Audits of Non-GAAP Earnings: Evidence from
Adjusted EBITDA in Segment Disclosures

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Abstract: We provide evidence on an important question to capital markets: "Would subjecting non-GAAP metrics to audit affect the quality of the metrics?" Focusing on instances where adjusted EBITDA is disclosed in firms' segment notes, which subjects the EBITDA metric to audit requirements, we find that the adjustments made when calculating EBITDA are of higher quality when subject to audit. Further tests help rule out concerns that the results are driven by a firm commitment to having high-quality adjusted EBITDA or firms with more informative EBITDA being more likely to use adjusted EBITDA in segment notes. We also find that analysts follow manager-provided adjusted EBITDA more when the measures are audited and that managers disclose audited EBITDA metrics more prominently in their earnings announcements. Overall, our evidence indicates that, at least in the context of our study, the answer to our research question is yes—auditing non-GAAP metrics affects their quality.

Keywords: adjusted EBITDA, non-GAAP, audit

JEL Codes: M41, M42

1. Introduction

Managers assert that they use non-GAAP earnings to adjust firms' GAAP-based performance to better reflect ongoing operations. Companies frequently disclose various non-GAAP earnings metrics, and investors often find them more informative than GAAP earnings (Bradshaw and Sloan 2002; Bradshaw et a. 2018). However, companies also have incentives to disclose non-GAAP earnings opportunistically, which can mislead investors (Doyle et al. 2003; Hsu et al. 2022). Practitioners and regulators have debated whether non-GAAP earnings should be audited and whether such audits would increase the quality of these metrics. For example, the Center for Audit Quality (CAQ) suggests that auditors "could bring discipline to management's process [of producing and disclosing non-GAAP earnings] and help enhance the trust and confidence in such information by all stakeholders in the reporting ecosystem" (CAQ 2020, 13). The Public Company Accounting Oversight Board (PCAOB) has also shown interest in this area by seeking input from their advisory group on whether auditors should audit non-GAAP earnings (PCAOB 2016; 2017). In this study, we examine whether an external auditor's audit of non-GAAP earnings affects the quality of such metrics.

Given the growing interest in whether auditors should play a more direct role in auditing non-GAAP earnings, several recent studies attempt to link auditors to non-GAAP reporting (Heflin et al. 2024; Feng et al. 2023). These studies, however, are unable to examine whether auditing actually improves non-GAAP reporting because the non-GAAP metrics they examine are outside the scope of the audit. Specifically, auditors have limited responsibility with respect to non-GAAP earnings disclosures because most non-GAAP earnings are disclosed in firms' earnings announcements or outside of the financial statements in their annual reports. Thus, these prior

studies focus on non-GAAP metrics that are not audited, which limits the inferences one can draw about whether auditing non-GAAP earnings affects its quality.

We differ from these prior studies by identifying a unique setting where auditors actually audit non-GAAP earnings because the non-GAAP metrics are in-scope for the financial statement audit. In particular, GAAP requires firms to report in their financial statement footnotes the primary performance metric used by the firm to evaluate segment performance (FASB 1997; Durney et al. 2024). Because companies often use non-GAAP metrics to allocate resources among segments, segment reporting can contain non-GAAP metrics that are subject to audit.[1] Thus, this unique setting allows us to identify non-GAAP metrics that are audited by external auditors and to provide evidence on how the audit process affects the quality of these non-GAAP metrics.

It is unclear, ex ante, whether an audit would improve the quality of non-GAAP metrics. On the one hand, auditing non-GAAP exclusions could improve their quality because auditors might (1) enforce more transparent disclosure, making it harder for managers to group questionable exclusions with higher quality exclusions, (2) enforce consistency in non-GAAP calculations through year-over-year analytical procedures, preventing managers from making aggressive one-off adjustments, or (3) exert more effort in auditing particular items because the performance metrics are presented in disaggregated amounts across segments as opposed to in aggregated amounts on the financial statements. On the other hand, an audit of non-GAAP metrics may not improve the quality of non-GAAP metrics. For example, it is unclear what accounting standards auditors would use as a basis for auditing non-GAAP metrics. Without a specific GAAP-based standard to rely on, auditors may have difficulty pushing back against managers' non-GAAP reporting choices, especially with the large amount of discretion afforded to managers in non-

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[1] Former PCAOB board member, J. Robert Brown, specifically highlights this point during his speech at the 2019 Data Amplified Conference (Brown 2019).

GAAP reporting. Further, a long list of monitors (e.g., clients' boards, analysts, lawyers, SEC) already monitor firms' financial reporting and may serve as a substitute for auditor oversight.

To examine our research question, we study multi-segment firms with firm-quarters ending between January 1, 2016 and December 31, 2019.[2] We first investigate which types of non-GAAP metrics managers include in their segment disclosures. Our initial analysis indicates that adjusted EBITDA is the primary non-GAAP metric disclosed in segment disclosures. Thus, we focus on adjusted EBITDA and hand-collect these metrics from firms' 10-Q/K segment disclosures and quarterly earnings announcements. Importantly, for firms with adjusted EBITDA in their earnings announcement, we find substantial variation in whether they also report the adjusted EBITDA metric in their segment disclosure. Leveraging this variation, we compare the quality of adjusted EBITDA metrics for firms that report these metrics in both their earnings announcement and segment disclosure (which captures firms with metrics that are audited) to the quality of adjusted EBITDA metrics for firms that report these metrics in their earnings announcement *but not* in their segment disclosure (which captures firms with metrics that are not audited). Our final sample includes 8,005 firm-quarter observations.[3]

To examine how auditing adjusted EBITDA affects its quality, we follow prior research (Kolev et al. 2008; Bentley et al. 2018) and define quality based on how the items that managers exclude from the non-GAAP metric map into future operating performance (earnings or cash flows). Exclusions that have a higher mapping with future performance are of lower quality, while

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[2] We begin our sample in 2016 (1) to coincide with the SEC's increased scrutiny of non-GAAP metrics (White 2016) and (2) because of the intensive hand collection required to examine our research question.

[3] We examine determinants of including adjusted EBITDA in segment disclosures. We find that firm size and engaging a Big 4 auditor are positively associated with including adjusted EBITDA in segment notes. In contrast, profitability and institutional ownership are negatively associated with including adjusted EBITDA in segment disclosures.

exclusions with lower mappings are of higher quality.[4] We group the items excluded from adjusted EBITDA into two categories. We label the first category as ITDA exclusions, which relates to interest, taxes, depreciation, and amortization exclusions. These exclusions provide no real flexibility to managers in their exclusion choice as they are standard exclusions in EBITDA calculations. We label the second category as non-ITDA exclusions, which captures the additional items beyond ITDA that managers exclude. Non-ITDA exclusions are not uniformly defined and are at managers' discretion. To the extent that auditing adjusted EBITDA curbs low quality reporting, we expect the effect to concentrate within non-ITDA exclusions because managers can be more aggressive in excluding these items. Consistent with the notion that auditing improves the quality of non-GAAP metrics, we find that the association between non-ITDA exclusions and future operating performance declines when adjusted EBITDA is subject to audit.

Next, we use several analyses to examine the strength of our primary results and help rule out alternative explanations. We begin by addressing the concern that our results are due to a firm commitment, as opposed to auditor oversight, to having high-quality adjusted EBITDA. We examine this alternative explanation using two cross-sectional tests: one based on the strength of corporate governance and one based on managerial ability. If firms are simply committed to higher quality EBITDA metrics because they use them in segment reporting, we expect our evidence to concentrate in instances where the quality of the board is higher or when managerial ability is higher. However, this is not what we find. Instead, we find that our results concentrate in scenarios with below median board independence and managerial ability, casting doubt that a firm commitment to high quality EBITDA metrics explains our results.

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[4] The intuition behind this design is that if managers report non-GAAP earnings to better capture firms' core operations, as they contend, then exclusions should not relate to future operating performance. Thus, exclusions with a lower relation represent higher quality adjustments, while exclusions with a higher relation are lower quality.

Another alternative explanation for our findings is that adjusted EBITDA is simply more informative for certain firms and these firms are more likely to use adjusted EBITDA when evaluating segment performance. In this scenario, our results capture a firm's underlying adjusted EBITDA quality through its choice to include these metrics in its segment reporting, and not the effect of auditing adjusted EBITDA. We view this alternative explanation as being less likely for several reasons. First, we do not find that adjusted EBITDA better explains future operating performance when disclosed in segment notes versus in the earnings announcement alone, which does not align with adjusted EBITDA informativeness driving its inclusion in segment notes. Second, our results concentrate in scenarios where *auditors* likely play a larger role in auditing exclusion quality. In particular, auditors take materiality into account when planning their audit, and, thus, we expect auditors to pay closer attention to more material exclusions. We also expect auditor quality to affect their ability to improve the quality of adjusted EBITDA exclusions. Across both settings, we find results consistent with our expectations and the inference that auditors improve the quality of non-ITDA exclusions.[5]

Although measuring non-GAAP reporting quality based on how exclusions map into future performance is common in the non-GAAP literature, there are other ways to measure non-GAAP reporting quality. Therefore, we next examine our research question using three alternative measures. First, Bentley et al. (2018) provides evidence that analysts agree with managers' non-GAAP metrics more when managers' metrics are of higher quality. Thus, if auditing adjusted EBITDA improves the quality of the measure, we expect analysts' and managers' adjusted EBITDA measures to agree more when it is audited. Second, prior research has expressed

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[5] We conduct two additional tests to rule out the "more informative" EBITDA alternative argument. First, our results hold using an entropy balanced design that matches firms with and without audited EBITDA measures on firm fundamentals. Second, we examine whether our results extend to non-GAAP EPS measures that are not subject to audit and find no evidence that firms with audited EBITDA measures have higher quality non-GAAP EPS exclusions.

considerable concern about aggressive non-GAAP reporting when managers report non-GAAP metrics that just meet analysts' expectations (Doyle et al. 2013). If auditing helps curb aggressive reporting, we expect analysts to agree more with managers in meet-or-beat settings when adjusted EBITDA is subject to audit. Third, Chen et al. (2021) find that firms report higher quality non-GAAP metrics more prominently in their earnings announcements. Thus, if auditing adjusted EBITDA improves its quality, we expect that firms will report this metric more prominently in their earnings announcements. Across all three measures of non-GAAP reporting quality, we continue to find that auditing adjusted EBITDA improves the quality of these metrics.

We contribute to the literature in several ways. First, we contribute to the intersection of non-GAAP reporting and auditors. This stream of research is still developing and often focuses on how non-GAAP disclosures impact the auditor (e.g., Hallman et al. 2022). A few studies (Feng et al. 2023; Heflin et al. 2024) attempt to examine how auditors affect non-GAAP reporting, although their analyses focus on non-GAAP metrics outside the scope of the audit.[6] In contrast, we examine non-GAAP disclosures that are included in the financial statements and, thus, subject to audit. As such, we provide more direct evidence on the research question that has long been of interest to standard setters, regulators, and academics: "Would subjecting non-GAAP earnings to audit affect the quality of non-GAAP earnings?" Our results provide support for the notion that auditing non-GAAP metrics can improve their quality. These results are also timely, as the FASB recently released a new segment reporting standard (ASU 2023-07), which they expect will result in an increase in non-GAAP metrics that are typically disclosed in earnings releases being incorporated into the audited financial statements (e.g., see BC51 of ASU 2023-07). Additionally, the

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[6] Feng et al. (2023) find that the persistence of unaudited non-GAAP exclusions of Australian and U.S. firms is lower for firms that employ a Big 4 auditor. Heflin et al. (2024, abstract) finds "that clients audited by the same auditor are more likely to disclose non-GAAP earnings in a similar manner."

International Accounting Standards Board (IASB) recently issued IFRS 18, which is effective January 1, 2027. Among other things, IFRS 18 requires certain non-GAAP disclosures in financial statements, subjecting them to audit (IFRS Foundation 2024; KPMG 2024).

Second, we complement studies examining non-GAAP metrics other than non-GAAP EPS. With few exceptions (e.g., Campbell et al. 2022, Brown et al. 2020, and Givoly et al. 2019), prior research has focused on non-GAAP EPS, primarily due to data availability from Bentley et al. (2018) and IBES. Our study sheds light on another common non-GAAP metric – adjusted EBITDA – which is commonly reported by managers and is among the most frequently used non-GAAP metrics by analysts (Elfrink et al. 2024). While Elfrink et al. (2024) focuses on why analysts provide EBITDA metrics to investors, we focus on whether audits affect the quality of managers' EBITDA metrics. Further, we also create and make publicly available the dataset of managers' adjusted EBITDA disclosures, which should fuel future non-GAAP research by allowing researchers to examine a non-GAAP metric beyond managers' non-GAAP EPS disclosures.[7]

2. Related literature and hypothesis development

2.1 Non-GAAP literature

Non-GAAP earnings represent a modified performance metric that managers frequently disclose to investors. Managers assert that they disclose non-GAAP information because the "one-size fits all" nature of GAAP-based earnings does not accurately capture their firm's core operations.[8] Bradshaw and Sloan (2002) are the first to empirically examine non-GAAP reporting and highlight two competing incentives for why managers disclose non-GAAP information. The first is based on the incentive to inform, where managers report non-GAAP earnings to provide

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[7] We plan to make the dataset publicly available upon the completion of the study.
[8] Managers can disclose a variety of non-GAAP measures (e.g., non-GAAP EPS, adjusted EBITDA), and there is not a standard definition for these different measures. Thus, one of the challenges with non-GAAP reporting is that the calculations can be unique to the firm and not comparable across firms or time.

investors with better insight into firms' core operations. This insight will inform investors about future expected cash flows and firm value. The second incentive is rooted in opportunism. Managers commonly exclude expense items when calculating non-GAAP earnings (e.g., restructuring charges, amortization expense), resulting in a non-GAAP measure that typically exceeds GAAP earnings. Thus, managers might use non-GAAP earnings to portray a more favorable measure of firm performance to benefit the firm and themselves.

The literature on non-GAAP reporting has grown considerably since Bradshaw and Sloan (2002), and much of the literature attempts to disentangle which incentives motivate managers' reporting choices (e.g., Lougee and Marquardt 2004). Numerous papers find that managers use non-GAAP earnings for informative reasons (e.g., Curtis et al. 2014; Black et al. 2018; Leung and Veenman 2018; Chen et al. 2021) and investors respond more strongly to non-GAAP numbers than to GAAP numbers (Bradshaw and Sloan 2002; Bhattacharya et al. 2003; Bradshaw et al. 2018). Nonetheless, some managers appear to disclose non-GAAP earnings for opportunistic reasons, such as benchmark beating (Black and Christensen 2009; Doyle et al. 2013), inflating firm value (Doyle et al. 2003; Hsu et al. 2022), or increasing their compensation (Black et al. 2021, Guest et al. 2022). Managers' use of non-GAAP metrics has also continued to grow over time (Bentley et al. 2018); with more than 90% of S&P 500 firms disclosing some form of non-GAAP metric in the first quarter of 2020 (CAQ 2020).

The increasing prominence of non-GAAP reporting has captured the attention of both standard setters and regulators. For example, the FASB has questioned what the growing popularity in non-GAAP reporting means for GAAP-based metrics and whether it signals a need to improve GAAP earnings (Siegel 2014; Linsmeier 2016; Golden 2017). The SEC has long expressed concern about non-GAAP reporting, and they first regulated the reporting practice in

2003 with Regulation G.[9] Subsequent to this regulation, the SEC has issued multiple Compliance

and Disclosure Interpretations to clarify common questions about non-GAAP disclosures, and they

have more recently used comment letters to fix compliance issues surrounding non-GAAP

reporting.[10] One area of particular concern for the SEC is whether non-GAAP earnings mislead

and confuse investors (Teitelbaum 2015; Cohn 2016).

2.2 Hypothesis development

Given the recent proliferation in non-GAAP reporting, and investors' reliance on these

measures, some parties question whether it is time for non-GAAP earnings to be subject to audit.

For example, the PCAOB has questioned what role, if any, auditors should play when firms

disclose non-GAAP information (PCAOB 2016; 2017). The PCAOB's Investor Advisory Group

provided more explicit recommendations about non-GAAP reporting and auditing. Among other

things, they suggested that managers should be required to disclose non-GAAP measures in their

financial statements or accompanying notes, subjecting them to audit (PCAOB 2016b). In addition,

the Center for Audit Quality highlights that auditors could help discipline non-GAAP reporting

and bring more trust to such measures (CAQ 2020).

A primary challenge in determining an auditor's role in non-GAAP reporting, however, is

that nearly all non-GAAP disclosures are made through channels that are not subject to audit (e.g.,

earnings announcements; conference calls). Because auditors are not required to "perform specific

procedures" on these other disclosure channels, these non-GAAP metrics fall outside the scope of

the audit (PCAOB 2016, 6). Further, even when non-GAAP information is contained in a 10-Q or

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[9] Among other things, Regulation G requires companies to reconcile their non-GAAP metrics to the most directly comparable GAAP metric and to not present non-GAAP information with greater prominence than GAAP information. It also prohibits "adjusting a non-GAAP performance measure to eliminate or smooth items identified as non-recurring, infrequent or unusual" when there are similar charges or gains in the surrounding two years. Kolev et al. (2008) and Heflin and Hsu (2008) find that the quality of non-GAAP reporting improved after Regulation G.
[10] For example, 35% of all comment letters during 2018-2019 related to non-GAAP reporting (CAQ 2020).

10-K, it primarily resides in the MD&A section and outside of the financial statements and notes. In these instances, the auditor is only required to assess whether the non-GAAP information is inconsistent with what is presented in the financial statements and is not required to perform procedures that corroborate the non-GAAP information (PCAOB Auditing Standard 2710, .04).

The growing interest in whether auditors should have some role in auditing non-GAAP earnings has motivated several recent studies on the topic. A few studies have examined how non-GAAP reporting affects auditors. For example, auditors appear to be aware of non-GAAP earnings, as this information can affect auditors' audit fee calculations (Chen et al. 2012), materiality thresholds (Hallman et al. 2022) and going-concern assessments (Albrecht et al. 2023). Other studies seek to examine how auditors affect non-GAAP reporting. Using an experimental approach, Anderson et al. (2022) find that investors could misinterpret auditing a non-GAAP metric as increasing the usefulness instead of the faithful representation of the metric.

A couple archival studies also link auditor characteristics, such as auditor quality (Feng et al. 2023) and style (Heflin et al. 2024), to non-GAAP reporting quality. One challenge facing these studies, however, is that they do not examine a setting where auditors actually audit the non-GAAP metric. As a result, their link between auditors and non-GAAP reporting is indirect. Thus, these studies cannot shed light on the important question of whether subjecting non-GAAP earnings to audit would improve their quality.[11] Providing this insight, however, is critical because finding

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[11] There are also a handful of related working papers. In a setting where auditors do not audit non-GAAP metrics, Bakke (2023) finds evidence suggesting that non-GAAP earnings quality varies with auditors' monitoring incentives. Hallman et al. (2024) examine the persistence and value relevance of non-GAAP EPS adjustments in the U.K. setting and conclude that auditing these adjustments results in higher-quality adjustments. The extent to which their results generalize to a U.S. setting is unclear. Lamoreaux et al. (2024) use non-GAAP metrics that are in the 10-K but not in the financial statements or footnotes to examine whether investors value auditor verification of non-GAAP metrics. They also use a subsample to examine the percentage of exclusions that are audited due to the fact that the exclusions are line items in the financial statements. Nonetheless, they do not examine specific non-GAAP metrics that are subject to audit. They conclude that investors perceive auditor verification of non-GAAP metrics as valuable based on associations with cumulative abnormal returns, bid-ask spreads, and stock return volatility on 10-K filing dates.

that auditing improves non-GAAP reporting quality not only informs the PCAOB on an area of interest, but also implies that auditing can help prevent the scenarios where investors are most likely misled by non-GAAP reporting (i.e., instances when non-GAAP reporting quality is lower), which is an area that the SEC is concerned about.

Although nearly all non-GAAP metrics reside outside of the audit, there is at least one setting where non-GAAP information is subject to audit. As former PCAOB board member, J. Robert Brown, highlights in his speech at the 2019 Data Amplified Conference, "In some cases, firms provide assurance on metrics that may, in other circumstances, qualify as non-GAAP. This can occur, for example, with respect to the footnote containing disclosure about operating segments, something examined as part of the audit." (Brown 2019). Specifically, GAAP requires firms to disclose in their financial statement notes the profit/loss metric that they use to evaluate segment performance (FASB 1997; Durney et al. 2024). Because non-GAAP metrics are a common measure to allocate resources among segments, firms can disclose these non-GAAP metrics in their segment notes, which subjects them to audit. Thus, this unique setting allows us to identify instances where auditors actually audit non-GAAP metrics, and, thus, we can examine whether auditing affects non-GAAP reporting quality.

Many studies finds that auditors improve financial reporting quality (e.g., see DeFond and Zhang 2014 for a review of the archival auditing literature), which supports the notion that auditors could also improve the quality of non-GAAP metrics when such metrics are audited. Specifically, when auditing non-GAAP metrics, auditors should provide assurance that non-GAAP metrics do not contain material misstatements by auditing each exclusion. For example, the auditor may exert additional effort to audit a particular exclusion, even though it is already a line item on the income statement, because it is now disaggregated across segments. An auditor may also exert additional

effort to audit an exclusion that was not a line item on the income statement, but was instead a subcomponent of a more aggregated number on the income statement. Auditors can also use analytical procedures when auditing exclusions, which could result in examining exclusions for consistency across time. If auditors note inconsistency, they may either push their client to improve consistency or to provide transparent disclosures regarding the definition of non-GAAP metrics.[12]

Further, managers may be less aggressive in their non-GAAP reporting practices because they know their metrics are subject to auditor oversight. For example, the CAQ (2020, 13) states that auditors "could bring discipline to management's process [of producing and disclosing non-GAAP earnings]." In public commentary on the new segment standard, auditors have cautioned managers about disclosing non-GAAP metrics in segment reporting. Specifically, EY (2024, 2) states that companies "should proceed with caution" if disclosing "measures of segment profit or loss that are not calculated in accordance with GAAP." Thus, an audit of non-GAAP metrics could result in higher quality non-GAAP metrics because firms know auditors will be more skeptical of their non-GAAP metrics disclosed in audited segment notes as compared to other unaudited areas where managers can disclose non-GAAP information (e.g., earnings announcements).

However, there are several reasons why audits might not improve the quality of non-GAAP metrics. First, while auditors should audit each exclusion, it is unclear what auditors would audit non-GAAP metrics against. While Regulation G provides guidance on firms' non-GAAP reporting practices, KPMG (2023, 3) notes, "it is unclear whether segment profitability measures considered non-GAAP today but permitted under the ASU are subject to SEC non-GAAP measure

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[12] We do not contend that auditors will audit managers' reasons for providing a non-GAAP metric, but instead they may audit the calculation of the non-GAAP metric and the values of the exclusions. We informally asked three audit partners from large accounting firms about auditing non-GAAP metrics within segment reporting. All three said that they would audit each non-GAAP exclusion based on its risk of material misstatement (e.g., accuracy). These informal discussions do not qualify as human-subjects research per the IRBs from our respective universities.

requirements (e.g., Reg G and Reg S-K Item 10(e))." Second, even if auditors audit against Regulation G, Regulation G is not nearly as prescriptive as GAAP, and, thus, firms have significant leeway in determining their non-GAAP adjustments. Thus, auditors likely have clients that each determine non-GAAP metrics in unique ways. This leads to significant subjectivity in the audit process and potentially impairs an audit firm's ability to (1) push back on management's preferred non-GAAP reporting choices and (2) establish standardized auditor training and prescriptive audit procedures that will allow for consistent audit outcomes for non-GAAP metrics.

Prior research also suggests that auditors may have incentives to appease clients in subjective areas of accounting (Ege and Stuber 2022). Thus, auditors may not rigorously seek to enforce the relevant aspects of Regulation G when auditing non-GAAP metrics that are used by firms to evaluate segment performance. Finally, clients' boards, audit committees, analysts, and lawyers already monitor firms' financial reporting, and the SEC specifically monitors companies' non-GAAP reporting. Thus, existing agents might already provide sufficient monitoring of non-GAAP metrics, and audits might not yield additional improvements in non-GAAP quality.

Because of these opposing arguments, we state our hypothesis in the null:

H1: Audited non-GAAP metrics are not of higher quality than unaudited non-GAAP metrics.

3. Sample Composition

The initial sample consists of all firm-quarters with an available earnings announcement in the Bentley et al. (2018) dataset for fiscal periods ending 2016 to 2019. The sample starts in 2016 to coincide with the SEC's increased scrutiny of non-GAAP reporting (White 2016) and ends in 2019 because it is the last full year of data in the Bentley et al. (2018) dataset.[13] Evidence related to this more recent enforcement environment should also be more relevant to policymakers who

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[13] Ending the sample in 2019 also removes any irregular effects that COVID 19 might have on firm disclosure.

question whether having auditors audit non-GAAP reporting would improve the quality of non-GAAP metrics. We eliminate observations for which we cannot successfully retrieve the 10-K/Q or the earnings announcement as these filings are required for our analyses. Further, we remove observations in the finance, insurance, and real estate investment trust industries given the different reporting requirements in these industries. We also remove observations missing information required to calculate variables used in equation (1).

Next, we identify and extract segment footnotes from the 10-K/Qs since these notes can contain non-GAAP metrics that are subject to audit. Within the segment notes, we search for common non-GAAP metrics and find that adjusted EBITDA is the most commonly used non-GAAP metric.[14] Thus, we focus our analyses on adjusted EBITDA metrics. Using this sample, we conduct keyword searches to identify whether the earnings announcement for the fiscal quarter includes adjusted EBITDA and extract the sentences containing an EBITDA metric. We then hand collect the numerical value of adjusted EBITDA from these sentences.[15] Focusing on firms where we collect an adjusted EBITDA number from their earnings announcements, we identify whether the segment notes for these firms also contain the adjusted EBITDA metric.[16,17]

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[14] We searched for EBITDA, adjusted EBITDA, non-GAAP EPS, non-GAAP income, and free cash flow. Our search terms also included variations of these terms such as adjusted EPS or non-GAAP earnings etc. While adjusted EBITDA was the first most common term, EBITDA (not adjusted) was the second most common term, and about 60% of filings that mentioned EBITDA also mentioned adjusted EBITDA. The remaining terms rarely appeared.

[15] Although we used multiple research assistants to collect the data, each data point was only collected by one research assistant. Therefore, we also had a different set of research assistants re-collect a random sample of 20% of our initial collection to examine its accuracy. We find that the accuracy exceeds 96%.

[16] We note that firms usually report the annual value of adjusted EBITDA in their segment note in quarter 4, but report both a quarterly and an annual value in the earnings announcement. Given that our analysis is done at the quarterly level, we use the quarterly number from the earnings announcements in our tests and consider firms that report the annual numbers in the segment note as having their EBITDA measures audited.

[17] We find that adjusted EBITDA measures in segment notes typically match the adjusted EBITDA measures in earnings announcements. On the rare occasion when the numbers do not match, we ensure that the firm reconciles their adjusted EBITDA measure in the segment note to GAAP earnings because the difference between the adjusted EBITDA measures in the segment note and earnings announcement is typically found in the adjusted EBITDA reconciliation (e.g., headquarter performance). We classify both scenarios as having audited adjusted EBITDA metrics. Firms mentioning adjusted EBITDA in their segment note without disclosing a numerical value are treated as not having an audited adjusted EBITDA metric. Appendix B provides an example of a treated observation.

Our final sample consists of 8,005 firm-quarters, from 1,041 unique firms, with a segment note in the financial statements and an adjusted EBITDA metric reported in the earnings announcement. Table 1 provides detailed information about our sample composition.

4. Descriptive Evidence and Determinants of Segment Reporting

Table 2 presents descriptive statistics comparing firm-quarters reporting adjusted EBITDA in both the earnings announcement and segment note to firm-quarters reporting adjusted EBITDA only in the earnings announcement.[18] First, we find that 1,315 observations (16.4% of the sample) report an adjusted EBITDA metric in their segment disclosures. We also find the two sets of firms differ on several dimensions. For example, firms with adjusted EBITDA in their segment notes are larger (*Ln(Assets)*), more profitable and levered (*ROA* and *Leverage*), more likely to employ a *Big 4* auditor, have higher analyst following and institutional ownership (*Ln(Analysts)* and *Institutional Ownership*), and have lower book-to-market ratios and earnings volatility (*BTM* and *Earnings Volatility*) ($p < 0.05$). Firms in our sample report five segments, on average, with the number of segments being similar across firms that do and do not disclose adjusted EBITDA in segment notes, and adjusted EBITDA across the sample is 3% of assets. We group EBITDA exclusions into two categories. First, ITDA exclusions are generally well defined and relate to the exclusion of interest, tax, depreciation, and amortization. Second, non-ITDA exclusions are not well defined, are largely at managers' discretion, and relate to the EBITDA exclusions beyond the ITDA adjustments. We find that firms exclude ITDA expenses equal to 2% of assets, on average, and make additional adjustments for non-ITDA expenses equal to 1% of assets.

Next, we move beyond the univariate comparisons in Table 2 and use the following ordinary least squares (OLS) regression to examine managers' decisions to disclose adjusted

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[18] We winsorize continuous variables at the 1st and 99th percentiles throughout our analyses to minimize the influence of outliers.

EBITDA in segment notes:[19]

$$Segment\ NG_{it} = \beta_1\ Ln(Assets)_{it} + \beta_2\ \#\ Segments_{it} + \beta_3\ BTM_{it} + \beta_4\ Sales\ Gr_{it} +$$
$$\beta_5\ Loss_{it} + \beta_6\ ROA_{it} + \beta_7\ Earnings\ Volatility_{it} + \beta_8\ Leverage_{it} +$$
$$\beta_9\ Total\ Accruals_{it} + \beta_{10}\ Ln(Analysts)_{it} + \beta_{11}\ Institutional\ Ownership_{it} +$$
$$\beta_{12}\ Big\ 4_{it} + \beta_{13}\ FQ4_{it} + FF48\ FE + Year\ FE + \varepsilon_{it} \qquad (1)$$

where *Segment NG* is an indicator variable set to one if the firm includes adjusted EBITDA in its segment note. The subscripts *i* and *t* index firms and quarters, respectively. We examine a wide set of potential determinants, as it is unclear, ex ante, why a firm would use adjusted EBITDA to evaluate segment performance over a different evaluation metric (GAAP or non-GAAP).[20] We include firm size and complexity (*Ln(Assets)* and *# Segments*) as larger firms with more segments may be more likely to rely on non-GAAP metrics to more directly compare core performance across the segments. We also include growth, profitability, and other risk factors. Specifically, we examine book-to-market (*BTM*), sales growth (*Sales Gr*), the presence of a loss quarter (*Loss*), return on assets (*ROA*), earnings volatility (*Earnings Volatility*), leverage (*Leverage*), and total accruals (*Total Accruals*). Next, we examine whether external monitoring (*Ln(Analysts)* and *Institutional Ownership*) or auditor size (*Big 4*) are associated with using adjusted EBITDA to evaluate segment performance. Finally, we examine whether firms are more likely to use adjusted EBITDA to measure segment performance during the fourth fiscal quarter (*FQ4*) when firms more commonly report transitory items (Bradshaw and Sloan 2002). We cluster standard errors by firm and include industry and calendar-year fixed effects to control for time-invariant differences across

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[19] Greene (2004) shows that using an OLS model when examining a dichotomous variable reduces potential bias from fixed effects and does not result in biased or inconsistent coefficients or standard errors.

[20] During our sample period, segment reporting requires firms to report the measure that chief operating decision makers (CODM) use to assess segment performance. If the CODM uses multiple measures, firms are required to disclose the one that is most consistent with GAAP. Further, during our sample period, there appears to be confusion as to whether firms can disclose more than one measure (FASB 2023, BC49), and the SEC appears to be against disclosing a non-GAAP metric when a GAAP metric is also used to assess segment performance (EY 2023, 4.1.4). Thus, in our sample, managers have a choice in determining which measure is most useful for assessing segment performance, and thus some choice in determining which measure they subject to auditor oversight. After our sample period, firms are explicitly allowed to report multiple segment performance measures (see ASU 2023-07).

industries and for macroeconomic conditions.

Column 1 of Table 3 presents the results from estimating equation (1). Although Table 2 indicates that several variables differ across firms that include versus do not include adjusted EBITDA in their segment notes, we find few significant determinants in Table 3. In particular, larger firms, less profitable firms, firms with lower institutional ownership, and firms with a Big 4 auditor are significantly associated with the likelihood of firms reporting adjusted EBITDA in their segment notes ($p < 0.1$). The coefficients on the remaining variables are insignificant. In column 2, we include four additional determinants that capture potentially aggressive reporting.[21] Specifically, we include measures for (1) the extent to which managers obfuscate financial statements (*Bog Index*), (2) when firms report positive GAAP earnings (*Meet/Beat GAAP EPS*), (3) when firms miss their GAAP forecast but meet their non-GAAP forecast (*Meet/Beat*), and (4) when firms report non-GAAP EPS that exceeds analysts' metrics (*Exceed*). The coefficients on these four variables are insignificant, while the inferences from column 1 remain unchanged. Overall, only a few variables help distinguish whether firms disclose adjusted EBITDA in their segment notes versus only in their earnings announcements.

5. Quality of audited adjusted EBITDA

5.1. Primary results

To test H1, we examine how audits affect the quality of adjusted EBITDA exclusions. Prior research often measures non-GAAP exclusion quality based on how exclusions map into future operating performance, which we term as "exclusions persistence" (Doyle et al. 2003; Kolev et al. 2008; Bentley et al. 2018). As exclusions become more persistent, the literature views their quality as decreasing since the exclusions relate more to firms' core operations and it is unclear why

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[21] We exclude these variables from column 1 because their data requirements substantially reduce our sample size (8,005 to 4,320 observations).

managers would exclude these items. If audits improve the quality of adjusted EBITDA, we expect

EBITDA exclusions to have lower persistence when audited, and, thus, be of higher quality. We

test this assertion using the following OLS regression:

$$Future\ Perf_{it+1,t+4} = \beta_1\ Segment\ NG_{it} + \beta_2\ Adj\ EBITDA_{it} + \beta_3\ Adj\ EBITDA_{it}\ x\ Segment\ NG_{it} +$$
$$\beta_4\ ITDA_{it} + \beta_5\ ITDA_{it}\ x\ Segment\ NG_{it} + \beta_6\ Non\text{-}ITDA\ Excl_{it} +$$
$$\beta_7\ Non\text{-}ITDA\ Excl_{it}\ x\ Segment\ NG_{it} + Controls + FF48\ FE +$$
$$Year\ FE + \varepsilon_{it} \qquad (2)$$

Future Perf represents the sum of either operating cash flows (*Op C/F*) or operating

earnings (*Op Earn*) over the four quarters after the earnings announcement. *Segment NG* is as

previously defined. *Adj EBITDA* is the quarterly adjusted EBITDA number, in millions, reported

by the firm in their earnings announcement. *ITDA* represents the sum of interest, taxes,

depreciation, and amortization, which we multiply by negative one so that expenses maintain a

negative value.[22] *Non-ITDA Excl* is calculated as the difference between EBITDA and adjusted

EBITDA. We scale the future performance, adjusted EBITDA, and exclusions variables by current

period total assets. We also include a vector of control variables (*Controls)* based on prior research

(e.g., Curtis et al. 2014). Specifically, we control for firm size (*Ln(Assets)*), book-to-market (*BTM*),

the presence of a loss quarter (*Loss*), sales growth (*Sales Gr*) and earnings volatility (*Earnings

Volatility*). We cluster standard errors by firm and include industry and calendar-year fixed effects.

To the extent that auditing adjusted EBITDA curbs aggressive reporting, we expect the

effect to concentrate within non-ITDA exclusions because managers have more discretion, and

more of an opportunity to be aggressive, with these exclusions. Thus, our primary variable of

interest is *Non-ITDA Excl x Segment NG*. To the extent managers exclude items associated with

future operating performance, the coefficient on the main effect for non-ITDA exclusions (*β6*) will

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[22] Compustat does not provide quarterly interest income, but rather includes it under other income/expenses. Thus, our EBITDA calculations contain some noise because of this.

be positive. If auditing improves the quality of exclusions, we expect the persistence of these exclusions to decline resulting in a negative coefficient on *Non-ITDA Excl x Segment NG* (β_7).

Table 4 presents the results from estimating equation (2). The dependent variable in column 1 (2) is future operating cash flows (future operating earnings). We find that the coefficient on *Adj EBITDA* is significantly positive in both columns (1.89 in column 1 and 2.11 in column 2), implying that $1 of adjusted EBITDA in quarter *t* is associated with $1.89 ($2.11) in operating cash flows (earnings) over the next four quarters. In contrast, the coefficient on *ITDA* is insignificant in column 1 and significant in column 2 (1.27). The insignificant result in column 1 is likely due to operating cash flows excluding depreciation and amortization, two primary components of ITDA, minimizing the extent to which these components can associate with future operating cash flows. Furthermore, the coefficients on *Adj EBITDA x Segment NG* and *ITDA x Segment NG* are insignificant, suggesting that the persistence of EBITDA and ITDA exclusions is not different when they are in segment notes and subject to audit. The ITDA results align with the notion that managers have less discretion, and less of an opportunity to be aggressive, with these exclusions compared to non-ITDA exclusions. Regarding non-ITDA exclusions, we find that these adjustments are positively associated with both future operating cash flows and earnings (0.49 and 0.73). The significantly negative coefficients on *Non-ITDA Excl x Segment NG* (-0.30 and -0.43), however, indicate that non-ITDA exclusions are less persistent when adjusted EBITDA is audited. Thus, these results are consistent with auditing adjusted EBITDA improving the quality of these metrics because the non-ITDA exclusions relate to more transitory items.

5.2. Cross-sectional results, entropy balancing, and non-audited non-GAAP metrics

Next, we use several analyses to examine the strength of our primary results and to rule out alternative explanations. One alternative explanation for our findings is that firms using adjusted

EBITDA to measure segment performance may be more committed to ensuring that these measures are of high quality. As such, it is not the auditor that improves the quality of adjusted EBITDA, but simply that firms ensure quality is higher when they use these measures to examine segment performance. We examine this alternative explanation using cross-sectional tests based on the strength of corporate governance and managerial ability. Prior research indicates that firms with better corporate governance provide higher quality non-GAAP EPS (Frankel et al. 2011) and that firms with higher ability managers provide higher quality earnings (Demerjian et al. 2013). Thus, if firm commitment, and not auditor oversight, explains our results, our primary inferences should concentrate in settings where firms have relatively strong corporate governance and more capable managers since these firms should be most capable of producing high-quality adjusted EBITDA metrics. We define weak versus strong corporate governance based on whether the percent of independent directors for a firm is below or above the sample median. Similarly, we define low versus high managerial ability based on whether the updated managerial ability measure from Demerjian et al. (2012) for a firm is below or above the sample median.[23]

We present the results related to corporate governance in Table 5. Similar to Table 4, columns 1 and 2 examine persistence based on future operating earnings and cash flows, but focus on observations with weaker corporate governance. Columns 3 and 4 capture observations with stronger corporate governance. Consistent with auditors improving the quality of adjusted EBITDA, our results hold when corporate governance is weaker. That is, the coefficients on *Non-ITDA Excl x Segment NG* are negative and significant in columns 1 and 2. Further, the coefficients on *Non-ITDA Excl x Segment NG* in columns 3 and 4 are insignificant, which further mitigates concerns that firm commitment explains our results.

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[23] Data requirements for board independence and managerial ability result in lost observations in both analyses.

We present the results related to managerial ability in Table 6. Columns 1 and 2 focus on observations with lower managerial ability, and columns 3 and 4 capture observations with higher managerial ability. Consistent with auditors improving the quality of adjusted EBITDA, we find that our results hold when managers are less capable. That is, we find that the coefficients on *Non-ITDA Excl x Segment NG* are negative and significant in columns 1 and 2. Further, we do not find strong evidence that managers with high ability have higher quality EBITDA metrics when adjusted EBITDA is reported in their segment notes. The coefficient on *Non-ITDA Excl x Segment NG* in column 3 is insignificant and in column 4 is significant at the 10% level.

A second alternative explanation for our evidence is that firms with more informative EBITDA measures are more likely to use adjusted EBITDA to evaluate segment performance. In this scenario, our results capture a firm's underlying adjusted EBITDA quality through a firm's choice to include these metrics in their segment reporting, and not the effect of auditing adjusted EBITDA. We address this concern in several ways. First, if managers include EBITDA metrics in their segment notes because they are particularly informative about firm performance, we expect the relation between EBITDA and future operating performance to be significantly larger when EBITDA is disclosed in segment notes. The results in Table 4, however, do not support this expectation. In particular, we find no evidence that adjusted EBITDA maps more strongly into future operating performance when included in segment notes (the coefficient on *Adj EBITDA x Segment NG* is insignificant).[24]

We also examine this alternative explanation by exploring variation in auditor effects on exclusion quality. If auditors affect exclusion quality, as opposed to managers simply including EBITDA in segment notes when EBITDA is more informative, we expect our results to

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[24] Further, we fail to find evidence of a significantly positive coefficient on *Adj EBITDA x Segment NG* in 18 of the 20 regression analyses across Tables 4-9 (at p-value ≤ 0.10).

concentrate in cross-sections where auditors are more likely to improve the quality of exclusions. In our first auditor-related cross-section, we consider exclusion materiality. Auditors take materiality into account when planning and performing an audit and evaluating misstatements (see PCAOB Auditing Standard 2105 and 2810). As an amount gets larger, it becomes more material, and auditors obtain more assurance over more material amounts to reduce the risk of material misstatement. Thus, we expect our primary inferences to concentrate in settings where firms exclude more material items from their adjusted EBITDA. To examine this setting, we split our sample based on the median value of the absolute magnitude of non-ITDA exclusions.

Table 7 presents results, which are consistent with auditors considering materiality when auditing non-ITDA exclusions. Specifically, the coefficient on *Non-ITDA Excl x Segment NG* is negative and statistically significant when non-ITDA exclusions are more material (columns 1 and 2) and insignificant when these exclusions are less material (columns 3 and 4). These results indicate that audits of adjusted EBITDA improve the quality of these metrics when non-ITDA exclusions are more material, but not when the exclusions are less material.[25]

In our second auditor cross-section, we examine auditor quality. Higher quality auditors impact financial reporting quality to a greater extent than lower quality auditors, as evidenced by higher quality auditors being associated with higher financial reporting quality (see DeFond and Zhang 2014). Thus, we expect our primary inferences to concentrate in settings where firms engage higher quality auditors. To examine this, we split our sample based on auditor quality. We define audit offices as high quality if they have zero income-increasing misstatements in year *t* and as

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[25] As an alternative way to examine the effect of materiality, we use 1% of total assets as a potential materiality benchmark (Eilifsen and Messier 2015). Our inferences continue to hold using this alternative design (untabulated).

low quality offices otherwise.[26] We identify income-increasing misstatements by using the misstatement period from restatement announcements.[27]

Table 8 presents results after splitting observations on auditor quality. We find results consistent with auditor quality affecting the quality of audited adjusted EBITDA. Specifically, the coefficient on *Non-ITDA Excl x Segment NG* is negative and statistically significant when audited by higher quality audit offices (columns 1 and 2) and insignificant when audited by lower quality audit offices (columns 3 and 4). These results indicate that audits of adjusted EBITDA improve the quality of these metrics when audited by high, but not low, quality auditors.

We perform two additional analyses to address the "more informative" alternative explanation. First, we use entropy balancing to align firm fundamentals across firms with and without audited adjusted EBITDA. In particular, we re-estimate equation (2) after performing entropy balancing on the first three moments for all control variables in equation (2) (Hainmueller 2012). Table 9 presents the results. Inferences are the same as those from our primary analysis. The coefficients on *Non-ITDA Excl x Segment NG* are negative and significant in both columns.[28]

Second, if firms with more informative non-GAAP measures are more likely to provide adjusted EBITDA in their segment notes, we would expect the quality of their other non-GAAP measures to also be of higher quality even though these measures are not audited. Using firm-quarters in our sample that also report non-GAAP EPS per Bentley et al. (2018), we examine whether non-GAAP EPS exclusions are of higher quality for firms with audited adjusted EBITDA. We focus on non-GAAP EPS (*Non-GAAP EPS*) because it is the most commonly examined non-

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[26] It is possible that this design is more likely to identify smaller audit offices as being of higher quality, and Francis et al. (2013) find that larger audit offices have higher audit quality. To examine the robustness of our results, we control for the number of audit office clients and draw the same inferences (untabulated).

[27] For example, if a restatement is announced on February 27, 2019 stating that financial statements for year-ends December 31, 2017 and 2016 will be restated, we would identify years 2017 and 2016 as being misstated.

[28] Inferences are the same if we instead perform entropy balancing on all of the variables included in the determinants analysis as per equation (1) (untabulated).

GAAP metric in the literature. Following Kolev et al. (2008), we decompose total non-GAAP EPS exclusions into special items (*Special Items Excl*) and other (*Other Excl*) exclusions. We then interact *Non-GAAP EPS*, *Special Items Excl*, and *Other Excl* with *Segment NG*. A negative coefficient on *Special Items Excl x Segment NG* or *Other Excl x Segment NG* would be indicative of a selection bias (i.e., firms disclosing adjusted EBITDA have more informative non-GAAP metrics in general). Table 10 presents the results. We fail to find a statistically significant coefficient for either interaction term in columns 1 and 2. These findings suggest that our primary results are not due to firms with audited adjusted EBITDA simply having higher quality non-GAAP metrics more generally. Instead, these findings further suggest that our primary results are due to an improvement in exclusion quality as a result of adjusted EBITDA being audited.

6. Alternative measures for adjusted EBITDA quality

6.1. Analysts' non-GAAP reporting

Although non-GAAP exclusion persistence is a primary measure of non-GAAP reporting quality in prior research, other measures of non-GAAP quality exist. Therefore, we next use alternative quality measures to examine whether auditing adjusted EBITDA improves its quality. Bentley et al. (2018) find that analysts are less likely to agree with managers' non-GAAP reporting when the quality of managers' non-GAAP metrics is lower. Thus, if analysts perceive managers' non-ITDA exclusions to be aggressive or unreasonable, then analysts are more likely to provide an adjusted EBITDA number that differs from managers' metrics. However, if auditing improves the quality of managers' adjusted EBITDA metrics, then we expect analysts to be more likely to corroborate managers' metrics that are audited. We present the results in Panel A of Table 11.

The first (second) column presents firm-quarters that do not (do) include adjusted EBITDA in the segment notes. In each column, we group observations based on whether (1) the analyst

reported the same numerical value for adjusted EBITDA as managers (*Both – Agree*); (2) the analyst reported a different adjusted EBITDA value (*Both – Disagree*); or (3) the analysts did not report an adjusted EBITDA measure (*Manager Only*).[29] Concentrating on firm-quarters that do not disclose adjusted EBITDA in their segment notes (column 1), we observe that analysts agree with managers' EBITDA disclosures for 61.7% of the observations and they provide an adjusted EBITDA measure that differs from that of managers for 28.9% of the observations. For 9.4% of the observations, analysts do not report an EBITDA measure at all, although managers disclose one. Thus, analysts differ from managers 38.3% of the time (28.9% + 9.4%) when managers report unaudited adjusted EBITDA. For firms with audited adjusted EBITDA (column 2), analysts are significantly more likely to agree with managers. In particular, analysts agree with managers in 70.8% of the cases, which represents a 14.8% increase in agreement (70.8% versus 61.7%; difference is statistically significant), while analysts disagree for only 29.2% of observations.

Next, we further restrict the comparison of managers' and analysts' reporting to settings where managers may be aggressive in their non-GAAP reporting. We focus on "meet/beat" scenarios where firms miss analysts' GAAP forecasts but barely meet analysts' adjusted EBITDA forecasts. Thus, non-GAAP reporting in these scenarios allows a firm to meet expectations that were otherwise missed on a GAAP basis, which could represent instances where (1) managers report more aggressively (Donelson et al. 2012; Doyle et al. 2013) and (2) analysts are wary of agreeing with managers' potentially aggressive metrics. If auditing improves the quality of adjusted EBITDA, we expect the audit to temper analysts' concerns about aggressive non-GAAP reporting, resulting in analysts being more likely to agree with managers. We use three different approaches to capture the idea of "just beating." We consider cases where the firm meets or beats

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[29] As our final sample requires managers to provide a quarterly adjusted EBITDA number, we have no instances where analysts report adjusted EBITDA but managers do not.

the forecast by a maximum of two cents per share, 2% of the forecast, or 0.5% of total assets.

Panel B of Table 11 presents the results. Similar to Panel A, column 1 (2) concentrates on firm-quarters that do not (do) report adjusted EBITDA in their segment notes. Across all scenarios, analysts are more likely to agree with managers' adjusted EBITDA metrics when the metrics are audited. The differences are economically meaningful. For example, when examining cases where the reported EBITDA number meets or beats the forecast by up to 2% of the forecasted number, analysts are 19% more likely to agree with managers' adjusted EBITDA metric (88% versus 74%) when it is audited. Overall, these results again support our primary inference that audits of adjusted EBITDA improve the quality of these metrics.

6.2. Prominence in earnings announcements

We next examine a third measure of non-GAAP reporting quality, the prominence of adjusted EBITDA in firms' earnings announcements. Prior research finds that firms disclose higher quality non-GAAP earnings more prominently in their earnings announcements (Chen et al. 2021). If auditing EBITDA improves its quality, we expect firms to present audited EBITDA metrics more prominently in their earnings announcements. We use the following OLS regression:

$$Prominence_{it} = \beta_1\,Segment\,NG_{it} + Controls + FF48\,FE + Year\,FE + \varepsilon_{it} \qquad (3)$$

where *Prominence* relates to one of two variables. First, we examine how early firms reference adjusted EBITDA in their earnings announcements (*Adj EBITDA Prom*). We identify the character position corresponding to the first reference to an adjusted EBITDA term and scale this amount by the total number of characters in the earnings announcement. We multiply this value by negative one so that larger values indicate more prominent disclosure. Second, we examine the distance between the first reference to adjusted EBITDA and GAAP EPS. Specifically, we subtract the character position corresponding to the first numeric disclosure of GAAP EPS or reference to a

net income term such as net income, net loss etc. (the earliest of the two) from the character position corresponding to the first reference to adjusted EBITDA. We scale this value by the total number of characters in the earnings announcement and multiply by negative one so that larger values imply higher prominence (*Relative Adj EBITDA Prom*). A positive coefficient for *Segment NG* suggests a more prominent disclosure indicating higher quality adjusted EBITDA metrics.

Controls refers to a vector of variables that likely affect adjusted EBITDA prominence. Similar to Chen et al. (2021), we control for size (*Ln(Assets)*), book-to-market (*BTM*), earnings volatility (*Earnings Volatility*), sales growth (*Sales Gr*) and the presence of a loss quarter (*Loss*). We include industry and calendar-year fixed effects and cluster standards errors at the firm level.

We present the results from estimating equation (3) in Table 12. Column 1 presents results regarding the overall placement of the first reference to adjusted EBITDA. The coefficient of *Segment NG* is significantly positive, suggesting that firms report adjusted EBITDA earlier in their earnings announcement when the number is subject to audit. Column 2 presents results related to the distance between the placement of adjusted EBITDA and the first mention of GAAP earnings. We again find a significantly positive coefficient on *Segment NG*. Overall, the results suggest that audits of adjusted EBITDA improve the quality of adjusted EBITDA.

7. Audited versus reviewed financial statements

Throughout our analyses, we group all four fiscal quarters together. As noted in Auditing Standard 4105, however, auditors provide different levels of assurance based on filing type. Specifically, auditors review form 10-Q and audit form 10-K. This results in the first three fiscal quarters being initially reviewed (for the respective 10-Q filings) and then all quarters being subject to audit during the annual audit of the 10-K. Because audits are subject to a more stringent set of standards than are reviews (where reviews typically consist of analytical procedures and

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inquiries), it is possible that auditors improve the quality of non-GAAP numbers more when they audit, as opposed to when they review, non-GAAP metrics. There are reasons, however, why this may not be the case. For example, annual non-GAAP earnings are the sum of the four quarterly numbers. As such, managers know throughout the year that these quarterly numbers will be subject to an audit as part of the annual EBITDA metric. Knowing that information in quarterly reports will eventually be subject to an audit could constrain managers' aggressive reporting during the first three fiscal quarters (PCAOB 2017).

In untabulated tests, we split the sample based on the first three fiscal quarters versus the fourth fiscal quarter. The results suggest that auditor oversight improves the quality of adjusted EBITDA both during reviews of 10-Qs as well as audits of 10-Ks. Thus, results suggest that inferences are not conditional on whether the initial segment disclosures are reviewed versus audited. We do not draw conclusions about the effectiveness of a review versus an audit because almost all of our treated observations for quarters one through three have a corresponding treated observation for quarter four.

8. Conclusion

We examine whether the quality of non-GAAP metrics increases when they are subject to an external audit. Auditors currently have limited responsibility with respect to non-GAAP earnings disclosures because managers primarily disclose non-GAAP earnings outside of financial statements, most often in the earnings announcement. When non-GAAP information is disclosed in this manner, the auditor is not required to audit this information. Thus, auditors typically do not audit non-GAAP earnings.

Prior studies (e.g., Feng et al. 2023; Heflin et al. 2024) provide evidence of a link between auditors and non-GAAP reporting, but are unable to examine whether auditing improves non-

GAAP reporting because the non-GAAP metrics they examine are outside the scope of the audit. In contrast to these prior studies, we identify a unique setting where non-GAAP earnings are in-scope for the financial statement audit. Specifically, we examine segment notes in the financial statements that disclose adjusted EBITDA metrics.

We use a sample of multi-segment firm-quarters that disclose adjusted EBITDA in their earnings announcements, and identify a subset of these firms that also disclose these EBITDA measures in their segment notes. Thus, we compare the quality of adjusted EBITDA metrics that are reported in both the earnings announcement and segment note (which captures metrics that are subject to audit) to the quality of adjusted EBITDA metrics that are reported only in the earnings announcement (which captures metrics that are not subject to audit).

We find that the association between non-ITDA exclusions and future operating performance declines when adjusted EBITDA is audited, which is consistent with auditing non-GAAP metrics directly improving the quality of such metrics. There are two alternative explanations for this finding. First, results could be due to a firm commitment, as opposed to auditor oversight, to having high-quality adjusted EBITDA. However, we find that our results concentrate in scenarios with below median board independence and managerial ability, casting doubt that a firm commitment to high quality EBITDA metrics explains our results. A second alternative explanation for our evidence is that firms with more informative EBITDA metrics are more likely to use adjusted EBITDA to evaluate segment performance. However, we do not find that adjusted EBITDA has a higher mapping with future operating performance when disclosed in segment notes versus in the earnings announcement alone. Further, our results concentrate in settings where auditors are more likely to improve the quality of non-ITDA exclusions (i.e.,

settings with more material non-ITDA exclusions and with higher quality auditors). These analyses cast doubt that the "more informative" EBITDA explanation explains our results.

In further analyses, we examine alternative measures of non-GAAP reporting quality to examine how auditors affect the quality of adjusted EBITDA. First, we find that analysts' EBITDA metrics are more likely to agree with managers' metrics when managers' EBITDA metrics are audited. We also find that managers report adjusted EBITDA more prominently in their earnings announcements when the measure is subject to audit. Collectively, these results provide further support that adjusted EBITDA metrics are of higher quality when they are audited.

We contribute to the accounting literature in several ways. First, we contribute to the intersection of non-GAAP reporting and auditors by providing more direct evidence that auditing non-GAAP metrics can improve their quality. Second, we complement studies examining non-GAAP metrics other than non-GAAP EPS. Prior research has primarily focused on non-GAAP EPS, while our study examines adjusted EBITDA, and research finds that EBITDA is among the most frequently used non-GAAP metrics by professional investors (CFA 2016). Finally, we also create and make publicly available the dataset of managers' adjusted EBITDA disclosures, which should be useful in future research.

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Appendix A: Variable Definitions

Variable	Definition
Adj EBITDA	Quarterly adjusted EBITDA retrieved from the earnings announcement scaled by total assets at quarter end.
Adj EBITDA Prom	The prominence of adjusted EBITDA in the earnings announcement. It is calculated as the position character of the first mention of adjusted EBITDA in the earnings announcement scaled by the total number of characters in the earnings announcement. We multiply by negative one so higher values will indicate higher prominence.
Auditor–Inc Incr Misstatement	An indicator variable set to one if the auditor of the firm has any client with an income-increasing misstatement in year t. We define misstatements as instances in which the current fiscal year's annual financial statements are eventually restated. Calculations are done at the audit-office level.
Big 4	An indicator variable set to one if the firm engages a Big 4 auditor.
Bog Index	Bog index as per Bonsall, Leone, Miller and Rennekamp (2017) as of the most recent fiscal year end. We divide the Bog index by 100 for presentation purposes.
BTM	Shareholders' equity scaled by market value of equity at quarter end.
Earnings Volatility	Standard deviation of *ROA* over the prior eight quarters. We require at least five quarters with available data.
Exceed	An indicator variable set to one if the quarterly non-GAAP EPS number provided by the manager exceeds the one disclosed by IBES; zero otherwise.
FQ4	An indicator variable set to one for the fourth fiscal quarter; zero otherwise.
Institutional Ownership	Ratio of institutional ownership to total shares outstanding.
ITDA	The sum of quarterly interest expense, depreciation and amortization expense, and income tax expense scaled by total assets at quarter end and multiplied by negative one.
Leverage	Leverage calculated as total liabilities scaled by total assets at quarter end.
Loss	An indicator variable set to one if the quarterly net income is negative; zero otherwise.
Ln(Assets)	Natural logarithm of total assets in million at quarter end.
Ln(# Analysts)	Natural logarithm of one plus the total number of analysts following the firm.
Mgr Ability	Managerial ability based on the updated measure from Demerjian et al. (2013). Demerjian et al. (2013) estimate the measure at the annual level. We assign the annual value to the quarterly observations.
Meet/Beat GAAP EPS	An indicator variable set to one if the firm meets or beat analysts' quarterly GAAP EPS forecast; zero otherwise.
Meet/Beat	An indicator variable set to one if the firm misses analysts' quarterly GAAP EPS forecast, but meets analysts' quarterly non-GAAP EPS forecast; zero otherwise.
Non-GAAP EPS	Non-GAAP EPS multiplied by common shares for diluted EPS and scaled by total assets at quarter end.

Appendix A, Continued

Variable	Definition
Non-ITDA Excl	The difference between quarterly EBITDA and *Adj EBITDA* scaled by total assets at quarter end. EBITDA is defined as quarterly net income adjusted for *ITDA*.
Op C/F$_{[t+1, t+4]}$	Cash flows from operations over the following four quarters scaled by current quarter's total assets.
Op Earn$_{[t+1, t+4]}$	Operating earnings over the following four quarters scaled by current quarter's total assets. Operating earnings are calculated as diluted earnings per share multiplied by common shares used to calculate earnings per share.
Other Excl	The difference between total non-GAAP EPS exclusions and *Special Items Excl* scaled by total assets at quarter end.
Relative Adj EBITDA Prom	Distance between discussing adjusted EBITDA and GAAP EPS or net income/loss/earnings. Specifically, it is the difference between the character position of the earliest mention of adjusted EBITDA and the character position of the numeric value of GAAP EPS or the mention of net income/loss/earnings, whichever comes first, scaled by the total number of characters in the earnings announcement. We multiply by negative one so higher values will indicate higher prominence.
ROA	Return on assets calculated as quarterly income before extraordinary items scaled by total assets at quarter end.
Sales Gr	The difference between current quarter's sales and sales as of four quarter ago scaled by current quarter's total assets.
Segment NG	An indicator variable set to one if the firm-quarter reports adjusted EBITDA in the segment notes; zero otherwise.
Special Items Excl	The difference between net income and operating income scaled by total assets at quarter end.
Total Accruals	Total accruals calculated as the difference between quarterly net income and cash flows from operating activities scaled by total assets at quarter end.
|Non-ITDA Excl|	Absolute value of *Non-ITDA Excl*.
% Board Independence	Percent of independent directors for the fiscal year.
# Segments	Total number of segments as of the most recent fiscal year end.

Appendix B: Segment Note Example

Excerpt 1: Earnings Announcement Disclosure

Adjusted EBITDA of $227.2 million for the second quarter compared with $251.1 million in Q2 2016. This result was led by the impact of lower average pricing, and also included slightly lower volume driven by Latin America and EMEA, modest variable cost pressure and negative foreign currency translation. These factors were offset in part by savings from our operating improvement initiatives.

Excerpt 2: 10-Q Segment Allocation in Segment Note

| | Three Months Ended June 30, | | | | | |
| | 2017 | | | 2016 | | |
	Performance Coatings	Transportation Coatings	Total	Performance Coatings	Transportation Coatings	Total
Net sales [1]	$ 662.9	$ 425.6	$ 1,088.5	$ 630.6	$ 433.0	$ 1,063.6
Equity in earnings in unconsolidated affiliates	0.1	0.1	0.2	0.1	—	0.1
Adjusted EBITDA [2]	146.8	80.4	227.2	155.8	95.3	251.1
Investment in unconsolidated affiliates	3.0	11.8	14.8	3.9	11.2	15.1

Excerpt 3: 10-Q Adjusted EBITDA Reconciliation in Segment Note

| | Three Months Ended June 30, | | Six Months Ended June 30, | |
	2017	2016	2017	2016
Income (loss) before income taxes	$ (9.4)	$ 68.9	$ 66.4	$ 115.7
Interest expense, net	35.6	47.8	71.4	97.9
Depreciation and amortization	84.9	78.6	167.3	154.6
EBITDA	111.1	195.3	305.1	368.2
Debt extinguishment and refinancing related costs (a)	12.4	2.3	12.4	2.3
Foreign exchange remeasurement losses (b)	6.0	18.0	4.8	25.5
Long-term employee benefit plan adjustments (c)	0.1	0.7	0.5	1.3
Termination benefits and other employee related costs (d)	—	7.0	0.8	8.9
Consulting and advisory fees (e)	—	2.6	(0.1)	5.6
Transition-related costs (f)	3.9	—	3.9	—
Offering and transactional costs (g)	6.6	1.4	5.6	1.4
Stock-based compensation (h)	10.9	11.4	21.3	21.6
Other adjustments (i)	2.6	1.9	2.8	3.7
Dividends in respect of noncontrolling interest (j)	(0.5)	—	(0.9)	(1.5)
Deconsolidation impacts and impairments (k)	74.1	10.5	74.1	10.5
Adjusted EBITDA	$ 227.2	$ 251.1	$ 430.3	$ 447.5

Appendix B presents excerpts from Axalta Coating Systems Ltd's earnings announcement (Excerpt 1) and 10-Q (Excerpts 2 and 3) for the quarter ending June 30, 2017. Excerpt 1 presents the disclosure of adjusted EBITDA in the earnings announcement. Excerpt 2 presents the disclosure of adjusted EBITDA broken down by segment as reported in the segment note included in the 10-Q. Excerpt 3 presents the reconciliation, provided by the company in the segment note included in the 10-Q, between income before income taxes and adjusted EBITDA.

Table 1: Sample Composition

Description	Observations
Initial sample	198,695
With fiscal quarter ending between 01/01/2016 and 12/31/2019	45,598
Successfully retrieving 10-K/Q and Earnings Announcement	45,552
Exclude financial institutions and firm-quarters with missing industry code	36,578
Require available information for the EBITDA components and other main variables	29,917
Require a Segment Note and quarterly Adj. EBITDA reported in Earnings Announcement	8,005

Table 1 presents information regarding the sample construction. The initial sample consists of all observations included in the Bentley et al. (2018) dataset.

Table 2: Descriptive Statistics

	Adj. EBITDA in EA and Segm. Note				Adj. EBITDA only in EA				Diff
	N	Mean	Median	S.D.	N	Mean	Median	S.D.	
Ln(Assets)	1,315	8.04	7.93	1.39	6,690	7.17	7.25	1.57	0.87***
# Segments	1,315	5.28	5.00	2.84	6,690	5.30	5.00	3.00	-0.02
BTM	1,315	0.46	0.38	0.54	6,690	0.51	0.41	0.69	-0.05***
Loss	1,315	0.30	0.00	0.46	6,690	0.36	0.00	0.48	-0.05***
Sales Gr	1,315	0.01	0.01	0.05	6,690	0.01	0.01	0.05	-0.00**
ROA	1,315	0.00	0.01	0.03	6,690	0.00	0.01	0.03	0.00***
Earnings Volatility	1,315	0.02	0.01	0.02	6,690	0.02	0.01	0.03	-0.00***
Leverage	1,315	0.69	0.68	0.20	6,690	0.63	0.61	0.25	0.06***
Ln(# Analysts)	1,315	2.12	2.20	0.67	6,690	1.85	1.95	0.78	0.27***
Institutional Ownership	1,315	0.71	0.84	0.31	6,690	0.69	0.82	0.31	0.02*
FQ4	1,315	0.26	0.00	0.44	6,690	0.26	0.00	0.44	-0.00
Big 4	1,315	0.92	1.00	0.27	6,690	0.77	1.00	0.42	0.15***
Total Accruals	1,315	-0.02	-0.02	0.03	6,690	-0.02	-0.01	0.04	-0.00
Meet/Beat GAAP EPS	1,259	0.41	0.00	0.49	5,978	0.45	0.00	0.50	-0.04
Bog Index	1,243	0.91	0.92	0.06	6,409	0.90	0.90	0.06	0.01
Meet/Beat	725	0.34	0.00	0.47	3,760	0.33	0.00	0.47	0.00
Exceed	738	0.03	0.00	0.16	3,894	0.05	0.00	0.22	-0.02
Adj EBITDA	1,315	0.03	0.03	0.02	6,690	0.03	0.03	0.02	0.00***
ITDA	1,315	-0.02	-0.02	0.01	6,690	-0.02	-0.02	0.01	0.00
Non-ITDA Excl	1,315	-0.01	-0.00	0.02	6,690	-0.01	-0.00	0.02	0.00
Op C/F$_{[t+1, t+4]}$	1,315	0.09	0.08	0.07	6,690	0.08	0.08	0.08	0.01***
Op Earn$_{[t+1, t+4]}$	1,315	0.02	0.02	0.08	6,690	0.01	0.03	0.09	0.01**
% Board Independence	558	0.80	0.85	0.11	2,903	0.81	0.86	0.09	-0.01
Mgr Ability	1,056	-0.05	-0.07	0.10	5,577	-0.04	-0.06	0.12	-0.01
|Non-ITDA Excl|	1,315	0.01	0.01	0.02	6,690	0.01	0.01	0.02	-0.00*
Auditor–Inc Incr Misstatement	1,315	0.48	0.00	0.50	6,690	0.47	0.00	0.50	0.01

Table 2 presents descriptive statistics for firms reporting adjusted EBITDA in the earnings announcement and the segment note versus those reporting the information only in the earnings announcement. Column Diff presents *t*-tests to test for significant differences between the mean values of the two groups. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. To minimize the influence of outliers, all continuous variables are winsorized at the 1 percent and 99 percent levels. Variables are defined in Appendix A.

Table 3: Determinants of Reporting Choice

VARIABLES	(1) Segment NG	(2) Segment NG
Ln(Assets)	0.04***	0.05***
	(3.28)	(3.30)
# Segments	-0.00	-0.00
	(-0.27)	(-0.95)
BTM	0.00	0.02
	(0.21)	(0.82)
Sales Gr	-0.06	-0.09
	(-0.46)	(-0.37)
Loss	-0.02	-0.01
	(-0.99)	(-0.29)
ROA	-0.55*	-0.97*
	(-1.72)	(-1.93)
Earnings Volatility	0.09	-0.13
	(0.31)	(-0.34)
Leverage	0.02	0.06
	(0.34)	(0.88)
Total Accruals	-0.05	0.14
	(-0.30)	(0.68)
Ln(# Analysts)	0.02	0.02
	(1.07)	(0.83)
Institutional Ownership	-0.09**	-0.12**
	(-2.26)	(-2.34)
Big 4	0.06**	0.07**
	(2.03)	(2.53)
FQ4	-0.00	-0.01
	(-0.60)	(-1.00)
Bog Index		0.28
		(1.20)
Meet/Beat GAAP EPS		-0.00
		(-0.02)
Meet/Beat		-0.02
		(-1.13)
Exceed		0.00
		(0.07)
Observations	8,005	4,320
R-squared	0.143	0.187
Fama-French 48 F.E.	Yes	Yes
Calendar Year F.E.	Yes	Yes

Table 3 presents results examining determinants of reporting adjusted EBITDA in the segment note. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. *t*-stats are presented in parentheses. Standard errors are clustered at the firm level. To minimize the influence of outliers, all continuous variables are winsorized at the 1 percent and 99 percent levels. Variables are defined in Appendix A.

Table 4: Exclusion Quality

VARIABLES	(1) $Op\ C/F_{[t+1,\ t+4]}$	(2) $Op\ Earn_{[t+1,\ t+4]}$
Segment NG	-0.01	-0.02**
	(-1.25)	(-2.32)
Adj EBITDA	1.89***	2.11***
	(14.72)	(14.18)
Adj EBITDA x Segment NG	0.07	0.26
	(0.22)	(0.76)
ITDA	0.18	1.27***
	(1.32)	(6.85)
ITDA x Segment NG	-0.33	-0.23
	(-1.18)	(-0.74)
Non-ITDA Excl	0.49***	0.73***
	(7.22)	(8.27)
Non-ITDA Excl x Segment NG	-0.30*	-0.43***
	(-1.87)	(-3.33)
Ln(Assets)	0.00	0.01***
	(0.90)	(7.14)
BTM	-0.00	-0.01***
	(-1.44)	(-2.85)
Loss	-0.01**	-0.02***
	(-2.24)	(-5.51)
Sales Gr	0.06**	0.01
	(2.11)	(0.33)
Earnings Volatility	-0.16**	-0.17**
	(-2.46)	(-2.50)
Observations	8,005	8,005
R-squared	0.389	0.500
Fama-French 48 F.E.	Yes	Yes
Calendar Year F.E.	Yes	Yes

Table 4 presents results examining whether the quality of the non-ITDA exclusions is higher for firms reporting adjusted EBITDA in the segment note. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. *t*-stats are presented in parentheses. Standard errors are clustered at the firm level. To minimize the influence of outliers, all continuous variables are winsorized at the 1 percent and 99 percent levels. Variables are defined in Appendix A.

Table 5: Exclusion Quality — Board Independence

VARIABLES	Below Median		Above Median	
	(1) $Op\ C/F_{[t+1,\ t+4]}$	(2) $Op\ Earn_{[t+1,\ t+4]}$	(3) $Op\ C/F_{[t+1,\ t+4]}$	(4) $Op\ Earn_{[t+1,\ t+4]}$
Segment NG	-0.02*	-0.03**	0.00	0.01
	(-1.66)	(-2.20)	(0.01)	(0.55)
Adj EBITDA	1.80***	1.26***	1.49***	1.57***
	(8.26)	(5.83)	(7.65)	(7.86)
Adj EBITDA x Segment NG	0.13	0.05	0.08	0.17
	(0.36)	(0.12)	(0.16)	(0.31)
ITDA	0.30**	0.71***	0.02	0.75***
	(2.00)	(3.89)	(0.08)	(2.87)
ITDA x Segment NG	-0.77**	-0.53*	0.47	0.92
	(-2.42)	(-1.73)	(0.98)	(1.63)
Non-ITDA Excl	0.64***	0.52***	0.41***	0.50***
	(5.97)	(4.68)	(4.27)	(4.69)
Non-ITDA Excl x Segment NG	-0.43***	-0.82***	-0.30	0.02
	(-2.65)	(-4.52)	(-1.36)	(0.10)
Ln(Assets)	-0.00*	0.00	-0.01**	-0.00
	(-1.84)	(1.02)	(-2.49)	(-0.42)
BTM	-0.02***	-0.05***	-0.01	-0.02***
	(-2.89)	(-5.38)	(-1.61)	(-4.55)
Loss	0.00	-0.02***	-0.00	-0.01**
	(0.61)	(-2.70)	(-0.48)	(-1.99)
Sales Gr	0.01	0.11***	0.16***	0.17***
	(0.26)	(2.68)	(3.04)	(3.14)
Earnings Volatility	-0.03	0.14	-0.16	-0.23**
	(-0.27)	(1.28)	(-1.55)	(-2.03)
Observations	1,932	1,932	1,527	1,527
R-squared	0.392	0.527	0.420	0.493
Fama-French 48 F.E.	Yes	Yes	Yes	Yes
Calendar Year F.E.	Yes	Yes	Yes	Yes

Table 5 presents results similar to Table 4 after splitting observations into those with below (Columns 1-2) versus above (Columns 3-4) median board independence. The median is calculated on a quarterly basis. There is sample attrition relative to Table 4 as we are not able to retrieve board independence information for all the observations in the sample. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. *t*-stats are presented in parentheses. Standard errors are clustered at the firm level. To minimize the influence of outliers, all continuous variables are winsorized at the 1 percent and 99 percent levels. Variables are defined in Appendix A.

Table 6: Exclusion Quality — Managerial Ability

VARIABLES	BelowMedian		Above Median	
	(1) $Op\ C/F_{[t+1,\ t+4]}$	(2) $Op\ Earn_{[t+1,\ t+4]}$	(3) $Op\ C/F_{[t+1,\ t+4]}$	(4) $Op\ Earn_{[t+1,\ t+4]}$
Segment NG	-0.01	0.00	0.01	-0.03*
	(-1.39)	(0.24)	(0.34)	(-1.70)
Adj EBITDA	1.73***	1.80***	2.00***	2.39***
	(8.54)	(6.53)	(11.22)	(13.28)
Adj EBITDA x Segment NG	-0.08	-0.54*	-0.13	0.32
	(-0.27)	(-1.84)	(-0.28)	(0.66)
ITDA	0.09	1.03***	0.32	1.54***
	(0.48)	(4.30)	(1.45)	(5.69)
ITDA x Segment NG	-0.52*	-0.24	0.06	-0.13
	(-1.93)	(-0.70)	(0.13)	(-0.22)
Non-ITDA Excl	0.28***	0.61***	0.70***	0.87***
	(3.48)	(4.91)	(6.96)	(7.03)
Non-ITDA Excl x Segment NG	-0.34**	-0.66***	-0.20	-0.39*
	(-2.21)	(-4.65)	(-0.80)	(-1.95)
Ln(Assets)	0.00	0.01***	-0.00	0.01***
	(1.43)	(3.66)	(-0.06)	(5.99)
BTM	-0.00	-0.02***	-0.00	-0.00
	(-1.13)	(-3.66)	(-0.47)	(-0.06)
Loss	-0.01**	-0.02***	-0.00	-0.01***
	(-2.23)	(-3.82)	(-0.18)	(-2.71)
Sales Gr	-0.00	0.03	0.07*	-0.02
	(-0.05)	(0.74)	(1.66)	(-0.49)
Earnings Volatility	-0.06	-0.15	-0.28***	-0.10
	(-0.66)	(-1.52)	(-3.12)	(-1.08)
Observations	3,320	3,320	3,312	3,312
R-squared	0.365	0.459	0.435	0.577
Fama-French 48 F.E.	Yes	Yes	Yes	Yes
Calendar Year F.E.	Yes	Yes	Yes	Yes

Table 6 presents results similar to Table 4 after splitting observations into those with below (Columns 1-2) versus above (Columns 3-4) median managerial ability. The median is calculated on a quarterly basis. There is sample attrition relative to Table 4 as we are not able to retrieve managerial ability information for all the observations in the sample. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. *t*-stats are presented in parentheses. Standard errors are clustered at the firm level. To minimize the influence of outliers, all continuous variables are winsorized at the 1 percent and 99 percent levels. Variables are defined in Appendix A.

Table 7: Exclusion Quality — Magnitude of Absolute non-ITDA Exclusions

VARIABLES	Above Median		Below Median	
	(1) $Op\ C/F_{[t+1,\ t+4]}$	(2) $Op\ Earn_{[t+1,\ t+4]}$	(3) $Op\ C/F_{[t+1,\ t+4]}$	(4) $Op\ Earn_{[t+1,\ t+4]}$
Segment NG	-0.01	-0.02*	-0.02**	-0.02**
	(-0.83)	(-1.94)	(-2.09)	(-1.98)
Adj EBITDA	1.78***	2.12***	2.06***	2.01***
	(11.67)	(11.95)	(12.79)	(9.28)
Adj EBITDA x Segment NG	-0.06	0.14	0.44*	0.32
	(-0.18)	(0.34)	(1.68)	(0.94)
ITDA	0.07	1.00***	0.38**	1.73***
	(0.43)	(4.60)	(2.21)	(6.01)
ITDA x Segment NG	-0.23	-0.04	-0.29	-0.72*
	(-0.66)	(-0.11)	(-0.96)	(-1.91)
Non-ITDA Excl	0.43***	0.65***	0.80	0.89
	(6.24)	(6.74)	(1.40)	(1.39)
Non-ITDA Excl x Segment NG	-0.34**	-0.49***	0.55	0.97
	(-2.08)	(-3.90)	(0.53)	(0.99)
Ln(Assets)	0.00	0.01***	-0.00	0.00***
	(1.31)	(6.84)	(-0.12)	(3.88)
BTM	-0.00	-0.01*	-0.01***	-0.02***
	(-0.12)	(-1.83)	(-2.74)	(-3.42)
Loss	-0.01***	-0.02***	0.00	-0.01***
	(-3.34)	(-4.56)	(0.48)	(-2.90)
Sales Gr	0.10***	-0.01	0.01	0.05*
	(2.61)	(-0.16)	(0.28)	(1.78)
Earnings Volatility	-0.22***	-0.19**	-0.07	-0.12
	(-2.78)	(-2.20)	(-0.92)	(-1.44)
Observations	4,000	4,000	4,004	4,004
R-squared	0.416	0.507	0.380	0.484
Fama-French 48 F.E.	Yes	Yes	Yes	Yes
Calendar Year F.E.	Yes	Yes	Yes	Yes

Table 7 presents results similar to Table 4 after splitting observations into those with above (Columns 1-2) versus below (Columns 3-4) median absolute non-ITDA exclusions (scaled by total assets). The median is calculated on a quarterly basis. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. *t*-stats are presented in parentheses. Standard errors are clustered at the firm level. To minimize the influence of outliers, all continuous variables are winsorized at the 1 percent and 99 percent levels. Variables are defined in Appendix A.

Table 8: Exclusion Quality — Auditor Quality

VARIABLES	No Inc. Incr. Misstatement		At least one Inc. Incr. Misstatement	
	(1) $Op\ C/F_{[t+1,\ t+4]}$	(2) $Op\ Earn_{[t+1,\ t+4]}$	(3) $Op\ C/F_{[t+1,\ t+4]}$	(4) $Op\ Earn_{[t+1,\ t+4]}$
Segment NG	-0.03**	-0.03**	0.01	-0.01
	(-2.50)	(-2.41)	(1.18)	(-0.73)
Adj EBITDA	1.83***	2.16***	1.90***	2.03***
	(10.55)	(11.03)	(11.22)	(9.72)
Adj EBITDA x Segment NG	0.68**	0.44	-0.62*	0.06
	(2.24)	(1.13)	(-1.75)	(0.09)
ITDA	0.26	1.40***	0.15	1.16***
	(1.39)	(5.55)	(0.95)	(5.09)
ITDA x Segment NG	-0.10	-0.38	-0.47	-0.06
	(-0.28)	(-0.97)	(-1.55)	(-0.11)
Non-ITDA Excl	0.48***	0.70***	0.46***	0.73***
	(5.33)	(5.87)	(5.23)	(6.10)
Non-ITDA Excl x Segment NG	-0.35*	-0.46**	-0.09	-0.31
	(-1.87)	(-2.53)	(-0.45)	(-1.52)
Ln(Assets)	0.00	0.01***	-0.00	0.01***
	(1.36)	(5.64)	(-0.20)	(4.97)
BTM	-0.00	-0.01*	-0.01*	-0.01***
	(-0.96)	(-1.95)	(-1.75)	(-2.78)
Loss	-0.00	-0.01***	-0.01**	-0.02***
	(-0.97)	(-3.56)	(-2.38)	(-4.37)
Sales Gr	0.00	0.01	0.13***	0.00
	(0.08)	(0.26)	(3.39)	(0.06)
Earnings Volatility	-0.30***	-0.30***	-0.04	-0.07
	(-3.49)	(-3.56)	(-0.57)	(-0.77)
Observations	4,204	4,204	3,801	3,801
R-squared	0.404	0.518	0.407	0.497
Fama-French 48 F.E.	Yes	Yes	Yes	Yes
Calendar Year F.E.	Yes	Yes	Yes	Yes

Table 8 presents results similar to Table 4 after splitting observations into those where the audit office has no (Columns 1-2) versus at least one (Columns 3-4) income increasing misstatement in the current year. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. *t*-stats are presented in parentheses. Standard errors are clustered at the firm level. To minimize the influence of outliers, all continuous variables are winsorized at the 1 percent and 99 percent levels. Variables are defined in Appendix A.

Table 9: Exclusion Quality — Entropy Balance

VARIABLES	(1) $Op\ C/F_{[t+1,\ t+4]}$	(2) $Op\ Earn_{[t+1,\ t+4]}$
Segment NG	-0.01	-0.02**
	(-0.99)	(-2.36)
Adj EBITDA	1.82***	2.03***
	(13.75)	(14.46)
Adj EBITDA x Segment NG	0.08	0.40
	(0.34)	(1.31)
ITDA	0.15	1.14***
	(1.13)	(7.60)
ITDA x Segment NG	-0.22	0.03
	(-0.92)	(0.11)
Non-ITDA Excl	0.48***	0.71***
	(6.13)	(8.57)
Non-ITDA Excl x Segment NG	-0.31**	-0.36***
	(-2.09)	(-3.26)
Ln(Assets)	-0.00	0.01***
	(-0.85)	(6.05)
BTM	-0.00	-0.01***
	(-1.21)	(-2.99)
Loss	-0.01**	-0.01***
	(-2.09)	(-4.07)
Sales Gr	0.15***	0.01
	(3.47)	(0.12)
Earnings Volatility	-0.23***	-0.08
	(-3.36)	(-0.94)
Observations	8,005	8,005
R-squared	0.385	0.459
Fama-French 48 F.E.	Yes	Yes
Calendar Year F.E.	Yes	Yes

Table 9 presents results similar to Table 4 after performing entropy balance. The balancing is performed on all the independent variables in the regression other than *Adj EBITDA, ITDA*, and *Non-ITDA Excl*. Further, the balancing is performed on the first three moments. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. *t*-stats are presented in parentheses. Standard errors are clustered at the firm level. To minimize the influence of outliers, all continuous variables are winsorized at the 1 percent and 99 percent levels. Variables are defined in Appendix A.

Table 10: Non-GAAP EPS Exclusion Quality

VARIABLES	(1) $Op\ C/F_{[t+1,\ t+4]}$	(2) $Op\ Earn_{[t+1,\ t+4]}$
Segment NG	-0.01	-0.02***
	(-1.33)	(-2.68)
Non-GAAP EPS	2.35***	2.86***
	(14.70)	(16.90)
Non-GAAP EPS x Segment NG	0.09	0.99*
	(0.19)	(1.77)
Special Items Excl	0.09	-0.03
	(1.20)	(-0.34)
Special Items Excl x Segment NG	0.18	-0.13
	(1.21)	(-0.90)
Other Excl	0.80***	1.93***
	(5.16)	(8.55)
Other Excl x Segment NG	-0.50	-0.20
	(-0.58)	(-0.39)
Ln(Assets)	0.00	0.01***
	(0.08)	(5.35)
BTM	-0.01**	-0.02***
	(-2.22)	(-3.97)
Loss	0.00	-0.01
	(0.05)	(-1.59)
Sales Gr	0.07**	-0.02
	(1.99)	(-0.65)
Earnings Volatility	0.11	0.01
	(1.33)	(0.17)
Observations	4,689	4,689
R-squared	0.359	0.592
Fama-French 48 F.E.	Yes	Yes
Calendar Year F.E.	Yes	Yes

Table 10 presents results similar to Table 4, but rather than examining the persistence of non-ITDA exclusions, we examine the persistence of non-GAAP exclusions based on whether a firm reports adjusted EBITDA in the segment note.***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. *t*-stats are presented in parentheses. Standard errors are clustered at the firm level. To minimize the influence of outliers, all continuous variables are winsorized at the 1 percent and 99 percent levels. Variables are defined in Appendix A.

Table 11: Managers and Analysts Reported Numbers

Panel A: Overall Agreement Between the Numbers Reported

	W/o Adj. EBITDA in Segm Note - N:6,690	With Adj. EBITDA in Segm Note - N:1,315	Diff
Both - Agree	0.617	0.708	0.09***
Both - Disagree	0.289	0.265	-0.02*
Manager Only	0.094	0.027	-0.07***

Panel B: Company-Quarters That Did Not Meet the GAAP Forecast

	W/o Adj. EBITDA in Segm Note	With Adj. EBITDA in Segm Note	Diff
By 2 cents per share	0.74	0.88	0.14***
By 2% of Forecast	0.75	0.87	0.13***
By 0.5% of Total Assets	0.75	0.80	0.06**

Panel A of Table 11 presents results examining how often managers and analysts agree or disagree with each other depending on whether adjusted EBITDA is reported in the segment note. Panel B presents agreement rates between analysts and managers when the firm misses the GAAP forecast and just meets or beats the adjusted EBITDA forecast. We use three different criteria for just meeting or beating the adjusted EBITDA forecast. Criteria 1 is based on whether the firm meets or beats the forecast by up to 2 cents per share; it includes 353 (91) firm-quarter observations without (with) adjusted EBITDA in the segment note. Criteria 2 is based on whether the firm meets or beats the forecast by up to 2%; it includes 307 (95) firm-quarter observations without (with) adjusted EBITDA in the segment note. Criteria 3 is based on whether the firm meets or beats the forecast by up to, but not including, 0.5% of total assets; it includes 1,193 (282) firm-quarter observations without (with) adjusted EBITDA in the segment note. Column *Diff* shows results of *t*-tests to test for significant differences between the mean values of the two groups. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 12: Adjusted EBITDA prominence in Earnings Announcements

VARIABLES	(1) *Adj EBITDA Prom*	(2) *Relative Adj EBITDA Prom*
Segment NG	0.08***	0.09***
	(5.95)	(8.57)
Ln(Assets)	-0.01***	-0.02***
	(-2.61)	(-4.86)
BTM	-0.01	-0.01
	(-0.79)	(-0.97)
Earnings Volatility	-0.01	0.01
	(-0.06)	(0.05)
Sales Gr	0.18***	0.11**
	(3.27)	(2.22)
Loss	0.03***	0.05***
	(3.80)	(6.38)
Observations	8,005	7,978
R-squared	0.119	0.141
Fama-French 48 F.E.	Yes	Yes
Calendar Year F.E.	Yes	Yes

Table 12 presents results examining whether firms that report adjusted EBITDA in the segment note present adjusted EBITDA more or less prominently in the earnings announcement. Column 1 examines the prominence of the adjusted EBITDA in the earnings announcement. It is calculated as the character position of the first mention of adjusted EBITDA in the earnings announcement scaled by the total number of characters in the earnings announcement and multiplied by -1 so that larger values indicate more prominent disclosure. Column 2 examines the relative adjusted EBITDA prominence. It is defined as the character position of the first mention of adjusted EBITDA in the earnings announcement less the character position of the first mention of net income (or numeric value of diluted non-GAAP EPS; the earliest of the two) scaled by the total number of characters in the earnings announcement and then multiplied by -1 so that larger values indicate more prominent relative adjusted EBITDA disclosure. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. *t*-stats are presented in parentheses. Standard errors are clustered at the firm level. To minimize the influence of outliers, all continuous variables are winsorized at the 1 percent and 99 percent levels. Variables are defined in Appendix A.