The tradeoff between relevance and comparability in segment reporting

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ABSTRACT

The rule change for segment reporting in 1998 has arguably made segment reporting more relevant through the adoption of the management approach. Meanwhile, the management approach has resulted in a decrease in the comparability of segment income. We introduce firm-specific measures of changes in relevance and comparability due to the rule change. Our treatment firms experienced an increase in the relevance of segment reporting but a large decrease in the comparability of segment income; our benchmark firms barely experienced any changes in relevance and comparability. We examine earnings forecasts before vs. after the rule change issued by financial analysts—a major user group of segment reporting. Relative to benchmark firms, treatment firms’ analyst forecast error reductions around the segment disclosure event are not significantly different after the rule change than before the rule change, but treatment firms’ forecast dispersion reductions around the segment disclosure event are significantly larger after the rule change than before the rule change. These results suggest that despite the decrease in comparability, the new segment reporting rule has increased the decision usefulness of segment information by decreasing disagreement among analysts.

1. Introduction

Under the Conceptual Framework, relevance and comparability are desirable properties of financial reporting (FASB, 1980, 2010). Relevance is defined as the capacity of information to make a difference in the decisions made by users. Comparability is defined as the quality of information that enables users to identify and understand similarities in, and differences among, firms through financial reporting. The standard setters acknowledge that relevance and comparability may not be achievable in all cases, so a tradeoff between the two might need to be made sometimes (FASB, 1980, para. 42). The change of segment reporting rules in 1998 is an example of such a tradeoff. In this study we examine the implications of this tradeoff to a major group of users of financial reporting—financial analysts.

In June 1997, the Financial Accounting Standard Board (FASB) issued SFAS 131 “Disclosures about segments of an enterprise and related information” to replace SFAS 14 “Financial reporting for segments of a business enterprise.” The new rule uses the management approach, which allows users to see segment data through the eyes of management. This approach may help users better...
predict managers' decisions (e.g., business expansions or contractions) that can significantly affect a firm's operations (Herrmann & Thomas, 1997). The approach may also enhance the feedback value of segment data to investors because the information would align with managers' discussion and analysis in other sections of the financial report or outside of the report (e.g., corporate website and press releases). Thus, the new rule is expected to increase the relevance of segment reporting. On the other hand, the comparability of segment income measures across firms that have segments in the same industry is expected to decrease because the management approach allows firms to report whichever income measures they use for internal reporting and evaluations. In contrast, SFAS 14 required firms to provide segment "operating profit or loss" and explicitly defined this measure. Thus, critics argue that the new rule increases the relevance of segment reporting at the cost of comparability (Berger & Hann, 2003; Herrmann & Thomas, 1997).

The overall effects of increased relevance but decreased comparability in segment reporting are unclear ex ante. On the one hand, the U.S. standard setters consider relevance a primary desired property of financial reporting and comparability secondary. Thus, in case of a conflict, prioritizing relevance over comparability seems reasonable. On the other hand, a decrease in comparability may have a larger negative effect than what the U.S. standard setters had anticipated for three reasons. First, the view that relevance dominates comparability is not universally accepted. In fact, the conceptual framework established in 1989 by the predecessor of the International Accounting Standards Board (IASB) considered comparability as important as relevance (FASB, 1997, para. BC3.32). Second, a major purpose of financial reporting is to provide investors with information so that they can decide which firm to invest in. To serve this purpose, financial reporting must be comparable. Concerns about a potential decrease in the comparability of segment income were widely expressed around the time of the rule change (Deppe & Omer, 2000; Herrmann & Thomas, 1997). Last, the past 15 years have seen increased academic interest in the comparability of financial reporting. In hindsight, comparability might have deserved more attention when SFAS 131 was passed. We re-examine the segment reporting rule change by explicitly taking comparability into consideration.

Even though the rule change occurred 20 years ago, the issue is still relevant today for three reasons. First, SFAS 131 is the first accounting standard that uses the management approach. The tradeoff between relevance and comparability is a direct outcome of the management approach. Our evidence may be useful to standard setters when they consider the management approach for other accounting issues. Second, the IASB issued a similar standard for segment reporting, IFRS 8 “Operating Segments,” for fiscal years beginning on or after 2009. Inferences about the tradeoff between relevance and comparability based on data obtained from the U.S. may shed light on the consequences of IFRS 8, the examination of which would require effective controls for cross-country institutional differences. Last, the FASB added a project on segment reporting to its technical agenda in September 2017 and just issued a media release in June 2019, calling for participation in its deliberations of whether targeted improvements to segment reporting are needed to provide investors with more decision-useful information.

We examine the tradeoff between relevance and comparability in segment reporting from the perspective of financial analysts. Analysts are a major user group of financial reporting and provide information to other market participants. In predicting a firm's overall earnings growth, analysts use segment data to separate a firm's divisions that have greater growth opportunities from the other divisions. In assessing a firm's overall risk, analysts use segment data to identify the divisions that have greater volatility. High-quality segment data are expected to improve the accuracy of analysts' earnings forecasts for a firm as a whole and help them assess investment risk (Pacter, 1993). Thus, examining analyst forecasts before vs. after the segment reporting rule change provides useful feedback on the relevance vs. comparability tradeoff in segment reporting.

Ex ante, analysts are expected to benefit from the segment reporting rule change. As Pacter (1993) states, "Few financial reporting issues have captured the attention and involvement of the financial analyst community as much as segment reporting." Analysts were the loudest voice in the debate on segment reporting in the 1980s and 1990s. They were a main source of criticism of SFAS 14 and later pushed for the management approach in SFAS 131 (FASB, 1997, para. 44, 58, and 59; Pacter, 1993). Thus, analysts were expected to benefit from the rule change (Botosan & Stanford, 2005).

The management approach, however, may negatively affect analysts' information production. A key task of analysts is to understand industry trends and distinguish the component of a firm's performance attributable to market/industry factors from the component attributable to the firm's own actions. Comparability of financial reporting is crucial for analysts in performing this task. A lack of comparability of segment income may erode the benefits that analysts can reap from accessing segment information that managers use internally.

We measure the change in segment reporting relevance by comparing the segments reported before SFAS 131 ("pre-period") and after SFAS 131 ("post-period"). If a firm reports a segment in the post-period that does not appear in the pre-period, we code the firm as having an increase in relevance. SFAS 131 is supposed to make segment reporting more relevant by identifying reportable segments that are evaluated by management internally for performance and resource allocations. In contrast, in the pre-period firms identify segments based on product or service lines even if such segments do not align with the organization and evaluations within the company. Reporting a segment in the post-period whose identity does not appear in the pre-period is a sign that the firm now reports information that better reflects its actual operations and internal organization and, therefore, provides more relevant segment information.

We measure comparability of segment income by first determining the measure of income that a firm chooses to report as segment

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1 As a result, segment income under SFAS 14 was a Generally Accepted Accounting Principles (GAAP) measure.
2 See https://www.fasb.org/jsp/FASB/FASBContent_C/ProjectUpdateExpandPage&cid=1176170647220.
3 For a firm with a relevance increase, the total number of segments in the post-period may increase, decrease, or not change from the pre-period. Among our treatment firms, 86.0% increase the number of segments from the pre-period to the post-period.
We then compare the firm's measure of segment income with the frequency of this measure chosen by all reportable segments of firms in the same industry-year (referred to as "comparison units"). The more often the firm's measure of income is used by members of the comparison units, the higher the comparability score. The comparability measure is 1 for all firms in the pre-period because all firms provided the GAAP-designated measure for segment income. For each reported segment in the post-period, we count the frequency of a firm's measure used by members of the comparison units and sum such frequencies if the firm uses more than one measure. We then divide the summed frequencies by the sum of frequencies for all measures used by the comparison units and yield our segment-level comparability measure, which is between 0 and 1. For a firm-year, we aggregate the segment-level comparability measure using the firm's percentage of sales from a given segment as the weight. We sort sample firms by the change in the comparability measure from the pre-to-post-period and identify large-comparability-decrease firms as those with this change in the bottom tertile of the distribution.

We collect sample firms from Compustat's segment database in the year before the adoption year of SFAS 131 and in the year after the adoption year, skipping the adoption year. In both the pre- and post-periods, we require sample firms to have sufficient analyst forecasts for subsequent-year earnings. To evaluate the tradeoff between relevance increases and comparability decreases of segment reporting, we focus on the 136 firms that experience an increase in relevance but a large decrease in comparability ("treatment firms").

Useful segment information is expected to help analysts predict future earnings with more accuracy and less disagreement. Analyst forecast errors and dispersion typically decrease after a corporate disclosure event. We compare the reductions in analyst forecast errors and dispersion around the disclosure of segment information between the pre- and post-periods. Some firms first disclose segment data for a fiscal year in the earnings announcement; other firms do so in the subsequent 10-K report. To accurately identify the disclosure event for segment information, we hand check a firm's earnings announcement press release and 10-K to determine the date of initial segment earnings disclosure.

We consider our research design a triple-difference design. The first difference is a firm's reductions in analyst forecast errors and dispersion around the segment disclosure event. This difference mitigates the concern of omitted correlated stable firm characteristics that may contribute to the levels of errors and dispersion in cross-firm comparisons. The second difference is comparing the same firm from the pre-to-post-period. This difference allows us to make inferences about the effects of the rule change on treatment firms. The third difference is comparing treatment firms' changes with benchmark firms'. This difference addresses the concern that analysts may become more capable of forecasting earnings over time as they are assisted with better technology and increased information avenues. We identify 241 benchmark firms, which experience no increase in relevance and no large decrease in comparability (e.g., relevance and comparability barely change for these firms from the pre- to post-period). To control for the differences in firm characteristics between treatment firms and benchmark firms, we use entropy balancing, which assigns weights to benchmark firms so that the reweighted benchmark group resembles the treatment group with respect to size, analyst following, and single- vs. multi-segment status.

In univariate analysis, we find that for treatment firms, the reductions in forecast errors and dispersion after segment disclosure are significantly larger in the post-period than in the pre-period. We observe the same pattern for benchmark firms' forecast errors but not for their dispersion. After we control for absolute earnings surprise, firm size, analyst coverage, and management earnings guidance in a multivariate analysis, treatment firms and benchmark firms exhibit no difference in the reductions of forecast error around the disclosure event between the pre- and post-periods. However, relative to benchmark firms, treatment firms experience larger reductions in forecast dispersion around segment disclosure in the post-period than in the pre-period. These results suggest that the new segment reporting rule helps analysts reduce their disagreement in forecasting a firm's earnings, even though it does not improve the forecast accuracy of their consensus.

In supplementary analyses, we examine firms that have an increase in the relevance of segment reporting from the pre- to post-period but do not experience a large decrease in comparability. These firms experience similar changes in forecast errors and dispersion from the pre- to post-period as benchmark firms. Alternatively, we examine firms that have a large decrease in the comparability of segment income from the pre- to post-period but do not have an increase in relevance. These firms experience similar changes in forecast errors and dispersion reductions from the pre- to post-period as benchmark firms, suggesting no evidence of detriments to financial analysts arisen from a decrease in comparability of segment income. Our lack of separate evidence for the benefits of relevance increases and detriments of comparability decreases might be due to low test power because we have only 75 firms with an increase in relevance but no large decrease in comparability and 26 firms with a large decrease in comparability but no increase in relevance.5

Even though our evidence may not generalize to other situations with relevance vs. comparability tradeoffs, our study raises the awareness of this tradeoff. This tradeoff exists in the deliberations of several accounting issues. Over the past few years, the FASB has focused on reducing the diversity in accounting applications by disallowing some alternative accounting treatments. This move may appear to increase the comparability of financial reporting at the cost of sacrificing relevance if the alternative treatments fit a firm's

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4 A firm may use more than one measure of segment income. We observe that in a given year, a firm always uses the same segment income measure for all its reportable segments.

5 If we had enough observations, the logical procedure would be examining the effects of relevance increases, comparability decreases, and then the combination of relevance increases and comparability decreases. One way to increase our sample size is to use the levels of forecast errors and dispersions after segment disclosure as in prior research. Our current research design sacrifices sample size for tighter identification.
situation and thus elicit more relevant information. For example, ASU 2017-09 “Compensation—Stock Compensation (Topic 718)” has substantially reduced the judgment allowed in using modification accounting for share-based compensation.\(^6\) Another example is the revenue recognition rule of ASU 2014-09 “Revenue from Contracts with Customers (Topic 606).” Before this rule, firms were allowed to use various industry-specific practices in recognizing revenue. The rule replaces much of the industry-specific guidance to improve the comparability of revenue recognition.

Our study contributes to the segment reporting literature. The segment reporting rule change has been extensively studied in prior research. SFAS 131 is the first FASB standard that was developed jointly with another country (Canada) and that allows the disclosure of accounting information that does not conform to GAAP (Herrmann & Thomas, 1997). SFAS 131 is also the first accounting standard that adopts the management approach. The standard has been controversial since the very beginning (Herrmann & Thomas, 1997; Street, Nichols, & Gray, 2000; Berger & Hann, 2003; Zhou, 2017). We provide new evidence about this standard by examining the tradeoff between relevance and comparability made in SFAS 131.

Our study also contributes to the recent financial reporting comparability literature by introducing a context-specific measure of comparability. Although our current study limits the examination to the years right before and after the adoption of SFAS 131, our segment income comparability measure could be used in future research to examine the effects of segment income comparability on information transfer, stock price co-movement, market participants’ use of industry information, etc.

2. Background and prior research

2.1. Background of segment reporting

To meet users’ demand for line-of-business information, the Securities and Exchange Commission (SEC) started to require that firms report segment information in 10-K filings in 1970, but not as an integral part of the financial statements (SEC, 1970). In practice, the nature and extent of segment disclosure as well as the presentation methods varied until the FASB issued SFAS 14. The rule, effective for fiscal years beginning after December 15, 1976, requires segment information to be part of annual financial reporting and provides rules regarding the identification of reportable segments, the information to be provided for each segment, the presentation of segment information, and supplementary disclosure of foreign operations, export sales, and major customers.

The approach in SFAS 14 to identify reportable segments is later referred to as the “industry approach” (FASB, 1997). Under this approach, segment reporting disaggregates the consolidated financial information into product or service lines (FASB, 1976, para. 6 and 7). Companies must follow GAAP in preparing segment information except for maintaining intersegment transactions, which are subsequently removed during consolidation.\(^7\) The standard defines segment income as “operating profit or loss” and provides rules about how to calculate it (FASB, 1976, para. 10(d)).\(^8\)

In the early 1990s, financial analysts and practitioners called for improving segment reporting (AIMR, 1993; AICPA, 1994). One complaint about SFAS 14 was that managers’ considerable discretion in identifying reportable segments enabled them to hide certain segments. Another complaint was that managers did not provide enough information about a reportable segment. However, managers used high preparation costs as an excuse for not providing more information. Responding to these complaints, the FASB developed SFAS 131, effective for fiscal years ending after December 15, 1998.

The new standard adopts the management approach in identifying reportable segments and reporting on these segments. For identifying reportable segments, firms are supposed to report the same operating segments that the Chief Operating Decision Maker (CODM, e.g., CEO) uses internally for performance evaluations and resource allocations.\(^9\) For reporting on the identified segments, segment income can be any measure of segment profitability used by the CODM. Appendix 1 provides an example of segment disclosure under the old vs. new rule by the same company. A firm is required to reconcile the total amount of reported segment income with the consolidated income for the firm as a whole.

The management approach has led to more segments and more detailed information about reported segments (Herrmann & Thomas, 2000; Street et al., 2000). The information is arguably more relevant than that under SFAS 14 because investors supposedly observe the information that managers actually use in decision making. However, a serious concern about SFAS 131 is its negative impact on comparability, especially the comparability of segment income across firms (Berger & Hann, 2003; Deppe & Omer, 2000; Herrmann & Thomas, 1997). One FASB member, James Leisenring, dissented from the issuance of SFAS 131 for this exact concern (FASB, 1997). He supported the management approach for identifying reportable segments but criticized the lack of a definition of segment income and the lack of a requirement that segment income measures “be consistent with the attribution of assets to reportable segments.”

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\(^6\) A modification is “a change in any of the terms or conditions of a share-based payment award” (ASC 718-20-20). Modification accounting refers to the method that firms need to follow in measuring and accounting for the effects of such a change in award.

\(^7\) The standard states that segment information is “a rearrangement (that is, a disaggregation) of information included in an enterprise’s consolidated financial statements” (FASB, 1976, para. 64).

\(^8\) Companies may provide additional measures of segment income but must describe the differences between these measures and the GAAP measure. Only one of our multi-segment sample firms provided additional segment income measures in the pre-period.

\(^9\) Under SFAS 131, firms may report geographic segments as their primary operating segments. The rule change also affects requirements of enterprise wide disclosures. For example, under SFAS 131, firms are no longer required to disclose geographic earnings if they report industry segments as their primary operating segments (Hope & Thomas, 2008).
2.2. Segment reporting research

Segment reporting has attracted the interest of many accounting researchers, who use various research methods and perspectives to investigate incentives for the non-disclosure of segments as well as the effects of segment information. One stream of research examines whether the proprietary costs of segment disclosure incentivize firms to conceal information about profitable segments (Botosan & Harris, 2006; Botosan & Stanford, 2005; Ettredge, Kwon, & Smith, 2002; Harris, 1998; Hayes & Lundholm, 1996; Zhou, 2017). Another stream of research examines whether agency costs incentivize firms to withhold information about poor-performing segments to avoid monitoring (Berger & Hann, 2003; Gigler & Hemmer, 2002, 2007). A third stream of research examines the capital-market effects of segment information (Ettredge, Kwon, Smith, & Zarowin, 2005; Ettredge, Kwon, Smith, & Stone, 2006; Givoly, Hayn, & D’Souza, 2000; Lobo, Kwon, & Nduebuz, 1998). Our study belongs to the third research stream.

In the third research stream, Lobo et al. (1998) and Givoly et al. (2000) examine segment reporting under SFAS 14. Ettredge et al. (2006) conclude that SFAS 131 has increased the transparency of segment profitability information. Ettredge et al. (2005) find that the stock prices of firms that previously disclosed multiple segments under SFAS 14 or that changed from single segment before SFAS 131 to multiple segments after SFAS 131 contain more information about future earnings after SFAS 131 than before it. Bugeja, Czernkowski, and Moran (2015) examine Australian firms’ adoptions of International Accounting Standards 14R, a “modified” management approach to segment reporting, and IFRS 8, a “pure” management approach. They do not find significant changes in analyst forecast accuracy or dispersion after the adoptions. We extend this research by comparing analyst earnings forecasts before vs. after SFAS 131.

Our study is most related to the supplementary analyses in Berger and Hann (2003) and Botosan and Stanford (2005). Berger and Hann compare analyst forecast errors in the 180 days after the 10-K report in the adoption year with forecast errors in the same window after the 10-K in the previous year and find that relative to no-change firms, firms that change the number of segments after SFAS 131 experience a reduction in forecast errors. Botosan and Stanford use Barron, Kim, Lim, and Stevens (1998) model to define analyst forecast errors and uncertainty and find weak univariate evidence of a marginal increase in analyst errors and uncertainty for firms that reported a single segment before SFAS 131 but multiple segments after it. Thus, the two studies reach opposite conclusions.

Our study contributes to the literature beyond these two studies. First, we emphasize and explicitly measure comparability. Dissenters of SFAS 131 were concerned about the decrease in the comparability of segment income. We examine whether this concern was valid and provide evidence on the tradeoff between relevance and comparability. Second, we are the first to examine analyst dispersion before vs. after SFAS 131 using multivariate analyses. Our evidence of a decrease in analyst forecast dispersion after SFAS 131 is a new finding in the literature. Last, we make several methodological improvements. We examine the changes, instead of levels, in forecast errors and dispersion around segment disclosure. We use entropy balancing to control for observable differences between firms affected by SFAS 131 and unaffected firms. We hand collect information to identify the date of a firm’s first segment earnings disclosure, whereas prior research assumes that segment data first become available in a firm’s 10-K report.

2.3. Financial reporting comparability

Regulators and financial statement users desire financial reporting comparability. The former Chairman of the SEC Arthur Levitt states, “The standards must be of high quality—they must result in comparability... Investors must be able to meaningfully analyze performance across time periods and among companies” (Levitt, 1998). Despite the importance of comparability, measuring comparability is challenging. This challenge is perhaps a main reason why the academic interest in financial reporting comparability did not take off until 2011.

De Franco, Kothari, and Verdi (2011) is an influential study about comparability. The authors use a firm’s stock returns to capture the net effects of economic events and use earnings to summarize financial reporting. They interpret the coefficients of the reverse regression of earnings on stock returns as the functions of the firm’s information system. With these coefficient estimates, the authors calculate predicted earnings for firm i and compare this number with the predicted earnings for firm j using firm i’s stock return but firm j’s coefficients. The difference between the two predicted earnings numbers is the financial statement comparability measure between firms i and j. 10 The authors conclude that financial statement comparability lowers the cost of acquiring information and increases the quality and quantity of information available to analysts. Several subsequent studies use this comparability measure to examine the implications of comparability for acquisition efficiency, innovation efficiency, and the informativeness of stock prices for future earnings (Chen, Collins, Kravet, & Morgenthaler, 2018; Chircop, Collins, & Hass, 2016; Choi, Choi, Myers, & Ziebart, 2019). Some studies use the measure to examine the effects of IFRS adoption (Brochet, Jagolinzer, & Riedl, 2013; DeFond, Hu, Hung, & Li, 2011; Neel, 2017; Yip & Young, 2012).

Barth, Landsman, Lang, and Williams (2012)) is another influential study of comparability. The authors use stock price, returns, and cash flows as outcome variables to capture the underlying economic events and use earnings and book value of equity to summarize accounting information. They introduce accounting system comparability and value relevance comparability. These measures are based on the differences of the fitted outcome variable or the explanatory powers when regressing an outcome variable on the accounting information variables. They conclude that the adoption of IFRS has resulted in greater comparability of non-US firms to US firms. Their comparability measures are subsequently used in Neel (2017) and Choi et al. (2019). A few cross-country

10 Under their method, the comparability measures for firms i and j calculated based on firm i’s predicted earnings and alternatively on firm j’s predicted earnings are not the same. In other words, their measure is not symmetrical.
studies also use other comparability measures (DeFond et al., 2011; Wang, 2014; Yip & Young, 2012; Young & Zeng, 2015). We extend the comparability literature by introducing segment income comparability. This measure helps us specifically address the concern of decreased comparability of segment income after SFAS 131.

3. Research design

Following Ettredge et al. (2005), we skip the adoption year to avoid capturing any confusion that firms experienced in implementing the new rule. We choose the fiscal year before the adoption year as the pre-period (Post = 0) and the fiscal year after the adoption year as the post-period (Post = 1).

We assign the value of 1 to Relevance Increase if any of the firm’s reported segments in the post-period does not appear in the pre-period and 0 otherwise. Among our relevance-increase firms, 78.7% report more segments, 12.8% report new identities of segments even though the number of segments does not change, and 8.5% report new identities of segments even though the number of segments decreases after SFAS 131.

We measure the comparability of segment income by weighting a firm’s use of a segment income measure by the frequency of the measure used by all firms with reportable segments, including single-segment firms, in the same industry-year. We use the Fama-French 48 groupings for industry classifications. A firm may report several segments. Therefore, we start by calculating comparability of segment income for each of a firm’s segments and then aggregate segment-level comparability into a measure for the firm-year, Comparability, with each segment weighted by its sales as a percentage of the firm’s total segment sales. Appendix 2 provides details and examples of the measurement. We assign the value of 1 to Comparability Decrease if the firm’s change in Comparability from the pre- to post-period is in the lowest tercile of the distribution of changes among the sample firms and 0 otherwise.

We create a dummy variable Treatment, which takes the value of 1 if Relevance Increase is 1 and Comparability Decrease is 1 and takes the value of 0 if Relevance Increase is 0 and Comparability Decrease is 0. The firms with the value of 0 for our Treatment variable are referred to as benchmark firms. Note that if we place Relevance Increase and Comparability Decrease in a 2 × 2 matrix, treatment firms and benchmark firms are in the diagonal cells.

To examine whether the segment reporting rule change facilitates, has no effects, or burdens financial analysts’ information production, we focus on analyst forecasts of fiscal year t + 1 earnings around the release date of segment data for fiscal year t. We examine earnings forecasts instead of forecasts of other items (e.g., revenue and cash flows), recommendations, or target prices because segment income reporting is most relevant to analysts’ earnings forecasts. We examine the changes in forecast errors and dispersion from before segment disclosure to after it.

As illustrated in Appendix 3, we measure forecast error in the window before the disclosure event and again in the window after the disclosure event. The difference, after scaling by the stock price at the beginning of fiscal year t, is referred to as ΔError. We calculate this variable for the pre-period firm-year observation and again for the post-period firm-year observation. We follow the same procedures to construct ΔDispersion. We then compare the changes of analyst behavior for treatment firms with the changes for benchmark firms. We measure ΔError and ΔDispersion for benchmark firms in the pre- and post-periods in the same way as for treatment firms. Our empirical models are Eqs. (1) and (2).

\[
\Delta Error = a_0 + a_1 \text{Treatment} + a_2 \text{Post} + a_3 \text{Treatment} \times \text{Post} + a_4 \text{control variables} + \epsilon
\]

(1)

\[
\Delta Dispersion = b_0 + b_1 \text{Treatment} + b_2 \text{Post} + b_3 \text{Treatment} \times \text{Post} + b_4 \text{control variables} + \epsilon
\]

(2)

We estimate Eqs. (1) and (2) using ordinary-least squares regression with and without entropy balancing. Entropy balancing reweights the benchmark observations so that the first (mean), second (variance), and third (skewness) moments of the benchmark group’s covariate distributions resemble those of the treatment group’s. This method is more efficient and more flexible than

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12 If we choose two years before the SFAS 131 adoption and two years after that, we continue to find no difference in forecast error reductions between treatment and benchmark firms but significantly greater forecast dispersion reductions for treatment firms than for benchmark firms.

13 We use segment ID from Compustat to identify segments; thus, a firm is not classified as a Relevance Increase firm for merely renaming a previously existing segment.

14 In the pre-period, our comparability measure equals 1; in the post-period, the measure is between 0 and 1. Thus, for a given firm our comparability measure either stays the same or decreases from the pre- to post-period. We use the lowest tercile to isolate the firms with substantial decreases in comparability. We find that 95.2% of the Comparability Decrease firms use only one segment income measure in the post-period, 4.4% use two measures, and 0.4% use three out of the six measures coded by Compustat.

15 Emmanuel and Garrod (2002) examine 74 U.K. firms in 1995 and measure the comparability of segment reporting by the deviation of a firm’s segment profitability from the mean profitability of all firms in the industry to which the segment belongs. Their comparability measure focuses on a firm’s actual segment performance and all their sample firms use the same performance measure. Our comparability measure focuses on the measures that a firm uses in reporting its segment performance.

16 The changes vs. levels research design is similar to the stock return vs. stock price research design in value-relevance studies.
propensity score matching (Hainmueller, 2012). In addition, entropy balancing has the benefit of maintaining the sample size, which is especially important in our setting. We choose firm size, analyst following, and the single- vs. multi-segment status as the covariates for entropy balancing because Table 2 suggests that the differences between the treatment and benchmark groups come from these covariates.17

We make statistical inferences from the estimated coefficients. The sum of coefficients on Post and Treatment x Post will tell us whether the dependent variable for treatment firms is on average lower in the post-period than in the pre-period. The coefficient on Post will tell us whether the dependent variable for benchmark firms is on average lower in the post-period than in the pre-period. The coefficient on Treatment x Post will tell us whether the changes for treatment firms are on average lower than the changes for benchmark firms.

We include four control variables in case they vary for a given firm from the pre- to post-period. |EarnSurp| is the absolute value of the difference between realized earnings (from IBES) and the mean consensus of analyst forecasts issued in the 60 days before the earnings announcement, scaled by the stock price at the beginning of fiscal year t. A larger magnitude of earnings surprise for the reported year is expected to shake analysts’ confidence in their own numbers, increase their forecasting uncertainty, and therefore contribute to their opinion divergence. LnMVE is the logarithm of the market value of equity measured at the end of fiscal year t. Larger firms tend to have a richer information environment and therefore the disclosure event may sway analysts’ opinions to a lesser degree. Analysts is the number of unique analysts issuing one-year ahead earnings forecasts in the windows before or after the segment disclosure event (see Appendix 3). Greater analyst following is supposed to reduce forecast errors and dispersion as the competition among analysts increases. MF is 1 if managers release a forecast of year t + 1 earnings within two days of the disclosure event [-2, +2] and 0 otherwise. Management earnings guidance is expected to lower analyst forecast errors and dispersion. Appendix 4 summarizes all variable definitions.

4. Sample and descriptive statistics

4.1. Sample collection

We use IBES to obtain analyst forecasts of annual earnings per share (EPS) for U.S. firms with fiscal years ending in December 1997-November 1999 and December 1999-November 2000. Requiring firm-year observations to have an IBES ticker, permno, and gvkey results in our initial sample of 8935 firm-years. We acquire 10-K dates from SEC EDGAR and drop firm-years with at least 10-K date and those with late filings (i.e., 10-Ks filed more than 105 days after the fiscal period end). We require firm-year observations to have at least two analyst forecasts both before and after the segment disclosure date and have a stock price of at least $2 at the beginning of fiscal year t. We exclude firm-year observations that lack the necessary data to compute our relevance and comparability change variables and control variables. In addition, a firm must have one firm-year observation in both the pre- and post-131 periods. After these requirements, we have 956 firm-years from 478 unique firms. Panel A of Table 1 summarizes the sample selection process.

We sort the 478 firms by Relevance Increase and Comparability Decrease variables. Panel B of Table 1 shows that we have 136 treatment firms (relevance increases but comparability decreases) and 241 benchmark firms (relevance and comparability barely change from the pre- to post-period).18 The numbers of observations in the off-diagonal are small at 75 and 26. We use treatment and benchmark firms in our primary analyses and off-diagonal firms in supplementary analyses.

4.2. Identifying the segment disclosure date

Chen, DeFond, and Park (2002)) and Francis, Schipper, and Vincent (2002)) document that firms have been providing increasingly more information in their earnings announcements. We hand check and determine whether a firm-year’s segment reporting data are first disclosed in the earnings announcement for that year or in the subsequent 10-K report. We first set aside six firm-years whose earnings announcement dates are the same as their 10-K filing dates. Then, we set aside 562 firm-years with single segments reported for that year and use the earnings announcement date as the segment disclosure date. We hand check the remaining 388 firm-year observations. For each observation, we start with the earnings announcement press release. If the press release contains earnings for all the firm’s segments, we use the earnings announcement date as the segment disclosure event date; otherwise, we use the 10-K filing date.19 We find that 275 (70.9 %) of the hand-checked, multi-segment firm-years first disclose their segment income information at the earnings announcement and 113 do so at the subsequent 10-K filing.

There are a few notable observations from the hand check. First, firms do not seem to be consistent either within themselves or within their industry in choosing the venue to first disclose their segment income. Second, most of the firms for which we assign the 10-K filing date as the segment disclosure date do not provide any segment information at all in the earnings announcement. On other occasions, firms provide segment revenue but no segment income, provide segment income for some but not all segments, or provide

17 Because the single- vs. multi-segment status is a dummy, we balance only the first moment of this variable.
18 Among treatment firms, 81 firms change from single-segment to multi-segment from the pre- to post-period and 55 have multiple segments in both periods. Among benchmark firms, 217 firms have a single segment in both periods, 21 firms have multiple segments in both periods, and three firms have multiple segments in the pre-period and a single segment in the post-period.
19 If a firm discloses some segment information, such as revenue and some expenses, but not segment earnings, we still use the 10-K filing date as the disclosure date.
4.3. Descriptive statistics

Table 2 presents the descriptive statistics for our treatment firms and benchmark firms in Panels A and B, respectively, after we winsorize the continuous variables at 1% and 99% of the distributions. In addition to the variables in Eqs. (1) and (2), we add Total segment income for the fourth quarter but not the fiscal year.
Table 3
Pairwise Correlations.

<table>
<thead>
<tr>
<th>Panel A: Pre-131 Period</th>
<th>Variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Treatment</td>
<td></td>
<td>0.076</td>
<td>0.030</td>
<td>−0.071</td>
<td>0.374</td>
<td>0.196</td>
<td>0.081</td>
<td></td>
</tr>
<tr>
<td>(2) ΔError</td>
<td></td>
<td>0.066</td>
<td>0.352</td>
<td>−0.216</td>
<td>0.197</td>
<td>−0.008</td>
<td>−0.010</td>
<td></td>
</tr>
<tr>
<td>(3) ΔDispersion</td>
<td></td>
<td>0.006</td>
<td>0.043</td>
<td>−0.048</td>
<td>0.064</td>
<td>0.036</td>
<td>−0.008</td>
<td></td>
</tr>
<tr>
<td>(4)</td>
<td>EarnSurp</td>
<td></td>
<td>−0.068</td>
<td>−0.299</td>
<td>−0.170</td>
<td>−0.215</td>
<td>−0.143</td>
<td>−0.036</td>
</tr>
<tr>
<td>(5) LnMVE</td>
<td></td>
<td>0.380</td>
<td>0.137</td>
<td>0.115</td>
<td>−0.247</td>
<td>0.677</td>
<td>0.098</td>
<td></td>
</tr>
<tr>
<td>(6) Analyst</td>
<td></td>
<td>0.196</td>
<td>−0.100</td>
<td>0.052</td>
<td>−0.178</td>
<td>0.668</td>
<td>0.131</td>
<td></td>
</tr>
<tr>
<td>(7) MF</td>
<td></td>
<td>0.081</td>
<td>−0.049</td>
<td>−0.047</td>
<td>−0.032</td>
<td>0.078</td>
<td>0.112</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B: Post-131 Period</th>
<th>Variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Treatment</td>
<td></td>
<td>0.054</td>
<td>−0.190</td>
<td>0.037</td>
<td>0.312</td>
<td>0.190</td>
<td>0.070</td>
<td></td>
</tr>
<tr>
<td>(2) ΔError</td>
<td></td>
<td>0.002</td>
<td>−0.234</td>
<td>−0.295</td>
<td>0.376</td>
<td>0.182</td>
<td>0.079</td>
<td></td>
</tr>
<tr>
<td>(3) ΔDispersion</td>
<td>−0.206</td>
<td>−0.152</td>
<td>−0.139</td>
<td>−0.013</td>
<td>0.013</td>
<td>−0.017</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4)</td>
<td>EarnSurp</td>
<td></td>
<td>0.004</td>
<td>−0.270</td>
<td>−0.070</td>
<td>−0.295</td>
<td>−0.210</td>
<td>−0.086</td>
</tr>
<tr>
<td>(5) LnMVE</td>
<td>0.302</td>
<td>0.307</td>
<td>0.015</td>
<td>−0.452</td>
<td>0.655</td>
<td>0.194</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) Analyst</td>
<td>0.188</td>
<td>0.103</td>
<td>0.027</td>
<td>−0.302</td>
<td>0.672</td>
<td>0.153</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(7) MF</td>
<td>0.070</td>
<td>0.063</td>
<td>−0.045</td>
<td>−0.122</td>
<td>0.195</td>
<td>0.183</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: This table presents Pearson correlations above the diagonal and Spearman correlations below the diagonal. The correlations that are significantly different from zero at the 5% level or better are in boldface. See variable definitions in Appendix 4.

Assets, Sales, and Number of Segments, all measured at the end of fiscal year t, to Table 2 for descriptive purposes. We conduct t-tests between treatment firms and benchmark firms and mark statistical significance of the tests next to the variables in Panel A.

Treatment firms have an average comparability score of 0.241 in the post-period (untabulated). The mean number of reported segments is 1.9 in the pre-period and 3.7 in the post-period (untabulated). Treatment firms are larger, have greater analyst following, are weakly more likely to issue management earnings forecasts, and have more segments than benchmark firms. There is no difference in the magnitude of earnings surprises.

Table 3 presents the correlation matrix for the pre- and post-periods in Panels A and B, respectively. We present both Pearson and Spearman correlations but focus on Spearman correlations in the lower diagonal. The correlation coefficients are in boldface if they are statistically different from zero at the 5% level. ΔError and ΔDispersion have no correlation in the pre-period and a negative correlation in the post-period, suggesting that the two variables capture different aspects of analyst information production. The correlations between ΔError (or ΔDispersion) and the four control variables are largely as expected.

5. Primary results

5.1. Univariate analyses

Univariate analyses provide an intuitive and convenient way to contrast the changes from the pre- to post-period between treatment and benchmark firms. In Table 4 we first present the univariate analysis for the change in forecast errors, ΔError, around the segment disclosure event. For both treatment and benchmark firms, ΔError is significantly negative in both the pre- and post-periods, indicating that on average analyst forecast errors decrease after segment disclosure, consistent with our expectations. For both groups of firms, the reductions in forecast errors are greater in magnitude in the post-period than in the pre-period. The univariate analyses based on median analyst forecasts yield similar results.

The univariate analysis for the change in forecast dispersion, ΔDispersion, around the disclosure event is presented in a similar fashion as for ΔError. In the pre-period, ΔDispersion is zero for treatment firms and weakly negative for benchmark firms. In the post period, the variable is significantly negative for treatment firms and significantly positive for benchmark firms. We speculate that an increase in dispersion around disclosure events occurs because the post period is near the burst of the tech bubble and there might be much uncertainty and disagreement about a firm’s future earnings. Comparing ΔDispersion between the pre- and post-periods, we notice significantly larger dispersion reductions for treatment firms in the post-period, but significantly less dispersion reduction for benchmark firms in the post-period.

20 The table also presents the t-tests between treatment firms and benchmark firms within each period. For example, in the pre-period, benchmark firms experience larger forecast error reductions than treatment firms. In the post-period, there is no difference in forecast error reductions after segment disclosure between treatment firms and benchmark firms.
### Table 4
Univariate Analyses.

<table>
<thead>
<tr>
<th></th>
<th>Pre-131</th>
<th>Post-131</th>
<th>Post minus Pre</th>
<th>Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \Delta \text{Error} ) Treatment firms</td>
<td>(-0.003 ) ***</td>
<td>(-0.007 ) ***</td>
<td>(-0.004 ) **</td>
<td>136</td>
</tr>
<tr>
<td></td>
<td>(-5.26 )</td>
<td>(-4.07 )</td>
<td>(-1.98 )</td>
<td></td>
</tr>
<tr>
<td>Benchmark firms</td>
<td>(-0.005 ) ***</td>
<td>(-0.010 ) ***</td>
<td>(-0.004 ) ***</td>
<td>241</td>
</tr>
<tr>
<td></td>
<td>(-6.46 )</td>
<td>(-6.63 )</td>
<td>(-2.68 )</td>
<td></td>
</tr>
<tr>
<td>Difference between samples</td>
<td>0.002</td>
<td>0.002</td>
<td></td>
<td>1.47</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-1.04)</td>
<td></td>
</tr>
<tr>
<td>( \Delta \text{Dispersion} ) Treatment firms</td>
<td>0.000</td>
<td>0.002</td>
<td>***</td>
<td>136</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-2.83)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benchmark firms</td>
<td>(-0.001 ) **</td>
<td>0.002 **</td>
<td>0.003 ***</td>
<td>241</td>
</tr>
<tr>
<td></td>
<td>(-1.72 )</td>
<td>2.58</td>
<td>(3.10)</td>
<td></td>
</tr>
<tr>
<td>Difference between samples</td>
<td>0.000</td>
<td>-0.004</td>
<td>***</td>
<td>0.58</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-3.74)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: This table presents univariate analyses of the effects of SFAS 131 on \( \Delta \text{Error} \) and \( \Delta \text{Dispersion} \). The two variables are winsorized at 1% and 99% before the analysis. See variable definitions in Appendix 4. Treatment firms experience an increase in relevance and a large decrease in segment income comparability after SFAS 131. Benchmark firms do not experience an increase in relevance and a large decrease in comparability. t-statistics are presented in parentheses. ***, **, * represent significance at the 1%, 5%, and 10% levels, respectively.

### Table 5
Regression Analyses.

\[
\begin{align*}
\Delta \text{Error} &= a_0 + a_1 \text{Treatment} + a_2 \text{Post} + a_3 \text{Treatment} \times \text{Post} + a_4 \text{control variables} + \epsilon \\
\Delta \text{Dispersion} &= b_0 + b_1 \text{Treatment} + b_2 \text{Post} + b_3 \text{Treatment} \times \text{Post} + b_4 \text{control variables} + \epsilon
\end{align*}
\]

<table>
<thead>
<tr>
<th>Variable</th>
<th>OLS estimation</th>
<th>Entropy balancing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \Delta \text{Error} )</td>
<td>( \Delta \text{Dispersion} )</td>
</tr>
<tr>
<td>Intercept</td>
<td>(-0.0265 ) ***</td>
<td>(-0.0015 )</td>
</tr>
<tr>
<td>Treatment</td>
<td>(-0.0024 ) (-1.37)</td>
<td>0.0002</td>
</tr>
<tr>
<td>Post</td>
<td>(-0.0055 ) ***</td>
<td>0.0027 ***</td>
</tr>
<tr>
<td>Treatment \times Post</td>
<td>0.0019</td>
<td>(-3.28)</td>
</tr>
<tr>
<td>[EarnSurp]</td>
<td>(-0.3631 ) ***</td>
<td>(-0.0928 ) ***</td>
</tr>
<tr>
<td>LnMVE</td>
<td>0.0038</td>
<td>0.0001</td>
</tr>
<tr>
<td>Analysts</td>
<td>(-0.0004 ) ***</td>
<td>0.0000</td>
</tr>
<tr>
<td>MF</td>
<td>0.0010</td>
<td>(-0.0007 )</td>
</tr>
<tr>
<td>Adj. R(^2)</td>
<td>15.4%</td>
<td>3.1%</td>
</tr>
</tbody>
</table>

Note: This table presents regression results of estimating Eqs. (1) and (2) using 754 firm-years of treatment and benchmark firms. The first two columns present OLS estimations. The last two columns present regression estimations with entropy balancing, where benchmark firms are re-weighted so that the distributions of (1) natural log of market value of equity, (2) number of analysts, and (3) whether the firm is a single or multi-segment firm of the benchmark group resemble those of the treatment group. See variable definitions in Appendix 4. Continuous variables are winsorized at 1% and 99%. The sum of coefficients on Post and Treatment \times Post indicates whether the dependent variable for treatment firms is lower in the post-period than in the pre-period. The coefficient on Post indicates whether the dependent variable for benchmark firms is lower in the post-period than in the pre-period. The coefficient on Treatment \times Post indicates whether the changes for treatment firms are lower than those for benchmark firms. t-statistics are in parentheses. ***, **, * represent significance at the 1%, 5%, and 10% levels, respectively.
5.2. Multivariate analyses

The first two columns of Table 5 present the OLS estimations, with tests of coefficients in the bottom rows. After including the control variables, the comparisons of \( \Delta Error \) and \( \Delta Dispersion \) between the pre- and post-periods for treatment firms yield the same conclusion as the univariate comparison in Table 4. Treatment firms’ changes in \( \Delta Error \) from the pre- to post-period are not significantly different from benchmark firms’ changes, suggesting that the new segment reporting rule does not improve consensus forecast accuracy (i.e., analyst performance as a group). However, treatment firms’ changes in \( \Delta Dispersion \) from the pre- to post-period are significantly lower than benchmark firms’ changes (-0.0045, p < 0.01), suggesting that the new segment reporting rule helps reduce disagreement among analysts.\(^{21}\)

The last two columns present the OLS estimation with entropy balancing results, and we find results similar to the OLS results.\(^{22}\) Treatment firms’ changes in \( \Delta Error \) from the pre- to post-period are not significantly different from benchmark firms’ changes. Treatment firms’ changes in \( \Delta Dispersion \) from the pre- to post-period are significantly lower than benchmark firms’ changes (-0.0071, p < 0.01). Thus, although the new segment reporting rule does not increase the accuracy of consensus forecast, it does decrease analysts’ disagreement and therefore increase their confidence in the forecasts.\(^{23}\)

6. Supplemental analysis

In this section, we examine the effects of changes in relevance and comparability separately. We utilize the two groups that had an increase in relevance or a large decrease in comparability, but not both, and contrast them with benchmark firms. First, we examine the effect of an increase in relevance holding the change in comparability constant. The variable Relevance Increase is 1 for the 75 firms that have relevance increases but no large comparability decreases and is 0 for the 241 benchmark firms that have neither a relevance increase nor a large comparability decrease. We modify Eqs. (1) and (2) by replacing Treatment with Relevance Increase. Table 6 reports the estimations of these modified equations. Using entropy balancing, we find no differences in the changes in analyst forecast errors and dispersion between firms with an increase in relevance and firms with no increase in relevance. Although the increase in \( \Delta Dispersion \) from the pre- to post-period is smaller for firms with an increase in relevance than for benchmark firms, the difference between the two groups is not statistically significant.

We then examine the effect of a large decrease in comparability, holding the change in relevance constant. The variable Comparability Decrease is 1 for the 26 firms that have large comparability decreases but no relevance increases and is 0 for the 241 benchmark firms. We modify Eqs. (1) and (2) by replacing Treatment with Comparability Decrease. Table 7 reports the estimations of these modified equations. We find no differences in the changes in analyst forecast errors and dispersion between firms with a large decrease in comparability and benchmark firms.\(^{24}\) The lack of statistical significance in Tables 6 and 7 might be due to the small sample size of the relevance-increase group (75 firms) and the large comparability-decrease group (26 firms).

7. Conclusion

We examine the implications of the tradeoff between relevance and comparability in SFAS 131 to financial analysts. We compare the reductions in analyst forecast errors and dispersion around the segment disclosure date between the pre-period and the post-period. We find no difference in forecast error reductions. Dispersion reductions are larger for firms that experience an increase in relevance but a large decrease in comparability after SFAS 131 than for firms that are barely affected by the segment reporting rule change. Analyst consensus and dispersion reflect different aspects of analyst forecast behavior, analogous to the mean and standard deviation reflecting different aspects of a distribution. Our results suggest that SFAS 131 has reduced analysts’ disagreement in forecasting earnings without affecting their accuracy. This benefit should relieve critics’ concerns about a decrease in the comparability of segment income when the FASB traded off comparability for relevance in adopting the management approach in SFAS 131.

Appendix 1

Examples of Segment Reporting Before vs. After the Rule Change

Viacom, Inc. is one of our treatment firms. Viacom reported two additional segments in the post-period, a reporting change that we define as an increase in relevance. In addition, the comparability of Viacom’s segment income measure declined from the pre-to post-period.

\(^{21}\) We obtain similar results if we re-estimate the OLS regressions after removing influential observations identified as those with studentized residuals of larger than two in absolute value. We also obtain similar results if we exclude sample firms that have mergers, acquisitions, or divestitures in the post period.

\(^{22}\) As expected, the weights of the multi-segment benchmark firms are substantially higher than those of the single-segment benchmark firms.

\(^{23}\) In untabulated analyses, we partition the sample by firm size, analyst following, return volatility, and the existence of management earnings forecasts and find similar results for small firms, firms with low analyst following, firms with high return volatility, and firms that do not issue any management earnings forecasts around the segment disclosure event.

\(^{24}\) Due to the small treatment group, we were unable to balance all three moments of firm size and analyst following in entropy balancing. Instead, we balanced the first moments (means) of size, analyst following, and single- vs. multi-segment status and the second moment (variance) of size.
Before the rule change—SFAS 14

Viacom reported segment income under SFAS 14 until December 31, 1997. The accounting rule required companies to report “operating profit or loss” for reportable segments. Viacom reported “operating income”—an income measure with a clear definition in the 10-K that is compliant with SFAS 14. In Compustat, this income measure populates the “OPS” variable, defined as “segment operating profit.”

Table 6
The Effect of Relevance Increases on Analyst Forecasts.

<table>
<thead>
<tr>
<th>Variable</th>
<th>OLS estimation</th>
<th>Entropy balancing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ΔError</td>
<td>ΔDispersion</td>
</tr>
<tr>
<td>Intercept</td>
<td>−0.0075***</td>
<td>0.0017</td>
</tr>
<tr>
<td></td>
<td>(8.11)</td>
<td>(0.93)</td>
</tr>
<tr>
<td>Relevance Increase</td>
<td>−0.00028</td>
<td>0.0006</td>
</tr>
<tr>
<td></td>
<td>(1.42)</td>
<td>(0.53)</td>
</tr>
<tr>
<td>Post</td>
<td>−0.0053***</td>
<td>0.0028***</td>
</tr>
<tr>
<td></td>
<td>(3.89)</td>
<td>(3.67)</td>
</tr>
<tr>
<td>Relevance Increase × Post</td>
<td>0.0067**</td>
<td>−0.0003</td>
</tr>
<tr>
<td></td>
<td>(2.40)</td>
<td>(0.21)</td>
</tr>
<tr>
<td></td>
<td>−0.3355***</td>
<td>−0.1357***</td>
</tr>
<tr>
<td></td>
<td>(5.30)</td>
<td>(3.59)</td>
</tr>
<tr>
<td>LnMVE</td>
<td>0.0037***</td>
<td>−0.0004</td>
</tr>
<tr>
<td></td>
<td>(7.48)</td>
<td>(1.59)</td>
</tr>
<tr>
<td>Analysts</td>
<td>−0.0004***</td>
<td>0.0001</td>
</tr>
<tr>
<td></td>
<td>(3.55)</td>
<td>(1.64)</td>
</tr>
<tr>
<td>MF</td>
<td>−0.0004</td>
<td>−0.0012</td>
</tr>
<tr>
<td></td>
<td>(0.13)</td>
<td>(0.67)</td>
</tr>
<tr>
<td>Adj. R²</td>
<td>15.4%</td>
<td>3.6%</td>
</tr>
<tr>
<td>Firm-years</td>
<td>632</td>
<td>632</td>
</tr>
</tbody>
</table>

F-tests

Relevance-increase firms:
Post vs. Pre 0.0014 0.0025 * 0.0018 0.0026 **
No-relevance-increase firms:
Post vs. Pre −0.0053*** 0.0028*** 0.0016 0.0041 **
Change (Post minus Pre):
Rel.-inc. vs. No-rel.-inc. 0.0067** −0.0003 0.0002 −0.0015

Note: The regression estimation uses firm-years with an increase in relevance but without a large decrease in comparability (Relevance Increase = 1) and benchmark firm-years (see Table 1. Relevance Increase = 0). The first two columns present the results of OLS estimations. The last two columns present the results of regression estimations with entropy balancing, where benchmark firms are reweighted so that the distributions of (1) natural log of market value of equity, (2) number of analysts, and (3) whether the firm is a single or multi-segment firm of the benchmark group resemble those of the treatment group. See variable definitions in Appendix 4. The continuous variables are winsorized at 1% and 99%. t-statistics are in parentheses. ***, **, * represent significance at the 1%, 5%, and 10% levels, respectively.

Before the rule change—SFAS 14

Viacom reported segment income under SFAS 14 until December 31, 1997. The accounting rule required companies to report “operating profit or loss” for reportable segments. Viacom reported “operating income”—an income measure with a clear definition in the 10-K that is compliant with SFAS 14. In Compustat, this income measure populates the “OPS” variable, defined as “segment operating profit.”
For 1997, its competitors reported the same segment income measure. For example, Media General, Inc. reported one segment income measure, “operating income (loss),” for its four segments (Publishing, Broadcast Television, Cable Television, and Newsprint).

After the rule change—SFAS 131
Viacom reported segment income under SFAS 131 for fiscal periods ending on or after December 31, 1998. We display segment reporting for December 31, 1999, to maintain consistency with our sample. SFAS 131 allows companies to report any measure of segment income that is used for internal evaluation and decision making. Viacom reported “EBITDA” for segment income. In Compustat, this income measure populates the “OIBDPS” variable, defined as “segment operating income before depreciation.” Note that Viacom reported two new segments and changed the identification of two other segments in the 1999 report.

Table 7
The Effect of Large Comparability Decreases on Analyst Forecasts.

<table>
<thead>
<tr>
<th>Variable</th>
<th>OLS estimation</th>
<th>Entropy balancing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ΔError</td>
<td>ΔDispersion</td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.0256 ***</td>
<td>0.0024</td>
</tr>
<tr>
<td></td>
<td>(-7.08)</td>
<td>(1.19)</td>
</tr>
<tr>
<td>Comparability Decrease</td>
<td>-0.0023</td>
<td>0.0018</td>
</tr>
<tr>
<td></td>
<td>(-0.71)</td>
<td>(0.98)</td>
</tr>
<tr>
<td>Post</td>
<td>-0.0054 ***</td>
<td>0.0028 ***</td>
</tr>
<tr>
<td></td>
<td>(-3.75)</td>
<td>(3.60)</td>
</tr>
<tr>
<td>Comparability Decrease × Post</td>
<td>0.0052</td>
<td>-0.0007</td>
</tr>
<tr>
<td></td>
<td>(1.14)</td>
<td>(0.28)</td>
</tr>
<tr>
<td>[EarnSurp]</td>
<td>-0.4407 ***</td>
<td>-0.1457 ***</td>
</tr>
<tr>
<td></td>
<td>(-5.30)</td>
<td>(-3.18)</td>
</tr>
<tr>
<td>LnMVE</td>
<td>0.0037 ***</td>
<td>0.0005</td>
</tr>
<tr>
<td></td>
<td>(6.50)</td>
<td>(1.48)</td>
</tr>
<tr>
<td>Analysts</td>
<td>-0.0004 ***</td>
<td>0.0001</td>
</tr>
<tr>
<td></td>
<td>(-3.22)</td>
<td>(0.84)</td>
</tr>
<tr>
<td>MF</td>
<td>0.0015</td>
<td>-0.0011</td>
</tr>
<tr>
<td></td>
<td>(0.44)</td>
<td>(-0.58)</td>
</tr>
<tr>
<td>Adj. R²</td>
<td>15.4%</td>
<td>3.2%</td>
</tr>
<tr>
<td>Firm-years</td>
<td>534</td>
<td>534</td>
</tr>
</tbody>
</table>

F-tests
Firms with large comparability decreases:
Post vs. Pre: -0.0002 0.0021 -0.0005 0.0025
Firms without large comparability decreases:
Post vs. Pre: -0.0054 *** 0.0028 *** 0.0010 0.0110 **
Change (Post minus Pre): Comp.-dec. vs. No-comp.-dec. 0.0052 -0.0007 -0.0015 -0.0085

Note: The regression estimation uses firm-years with a large decrease in comparability but without an increase in relevance (Comparability Decrease = 1) and benchmark firms (see Table 1; Comparability Decrease = 0). The first two columns present the results of OLS estimations. The last two columns present the results of regression estimations with entropy balancing, where benchmark firms are reweighted so that the distributions of (1) natural log of market value of equity, (2) number of analysts, and (3) whether the firm is a single or multi-segment firm of the benchmark group resemble those of the treatment group. See variable definitions in Appendix 4. The continuous variables are winsorized at 1% and 99%. t-statistics are in parentheses. ***, **, * represent significance at the 1%, 5%, and 10% levels, respectively.
For 1999, Media General, Inc. reported “segment profit” for the three segments (Publishing, Broadcast Television, and Newsprint). Note that Media General sold its Cable Television segment in October 1999, unrelated to the reporting standard change. In the 10-K, Media General defines “segment profit” as segment operating cash flows adjusted for allocated amounts of (1) equity in net income of unconsolidated affiliates, (2) license fees from unconsolidated affiliate, and (3) depreciation and amortization. Thus, Viacom’s segment income is not readily comparable to the segment income provided by Media General.

Appendix 2

Measure of Comparability of Segment Income

At the segment level

We measure the comparability of segment income measure of a given segment of a firm with the measures used by the comparison units (i.e., the same segment of other multi-segment firms in the segment’s industry and the single-segment firms in the segment’s industry) using the weighted average concept. That is, the use of a segment income measure is weighted by the percentage of the comparison units that use this measure. The more often the comparison units use this measure, the more comparable is the segment income measure.

For example, a firm uses three segment income measures: (A) operating income before depreciation, (B) operating income after depreciation, and (C) operating profit. The comparison units use A with a frequency of 3, B with a frequency of 5, and C with a frequency of 50. In addition, the comparison units use three other measures: (D) pretax income with a frequency of 2, (E) income before extraordinary items with a frequency of 25, and (F) net income with a frequency of 10. We calculate this segment’s comparability as follows:

\[
\text{COMP}_{\text{SEGMENT}} = \frac{(3 \times 1) + (5 \times 1) + (50 \times 1) + (2 \times 0) + (25 \times 0) + (10 \times 0)}{3 + 5 + 50 + 2 + 25 + 10} = 0.61
\]

Formally, our segment-level comparability measure is calculated as follows:

\[
\text{COMP}_{\text{SEGMENT}} = \frac{\sum (\text{Number of j occurrences} \times \text{DUMMY}_j)}{\sum (\text{Number of j occurrences})}
\]
Here, $j$ represents one of the six segment income measures reported by firms in Compustat’s segment database, including operating income before depreciation, operating income after depreciation, operating profit, pretax income, income before extraordinary items, and net income. $\text{Dummy}_j$ is 1 if the given segment uses measure $j$ and 0 otherwise.

At the firm-year level

We measure the comparability of a firm’s segment income by weighting the segment-level comparability measures by the percentage of the segment sales in the firm’s total sales. Suppose a firm has four reportable segments. Below are the segment sales and segment-level comparability.

<table>
<thead>
<tr>
<th>Segment</th>
<th>Segment Sales</th>
<th>COMP$_{\text{SEGMENT}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$6,000</td>
<td>0.58</td>
</tr>
<tr>
<td>2</td>
<td>$9,000</td>
<td>0.85</td>
</tr>
<tr>
<td>3</td>
<td>$3,500</td>
<td>0.70</td>
</tr>
<tr>
<td>4</td>
<td>$1,500</td>
<td>0.68</td>
</tr>
<tr>
<td>Total</td>
<td>$20,000</td>
<td></td>
</tr>
</tbody>
</table>

Comparability = $0.58 \times \frac{6,000}{20,000} + 0.85 \times \frac{9,000}{20,000} + 0.70 \times \frac{3,500}{20,000} + 0.68 \times \frac{1,500}{20,000} = 0.73$

Appendix 3

Timeline

Note: SFAS 131 is effective for fiscal years ending after December 15, 1998. We skip the adoption year and choose the year before the adoption year as the pre-period and the year after the adoption year as the post-period. The segment disclosure event is either the earnings announcement date (EA) or the 10-K filing date (10K), determined by our hand check. AF represents “analyst forecast.”

Appendix 4

Variable Definitions

Relevance Increase = 1 if a segment reported in the post-period did not appear in the firm’s pre-period reporting and 0 otherwise. A firm is assigned the value of 1 in one of three cases: (1) the number of segments increases from the pre- to post-period, (2) the number of segments does not change but at least one segment in the post-period did not appear in the pre-period, and (3) the number of segments decreases from the pre- to post-period but at least one segment in the post-period did not appear in the pre-period.

Comparability

Comparability Decrease = 1 if the firm’s change in Comparability from the pre- to post-period is in the lowest tercile of the distribution (i.e., in the one third of firms with the largest Comparability decreases) and 0 otherwise.

Treatment = 1 for a treatment firm (i.e., 1 for Relevance Increase and 1 for Comparability Decrease) and 0 for a benchmark firm (i.e., 0 for Relevance Increase and 0 for Comparability Decrease).
Post = 1 for a firm-year in the post-period (i.e., fiscal years ending between December 1999 and November 2000) and 0 for a firm-year in the pre-period (i.e., fiscal years ending between December 1997 and November 1998).

ΔError = The analyst earnings forecast error in the window after the segment disclosure date for fiscal year t minus the analyst earnings forecast error in the window before this disclosure event, where error is calculated as the absolute difference between the actual earnings for year t + 1 (from IBES) and the mean analyst consensus in the measurement window scaled by the stock price at the beginning of fiscal year t. See the timeline in Appendix 3 for the measurement windows.

ΔDispersion = The standard deviation of analyst forecasts for fiscal year t + 1 issued in the window after the segment disclosure date for fiscal year t minus the standard deviation of analyst earnings forecasts in the window before this disclosure event, scaled by the stock price at the beginning of fiscal year t. See the timeline in Appendix 3 for the measurement windows.

|EarnSurp| = The absolute value of the difference between the actual earnings for year t (from IBES) and the mean analyst consensus issued within 60 days before the earnings announcement for year t, scaled by the stock price at the beginning of fiscal year t.

MVE = The market value of equity, calculated as the number of common shares outstanding times the stock price at the end of fiscal year t. We use the logarithm of MVE, LnMVE, in the regression analyses.

Analysts = The number of unique analysts issuing forecasts for fiscal year t + 1 in the window before the segment disclosure date for fiscal year t or in the window after this event. See the timeline in Appendix 3 for the measurement windows.

MF = 1 if the firm releases a forecast for fiscal year t + 1 earnings within two days of the earnings announcement for fiscal year t and 0 otherwise. We obtain management forecasts from First Call’s Company Issued Guidelines (CIG) database.

Total Assets = Total assets at the end of fiscal year t, in millions of dollars.

Sales = Sales revenue for fiscal year t, in millions of dollars.

Number of Segments = The number of reported segments (i.e., segments in the Compustat Segment database with positive sales) for fiscal year t.

References


