls_{it} + \sum_l \beta_l UE_{it} Controls_{it} + FEs + \varepsilon_{it} \quad (8)$$

Our coefficients of interest are β_{10} and β_{11}. If monitoring drives the institutional investor effect, we expect that these two coefficients are not significantly different. If different processing or interpretation of information between institutional investors and retail investors drives the institutional investor effect, we expect these two coefficients are significantly different, because first disclosure on the ASC 606 becomes available after the first post-ASC 606 earnings announcement. The control variables are the same as in equation (7).

Additionally, we test whether the increase of abnormal accruals surrounding ASC 606 adoption is affected by institutional investors. To do so, we add an institutional investor variable, *Inst*, to regression (3) and interact with *ASC606*. $Inst$ is one of the following variables: percentage of institutional investors ($PINST$); binary variable with cutoff at median ($InstP50$); and binary variable with cutoff at 75% quantile ($InstP75$), both binary variables constructed based on values at the last quarter before the adoption. We estimate the following model:

$$WCA_{it} = \beta_1 ASC606_{it} + \beta_2 Inst_{it} + \beta_3 ASC606_{it} Inst_{it} + \beta_4 \Delta Cash\_Sales_{it} + \beta_5 PPE_{it} + \beta_6 ROA_{it} + FEs + \varepsilon_{it} \quad (9)$$

Our coefficient of interest is β_3 and $\beta_3 < 0$ supports the monitoring story.

5. Sample

5.1 Sample Construction

We begin by obtaining a dataset regarding ASC 606 adoption from AuditAnalytics. This dataset covers Russell 3000 companies and contains information collected from 10-Qs and 10-Ks about ASC 606

adoption-related information, including adoption beginning date and the effect of the adoption on firms' revenue recognition process and financial statement numbers.

We merge this dataset with Compustat, CRSP, IBES, Dealscan, and Thomson Reuters to obtain financial data for the control variable construction. Accounting data is from Compustat, stock-related data is from CRSP, analyst forecast data is from IBES, and debt-covenant-related data is from Dealscan. Institutional investor data is from Thomson Reuters. For our main analyses, the sample period spans between one year (four quarters) before the adoption and one year after the adoption, except for the debt covenant tests. For the debt covenant tests, our sample period is from 2016 to 2019 (roughly two years before and after the adoption), to cover enough observations before and after the adoption for each firm, since we use firm-fixed effect in our regressions. Samples for long-term tests span between two years before the adoption and two years after the adoption.[19]

5.2 Descriptive Statistics

Panel A of Table 1 provides descriptive statistics for selective variables that capture revenue-related firm characteristics. We present the results for the treatment group and the control group separately. The treatment group consists of firms that disclosed a material impact from the adoption of ASC 606 in their financial statements, and the remaining firms belong to the control group. All variables except Cum. Eff to RE (cumulative effects to retained earnings) are from the last 10-Q report *before* the adoption of ASC 606. Cum. Eff to RE is the amount disclosed in the first 10-Q report *after* the adoption of ASC 606 divided by common equity. Overall, the descriptive table shows that firms in the treatment and the control groups are not very different in the pre-ASC 606 adoption period, except for book-to-market ratio, while the cumulative effects to retained earnings show stark differences, consistent with the definitions of the treatment and the control groups.

[19] Currently, the sample covers up to fiscal quarters ending in March 2020 (May 2020 for accrual tests). We plan to update the sample as we obtain access to more recent data so that the sample fully covers two years of data surrounding the adoption.

Panel B of Table 1 shows the top five industry groups based on Fama-French's 49 industry classifications for firms in the treatment group that are significantly affected by ASC 606. The largest industry is computer software, followed by pharmaceutical products, trading, retail, and electronic equipment industry. This industry list is consistent with the fact that ASC 606 heavily affects firms that provide goods or service to customers and enter into contracts with them.

Summary statistics for variables used in the regressions are shown in Appendix B, with each panel corresponding to a test. The mean value of $ASC606$, which represents the odds of firm-quarters that are after the adoption of ASC 606 and pertain to firms materially impacted by the adoption, ranges from 0.28 to 0.32 depending on the regression specifications. Other variables' summary statistics are generally consistent with the prior literature.

5.3 Simplified Difference-in-Difference

Panel A of Table 2 compares the change between the pre and post period of the treatment group vs. the control group for our main variables of interest using a simplified difference-in-difference regression model, which includes the *POST*TREATED* interaction term and the associated individual terms. *POST* is an indicator variable that takes a value of 1 for periods after the adoption of ASC 606, and *TREATED* is an indicator variable for firms in our treatment group. The increase in absolute analyst forecast error and analyst forecast dispersion, which are proxies for earnings predictability, is larger for the treatment group compared to the control group, surrounding the adoption of ASC 606. Similarly, abnormal accruals increase more for the firms in the treatment group after the adoption. Regarding debt covenant measures, the use of earnings-based covenants decreases more for the treatment firms in the post-ASC 606 period, while the use of capital-based covenants increases. All of these differences are statistically significant. The results in this section provide preliminary evidence that the adoption of ASC 606 diminishes earnings predictability and increases abnormal accruals, and these two effects in turn alter the choice of debt covenants. Earnings-based covenants are used less, and capital-based covenants are used more in debt contracts in the post-ASC 606 period.

5.4 Textual Analysis of the ASC 606 Disclosure

Panel B of Table 2 shows the textual characteristics associated with ASC 606, compared across the treatment and the control groups. The first two rows reveal that, compared with the control group, more texts were added to the treatment group's 10-K in terms of words and sentences after ASC 606 goes into effect. Moreover, when we take a step further and examine the characteristics of the sentences added after ASC 606 is adopted, firms in the treatment group are more likely to include content related to ASC 606. For robustness, we also undertake the same textual analysis using only "Notes to Financial Statement" or its variation in 10-Ks, and the results are similar to those reported herein.

Additionally, for each firm, we compare pre- and post-adoption 10-Ks and make a list of the top 25 words that increase most in 10-Ks after the adoption (as shown in Figure 1). Consistent with our results in Panel B of Table 2 and our conjecture, the word list from the treatment group includes words such as "contract," "revenue," "service," "performance," "obligation," and "recognize," which are likely to capture ASC 606 required disclosure, while the list from the control group generally does not include the words related to ASC 606. We also visually present this word list using word clouds in Figure 2. Panel A is for the treatment group, and Panel B is for the control group. The difference in textual disclosure is much more noticeable in Figure 2. In summary, the results from Panel B of Table 2, Figure 1, and Figure 2, when taken together, suggest that the treatment and the control groups are indeed different in terms of their ASC 606-related disclosure and lend further support which indicates that these two groups are affected differently by the adoption of ASC 606.

6. Empirical Analysis

6.1 The Effect of ASC 606 on Analyst Forecasts

We present our empirical test results for H1 and H2, which address the effect of the new revenue recognition standard on earnings predictability captured by absolute analyst forecast error and analyst

forecast dispersion, in this section. Table 3 shows the results regarding absolute analyst forecast error. Column (1) is the baseline regression, which includes only *ASC606* and fixed effects. In column (2), we rerun the same regression with a full set of controls. The results from these two columns show that the absolute analyst forecast error significantly increases after the ASC 606 adoption. The magnitude of the effect is economically significant; the difference-in-difference estimate in column (1) is about 11% and in column (2) is about 13% of the mean pre-treatment absolute analyst forecast error.[20]

In column (3), we separately estimate the effect of the adoption of ASC 606 in: 1) the first quarter and, 2) the second quarter and beyond following the ASC 606 adoption. We split the variable *ASC606* into two – *1Q* and *From 2Q* – and rerun the regression in column (2). The coefficients of both $1Q$ and $From2Q$ are significantly positive. The magnitudes of these two coefficients are comparable and are not significantly different from each other. Our interpretation of this result is that the required disclosure regarding ASC 606, which is disclosed in the first *Post* financial statement that comes after the first quarter earnings announcement, does not help much in reducing absolute forecast errors. In summary, this table shows that earnings predictability decreases after ASC 606 is adopted, consistent with the idea that the increase in discretion used in revenue recognition renders forecasting earnings more difficult.

With regard to analyst forecast dispersion (H2), we report the estimation results in Table 4. The coefficients on the post-treatment indicator ($ASC606$) are significantly positive in columns (1) and (2), which means analysts' forecasts diverge after the new standard comes into effect. Also, the effect is economically significant; analyst forecast dispersion increases about 7% in column (1) and 5% in column (2)[21] after the adoption. This provides further evidence that it is more difficult to forecast earnings under the new revenue recognition standard.

In column (3), we divide the $ASC606$ indicator from columns (1) and (2) into two: *1Q* and *From2Q*. The results indicate that the coefficient of $From2Q$ is significantly positive, but $1Q$ is not. This

[20] The mean absolute forecast error in the pre-adoption period for the treatment group is 0.100. (0.0114/0.100) * 100 = 11.4% in column (1), and (0.0132/0.100) * 100 = 13.2% in column (2).
[21] [exp(0.0721) - 1] * 100 = 7.47 in column (1), and [exp(0.0511) - 1] * 100 = 5.24 in column (2).

suggests that although the absolute forecast error begins to significantly increase from the first quarter after the adoption, the forecast dispersion does not. In the first quarter, which is before the first ASC 606 disclosure from the first *Post* financial statement comes out, it is harder to predict the earnings, but this applies to all analysts in the same direction, thus not increasing dispersion. Moreover, the coefficient of *From2Q* is larger than that of $1Q$, but they are not statistically different. This suggests that ASC 606-related disclosure, which is available from the second quarter after the adoption, does not help analysts to converge on their forecasts. If anything, the disclosure makes analyst forecasts diverge. In summary, by demonstrating that analyst forecast dispersion increases, this table provides further evidence that earnings become harder to predict when ASC 606 is introduced.

6.2 The Effect of ASC 606 on Abnormal Accruals

Next, we examine whether discretionary noncash working capital accrual (Dechow et al. 2012) is affected by the adoption of ASC 606 as another dimension of earnings quality (H3). The Modified Jones model (Dechow et al., 1995) is used to estimate nondiscretionary accruals, and Table 5 presents the results. Across all columns, the dependent variable is noncash working capital accruals, and the coefficients of $ASC606$ are significantly positive. This means that after the adoption of ASC 606, discretionary accruals rise significantly. We tried different combinations of fixed effects (industry, firm, year- and quarter-fixed effects and their cross terms with controls), and the results are robust. In terms of economic significance, discretionary accruals increase by about 0.6% of total assets in column (4), which has the strictest set of control variables and fixed effects, after the adoption of ASC 606. The results indicate that managers use the increased discretion opportunistically.

6.3 The Effect of ASC 606 on Debt Covenants

We now turn our attention to the role of earnings in debt contracting. Specifically, we look at whether the use of earnings-based covenants in debt contracts changes (H4), because ASC 606 is about revenue recognition or, in general, earnings. Additionally, we examine the use of capital-based covenants

(H5) as a substitute for earnings-based covenants. Earnings-based covenant results are reported in Table 6. We use the number of earnings-based covenants as a dependent variable in columns (1) to (3), and the indicator variable regarding the use of earnings-based covenants in columns (4) to (6). In columns (1) and (4), we run the regression without controls and only with firm- and year*quarter-fixed effects. Columns (2) and (5) are with controls and industry- and year*quarter-fixed effects, and columns (3) and (6) are with controls and firm- and year*quarter-fixed effects. In all columns, negative and significant coefficients of *ASC606* show that earnings-based covenants are used less after the adoption of ASC 606. The number of earnings-based covenants used decreases by about 8%,[22] and the likelihood of including earnings-based covenants in debt contracts decreases by about 2%[23] after the adoption of ASC 606. This is consistent with the story that increased discretion in preparing earnings numbers, which leads to lower earnings predictability and higher abnormal accruals, renders earnings less useful in debt contracting. Lower earnings predictability makes earnings less useful as a tripwire, and higher abnormal accruals indicate that the possibility of earnings manipulation to avoid possible debt covenant violation is greater.

We also examine the use of capital-based covenants in Table 7. The structure of the table is exactly the same as Table 6, except that we use capital-based covenants as dependent variables instead. In all columns, positive and significant coefficients of *ASC606* show that capital-based covenants are used more often after the adoption of ASC 606. This indicates that capital-based covenants are used as a substitute for earnings-based covenants after the adoption.

To further examine the choice between the two types of covenants simultaneously, we examine the proportion of earnings-based vs. capital-based covenants in Table 8. Columns (1) and (2) are for the ratio of earnings-based covenants to the sum of earnings-based covenants and capital-based covenants. Columns (3) and (4) are for earnings-based covenants ratios, and columns (5) and (6) are for capital-based covenants ratios based on the total number of covenants in a debt package as a denominator. Significantly

[22] Mean $EarnCovNum$ in the pre-adoption period for the treatment group is 1.58. (0.13/1.58) * 100 = 8.23 in column (3).
[23] Mean $EarnCovBinary$ in the pre-adoption period of the treatment group is 0.94. (0.02/0.94) * 100 = 2.12 in column (6).

negative ASC 606 coefficients in columns (1) through (4) tell us that earnings-based covenants are used less after the adoption, and significantly positive ASC 606 coefficients in columns (5) and (6) tell us that capital-based covenants are used more often after the adoption, even when other types of covenants are considered simultaneously. The same control variables used in Table 6 or 7 are used in even-numbered columns ((2), (4), and (6)) and are not reported for brevity. On average, the ratio of earnings-based covenants to entire debt covenants decreases by 3.6% in column (4), and that of capital-based covenants increases by 2.9% in column (6). The results of this table corroborate our previous findings in Tables 6 and 7.

6.4 The Effect of ASC 606 on the Stock Market (ERC)

6.4.1 Baseline Regression

To study the effect of ASC 606 on the stock market, we first examine the effect of ASC 606 on the ERC without any cross-sectional partition, as a baseline regression. We do not make a directional prediction ex-ante, as stated in H6, since we believe it can go either way. We present the results in column (1) of Table 9. The interaction term between unexpected earnings (UE) and the post-adoption variable ($ASC606$) is not significant. This means that the ERC does not change as a whole after the adoption of ASC 606.

We also examine whether ASC 606 disclosure has an effect on the change in the ERC surrounding the adoption. To do so, we split $ASC606$ into $1Q$ and $From2Q$ as we did in the analyst forecast tests (Section 6.1). If there is disclosure effect, we expect $1Q * UE$ and $From2Q * UE$ to be different, because the first ASC 606 disclosure comes after the first $post$ earnings announcement. However, in column (2), the coefficients are not significantly different from each other. This indicates that ASC 606 disclosures do not affect how the stock market interprets earnings.

6.4.2 Effect of Institutional Investors on ERC

Next, we test whether institutional investors have an effect on the change in the ERC surrounding

the adoption of ASC 606 using *PINST*, which represents the proportion of shares held by institutional investors.[24] We report the results in column (2) of Table 9. The main result of this column is that the coefficient of $ASC606 * UE * PINST$ is significantly positive. This means that higher institutional investor holdings lead to larger increases in the ERC when ASC 606 comes into effect. Also, $UE * PINST$ is significantly negative and the sum of $ASC606 * UE * PINST$ and $UE * PINST$ is significantly positive. They indicate that the ERC has increased for firms with high institutional holdings and has decreased for firms with low institutional holdings after the adoption.

6.4.3 Channel of Institutional Investor Effect on ERC

There are two potential explanations for this positive effect of institutional investors on the change in ERC: monitoring from institutional investors, and different interpretations and utilization of ASC 606 disclosures between institutional and retail investors. To shed light on what drives this result, we conduct two additional tests.

First, we separately estimate the institutional investor effect in the first quarter and the remaining quarters after the adoption, utilizing the fact that the first disclosure regarding ASC 606 becomes available after the first quarter earnings announcement. This result is shown in column (3) of Table 9. The institutional investor effect on ERC is significant and positive for both time periods (coefficients of *1Q*UE*PINST* and *From2Q*UE*PINST*), and the respective magnitudes of the effects are comparable and are not statistically different from each other. This suggests that institutional investor monitoring drives the result. If it had been derived from different types of investors (retail vs. institutional) interpreting earnings numbers or related disclosures differently, there would have been some differences between the first quarter effect and the second quarter and beyond effect, since the first ASC 606

[24] As a robustness test, we rerun the regression excluding outliers based on different cutoffs (e.g., greater than +2 times standard error and +3 times standard error). The results are similar.

disclosure is not yet available at the point of the first quarter earnings announcement.

Next, we examine whether the effect of ASC 606 on abnormal accruals is dependent upon institutional holdings. If institutional investor monitoring leads to the ERC results, stronger monitoring would also be manifested in abnormal accruals. The results are reported in Table 10. The setting is identical to that of Table 5, except that we additionally include *Inst* and its interaction with *ASC606*. We try different definitions of institutional holdings – percentage of institutional investors (*PINST*); binary variable with cutoff at median (*InstP50*); and binary variable with cutoff at 75% quantile (*InstP75*), both binary variables constructed based on values at the last quarter before the adoption. Regardless of the choice of institutional holdings measure, the coefficients *ASC606 * Inst* are negative and significant. This means that abnormal accruals increase less after the adoption of ASC 606 when there is a larger institutional investor pool, which is consistent with the monitoring story (Rajgopal and Venkatachalam, 2002; Mitra and Cready, 2005).

6.5 Long-term Effects of ASC 606

The results so far are based on data that span between 1 year (4 quarters) before and after the ASC 606 adoption. As additional tests, we revisit the tests above with a longer time horizon of the data. The results are reported in Table 11. Columns (1) and (2) show that earnings predictability, measured by absolute analyst forecast error and analyst forecast dispersion, has improved in the second year of the ASC 606 adoption, and the results are not statistically different from the pre-adoption period level, while column (3) shows that the discretionary accruals continue to remain heightened after the first year of the adoption. These results suggest that analysts become accustomed to the new standard and learn how to predict earnings as time passes. Column (4) shows that the institutional investor effect on the ERC disappears from the second year of the adoption, and column (5) shows that the institutional investor effect on discretionary accruals also disappears in the second year of the adoption, suggesting that institutional investors' attention toward ASC 606-related issues weakens as time passes. We do not

perform additional long-term tests for debt covenants, because most debt contracts are long-term in nature, and thus, the original regressions in Tables 6 through 8 cover time periods beyond the first year of the adoption.

6.6 Parallel Trend Assumption

The parallel trend is a crucial assumption in a difference-in-difference design. To validate this assumption, we examine differences in the pre-ASC 606 period in our outcome variables across the treatment and the control groups by replacing the $ASC606$ indicator with interaction terms between the treatment group indicator and the indicator for each pre-ASC 606 quarter, up to the fourth quarter before the adoption (excluding the first quarter before the adoption as a benchmark period) in the regressions. The OLS coefficient estimates are plotted in Figure 3. In all pre-ASC 606 quarters, the coefficient estimates are not significantly different from zero, which suggests that our assumption of parallel trend is not violated.

7. Conclusion

We examine the effect of ASC 606, which represents a transition from a rules-based to a principles-based accounting standard, with increased disclosure requirements regarding the nature, amount, timing, and uncertainty of revenue and cash flows arising from contracts with customers. In the main analyses, we specifically focus on earnings quality and the role of earnings in debt contracting. We find that the new standard decreases earnings predictability, which is shown as an increase in absolute analyst earnings forecast error/analyst forecast dispersion and increases in abnormal accruals. These results suggest that managers use the increased discretion from a principles-based standard arbitrarily and opportunistically. In addition, the use of earnings-based covenants decreases and the use of capital-based covenants increases in debt contracts, which suggests that the role of earnings in debt contracting diminishes as earnings become less predictable and easier to fabricate. In turn, capital-based covenants

are used with increasing frequency in debt contracting as a substitute. In terms of the stock market response, overall, the earnings response coefficient does not change after the adoption. However, the increase in the ERC when ASC 606 comes into effect is larger for firms with higher institutional holdings. We find that the result is consistent with the monitoring story that institutional investors' monitoring constrains the opportunistic use of discretion.

This study sheds light on the debate of rules-based vs. principles-based accounting standards by empirically examining a transition from rules-based to principles-based accounting standards through the adoption of ASC 606, which provides a setting to derive difference-in-difference estimates. It also helps practitioners, regulators, and market participants in understanding the effect of ASC 606 and the related disclosure requirements, as this is among the first studies that examines the new standard. We also add to the debt contracting literature by demonstrating how the use of earnings-based and capital-based covenants changes when a plausibly exogenous shock in earnings quality arises. Finally, we document that the effect of ASC 606 on earnings quality is dependent upon institutional investors, which may be of interest to regulators and standard-setters.

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Appendix A: Variable Definitions

$ASC606$	=1 if a quarter falls after ASC 606 adoption and the effect of ASC 606 is disclosed as material in the financial statement (ASC 606 has a material effect on a firm's financial statement)
$1Q$	=1 if a quarter falls in the first quarter after ASC 606 adoption and the effect of ASC 606 is disclosed as material in the financial statement (ASC 606 has a material effect on a firm's financial statement)
$From2Q$	=1 if a quarter falls in the second quarter and beyond after ASC 606 adoption and the effect of ASC 606 is disclosed as material in the financial statement (ASC 606 has a material effect on a firm's financial statement)

Analyst Forecast Error Test

$\|ForecastErr\|$	Absolute value of actual earnings minus the last consensus analyst forecast before the earnings announcement
$ABSM$	Natural log of the absolute value of the mean analyst forecasts
$NUMANALYST$	Natural log of the number of analysts following a firm
PRE_FQE	= 1 if the latest analyst forecast before earnings announcement is before fiscal quarter end
$Loss$	=1 if EPS is negative
$Size$	Natural log of market value of equity
BTM	Book equity / market equity
RD	=1 if the company reports research and development expenses
$SDRES$	Standard deviation of the residual from the market model that estimated $Beta$
$VAREPS$	Variance of the past eight quarters' earnings per share calculated in a rolling window
RET	Stock return over the current fiscal quarter
STD_RET	Standard deviation of the firm's monthly stock returns over the previous 12 months
$NUMSEG$	Natural log of the number of reported business segments in the Compustat segment file for prior fiscal year
$MFCOUNT$	Natural log of the number of management earnings forecasts issued in the past year
$PINST$	Shares held by institutions / Total shares outstanding from the most recent 13-Fs

Analyst Forecast Dispersion Test

$ForecastDisp$	Natural log of the standard deviation of the last consensus analyst forecast before the earnings announcement
$ABSM$	Natural log of the absolute value of the mean analyst forecasts
$NUMANALYST$	Natural log of the number of analysts following a firm
$Loss$	=1 if EPS is negative
$Size$	Natural log of market value of equity
BTM	Book equity to market equity
RD	=1 if the company reports a research and development expense
DE	Debt to equity ratio
SA	Sales divided by total assets
ΔEPS	Current quarter EPS minus EPS four quarters ago (deseasonalized)
$VAREPS$	Variance of the past eight quarters' earnings per share calculated in a rolling window
$Beta$	Beta calculated using a market model, based on monthly returns over the past 36 to 60 months before the quarterly earnings announcement

$SDRES$	Standard deviation of the residual from the market model that estimated $Beta$
$MOMENT$	Cumulative monthly return calculated over the (-12, -2) window before the quarterly earnings announcement
$TURN$	Mean daily turnover measured over the past 250 days, lagged one month, before the quarterly earnings announcement (turnover is calculated as volume divided by shares outstanding)
$LOGP$	Natural log of stock price

Abnormal Accruals Test

WCA	Working capital accruals calculated by the following formula **(Source)**: $(\Delta Current\ Assets - \Delta Cash) - (\Delta Current\ Liabilites - \Delta Current\ portion\ of Debt)/Total\ Assets$
$\Delta Cash\_Sales$	$(\Delta Revenue - \Delta Receivable)/Total\ Assets$
PPE	$(Property, plant, and\ equipment\ (Gross))/Total\ Assets$
ROA	Net income divided by total assets

Debt Covenant Test

$EarnCovNum$	Number of earnings-based covenants in a loan package
$EarnCovBinary$	=1 if a loan package contains at least one covenant based on earnings
$CapCovNum$	Number of capital-based covenants (formulated in terms of balance sheet information only) in a package
$CapCovBinary$	=1 if a loan package contains at least one covenant solely based on balance sheet information
$EarnCovRatio$	$EarnCovNum/(EarnCovNum + CapCovNum)$
$EarnTotalRatio$	$EarnCovNum$ divided by total number of covenants in a loan package
$CapTotalRatio$	$EarnCovNum$ divided by total number of covenants in a loan package
$EarnVol$	Standard deviation of earnings before extraordinary items divided by average assets in the past five years
$NegEarn$	=1 if operating income before depreciation is negative for the past four quarters
$OROA$	Operating income before depreciation for the past four quarters divided by average total assets
$AssetMTB$	Market value of equity minus common equity plus total assets divided by total assets
$Maturity$	Weighted average of maturities in a package (in months)
$Materiality$	Amount of debt issued divided by total assets
$PerfPr$	=1 if a debt package includes a performance pricing clause
$Leverage$	Total debt to total market equity
$Zscore$	Altman Z-score (1968)

ERC Test

UR	Cumulative abnormal return in the three-day window around the earnings announcement, with daily abnormal return calculated as the firm's return less the CRSP value-weighted market return
UE	Actual earnings minus the last consensus analyst forecast before the earnings announcement, scaled by price at the end of a fiscal quarter
$PINST$	Shares held by institutions / Total shares outstanding from the most recent 13-Fs
$NONLINEAR$	$UE * \|UE\|$
MTB	Market equity / book equity
$Beta$	Beta calculated using a market model, based on daily returns over the past year (excluding two days before the quarterly earnings announcement)

$Size$	Natural log of market value of equity
$Loss$	=1 if EPS is negative
$Predict$	Earnings predictability, which is the variance of the absolute value of unexpected earnings over the two-year period prior to the earnings announcement, where unexpected earnings are based on a seasonal random walk
$Persist$	Earnings persistence (autoregressive coefficient from Foster's (1977) model estimated over the two-year period prior to the earnings announcement)
$Q4$	=1 if the earnings announcement is for 4th quarter of the fiscal year

Appendix B: Summary Statistics

This table represents the summary statistics of the variables used in the analysis. The definitions of the variables are available in Appendix A.

Panel A: Samples for Absolute Analyst Forecast Error Test (*N = 15,578*)

Variable	Mean	Median	Std. Dev.	25th	75th
$\lvert ForecastErr \rvert$	0.111	0.050	0.255	0.020	0.120
$ASC606$	0.287	0.000	0.452	0.000	1.000
$ABSM$	-0.846	-0.715	1.094	-1.519	-0.074
$NUMANALYST$	2.007	2.079	0.813	1.386	2.639
PRE_FQE	0.061	0.000	0.240	0.000	0.000
$Loss$	0.141	0.000	0.348	0.000	0.000
$Size$	21.84	21.71	1.598	20.69	22.88
BTM	0.432	0.379	0.678	0.190	0.622
RD	0.488	0.000	0.150	0.000	1.000
$SDRES$	0.071	0.061	0.072	0.042	0.090
$VAREPS$	0.289	0.022	4.947	0.006	0.077
RET	1.013	1.011	1.951	0.910	1.108
STD_RET	0.090	0.078	0.050	0.057	0.110
$NUMSEG$	0.965	0.693	0.632	0.693	1.609
$MFCOUNT$	1.368	1.609	0.707	1.099	1.792
$PINST$	0.743	0.777	0.236	0.650	0.888

Panel B: Samples for Analyst Forecast Dispersion Test (*N = 11,565*)

Variable	Mean	Median	Std. Dev.	25th	75th
$ForecastDisp$	-3.382	-3.414	0.965	-4.351	-2.766
$ASC606$	0.316	0.000	0.465	0.000	1.000
$ABSM$	-0.772	-0.633	1.074	-1.424	-0.019
$NUMANALYST$	2.104	2.197	0.734	1.609	2.708
$Loss$	0.156	0.000	0.363	0.000	0.000
$Size$	21.88	21.74	1.652	20.70	22.99
BTM	0.373	0.325	1.266	0.167	0.530
RD	0.528	1.000	0.499	0.000	1.000
DE	0.737	0.350	4.426	0.159	0.710
SA	0.232	0.188	0.178	0.114	0.304
ΔEPS	-0.006	0.002	0.723	-0.001	0.004
$VAREPS$	0.189	0.024	1.877	0.007	0.081
$Beta$	1.120	1.070	1.045	0.657	1.520
$SDRES$	0.086	0.071	0.081	0.051	0.102
$MOMENT$	1.179	1.128	0.449	0.936	1.338
$TURN$	0.215	0.169	0.166	0.118	0.254
$LOGP$	3.619	3.731	1.049	2.979	4.339

Panel C: Samples for Abnormal Accruals Test (*N = 11,154*)

Variable	Mean	Median	Std. Dev.	25th	75th
WCA	0.001	-0.000	0.052	-0.012	0.012
$ASC606$	0.290	0.000	0.454	0.000	1.000
$\Delta Cash\_Sales$	0.002	0.001	0.056	-0.008	0.012
PPE	0.579	0.405	0.610	0.178	0.865
ROA	0.000	0.009	0.066	-0.006	0.022

Panel D: Samples for Debt Covenant Test (*N=1,068*)

Variable	Mean	Median	Std. Dev.	25th	75th
$EarnCovNum$	1.542	2.000	0.712	1.000	2.000
$EarnCovBinary$	0.923	1.000	0.256	1.000	1.000
$CapCovNum$	0.140	0.000	0.350	0.000	0.000
$CapCovBinary$	0.139	0.000	0.347	0.000	0.000
$EarnCovRatio$	0.899	1.000	0.270	1.000	1.000
$EarnTotalRatio$	0.879	1.000	0.280	1.000	1.000
$CapTotalRatio$	0.100	0.000	0.267	0.000	0.000
$ASC606$	0.306	0.000	0.461	0.000	1.000
$EarnVol$	0.018	0.011	0.028	0.006	0.021
$NegEarn$	0.001	0.000	0.031	0.000	0.000
$OROA$	0.138	0.127	0.084	0.097	0.167
$AssetMTB$	2.122	1.722	1.372	1.292	2.507
$Maturity\ (in\ months)$	56.39	60.00	13.79	60.00	60.00
$Materiality$	0.291	0.206	0.280	0.099	0.399
$PerfPr$	0.219	0.000	0.414	0.000	0.000
$Leverage$	3.457	0.445	63.13	0.252	0.836
$Zscore$	2.831	2.167	3.249	1.259	3.600

Panel E: Samples for ERC Test (*N=16,275*)

Variable	Mean	Median	Std. Dev.	25th	75th
UR	1.001	1.001	0.088	0.961	1.042
$ASC606$	0.280	0.000	0.449	0.000	1.000
UE	-0.005	0.001	0.578	-0.000	0.002
$PINST$	0.728	0.761	0.234	0.623	0.878
MTB	2.495	2.326	130.42	1.438	4.346
$Beta$	1.088	1.032	0.469	0.771	1.356
$Size$	21.72	21.60	1.619	20.54	22.75
$Loss$	0.150	0.000	0.357	0.000	0.000
$Predict$	0.262	0.009	5.180	0.002	0.031
$Persist$	0.012	-0.000	0.289	-0.187	0.209
$Q4$	0.251	0.000	0.434	0.000	0.000

Table 1. Descriptive Statistics

This table presents the descriptive statistics for our sample. Panel A compares the descriptive statistics for selective variables that capture firm characteristics between the treatment and the control groups. All variables except *Cum. Eff to RE* (cumulative effects to retained earnings) are from the last 10-Q report before the adoption of ASC 606. *Cum. Eff to RE* is the disclosed amount divided by the common equity from the first 10-Q report after the adoption of ASC 606. The treatment group consists of firms that disclosed a material impact from the adoption of ASC 606 in their financial statements. The control group consists of firms that are not materially affected by ASC 606. Panel B shows the top five industry distribution of the firms in the treatment group based on Fama-French's 49 industry classification. The definitions of the variables are available in Appendix A.

Panel A: Descriptive Statistics

	Treatment Group (N=1,505)			Control Group (N=1,371)		
	Mean	Stdev	Median	Mean	Stdev	Median
$\log(Asset)$	21.58	1.78	21.46	21.46	1.76	21.46
BTM	0.36	1.15	0.33	0.53	0.50	0.48
$\log(Revenue)$	19.50	2.26	19.63	18.61	3.62	19.22
$\log(Sale)$	19.47	2.25	19.58	18.47	3.35	18.89
$\log(Receivables)$	18.82	3.02	19.04	18.82	3.76	19.24
Cum. Eff. to RE	2.01	17.52	0.0	0.00	0.06	0.00

Panel B: Industry Distribution of Treatment Group (Top 5)

Industry	Number	Percentage
Computer Software	183	12%
Pharmaceutical Products	115	8%
Trading	113	8%
Retail	90	6%
Electronic Equipment	80	5%

Table 2. Breakdown of Simplified Difference-in-Difference

This table presents simplified difference-in-difference estimates comparing the changes between the pre and post periods for the treatment and the control groups. The treatment group consists of firms that disclosed a material impact from the adoption of ASC 606 in their financial statements. The control group consists of firms that are not materially affected by ASC 606. Panel A compares Post-Pre changes across the groups for our main variables of interest using a simplified regression model that includes $POST * TREATED$ interaction term and associated main effects. Firm- and year-quarter fixed effects are also included. $POST$ is an indicator variable that takes one for periods after the adoption of ASC 606, and $TREATED$ is an indicator variable for firms in our treatment group. Panel B shows the comparison of pre- and post-10-K texts. The definitions of the variables are available in Appendix A. Firm-clustered standard errors are displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Panel A: Main Variables of Interest

	Treatment Group (Post-Pre)	Control Group (Post-Pre)	Difference between Groups
$\lvert ForecastErr \rvert$	0.0103	-0.0014	0.0117*
	(0.0080)	(0.0078)	(0.0060)
$ForecastDisp$	0.1320***	0.0819**	0.0501*
	(0.0034)	(0.0380)	(0.0261)
$AbAcc$	0.0338***	0.0301***	0.0037**
	(0.0057)	(0.0052)	(0.0014)
$EarnCov\_Num$	-0.1537*	-0.0410	-0.1127***
	(0.0806)	(0.0752)	(0.0382)
$CapCov\_Num$	0.0419	0.0039	0.0380*
	(0.309)	(0.0346)	(0.0217)

Panel B: Textual Analysis

	Treatment Group (N=1,502)	Control Group (N=1,322)	Difference between Groups
Change (Post-Pre) in # of words scaled by total # of words in pre-10-K	0.187***	0.132***	0.055**
			(0.067)
# of newly added sentences (Post, compared with Pre) scaled by total # of sentences in the pre-10-K	0.274***	0.233***	0.041**
			(0.011)
Ratio of newly added sentences (Post, compared with Pre) that include ASC 606 disclosure-related key words	0.061***	0.035***	0.026***
			(0.000)

Table 3. Absolute Analyst Forecast Error

This table presents the results of OLS regression that examines the effect of ASC 606 on absolute analyst forecast error. The dependent variable is $|ForecastErr|$, which is the absolute value of actual earnings minus the last median consensus analyst forecast before the earnings announcement. Column (1) is a baseline regression that includes only $ASC606$, and column (2) includes the entire set of controls, along with fiscal quarter indicators. Column (3) estimates the effect of the first quarter and from second quarter after the ASC 606 adoption separately, which is an extension of column (2). In all columns, we control for firm- and year*quarter-fixed effects. The definitions of the variables are available in Appendix A. Firm-clustered standard errors are displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Dependent Var.	$\|ForecastErr\|$		
Independent Var.	(1)	(2)	(3)
$\boldsymbol{ASC606}$	**0.0114****	**0.0132****	
	(0.0056)	**(0.0059)**	
$\boldsymbol{1Q}$ $(\boldsymbol{a})$			**0.0167****
			(0.0083)
$\boldsymbol{From2Q}$ $(\boldsymbol{b})$			**0.0119***
			(0.0065)
$ABSM$		0.0049	0.0049
		(0.0072)	(0.0071)
$NUMANALYST$		-0.0451***	-0.0451***
		(0.0127)	(0.0127)
PRE		0.0125	0.0125
		(0.0081)	(0.0081)
$Loss$		0.0571***	0.0570***
		(0.0203)	(0.0203)
$Size$		-0.0037	-0.0036
		(0.0116)	(0.0116)
BTM		0.0044	0.0044
		(0.009)	(0.0099)
RD		-0.0159	-0.0016
		(0.0098)	(0.0098)
$SDRES$		-0.0012	-0.0012
		(0.0645)	(0.0645)
$VAREPS$		0.0107	0.0107
		(0.0080)	(0.0080)
RET		-0.0242**	-0.0243**
		(0.0123)	(0.0123)
STD_RET		0.1154	0.1160
		(0.0828)	(0. 0828)
$NUMSEG$		0.0291**	0.0293**
		(0.0137)	(0.0137)
$MFCOUNT$		0.0003	0.0002
		(0.0056)	(0.0056)
$PINST$		-0.0032	-0.0030
		(0.0217)	(0.0217)
$(b)-(a)=0$			-0.0048

$(P\ value)$			(0.5864)
Fiscal Quarter Indicator	NO	YES	YES
Firm-fixed effect	YES	YES	YES
Year*Quarter-fixed effect	YES	YES	YES
Observations	15,567	15,567	15,567
Adjusted R-Squared	0.3339	0.3472	0.3472

Table 4. Analyst Forecast Dispersion

This table presents the results of OLS regression that examines the effect of ASC 606 on analyst forecast dispersion. The dependent variable is $ForecastDisp$, which is the natural log of the standard deviation of the last consensus analyst forecasts before the earnings announcement. Column (1) is a baseline regression that includes only $ASC606$, and column (2) includes the entire set of controls, along with fiscal quarter indicators. Column (3) separately estimates the effect for the first quarter and from the second quarter after the ASC 606 adoption, which is an extension of column (2). In all columns, we control for firm- and year*quarter-fixed effects. The definitions of the variables are available in Appendix A. Firm-clustered standard errors are displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Dependent Var. / Independent Var.	$ForecastDisp$		
	(1)	(2)	(3)
$\boldsymbol{ASC606}$	**0.0721*** **	**0.0511** **	
	(0.0231)	**(0.0260)**	
$\boldsymbol{1Q}$ $(\boldsymbol{a})$			**0.0422**
			(0.0342)
$\boldsymbol{From2Q}$ $(\boldsymbol{b})$			**0.0543** **
			(0.0274)
$ABSM$		0.1094***	0.1094***
		(0.0153)	(0.0153)
$NUMANALYST$		0.2242***	0.2241***
		(0.0446)	(0.0446)
$Loss$		0.0703**	0.0703**
		(0.0336)	(0.0336)
$Size$		0.3038***	0.3035***
		(0.1163)	(0.1163)
BTM		0.0473***	0.0473***
		(0.0204)	(0.0204)
RD		-0.0371	-0.0368
		(0.0353)	(0.0353)
DE		0.0164**	0.0164**
		(0.0077)	(0.0078)
SA		0.1866	0.1863
		(0.2158)	(0.2159)
ΔEPS		-0.0133	-0.0133
		(0.0266)	(0.0266)
$VAREPS$		-0.0004	-0.0004
		(0.0051)	(0.0051)
$Beta$		0.0096	0.0095
		(0.0134)	(0.0134)
$SDRES$		-0.4574	-0.4557
		(0.3423)	(0.3425)
$MOMENT$		0.0103	0.0103
		(0.0191)	(0.0191)
$Turnover$		0.1598	0.1596
		(0.1742)	(0.1742)
$LOGP$		-0.2370**	-0.2367**
		(0.1158)	(0.1157)

$(b)-(a)=0$ $(P\ value)$			0.0121 (0.6928)
Fiscal Quarter Indicator	NO	YES	YES
Firm-fixed effect	YES	YES	YES
Year*Quarter-fixed effect	YES	YES	YES
Observations	11,452	11,452	11,452
Adjusted R-Squared	0.6614	0.6673	0.6673

Table 5. Abnormal Accruals

This table presents the results of OLS regression that examines the effect of ASC 606 on abnormal accruals. The dependent variable, WCA, is noncash working capital accruals, which is equal to [(ΔCurrent Assets - ΔCash) - (ΔCurrent Liabilities - ΔCurrent portion of Debt)] divided by total assets. Controls, which are omitted for presentational brevity, include $\Delta Cash\_Sales$, PPE, and *ROA*. We estimate the regression with 1) industry- and year*quarter-fixed effects in columns (1) and (2), and 2) firm- and year*quarter-fixed effects in columns (3) and (4). Columns (1) and (3) are standard fixed-effect regressions, and in columns (2) and (4), to allow for greater flexibility in the regression, we interact each of our control variables with fixed effects. The definitions of the variables are available in Appendix A. Firm-clustered standard errors are displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Dependent Var. / Independent Var.	WCA			
	(1)	(2)	(3)	(4)
$ASC606$	**0.0036*** **	**0.0052*** **	**0.0080*** **	**0.0063** **
	(0.0010)	**(0.0011)**	**(0.0015)**	**(0.0027)**
Controls	YES	NO	YES	NO
Control*Industry, Control*Year*Quarter	NO	YES	NO	NO
Control*Firm, Control*Year*Quarter	NO	NO	NO	YES
Industry + Year*Quarter-fixed effect	YES	YES	NO	NO
Firm + Year*Quarter-fixed effect	NO	NO	YES	YES
Observations	11,151	11,151	11,076	11,076
Adjusted R-Squared	0.1304	0.3156	0.1120	0.4584

Table 6. Earnings-based Covenant

This table presents the results of OLS regression that examines the effect of ASC 606 on the usage of earnings-based covenants in debt contracts. The dependent variable is the number of earnings-based covenants ($EarnCovNum$) in columns (1) to (3) and is an indicator variable of whether a loan package includes at least one earnings-based covenant ($EarnCovBinary$) in columns (4) to (6). Columns (1) and (4) are baseline regressions that include only $ASC606$. Columns (2) and (5) include controls with industry-fixed effects, and columns (3) and (6) include controls with firm-fixed effects. In all columns, we control for year*quarter-fixed effects. The definitions of the variables are available in Appendix A. Firm-clustered standard errors are displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Dep. Var.	$EarnCovNum$			$EarnCovBinary$		
Indep. Var.	(1)	(2)	(3)	(4)	(5)	(6)
$ASC606$	**-0.1194*** **	**-0.1129***	**-0.1313*** **	**-0.0155***	**-0.0542** **	**-0.0163***
	(0.0391)	**(0.0665)**	**(0.0416)**	**(0.0093)**	**(0.0267)**	**(0.0098)**
$EarnVol$		-0.8180	-0.2407		0.4166	-0.3652
		(0.8971)	(1.6226)		(0.3849)	(0.2978)
$NegEarn$		-0.9052***			-0.5425***	
		(0.3241)			(0.1571)	
ROA		-0.6245	-0.2032		-0.0524	0.0439
		(0.3851)	(0.4579)		(0.1806)	(0.1039)
$AssetMTB$		0.0290	0.0202		0.0085	0.0084
		(0.0270)	(0.0184)		(0.0092)	(0.0059)
$Maturity$		0.0009	-0.0002		0.0020**	0.0005
		(0.0020)	(0.0019)		(0.0009)	(0.0006)
$Materiality$		0.3616***	-0.0636		0.0696***	-0.0744
		(0.1107)	(0.1335)		(0.0300)	(0.0559)
$PerfPr$		-0.1387**	-0.0134		-0.0576**	-0.0012
		(0.0607)	(0.0301)		(0.0235)	(0.0078)
$Leverage$		-0.0002	0.0000		0.0001	-0.0000
		(0.0002)	(0.0001)		(0.0001)	(0.0000)
$Zscore$		0.0071	-0.0001		0.0011	-0.0000
		(0.0087)	(0.0095)		(0.0015)	(0.0020)
Industry FE	NO	YES	NO	NO	YES	NO
Firm FE	YES	NO	YES	YES	NO	YES
Year*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	742	1,064	700	742	1,064	700
Adjusted R-Sq.	0.8608	0.1841	0.8563	0.8470	0.1529	0.8470

Table 7. Capital-based Covenant

This table presents the results of OLS regression that examines the effect of ASC 606 on the usage of capital-based covenants in debt contracts. The dependent variable is the number of capital-based covenants ($CapCovNum$) in columns (1) to (3) and is an indicator variable of whether a loan package includes at least one capital-based covenant ($CapCovBinary$) in columns (4) to (6). Columns (1) and (4) are baseline regressions that include only $ASC606$. Columns (2) and (5) include controls with industry-fixed effects, and columns (3) and (6) include controls with firm-fixed effects. In all columns, we control for year*quarter-fixed effects. The definitions of the variables are available in Appendix A. Firm-clustered standard errors are displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Dep. Var. / Indep. Var.	$CapCovNum$			$CapCovBinary$		
	(1)	(2)	(3)	(4)	(5)	(6)
$ASC606$	**0.0386***	**0.0684****	**0.0467****	**0.0352***	**0.0651****	**0.0427****
	(0.0198)	**(0.0335)**	**(0.0221)**	**(0.0195)**	**(0.0330)**	**(0.0217)**
$EarnVol$		0.5321	1.1350		0.5456	1.2258
		(0.3752)	(0.7947)		(0.3724)	(0.7811)
$NegEarn$		-0.8562***	-		-0.8448***	-
		(0.1933)			(0.1919)	
ROA		0.0537	0.0157		0.0636	0.0246
		(0.1935)	(0.1595)		(0.1927)	(0.1598)
$AssetMTB$		-0.0188*	-0.0136		-0.0187*	-0.0144*
		(0.0109)	(0.0093)		(0.0109)	(0.0090)
$Maturity$		-0.0024**	-0.0011		-0.0024**	-0.0010
		(0.0011)	(0.0011)		(0.0011)	(0.0011)
$Materiality$		-0.0409	0.0853		-0.0459	0.0774
		(0.0381)	(0.05602)		(0.0372)	(0.0597)
$PerfPr$		0.0449*	0.0140		0.0398	0.0042
		(0.0276)	(0.0150)		(0.0264)	(0.0119)
$Leverage$		-0.0001*	0.0000		-0.0151*	0.0000
		(0.0001)	(0.0000)		(0.0001)	(0.0000)
$Zscore$		-0.0005	0.0041		-0.0004	0.0047
		(0.0035)	(0.0057)		(0.0035)	(0.0056)
Industry FE	NO	YES	NO	NO	YES	NO
Firm FE	YES	NO	YES	YES	NO	YES
Year*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	742	1,064	700	742	1,064	700
Adjusted R-Sq.	0.0147	0.8404	0.8370	0.8444	0.2989	0.8406

Table 8. Earnings-based vs. Capital-based Covenants (Covenant Ratio)

This table presents the results of OLS regression that examines the effect of ASC 606 on the choice of earnings-based vs. capital-based covenants in debt contracts, using the proportion of each covenant employed. The dependent variable is *EarnCovRatio,* which is the ratio of earnings-based covenants to (earnings-based covenants + capital-based covenants) in columns (1) and (2), and *EarnTotalRatio* (*CapTotalRatio*) which is the ratio of earnings (capital)-based covenants to total number of covenants in a loan package in columns (3) and (4) ((5) and (6)). Odd-numbered columns ((1), (3), and (5)) are baseline regressions that do not include controls, and even-numbered columns ((2), (4), and (6)) are full regressions with controls. Controls are omitted for presentational brevity. In all columns, we control for year*quarter-fixed effects. The definitions of the variables are available in Appendix A. Firm-clustered standard errors are displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Dep. Var.	*EarnCovRatio*		*EarnTotalRatio*		*CapTotalRatio*	
Indep. Var.	(1)	(2)	(3)	(4)	(5)	(6)
ASC606	**-0.0254****	**-0.0291****	**-0.0319****	**-0.0363****	**0.0260****	**0.0295****
	(0.0127)	**(0.0139)**	**(0.0158)**	**(0.0170)**	**(0.0127)**	**(0.0139)**
Controls	NO	YES	NO	YES	NO	YES
Firm-fixed effects	YES	YES	YES	YES	YES	YES
Year*Quarter-FE	YES	YES	YES	YES	YES	YES
Observations	740	698	742	700	742	700
Adjusted R-Sq.	0.8459	0.8442	0.8534	0.8509	0.8668	0.8656

Table 9. ERC

This table presents the results of OLS regression that examines the effect of ASC 606 on ERC. Columns (1) and (2) are the baseline regressions, and columns (3) and (4) examine whether institutional investors influence the effect of ASC 606 on ERC, using a variable that captures the percentage of institutional investor ($PINST$). Columns (2) and (4) separately estimate the effects of ASC 606 for the first quarter ($1Q$) and from the second quarter after the adoption ($From2Q$). Controls are omitted for presentational brevity. In all columns, we control for firm- and year*quarter-fixed effects. The definitions of the variables are available in Appendix A. Firm-clustered standard errors are displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Dependent Var. / Independent Var.	UR			
	(1)	(2)	(3)	(4)
$\boldsymbol{ASC606 * UE}$ **(a)**	**-0.0790**		**-1.1858****	
	(0.2195)		**(0.5679)**	
$\boldsymbol{ASC606 * UE * PINST}$ **(b)**			**2.1756****	
			(0.9715)	
$\boldsymbol{1Q * UE}$ **(c)**		**-0.0773**		**-1.2970****
		(0.1883)		**(0.5156)**
$\boldsymbol{1Q * UE * PINST}$ **(d)**				**2.1858****
				(0.9144)
$\boldsymbol{From2Q * UE}$ **(e)**		**-0.0802**		**-1.1868***
		(0.2854)		**(0.6366)**
$\boldsymbol{From2Q * UE * PINST}$ **(f)**				**2.3006****
				(1.1474)
$(a) + (b) = 0$			0.9898**	
$(P\ value)$			(0.0406)	
$(e) - (c) = 0$		-0.0029		
$(P\ value)$		(0.9915)		
$(f) - (d) = 0$				0.1175
$(P\ value)$				(0.9221)
Controls	YES	YES	YES	YES
UE*Controls	YES	YES	YES	YES
Firm-fixed effect	YES	YES	YES	YES
Year*Quarter-fixed effect	YES	YES	YES	YES
Observations	16,270	16,270	16,270	16,270
Adjusted R-Squared	0.0886	0.0885	0.0918	0.0917

Table 10. Effect of Institutional Holdings on Abnormal Accruals

This table presents the results of OLS regression that examines whether the effect of ASC 606 on abnormal accruals is dependent upon institutional holdings. The dependent variable, WCA, is noncash working capital accruals, which is equal to [(ΔCurrent Assets - ΔCash) - (ΔCurrent Liabilities - ΔCurrent portion of Debt)] divided by total assets. $Inst$ is one of the following variables: percentage of institutional investors ($PINST$); binary variable with cutoff at median ($InstP50$); and binary variable with cutoff at 75% quantile ($InstP75$), both binary variables constructed based on values at the last quarter before the adoption. Controls, which are omitted for presentational brevity, include $\Delta Cash\_Sales$, PPE, and *ROA*. Odd-numbered columns ((1), (3), and (5)) include industry-fixed effects, and even-numbered columns ((2), (4), and (6)) include firm-fixed effects. In all columns, we control for year*quarter-fixed effects. All variables are defined in Appendix A. Firm-clustered standard errors are in parentheses. *** indicates significance at 1%, ** at 5%, and * at 10%.

Dep. Var. / Indep. Var.	WCA					
	(1)	(2)	(3)	(4)	(5)	(6)
Partition by	Continuous variable ($PINST$)		Binary based on median ($InstP50$)		Binary based on 75% quantile ($InstP75$)	
$\boldsymbol{ASC606 * Inst}$	**-0.0101****	**-0.0141****	**-0.0030***	**-0.0044****	**-0.0047****	**-0.0064*****
	(0.0044)	**(0.0056)**	**(0.0018)**	**(0.0019)**	**(0.0016)**	**(0.0019)**
$\boldsymbol{ASC606}$	0.0104***	0.0174***	0.0054***	0.0104***	0.0050***	0.0097***
	(0.0032)	(0.0041)	(0.0014)	(0.0017)	(0.0012)	(0.0017)
$Inst$	-0.0006	-0.0143*	-0.0006	-	-0.0009	-
	(0.0017)	(0.0077)	(0.0009)		(0.0009)	
Controls	YES	YES	YES	YES	YES	YES
Industry FE	YES	NO	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES	NO	YES
Year*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	11,142	11,073	11,142	11,073	11,142	11,073
Adjusted R-Sq.	0.1310	0.1137	0.1305	0.1123	0.1308	0.1125

Table 11. Long-term Effects

This table presents the long-term effects of ASC 606. Each column is an extension of Tables 3, 4, 5, 9, and 10, respectively. The *ASC606* variable is substituted by *1stYr* (first year of the adoption), and *2ndYr* (second year of the adoption) to examine the effect of ASC 606 beyond the first year of the adoption. All variables are defined in Appendix A. Firm-clustered standard errors are in parentheses. *** indicates significance at 1%, ** at 5%, and * at 10%.

Dep. Var. / Indep. Var.	$\lvert ForecastErr \rvert$	$ForecastDisp$	WCA	UR	WCA
	(1)	(2)	(3)	(4)	(5)
$\mathbf{1stYr}$	**0.0130*** **	**0.0404** **	**0.0038*** **		**0.0097** **
	(0.0049)	**(0.0201)**	**(0.0012)**		**(0.0034)**
$\mathbf{2ndYr}$	**0.0023**	**0.0341**	**0.0068*** **		**0.0076*** **
	(0.0079)	**(0.0255)**	**(0.0015)**		**(0.0023)**
$\mathbf{1stYr} * \mathbf{UE} * \mathbf{PINST}$				**1.6709** **	
				(0.7923)	
$\mathbf{2ndYr} * \mathbf{UE} * \mathbf{PINST}$				**0.4392**	
				(0.5629)	
$\mathbf{1stYr} * \mathbf{PINST}$					**-0.0091***
					(0.0051)
$\mathbf{2ndYr} * \mathbf{PINST}$					**-0.0014**
					(0.0032)
$\mathbf{1stYr - 2ndYr = 0}$					**0.0021**
$(P\ value)$					**(0.5529)**
$(\mathbf{Yr2 + Yr2} * \mathbf{PINST}) -$					**0.0056*** **
$(\mathbf{Yr1 + Yr1} * \mathbf{PINST}) = \mathbf{0}$					**(0.0048)**
$(P\ value)$					
Controls	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES
Year*Quarter FE	YES	YES	YES	YES	YES
Observations	30,220	22,709	21,681	31,260	21,681
Adjusted R-Sq.	0.2986	0.6505	0.0994	0.0644	0.0995

Figure 1. Top 25 Increased Words in Post-ASC 606 10-Ks

This figure presents the list of top 25 words that increased most in frequency in the post-ASC 606 10-Ks compared to the pre-ASC 606 10-Ks (company-level pairwise comparison). The treatment group consists of firms that disclosed a material impact from the adoption of ASC 606 in their financial statements. The treatment group consists of firms that are not materially affected by ASC 606.

Treatment Group		Control Group	
Rank	Word	Rank	Word
1	Company	1	FASB
2	Contract	2	US
3	Revenue	3	GAAP
4	GAAP	4	Type
5	Service	5	Name
6	Performance	6	Company
7	Note	7	Balance
8	Participant	8	Customer
9	Trustee	9	Contract
10	Indenture	10	Topic
11	Executive	11	ASC
12	Plan	12	Data
13	Class	13	Standard
14	Control	14	Period
15	Obligation	15	Revenue
16	Series	16	Role
17	Product	17	Accounting
18	Recognize	18	Codification
19	Adoption	19	Publisher
20	Transfer	20	Obligation
21	Employment	21	Credit
22	Bond	22	Agent
23	Lease	23	Asset
24	Trust	24	Financial
25	Consideration	25	Paragraph

Figure 2. Textual Description of ASC 606 Disclosure

The figures below present the word clouds for the top 35 words that increased most in terms of frequency of use in the post-ASC 606 10-Ks compared to the pre-10-Ks (company-level pairwise comparison). Panel A represents the words from the treatment group, which includes firms that disclosed a material impact from the adoption of ASC 606 in their financial statements, and Panel B represents the words from the control group.

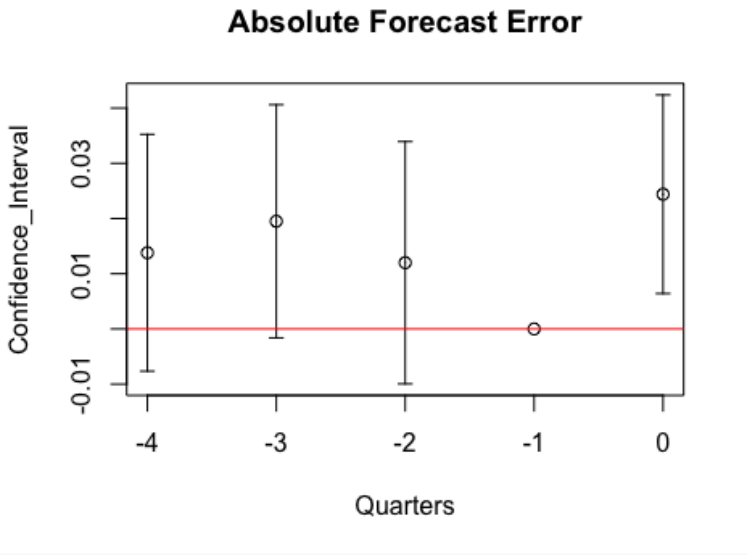
Panel A: Treatment group

Panel B: Control group

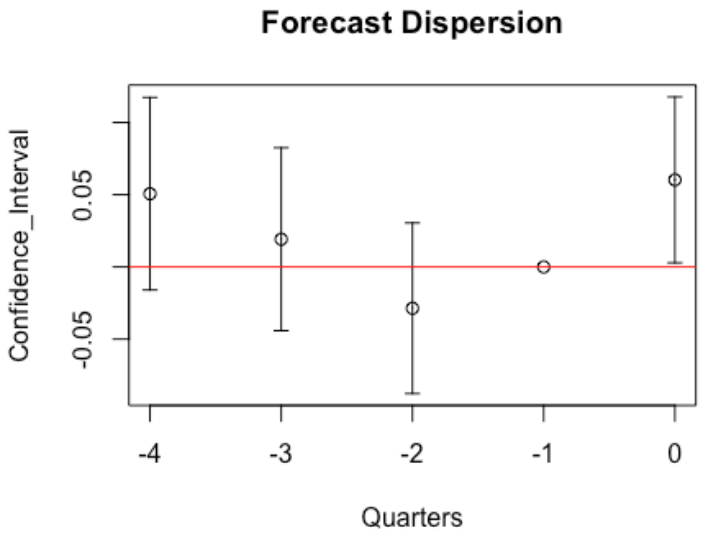
Figure 3. Counter-factual Treatment Effect in Pre-ASC 606 Adoption

The figures plot the OLS coefficient estimates with two-tailed 90% confidence intervals based on firm-clustered standard errors, beginning in the fourth quarter before ASC 606 adoption. We estimate coefficients and confidence intervals by including interaction terms between the treatment group indicator and the indicator for each pre-ASC 606 quarter up to the fourth quarter before the adoption of ASC 606 (excluding the first quarter before the adoption as a benchmark period) in the regressions.

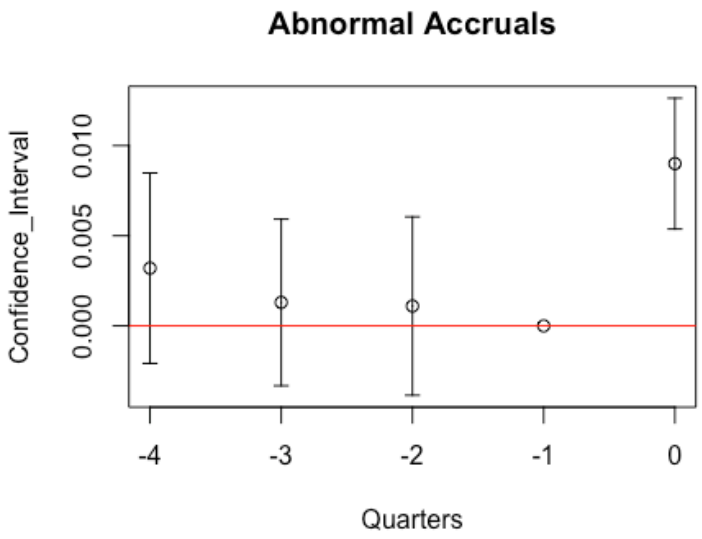
Panel A: Absolute Forecast Error



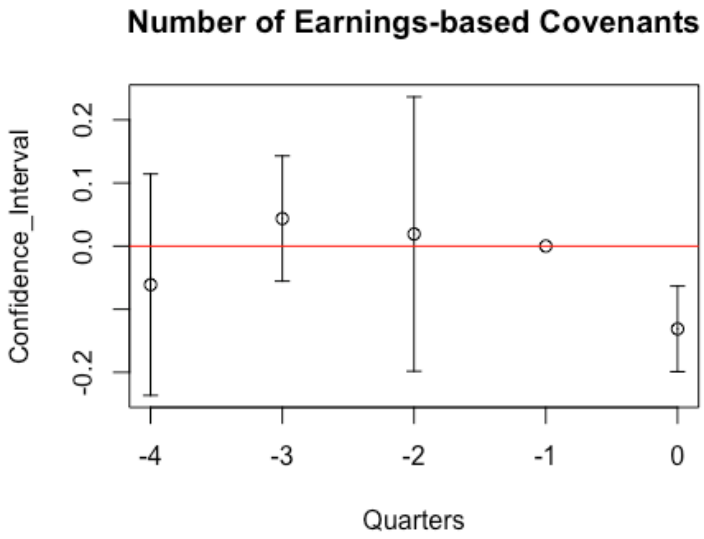
Panel B: Forecast Dispersion



Panel C: Abnormal Accruals



Panel D: Number of Earnings-based Covenants



Panel E: Number of Capital-based Covenants