Essays on Non-GAAP Reporting

Hui Fan

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By: *Hui Fan*

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_____ Chair
Dr. Xiao Huang

_____ External Examiner
Dr. Anup Srivastava

_____ Arms-Length Examiner
Dr. Zvi Singer

_____ Examiner
Dr. Michel Magnan

_____ Examiner
Dr. Hongping Tan

_____ Thesis Supervisor
Dr. Li Yao

Approved by _____
Dr. Tracy Hecht, Graduate Program Director

July 19, 2024 _____
Dr. Anne-Marie Croteau, Dean
John Molson School of Business

Abstract

Essays on Non-GAAP Reporting

Hui Fan, Ph.D.

Concordia University, 2024

This dissertation consists of two essays, which explore the quantity of non-GAAP metrics, and one proposal, which investigates non-GAAP forward-looking metrics.

The first essay examines the determinants of the quantity of non-GAAP metrics disclosed in quarterly earnings releases using a hand-collected sample of non-GAAP disclosures from 2016 to 2020. Results show that managers are likely to disclose a larger quantity of non-GAAP metrics when their firms have more complex accounting reports and more extensive intangible assets. These findings suggest that when firms' information environment is relatively poor, investors likely have a greater demand for additional information, and managers provide more non-GAAP metrics to respond. In a subsample where firms have missed analysts' expectations, I find that when firms just miss the expectations, they are more likely to use a greater quantity of non-GAAP metrics, suggesting that managers' self-serving incentives play a role in distracting investors' attention by information overload.

The second essay explores the impact of the quantity of non-GAAP metrics on analysts' forecast accuracy and dispersion. Results show that analysts' forecast accuracy is increasing, and their dispersion is decreasing for firms with a larger quantity of non-GAAP metrics (or categories). Among the twelve non-GAAP categories, non-GAAP revenue, non-GAAP operating income, and non-GAAP tax rate are associated with more accurate and less dispersed earnings forecasts; however, return on invested capital increases the disagreement among analysts and leads to less accurate earnings forecasts. Furthermore, I find that a greater quantity of non-GAAP metrics/categories is particularly beneficial to analysts who have less general experience and cover more industries in their portfolios.

Last, I propose a study to explore non-GAAP *forward-looking* measures and primarily examine managers' decisions to issue different quantities of non-GAAP forward-looking measures. In contrast to extant prior research on non-GAAP historical measures, studies on non-GAAP forward-looking measures are scant. This proposal intends to fill the void. In addition, to the extent that current regulations give managers broad discretion to issue forecasts that exclude certain recurring expenses and to rely on the "unreasonable efforts" exception to omit GAAP reconciliations, the findings of this study will also be of interest to standard setters.

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Contribution of Authors

Chapter 4:

Dr. Li Yao participated in conceptualization and manuscript editing. The paper is in the first round of revisions at the *Journal of Accounting, Auditing and Finance*.

All authors reviewed the final manuscripts and approved their contents.

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Chapter 1: Introduction

An increasing number of companies are voluntarily disclosing non-GAAP measures, which are derived from GAAP numbers by excluding (or including) certain amounts. Many of these companies often assert that their goal is to provide investors and other users with insights into their operations. Non-GAAP information is influential; it has been shown to affect information asymmetry between informed and uninformed traders (Huang and Skantz, 2016), investors welfare (Hsu et al., 2022), and analysts' forecasts (Bhattacharya et al., 2003; Gomez et al., 2023). With a few exceptions, however, most prior studies on non-GAAP reporting focus on non-GAAP earnings per share (EPS) or its equivalent (e.g., non-GAAP net income). This contrasts with the business practice where it is increasingly common that companies (1) provide non-GAAP measures beyond non-GAAP EPS, (2) issue multiple non-GAAP metrics simultaneously, and (3) provide (multiple) non-GAAP forward-looking (or guidance) metrics. Advancing knowledge on this new phenomenon is important because inferences drawn from non-GAAP earnings may not be generalizable to other non-GAAP metrics (Campbell et al., 2022). Black et al. (2018) also call for research to investigate non-GAAP metrics other than earnings-related measures.

Furthermore, regulators, e.g., the SEC in the U.S. and the Canadian Standards Association (CSA) in Canada, monitor the use of all non-GAAP measures, not just non-GAAP earnings. The SEC often sends comment letters to companies challenging their non-GAAP measures and non-GAAP forward-looking measures. Comprehensive knowledge of all non-GAAP measures (i.e., managers' non-GAAP portfolios) can aid regulators in assessing whether managers appropriately utilize these metrics in their quarterly earnings.

Therefore, in this dissertation, I empirically analyze the quantity of non-GAAP metrics managers use in their quarterly earnings releases. Specifically, I address the following two research questions in two separate essays:

1) *What are the determinants of the quantity of non-GAAP metrics disclosed in firms' quarterly earnings releases?*
2) *What is the impact of the quantity of non-GAAP metrics on the properties of analysts' earnings forecasts, namely, their forecast accuracy and dispersion?*

In addition, I propose to explore non-GAAP forward-looking measures and primarily examine the following research question:

3) Why do managers issue multiple non-GAAP forward-looking measures?

To explore these questions, I manually collect the quantity and types of non-GAAP metrics used by S&P 500 firms from quarterly earnings releases for all quarters from 2016 to 2020 and non-GAAP forward-looking metrics from 2016 to 2019.

The first essay examines the determinants of the quantity of non-GAAP metrics disclosed in firms' quarterly earnings releases. Building on evidence from the extant literature, I explore the extent to which managers' non-GAAP reporting is influenced by incentives of providing informative disclosure and/or self-serving. Before conducting determinant tests, I first assess whether investors incorporate the information provided by additional non-GAAP metrics. I find a significantly positive reaction in abnormal returns and trading volumes, suggesting that investors, on average, find additional non-GAAP metrics incrementally valuable in assessing firms' accounting information. Next, I examine the determinants of the quantity of non-GAAP metrics by regressing the number of non-GAAP metrics on a list of determinants. I find that managers disclose a greater quantity of non-GAAP metrics in quarterly earnings announcements for firms: (1) with more complex accounting reporting and (2) with more extensive intangible assets, using both a level specification and a change specification. These findings support the prediction that managers disclose more non-GAAP metrics when investors' demand increases, and their incentive is to inform investors. Prior literature suggests that managers use non-GAAP earnings opportunistically to meet analysts' consensus to manage investors' perceptions about their firm's performance (e.g., Doyle et al., 2013). Thus, I use a subsample where firms have missed analysts' expectations based on reported earnings to conduct determinant tests. The quantity of non-GAAP metrics is still significantly and positively associated with accounting reporting complexity and extensive intangible assets. Simultaneously, I find that firms just missing analysts' expectations (i.e., by 5 cents per share or less) are more likely to disclose a greater quantity of non-GAAP metrics, indicating an attempt to mislead rather than to inform investors. This result provides us some evidence that firms that just miss analysts' expectations are more likely to use a greater quantity of non-GAAP metrics than firms that miss the expectations further in order to distract investors' attention through information overload because such firms have greater self-serving incentives.

The second essay examines the impact of the quantity of non-GAAP metrics on analysts' forecast accuracy and dispersion. I find that analysts' forecast accuracy is increasing, and their dispersion is decreasing for firms with a larger quantity of non-GAAP metrics (or categories). Among the twelve non-GAAP categories, non-GAAP revenue, non-GAAP operating income, and non-GAAP tax rate are associated with more accurate and less dispersed earnings forecasts; however, return on invested capital (ROIC) increases the disagreement among analysts and leads to less accurate earnings forecasts. Furthermore, I find that a greater quantity of non-GAAP metrics/categories is particularly beneficial to analysts who have less general experience and cover more industries in their portfolios.

Last, I propose to examine managers' decisions to issue different quantities of non-GAAP forward-looking (or guidance) measures. I also plan to investigate further the consequences of management non-GAAP forecasts, such as firms' future performance, stock reactions, analysts' earnings forecasts properties, analysts' revenue forecasts properties, and analysts' stock recommendation profitability. After comprehensively examining the portfolio of non-GAAP forward-looking measures, I will focus on a particular metric: free cash flow guidance.

In general, this dissertation contributes to the extant literature in several ways. First, this dissertation complements the extant non-GAAP reporting literature. Although much is known about the informativeness and consequences of non-GAAP earnings disclosure, little is known about the informativeness and consequences of the quantity of non-GAAP metrics. Gomez et al. (2023) and Brown et al. (2024) are closely related to my study. These two studies go beyond a single non-GAAP metric. Gomez et al. (2023) find that firms are more likely to disclose non-GAAP income statements when there is greater demand for this information from capital market participants and when their GAAP disclosures are complex. They also find that removing full non-GAAP income statements impairs the informativeness of non-GAAP earnings and the overall informativeness of earnings announcements. Brown et al. (2024) find that firms with less adequate financial statements discuss non-GAAP measures more extensively in their MD&A sections. Those two recent publications exploring the intensity of non-GAAP metrics make it evident that this field holds promise for further study and analyses. However, this dissertation is different from those two studies. Because not all non-GAAP reporting firms disclose a full non-GAAP income statement, and many firms encompass not only non-GAAP metrics within non-GAAP income statements but also extend to non-GAAP metrics across other financial statements, my

examination of the broader population of non-GAAP reporting firms with different quantity of non-GAAP metrics in earnings announcements, rather than non-GAAP income statements reporting firms alone, provides more generalizable evidence. In addition, while Brown et al. (2024) consider various non-GAAP metrics beyond non-GAAP earnings, they count the occurrences of case-insensitive keywords for non-GAAP metrics in firms' MD&A. In contrast, I measure the actual number of different non-GAAP metrics disclosed in earnings releases. I manually collect a sample of non-GAAP disclosures and find that firms increase the quantity of non-GAAP metrics over time. I provide evidence that managers disclose a larger number of non-GAAP metrics to inform investors. I also find that investors recognize the incremental information in firms' non-GAAP disclosures at the disclosure date, and those non-GAAP metrics are helpful to analysts. These findings complement the results presented by Gomez et al. (2023) and Brown et al. (2024).

Second, this dissertation is relevant for regulators, given that regulators have consistently expressed their concerns about the proper use of non-GAAP financial measures. The significant increase in the use of non-GAAP measures has brought heightened scrutiny from regulators (e.g., the SEC) concerning how non-GAAP measures are calculated and the transparency of the related disclosures (PwC, 2021). A comprehensive understanding of non-GAAP disclosures, specifically the quantity of non-GAAP metrics in this study, can inform regulators that, on average, managers include more non-GAAP metrics in their quarterly earnings releases to inform investors. Additionally, it highlights that investors and analysts find this information useful.

Third, the findings of this dissertation can help investors and financial analysts decide whether and to what extent they can rely on this type of disclosure when making investment and forecasting decisions. The findings of this dissertation suggest that, on average, managers provide more non-GAAP metrics to inform investors and analysts. However, in a subsample of firms that have missed analysts' expectations based on reported earnings, I find that firms just missing expectations are more likely to disclose more non-GAAP metrics than firms falling farther short of expectations. In this case, investors and analysts should be cautious when deciding whether to use non-GAAP metrics in their exercises.

The rest of the dissertation is organized as follows. Chapter 2 provides an extensive literature review on non-GAAP reporting. Chapter 3 and Chapter 4 present the two essays, respectively. Chapter 5 discusses the proposal, and Chapter 6 concludes.

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Chapter 2: Literature Review

2.1 Introduction

In this chapter, I synthesize research on non-GAAP reporting over the last two decades. Because most prior studies focus on non-GAAP earnings per share (hereafter, non-GAAP EPS), I separate my review of research on non-GAAP EPS from research on other non-GAAP metrics (e.g., non-GAAP revenues, free cash flows, etc.). This differentiation allows me to highlight the scarcity of research on other non-GAAP metrics.

The rest of this chapter is organized as follows. In the next section, I present the definition of non-GAAP measures and provide an overview of the regulatory background related to non-GAAP reporting. Section 2.3 summarizes the major themes in the non-GAAP EPS reporting literature, focusing on its determinants, characteristics, and consequences. In Section 2.4, I conduct a literature review on non-GAAP metrics other than non-GAAP EPS.

2.2 Background

2.2.1 Definition

Regulation G defines a non-GAAP financial measure as a numerical measure that excludes (or includes) amounts included (or excluded) in the most directly comparable GAAP measure presented in the statement of income, balance sheet, or statement of cash flows.[1] Common non-GAAP measures include non-GAAP EPS or its equivalent (e.g., non-GAAP net income), EBITDA, adjusted EBITDA, non-GAAP revenues, free cash flows, funds from operations, net debt, non-GAAP effective tax rate, etc. The calculation of such non-GAAP measures is highly subjective and is not comparable across companies or industries.

Many companies disseminate non-GAAP information in earnings press releases with a Form 8-K (filed with the regulator). Non-GAAP information can also be released through oral, telephone, webcast, broadcast, or other similar methods, including conference calls and investor presentations. In addition, non-GAAP information can be disclosed on a firm's website or other electronic media. Moreover, non-GAAP information can be disclosed in periodic filings (e.g., 10-K or 10-Q), proxy statements, registration statements (e.g., S-1), or other SEC filings.

[1] The definition of non-GAAP financial measures by the SEC can be viewed at https://www.sec.gov/rules/2003/03/conditions-use-non-gaap-financial-measures.

2.2.2 Regulatory Background in the U.S.

The practice of disclosing non-GAAP metrics emerged during the mid-1990s when non-GAAP reporting remained unregulated. Regulations regarding non-GAAP reporting have evolved, primarily in response to concerns about potential misleading or deceptive financial reporting practices. Figure 1 presents a timeline detailing the main regulations for non-GAAP reporting.[2]

……. [INSERT FIGURE 1 ABOUT HERE] …….

In the latter half of the 1990s, there was a growing concern about the quality of the numbers being disclosed to and relied upon by investors (Turner, 2001). Consequently, the early 2000s saw a series of regulatory changes in response to notable corporate scandals, such as that involving Enron. Lynn Turner, the SEC's chief accountant, expressed concerns about "Everything But Bad Stuff" or EBS press releases, which appeared to be trying to lead investors away from the "real" numbers, real net income, and actual cash inflows and outflows, and thus asked if the Committee on Corporate Reporting of Financial Executives International (FEI) would consider trying to develop some guidance to address some of the abuses in press releases (Turner, 2001). In April 2001, at the behest of the SEC, the FEI and the National Investor Relations Institute (NIRI) jointly published "FEI/NIRI Earnings Press Release Guidelines." These guidelines suggested, among other things, that companies provide a tabular reconciliation of any non-GAAP results to GAAP.[3]

As non-GAAP financial information inherently deviates from traditional accounting norms, its utilization can present challenges for investors when comparing an issuer's financial data across different reporting periods and with that of other companies. In December 2001, to add further warning to public companies on their use of this non-GAAP information and to alert investors to the potential risks associated with such information, the SEC endorsed the guidelines proposed by the FEI and NIRI. It issued a statement titled "Cautionary Advice Regarding the Use of 'Pro Forma' Financial Information in Earnings Releases" (SEC, 2001). This release emphasized the importance of transparency and cautioned against the selective disclosure of non-GAAP financial measures.

In March 2003, the SEC introduced Regulation G, "Conditions for Use of Non-GAAP Financial Measures," as part of the broader regulatory response (i.e., the Sarbanes-Oxley Act of

[2] This figure is adapted from Table 1 in Black et al. (2018) and includes several regulatory updates.
[3] The guidelines address such considerations as scope, timing, content, forward-looking statements, and consistency about earnings press releases. With respect to non-GAAP reporting, the guidelines state that "[p]ro forma results should always be accompanied by clearly described reconciliation to GAAP results."

2002) to accounting scandals at companies such as Enron and WorldCom.[4] Regulation G aims to enhance transparency and accuracy in public companies' financial reporting. It specifically defines non-GAAP financial measures and addresses general rules requiring that, whenever a public company discloses a non-GAAP financial measure, the company must (i) present the most directly comparable GAAP measure and (ii) provide a quantitative reconciliation of the non-GAAP financial measure to the most directly comparable GAAP financial measure. With the implementation of Regulation G, the SEC also amended Item 10 of Regulation S-K, Item 10 of Regulation S-B, and Exchange Act Form 20-F to guide non-GAAP measures included in the SEC filings. A key provision for SEC filings is that issuers must present the most directly comparable GAAP measure with "equal or greater prominence." By imposing stricter disclosure requirements, Regulation G and other amendments aim to prevent the dissemination of misleading or deceptive financial information to investors, thereby promoting trust and confidence in the integrity of corporate reporting.

The SEC further interpreted and clarified its guidance on non-GAAP measures through Non-GAAP Financial Measures Compliance and Disclosure Interpretations ("C&DIs") in 2010, 2011, 2016, 2017, 2018 and 2022.[5] These interpretations provide further guidance on how companies should interpret and apply Regulation G and other relevant regulations. The C&DIs cover various topics, including the definition of non-GAAP measures, reconciliation requirements, and using non-GAAP measures in specific contexts such as earnings releases and filings with the SEC. Compliance with these interpretations is essential for maintaining transparency and credibility in financial reporting.

In 2019, the SEC emphasized audit committees' role in financial reporting, particularly the oversight role on non-GAAP reporting.[6] In March 2020, in response to the COVID-19 pandemic, the SEC issued reminders regarding non-GAAP financial measures in CF Disclosure Guidance: Topic No. 9 (Coronavirus (Covid-19)), encouraging companies to provide transparent disclosures, including explanations of how COVID-19 has impacted their operations and financial condition.[7]

[4] Detail requirements of Regulation G can be found here: https://www.sec.gov/rules/final/33-8176.htm
[5] Detail information on C&DIs can be found here: https://www.sec.gov/corpfin/non-gaap-financial-measures
[6] Detail information can be found here: https://www.sec.gov/news/public-statement/statement-role-audit-committees-financial-reporting
[7] Detail information can be found here: https://www.sec.gov/corpfin/coronavirus-covid-19

These reminders reiterated the importance of compliance with existing regulations regarding non-GAAP measures.

In general, the SEC does not forbid using non-GAAP financial measures if they are not misleading investors. In addition, the SEC regularly sends comment letters to companies it believes may include material misstatements or omissions related to non-GAAP reporting. More recently, the SEC has started to take enforcement actions against false and misleading statements in connection with non-GAAP measures.[8] All of these actions by the SEC suggest that standard setters and regulators have been paying close attention to non-GAAP reporting.

2.2.3 Regulatory Background in Canada

In Canada, an important regulation regarding non-GAAP reporting is National Instrument 52-112 (NI 52-112) Non-GAAP and Other Financial Measures Disclosure. It was introduced by the Canadian Securities Administrators (CSA) and came into force on August 25, 2021.[9] It requires issuers to define, reconcile, and disclose non-GAAP measures alongside the most directly comparable GAAP measures, ensuring transparency for investors. The regulation emphasizes that non-GAAP measures should not overshadow GAAP measures in financial disclosures to prevent misleading investors. Furthermore, it underscores the importance of consistency, transparency, and internal controls in the disclosure process, promoting accuracy and reliability in financial reporting. Overall, NI 52-112 aims to enhance the quality and reliability of financial reporting by providing clear guidelines for disclosing non-GAAP and other financial measures.

2.3 Research on Non-GAAP Earnings

Because non-GAAP disclosures are voluntary, the first question confronting managers is whether to disclose non-GAAP measures. The answer is shaped by various factors (e.g., managerial incentives, corporate governance, litigation risk, regulatory environment, institutional factors, and external monitoring). Having decided to disclose non-GAAP measures, managers are confronted with choices regarding the nature of the actual non-GAAP measures, such as the type of exclusions, the magnitude of those exclusions, the emphasis placed on non-GAAP measures,

[8] For instance, on September 30, 2020, the SEC charges against BGC Partners, Inc. for false and misleading disclosures concerning how it calculated a key non-GAAP financial measure, which it called post-tax distributable earnings or Post-Tax DE. Details can be found at https://www.sec.gov/whistleblower/award-claim/award-claim-2020-139

[9] Details information on NI 52-112 can be found at https://www.osc.ca/sites/default/files/2021-08/ni_20210812_52-112_measures-disclosure.pdf

and the accompanying qualitative narratives. Finally, after non-GAAP measures are disclosed, consequential outcomes ensue. As expected, these outcomes are closely tied to the determinants and characteristics of non-GAAP reporting.

In this section, I conduct a literature review on non-GAAP earnings (or EPS) and characterize the literature by including three primary components: determinants, characteristics, and consequences. I organize a large number of studies on non-GAAP EPS reporting within this framework. Figure 2 shows the framework used to discuss non-GAAP EPS reporting.

……. [INSERT FIGURE 2 ABOUT HERE] …….

2.3.1 Determinants

Determinants influence whether a manager will disclose non-GAAP information, and as elaborated later, they can shape the manager's selection of non-GAAP characteristics and their ensuing consequences. Some factors exhibit significant cross-sectional variations because they refer to unique aspects of an issuing firm. Other factors capture the broader environment within which companies operate. I discuss a number of these important factors next.

Managerial Incentives. The central debate surrounding non-GAAP reporting focuses on whether this voluntary information is primarily used to mislead or to inform investors. Managers often claim that they disclose non-GAAP earnings to reflect sustainable performance and core operations by excluding non-core items (e.g., transitory items or one-time items) from GAAP earnings. However, as non-GAAP exclusions predominantly pertain to items that reduce income, such as expenses and losses, and given that managers possess discretion over these exclusions, critics of non-GAAP reporting contend that some managers may reveal non-GAAP earnings with opportunistic motives. Prior research has found evidence that some managers use non-GAAP earnings opportunistically to meet analysts' consensus (Bhattacharya et al., 2004; Black and Christensen, 2009; Barth et al., 2012; Doyle et al., 2013; Isidro and Marques, 2015), to avoid reporting losses, to show growth in profits, and to portray better performance when GAAP earnings fall short of those targets (Barth et al., 2012; Isidro and Marques, 2015). Prior research indicates that these opportunistic incentives play a role in shaping managers' behavior towards exclusions. For example, Doyle et al. (2013) find that managers strategically use positive exclusions (but not special items) to arrive at non-GAAP earnings that are higher than GAAP earnings to exceed analyst forecasts. Isidro and Marques (2015) find that managers are more likely to adjust non-

GAAP earnings for recurring expenses, such as R&D expenses and depreciation, to meet earnings benchmarks in an environment where there is more pressure to achieve earnings benchmarks and less opportunity to manipulate GAAP earnings. Black et al. (2017a) find that when managers just miss expectations after managing GAAP earnings using real and accruals management, they are significantly more likely to employ non-GAAP reporting. Collectively, those studies suggest that some managers disclose non-GAAP earnings to influence stakeholder perceptions driven by opportunistic motives.

Supporters of non-GAAP reporting argue that GAAP net income often encompasses transitory or non-core items, which are not conducive to predicting future cash flows and, therefore, should be excluded. Consequently, advocates assert that non-GAAP earnings provide valuable insights into core operations and exhibit greater predictability of future performance. Prior research finds that some managers provide non-GAAP earnings with the intention of providing informative and value-relevant earnings information to stakeholders (Bhattacharya et al., 2003; Curtis et al., 2014; Black and Christensen, 2018; Leung and Veenman, 2018; Beardsley et al., 2021). For instance, Curtis et al. (2014) find that managers disclose non-GAAP earnings by excluding transitory gains, which allows investors to assess the firm's operating performance easily.

In sum, these studies show that managerial incentives play an essential role in the decision to issue non-GAAP earnings. Although I explore additional factors influencing managers' decisions, it is important to note that many of these factors, to varying degrees, can inherently reflect managerial incentives.

Information Environment. The information environment is another important determinant of whether a firm issues non-GAAP measures. When publicly available information is uninformative or limited, managers are more likely to disclose additional value-relevant information. Lougee and Marquardt (2004) find that managers are more likely to disclose non-GAAP earnings when the informativeness of GAAP earnings declines (i.e., small earnings response coefficients, high-technology industries, high intangible intensity, great sales growth, and great earnings volatility). More importantly, Lougee and Marquardt (2004) find that non-GAAP earnings have incremental information content over GAAP earnings, and the information content of non-GAAP earnings varies systemically according to GAAP earnings' informativeness. Huang and Skantz (2016) find that the reduction in information asymmetry following earnings

announcements is more pronounced when non-GAAP earnings supplement GAAP earnings disclosures. Along related lines, Brown et al. (2023) find a positive association between accounting reporting complexity and the disclosure of non-GAAP earnings in earnings releases, and they further find that the quality and informativeness of non-GAAP earnings increase with accounting reporting complexity. In addition, Hribar et al. (2022) find that managers are more likely to disclose non-GAAP EPS in earnings announcements when the boundaries of GAAP restrict the provision of sufficient financial statement details to investors. Likewise, Brown et al. (2024) provide evidence that managers discuss non-GAAP measures more intensively in MD&As when the information in financial statements is insufficient.

Corporate Governance. Managers' decisions to disclose non-GAAP information are also affected by corporate governance. That is, stronger corporate governance (i.e., a higher percentage of independent members on the firm's board of directors) is associated with more informative (i.e., less aggressive) non-GAAP reporting (Frankel et al., 2011). Furthermore, Christensen et al. (2019) find that the likelihood that a manager discloses non-GAAP earnings decreases, and (for those that continue to disclose) the quality of non-GAAP reporting improves following debt covenant violations. This finding is consistent with the notion that heightened shareholder monitoring during this scrutiny period increases the costs of opportunistic disclosure, thereby restraining opportunistic reporting. Seetharaman et al. (2014) find a larger decline in non-GAAP earnings exclusions following the appointment of accounting (rather than nonaccounting) experts to audit committees. Consequently, the audit committee is pivotal in overseeing companies' non-GAAP reporting practices. The SEC further emphasizes the role of audit committees in overseeing non-GAAP reporting (Clayton et al., 2019).

Managerial Trait. Non-GAAP measures are chosen by *management*. Thus, in addition to firm characteristics and determinants, manager-specific characteristics influence the use of non-GAAP measures. According to Abdel-Meguid et al. (2021), companies with narcissistic CEOs are more inclined to reveal non-GAAP earnings. Such CEOs tend to exclude income-decreasing items from non-GAAP earnings to shape how their company is viewed. This study suggests that narcissistic CEOs, driven by an unrelenting need for self-enhancement, find the flexibility of non-GAAP earnings reporting as an avenue to fulfill this desire. Black et al. (2023) find that CEOs with a long-term focus (captured by their long-term incentive plan payouts) tend to be less inclined to disclose aggressive non-GAAP earnings (i.e., CEOs' propensity to exclude expense items from

GAAP earnings that exceed analysts' exclusions and the magnitude of these incremental exclusions).

Litigation Risk. Researchers have long recognized litigation risk as a fundamental element of the financial reporting environment. Disclosure theory and prior empirical research suggest that litigation risk can either discourage or encourage voluntary disclosures (Healy and Palepu, 2001). Empirical evidence suggests that the relationship between litigation risk and disclosures varies across different disclosures (e.g., Leuz and Wysocki, 2016). One possible explanation is that these disclosures' legal protections from shareholder litigation risk significantly differ.[10] Earlier studies on non-GAAP reporting commonly include a proxy for litigation risk as a control variable in models examining the determinants of non-GAAP disclosure and generally report either a positive or an insignificant association between litigation risk and the likelihood of non-GAAP disclosure (e.g., Brown et al., 2012a; Christensen et al., 2014; Christensen et al., 2019).[11] However, using a plausibly exogenous shock to litigation risk based on a U.S. circuit court ruling, Cazier et al. (2023) find a negative relation between litigation risk and both the likelihood and aggressiveness of non-GAAP reporting, suggesting that litigation risk is an important constraining mechanism.

Investor Sentiment. Investor sentiment, encompassing optimism or pessimism regarding stocks, influences investors' expectations about future firm performance, thereby correlating with various corporate decisions such as managers' disclosure decisions. Brown et al. (2012b) find that managers' propensity to disclose non-GAAP earnings (especially the one that exceeds the GAAP earnings number) increases with the level of investor sentiment (i.e., investor optimism or pessimism). They further find that as investor sentiment increases, managers' non-GAAP adjustments are of even lower quality when they sell their shares, suggesting that the relation between investor sentiment and non-GAAP disclosure is partly attributable to managerial opportunism.

Regulatory Environment. While non-GAAP reporting remains voluntary, the regulatory environment can significantly influence the nature of firms' non-GAAP disclosures. In 2003, the

[10] For instance, management earnings forecasts are forward-looking statements that are protected under the safe harbor provisions of the Private Securities Litigation Reform Act (PSLRA of 1995). Non-GAAP reporting provides historical data and is not protected by the PSLRA's safe harbor provisions.

[11] Brown et al. (2012a) and Christensen et al. (2014) use indicator variables for high-risk industries to capture litigation risk. Christensen et al. (2019) define the litigation risk as the predicted probability of being named in a class action lawsuit estimated using the litigation model of Ball et al. (2012, Eq. 5).

SEC introduced Regulation G and then issued C&DIs in 2010, with subsequent updates, to mitigate the improper use of non-GAAP reporting. Many studies find a short post-regulation decrease in the frequency of non-GAAP reporting (Entwistle et al., 2006; Marques, 2006; Black and Christensen, 2018). At the same time, prior studies find that the magnitude of non-GAAP exclusions also decreases in a short post-regulation period (Heflin and Hsu, 2008). However, the frequency of non-GAAP disclosures has subsequently increased in the years following the initial post-regulation decline (Black et al., 2017b).

Consistent with the regulation's objectives, prior research finds that, on average, the quality of non-GAAP earnings increases in the post-regulation period in the sense that exclusions are more transitory and have less predictive power for future operating earnings (Kolev et al., 2008; Bond et al., 2017). However, prior literature also provides evidence on the unintended consequences of implementing regulations (Heflin and Hsu, 2008; Kolev et al., 2008; Baumker et al., 2013; Black et al., 2017b; Thielemann and Dinh, 2019). For instance, the SEC regulation is designed to improve reporting transparency. However, Heflin and Hsu's (2008) findings indicate that firms are less likely to report special- and other-item exclusions when firms experience special items in the post-regulation period. This reporting behavior reflects the low transparency of the information environment after implementing the regulations. Kolev et al. (2008) explore changes in the composition of special items around the implementation of regulation G. They find that managers adapt to the new reporting environment by shifting more recurring expenses to special expenses. Thielemann and Dinh (2019) focus on the reporting behavior of "implicit non-GAAP reporting." They define implicit non-GAAP reporting as "firms only disclose adjustments to GAAP earnings instead of entire adjusted earnings figures, thereby not providing the ideal non-GAAP to GAAP reconciliation promoted by Regulation G." Thielemann and Dinh (2019) find that this reporting behavior increases in the post-regulation period. Overall, there are both wanted and unwanted consequences of imposing Regulation G on non-GAAP reporting.

In addition, Baik et al. (2008) find a decline in the occurrence of real estate investment trusts (REITs) meeting or beating analysts' expectations of funds from operations (FFO) after explicit industry initiatives to discourage manipulation. Notably, industry guidance regarding non-GAAP performance curtailed managers' opportunistic reporting. Additionally, Kyung et al. (2019) explore the effect of voluntary adoption of clawback provisions on non-GAAP earnings disclosures. Although the clawback provision is not implemented to restrict the non-GAAP reporting behavior,

empirical analysis documents that non-GAAP earnings disclosure frequency increases and non-GAAP exclusion quality decreases after the clawback adoption, consistent with a more opportunistic use of non-GAAP reporting (Kyung et al., 2019). Moreover, Hribar et al. (2022) find that managers are more likely to disclose non-GAAP earnings when GAAP limits their discretion, which is captured by the number of times the modal verbs "shall," "should," and "must" occur in each accounting standard. Likewise, Cheng et al. (2022) find similar results in the context of debt contracting.

External Monitoring. Regulations seem to influence non-GAAP reporting significantly. Moreover, other external monitoring mechanisms can also influence such reporting practices. To the extent that external monitoring is enhanced (weakened), managers' costs of providing aggressive non-GAAP measures increase (decrease). As a result, managers could provide less (more) non-GAAP information, or they could employ higher (lower) quality exclusions. For example, Christensen et al. (2021) find that, following exogenous drops in analyst coverage, managers are more likely to disclose non-GAAP EPS; in addition, managers become more aggressive in their disclosure choices, and the quality of their non-GAAP exclusions decreases after analysts terminate coverage. Bhattacharya et al. (2022) find that the threat of increased short selling prompted by Regulation SHO significantly curbs managers' aggressive non-GAAP earnings disclosures. Both studies suggest that external monitoring can constrain aggressive non-GAAP reporting. Along related lines, Feng et al. (2023) find that companies with high-quality auditors (i.e., Big 4 auditors and auditors with greater industry expertise) are more likely to disclose non-GAAP earnings and those companies also disclose high-quality non-GAAP measures, suggesting that high-quality auditors have a positive impact on the quality of non-GAAP reporting. Over time, the debate over whether auditors should assess non-GAAP measures continues to emerge. Nevertheless, using an experiment, Anderson et al. (2022) add a note of caution to this discussion by highlighting that an audit of non-GAAP measures can create a false sense of assurance among investors.

In sum, the decision to disclose non-GAAP measures is influenced by many factors, which can, to some extent, reflect managers' inherent motivations for reporting such measures.

2.3.2 Characteristics

Characteristics of non-GAAP reporting are properties or attributes of the non-GAAP metrics themselves. In the preceding section, I explore a range of factors that influence managers' decisions to disclose non-GAAP earnings, many of which inherently reflect managerial incentives to varying degrees. However, the mere use of non-GAAP earnings does not necessarily indicate opportunistic behavior for managers. Managers' diverse incentives, such as the desire to inform or potentially mislead investors, often influence their decisions regarding the quality of non-GAAP earnings, the type, magnitude, and quality of exclusions, and other attributes of non-GAAP earnings.

2.3.2.1 Quality of Non-GAAP Measures

Value Relevance. An accounting item is value-relevant if it explains variation in share price (Barth et al., 2001). Therefore, if non-GAAP earnings are value-relevant, contemporaneous returns will be more highly correlated with non-GAAP earnings than GAAP earnings. Prior studies investigate the value-relevance of non-GAAP earnings by examining its predictive capacity and correlation with stock prices and abnormal stock returns. For instance, Brown and Sivakumar (2003) find that non-GAAP (operating) earnings are value-relevant due to their enhanced predictive capacity and stronger correlation with stock prices and abnormal stock returns. The value relevance results are also confirmed by Bradshaw and Sloan (2002) and Bhattacharya et al. (2003), who both find that the market response is more closely associated with non-GAAP earnings.[12] However, in contrast, Johnson and Schwartz (2005) and Lougee and Marquardt (2004) generally find no difference in the market's reaction to GAAP or non-GAAP earnings.[13] Subsequently, Barth et al. (2023), in examining the evolution of the value relevance of various accounting items from 1962 to 2018, find that, in alignment with most other accounting items, non-GAAP earnings demonstrate a significant increase in relevance.

Since non-GAAP earnings are commonly formulated by excluding certain GAAP-based components (e.g., ideally transitory items) from GAAP earnings, these exclusions can influence the value relevance of non-GAAP earnings. Prior research highlights that these exclusions' type

[12] Bradshaw and Sloan (2002) define non-GAAP earnings as the actual EPS reported by I/B/E/S. Bhattacharya et al. (2003) collect non-GAAP earnings from a sample of press releases.
[13] Johnson and Schwartz (2005) and Lougee and Marquardt (2004) hand collect non-GAAP earnings from a sample of press releases.

and magnitude significantly influence non-GAAP earnings' value relevance. This discussion is elaborated in the following section.

Risk Relevance. Information about risk plays an important role in decision-making processes for investors and other stakeholders. Investors need to assess the level of risk associated with potential investments. Understanding risks such as market volatility and financial stability helps investors gauge the potential return and make decisions aligned with their risk tolerance and investment objectives. There is limited research on the risk relevance of non-GAAP measures, except for the work by Heflin et al. (2022), which address the extent to which an earnings construct reflects information about a firm's equity risk. In particular, Heflin et al. (2022) examine the risk relevance of non-GAAP earnings by analyzing the contemporaneous relationship between equity risk and non-GAAP earnings volatility and find that non-GAAP earnings capture the more risk-relevant components within GAAP earnings. Additionally, Heflin et al. (2022) investigate whether non-GAAP earnings convey new information about risk by examining the correlation between non-GAAP earnings volatility and future equity risk and find that non-GAAP earnings contain information relevant to future risk.

Consistency and Comparability. In the Conceptual Framework for Financial Reporting, FASB (2010) states that information is deemed useful when it exhibits comparability over time (consistency) and comparability across different firms (comparability). Given managers' discretion in determining exclusions or inclusions for non-GAAP measures, alongside the absence of standardization in these metrics, regulators and practitioners have consistently expressed concerns regarding the consistency and comparability of such metrics. Black et al. (2021) examine the across-time consistency and across-firm comparability of firms' non-GAAP earnings disclosures. The authors find a predominant consistency in non-GAAP calculations across time by companies. They also find that if managers modify their calculations, these modifications tend to enrich the information in earnings about core performance. Moreover, Black et al. (2021) find that non-GAAP earnings improve earnings comparability relative to GAAP earnings. Notably, Black et al. (2021) find that when companies deviate from their sector's norm in terms of non-GAAP calculations, their incomparable reporting choices further augment the information in earnings about core performance.

2.3.2.2 Exclusion – Type, Magnitude, Quality

Once the decision to issue non-GAAP measures has been made, managers can strive to provide informative non-GAAP measures by excluding items only if those items are transitory, or they can strategically exclude recurring items to achieve a desired result. Managers often claim they exclude certain expenses they consider non-recurring, non-cash, or otherwise unimportant for understanding their firms' future value. However, prior research shows substantial variations in exclusions made by managers, including variations in their type, magnitude, and quality.

Prior studies typically categorize non-GAAP exclusions into two main groups: nonrecurring and recurring exclusions, based on these items' expected frequency within a firm's core operations over time (e.g., Black and Christensen, 2009; Brown et al., 2012b; Christensen et al., 2014; Black et al., 2021; Laurion and Sloan, 2022). Black et al. (2021) manually collect non-GAAP EPS data and delineate that nonrecurring exclusions pertain to the following types of adjustments, listed in order of frequency: (i) restructuring, (ii) tax resolutions, (iii) acquisitions, (iv) impairments, (v) legal settlements, (vi) divestitures, (vii) debt extinguishments, and (viii) R&D tax credits; and that recurring exclusions include adjustments such as: (i) investment gains/losses, (ii) amortization expense, (iii) stock-based compensation expense, (iv) pension, (v) net interest, and (vi) currency effects. In addition, there are certain uncommon exclusions that represent excluded items that do not fit into any of the categories mentioned above and are individually infrequent enough to warrant a new category (Black et al., 2018; Black et al., 2021).

The magnitude of exclusions has been steadily increasing from 1986 to 1997 (Bradshaw and Sloan, 2002). However, in 2003, coinciding with the implementation of Regulation G, which led to a decrease in the frequency of non-GAAP disclosures, the magnitude of non-GAAP exclusions is lower in the post-Regulation period (Heflin and Hsu, 2008; Kolev et al., 2008; Brown et al., 2012b). Black et al. (2018) look at non-GAAP reporting trends among S&P 500 firms from 2009 to 2014 and document a significant rise in the magnitude of exclusions over the sample period, primarily attributed to the increase in nonrecurring exclusions. The magnitude of exclusions is influenced by various factors that have been identified as being associated with the decision to disclose non-GAAP metrics.

Prior studies have employed various methods to assess the quality of non-GAAP exclusions and, consequently, to uncover managerial incentives associated with reporting non-GAAP metrics.

The first method is to examine the relationship between non-GAAP exclusions and future firm performance (Doyle et al., 2003; Gu and Chen, 2004; Kolev et al., 2008; Frankel et al., 2011; Barth et al., 2012; Brown and Christensen, 2014; Curtis et al., 2014; Heflin et al., 2015; Bentley et al., 2018; Leung et al., 2018; Christensen et al., 2019; Kyung et al., 2019; Black et al., 2021; Chen et al., 2021a; Black et al., 2023). The intuition behind this approach is as follows. Managers who disclose non-GAAP earnings to better inform investors are expected to exclude items unrelated to core performance and future outcomes and thus create a clearer picture of ongoing operations. As a result, the extant literature views the quality of exclusions (and thus non-GAAP earnings) to be higher when the association between non-GAAP exclusions and future firm performance declines, indicating that non-GAAP exclusions are less predictive of future performance.

The second method to assess the quality of non-GAAP exclusions is to examine the exclusions type (Doyle et al., 2003; Kolev et al., 2008; Bentley et al., 2018; Kyung et al., 2019). The intuition behind this approach is as follows. Managers who opt for non-GAAP earnings disclosure to enhance investor understanding are inclined to exclude items if they are temporary in nature, aiming for non-GAAP measures to accurately represent core earnings. As a result, the exclusion of a transient item is thus regarded as a "high-quality" exclusion. Conversely, managers aiming to deceive investors are more inclined to exclude recurring items from non-GAAP earnings, leading to what is considered a "low-quality" exclusion (Kyung et al., 2019).

The third method examines the relation between non-GAAP exclusions and benchmark beating (Black and Christensen, 2009; Doyle et al., 2013; Bentley et al., 2018; Bradshaw et al., 2018). Benchmark beating has frequently been used in existing literature as evidence of aggressive non-GAAP reporting. Non-GAAP earnings, which enable companies to achieve strategic earnings targets that they fail to meet under GAAP earnings, are deemed low-quality.

In addition, Chen et al. (2021a) examine how the qualitative characteristics of a non-GAAP earnings disclosure reveal the quality of the non-GAAP earnings metric itself. They find that more transparent qualitative information in non-GAAP disclosures is associated with more transitory non-GAAP exclusions and a lower likelihood that managers will aggressively exclude expenses in calculating non-GAAP earnings to meet or beat analysts' forecasts.

2.3.2.3 Reconciliation

In 2003, the implementation of Regulation G mandated that all companies quantitatively reconcile non-GAAP earnings with GAAP earnings. Delving deeper into this regulatory landscape, Elliott (2006) finds compelling evidence suggesting that analysts tend to place greater trust in non-GAAP earnings when companies reconcile these metrics to GAAP-based earnings. Additionally, Zhang and Zheng (2011) find a notable reduction in the incidence of investor mispricing following the implementation of the reconciliation requirement. This effect is particularly pronounced among firms that take proactive measures to bolster the transparency of their non-GAAP disclosures, underscoring the pivotal role of transparency in enhancing market efficiency and investor confidence (Zhang and Zheng, 2011).

2.3.2.4 Non-GAAP Labels

Apart from the diversity in non-GAAP exclusions, there is also variability in how non-GAAP earnings are labeled. The SEC has expressed concerns about potentially improperly labeling non-GAAP earnings (Rapoport, 2013). Garavaglia (2023) manually collects a sample of non-GAAP labels used in practice and finds that the sample firms (i.e., S&P 500 firms) use 12 labels to describe their non-GAAP earnings metrics. Among these, the most prevalent labels are "adjusted" and "non-GAAP." Additional labels include "core," "operating," "organic," "comparable," "pro forma," and others. Garavaglia (2023) finds that investors' willingness to invest depends on the regulatory bulletin and non-GAAP labeling because investors have different interpretations of the exclusion of stock-based compensation expense.

2.3.2.5 Non-GAAP Emphasis

As they prepare to disclose non-GAAP measures, managers also have discretion regarding the emphasis placed on these disclosures. In 2003, the SEC amended Item 10 of Regulation S-K, mandating that GAAP measures, most directly comparable to non-GAAP measures, be presented with "equal or greater prominence" in SEC filings and press releases.

In the pre-regulation era, the relative emphasis on non-GAAP earnings in press releases is driven by impression-management and informational motivations (Bowen et al., 2005). For instance, Marques (2010) finds that managers strategically place more prominence on non-GAAP

measures than on GAAP numbers when the GAAP earnings number falls short of a benchmark, but the non-GAAP earnings number does not.

In the post-regulation era, the SEC indicates that "a non-GAAP measure that proceeds the most directly comparable GAAP measure" is considered more prominent, a practice that the SEC prohibits (SEC, 2016). However, a large proportion of non-GAAP reporters still present non-GAAP EPS before GAAP EPS in their earnings announcements. Campbell and López (2010) find that small-cap companies put a higher level of emphasis on non-GAAP measures when GAAP measures are less value-relevant and when firms' shares are owned by a higher portfolio of institutional investors. Recent studies find that when GAAP earnings are less value relevant and when non-GAAP earnings portray more favorable performance, firms present non-GAAP measures prominently; that is, they mention non-GAAP earnings earlier and more frequently than GAAP earnings during the conference calls (Henry et al., 2020). Although the SEC prohibits the presentation of non-GAAP measures more prominently in earnings announcements, some reporters still place relatively greater emphasis on non-GAAP disclosures. Chen et al. (2021b) find that these firms use noncompliance to inform investors. They find that, for these firms, their non-GAAP reporting is high quality and informative. Their further tests reveal that nonregulatory incentives, rather than regulatory costs, explain this relation.

In sum, once the decision to issue non-GAAP measures is made, managers have many choices and discretion regarding the characteristics of these metrics. In the next section, I describe the consequences of firms issuing non-GAAP measures.

2.3.3 Consequences

Non-GAAP reporting consequences refer to the outcomes associated with issuing non-GAAP metrics. As I note previously, non-GAAP earnings are issued for various reasons and thus produce a variety of related consequences. I organize the discussion in this section around those consequences, as shown in Figure 2 – namely, investor behavior, analyst behavior, firm behavior, litigation risk, and audit quality.

2.3.3.1 Investor Behavior

Managers often issue non-GAAP earnings to either inform or potentially mislead investors. Consequently, it raises the question of whether investors can fully understand the implications of

non-GAAP disclosure (Young, 2014). One stream of research suggests that investors may discount the value relevance of non-GAAP earnings due to suspicions of management opportunism (e.g., Marques, 2006; Black et al., 2017a). Doyle et al. (2013) indicate that investors discount earnings surprises associated with income-increasing exclusions. Conversely, other research suggests that investors might not fully grasp managers' reporting incentives, with some evidence indicating that they are misled by non-GAAP earnings (Jennings and Marques, 2011). However, some studies indicate that investors exhibit greater responsiveness to non-GAAP earnings compared to GAAP earnings (Bradshaw and Sloan, 2002; Bhattacharya et al., 2003; Brown and Sivakumar, 2003), particularly valuing non-GAAP earnings in loss firms (Leung and Veenman, 2018). Bowen et al. (2005) find that the stock market response to non-GAAP earnings is with greater levels of emphasis.

Bhattacharya et al. (2007) use trade size to differentiate between larger, more sophisticated investors and smaller, less informed investors. Bhattacharya et al. (2007) find that the market's response to non-GAAP earnings information is largely driven by the actions of less sophisticated investors. Specifically, the abnormal net-buying activities of less sophisticated investors are significantly associated with the magnitude and direction of forecast errors based on non-GAAP earnings. To explore how sophisticated investors interpret non-GAAP exclusions, Christensen et al. (2014) analyze the trading behavior of informed investors (i.e., short sellers) because short selling often indicates informed trading based on negative information. They find significantly higher short selling volume around earnings announcements containing non-GAAP earnings compared to those without non-GAAP metrics.

Managers' disclosures of non-GAAP earnings can potentially harm investors' welfare and thus expose them to significant adverse economic outcomes, particularly in cases where managers make income-increasing exclusions and are more inclined to be aggressive in their reporting choices. Hsu et al. (2022) document that a firm's crash risk increases with the frequency of managers reiterating non-GAAP earnings to investors throughout the year, and this positive association with future crash risk exists only when firms exclude items leading to non-GAAP earnings exceeding GAAP earnings.

2.3.3.2 Analyst Behavior

Prior studies have attempted to uncover the effect of non-GAAP earnings on analysts' judgments and forecasts. Using an experiment, Frederickson and Miller (2004) find that analysts'

stock price judgments do not differ when they receive both non-GAAP earnings and GAAP earnings in an earnings announcement and when they receive only GAAP earnings. This finding suggests that analysts' stock price judgments are not affected by the presence of non-GAAP earnings. Further responses to their debriefing questions indicate that those analysts use well-defined valuation models based on either earnings-multiples or cash flows. Using those models enables analysts to see through the non-GAAP earnings and focus only on the information relevant to their valuation models. In another experiment, however, Elliott (2006) finds that analysts assess higher earnings performance when the firm's earnings release places non-GAAP earnings ahead of GAAP earnings and provides a reconciliation between GAAP and non-GAAP earnings. Further analyses suggest that analysts view non-GAAP earnings as more reliable when managers reconcile them with GAAP earnings. Archival evidence suggests that non-GAAP earnings disclosed by managers are generally useful to analysts. For example, Bhattacharya et al. (2003) find that non-GAAP earnings are more highly associated with analysts' one-quarter-ahead earnings forecast revisions than GAAP operating earnings, suggesting that non-GAAP earnings represent a more permanent measure of firm profitability than GAAP operating earnings. Chen (2010) finds that analysts underestimate the persistence of non-MBF exclusions (i.e., exclusions that allow the firm to meet or beat analyst earnings forecasts), but the degree of underestimation is lower in the post-Reg G period. In contrast, analysts appear to understand the persistence of MBF exclusions, as this information has been fully incorporated into their earnings forecasts, especially in the post-Reg G period. Gomez et al. (2023) find that analysts' forecasts become less accurate and more disperse after firms stop disclosing full non-GAAP income statements. Their findings suggest that eliminating non-GAAP income statements reduces information available to analysts. Collectively, those findings suggest that managers' non-GAAP earnings are useful to analysts.

2.3.3.3 Firm Behavior

Recent studies also explore the implications of non-GAAP earnings for reporting firms' real activities and accounting choices. For instance, Laurion (2020) finds that firms that consistently report non-GAAP measures effectively put less weight on the expenses typically excluded in calculating non-GAAP measures when making real activities and accounting choices. More specifically, firms that reported non-GAAP earnings consistently in the past pursue more and larger acquisitions, have higher total capital investment, and are more likely to restructure. This is because managers know that when they calculate non-GAAP earnings, they will exclude

acquisition and restructuring expenses, the amortization of intangibles, and asset impairments. Meanwhile, Guggenmos et al. (2022), employing a combination of experimental methods, surveys of experienced accounting managers, and archival analyses, document that non-GAAP earnings have the potential to mitigate GAAP earnings management. This is attributed to the alteration in managerial pressures concerning the achieving of GAAP benchmarks following the inclusion of non-GAAP measures. In addition, Brown et al. (2022) find higher offers and less undervaluation for IPO firms that disclose non-GAAP earnings. Furthermore, Ashby et al. (2024) find that non-GAAP-reporting firms that exclude amortization from non-GAAP earnings allocate more of the purchase price to definite-lived intangible assets and less of the purchase price to depreciable assets and goodwill. McClure and Zakolyukina (2024) document that non-GAAP earnings reporting encourages investment in intangible assets. Overall, these studies suggest that non-GAAP reporting can influence management's GAAP accounting choices and real activities.

2.3.3.4 Litigation Risk

Palmrose and Scholz (2004) explore the legal consequences of non-GAAP reporting and find a positive association between lawsuits and core and pervasive restatements of prior non-GAAP earnings numbers. Jo and Yang (2020) discuss the consequences of non-GAAP reporting from another perspective. They find that firms that have poor GAAP performance and prominently present non-GAAP measures are more likely to receive SEC comment letters on their use of non-GAAP measures.

2.3.3.5 Audit Quality

Auditors in various countries rely to varying degrees on non-GAAP metrics as benchmarks for establishing quantitative materiality (Hallman et al., 2022). In their examination within the U.K. context, Hallman et al. (2022) find that the reliance on non-GAAP materiality benchmarks is associated with diminished audit quality, suggesting that non-GAAP reporting can indirectly affect investors through the audit process.

2.4 Research on Other Non-GAAP Measures

There are many common non-GAAP measures, such as non-GAAP earnings, non-GAAP revenues, non-GAAP effective tax rate, free cash flows, net debt, etc. However, nearly all research on non-GAAP reporting focuses exclusively on non-GAAP earnings or EPS. There is a lack of

clarity on why companies report other non-GAAP measures and related consequences. Black et al. (2018) call for research to investigate non-GAAP metrics other than earnings-related measures. Some recent studies have started to explore other non-GAAP metrics.

2.4.1 Non-GAAP Revenues

There is limited research on non-GAAP revenues. One exception is Campbell et al. (2022), which examine why companies choose to disclose non-GAAP revenues and whether the disclosures are truly informative to investors. According to Campbell et al. (2022), approximately 20% of all earnings press releases issued by U.S. public companies during 2015-2018 include a non-GAAP revenue disclosure. Campbell et al. (2022) break the adjustments used in calculating non-GAAP revenues into four broad categories: (i) foreign currency exchange adjustments, (ii) adjustments for changes to the reporting entity, (iii) satisfaction of acquired deferred revenue liabilities, and (iv) other adjustments that do not fit into the other three categories. They find that the predominance of non-GAAP revenue adjustments is attributed to the first two categories. Furthermore, Campbell et al. (2022) find that (i) firms usually resort to non-GAAP revenue reporting when GAAP revenue is incomparable to earlier quarters, (ii) non-GAAP revenue is a better predictor of future revenue growth than GAAP revenue is, and (iii) investors respond to non-GAAP revenue disclosures rationally in proportion to their predictive value. Overall, Campbell et al. (2022) suggest that non-GAAP revenue disclosures are primarily motivated by economic fundamentals rather than opportunism, on average, and they provide investors with relevant information.

2.4.2 EBITDA

Another common non-GAAP metric is EBITDA.[14] According to Rozenbaum (2019), the prevalence of firms disclosing EBITDA in their earnings announcements has risen from 17% in 2003 to 35% in 2011. Rozenbaum (2019) suggests that both managers' incentive structure and investors' use of EBITDA in valuation play significant roles in the decision to disclose EBITDA in earnings announcements. These determinants consequently lead managers to focus on EBITDA when making business decisions. However, managers' focus on EBITDA creates incentives for them to overinvest in capital and over lever the firm. Cormier et al. (2017) also investigate

[14] Exchange Act Release No. 47226 describes EBITDA as "earnings before interest, taxes, depreciation and amortization."

EBITDA and find that growth firms are more likely to disclose EBITDA, whereas large firms are less likely to report it. Moreover, they find that EBITDA disclosure is associated with greater analyst following and less information asymmetry. Furthermore, Cormier et al. (2017) find that EBITDA disclosure enhances the value relevance and the predictive ability of earnings, particularly in firms with weaker governance structures.

2.4.3 Free Cash Flows

Firms have increasingly disclosed free cash flows as a non-GAAP metric in SEC filings and/or press releases (Adhikari and Duru, 2006; Adame et al., 2023). Researchers have started to explore why managers produce free cash flows in their disclosures.[15] Adame et al. (2023) document a notable rise in free cash flow disclosures in earnings announcements of S&P 1500 firms, increasing from 9.1% in 2004 to 20.3% in 2016. Interestingly, firms that disclose free cash flows in their 10-Q or 10-K filings tend to exhibit lower profits, higher leverage, lower credit ratings, and a propensity for higher dividend payments (Adhikari and Duru, 2006). Additionally, Adame et al. (2023) find that firms' disclosure of free cash flows can both mislead (i.e., especially for initial disclosures) and inform (i.e., more for ongoing disclosures) investors, but the decision to disclose is more closely tied to informative factors. Specifically, Adame et al. (2023) find that capital- and intangible-intensive firms are more likely to disclose free cash flows to inform investors because the free cash flow of these firms is less volatile and predicts future cash flows more reliably. Similarly, firms with higher market-to-book ratios and more transitory events are more likely to report free cash flows to inform investors since these firms have relatively low informative GAAP earnings (Adame et al., 2023). However, firms with positive free cash flows are also likely to report free cash flows with the intent to mislead investors. Nevertheless, the empirical analysis by Adame et al. (2023) suggests that informative factors play a more significant role than opportunistic factors. Bhojraj (2020) further highlights that managers frequently exclude stock-based compensation from free cash flows and indicates that removing these expenses results in overvaluation.

[15] Even though a firm generally uses a consistent free cash flow definition in different reporting periods (Adhikari and Duru, 2006), there is no consensus on the definition of free cash flow among firms. Most disclosing firms use the same definition of free cash flow as in finance theory. They calculate free cash flow as operating cash flow excluding gross capital expenditures (Adame et al., 2023). However, firms may also consider their own specific circumstances when deciding on their free cash flow definitions.

2.4.4 Non-GAAP Effective Tax Rates

Taxes are an important component of earnings. Beardsley et al. (2021) explore the informativeness of analysts' street effective tax rates (ETRs) and find that these tax metrics exhibit greater predictive ability about future tax outcomes and provide more information to investors than GAAP tax metrics. Furthermore, Beardsley et al. (2021) find that the quality of ETR exclusions improves when the magnitude of the potentially excluded item is larger and when managers disclose non-GAAP earnings.

2.4.5 Non-GAAP Guidance Measures

Much of the existing research on non-GAAP reporting concentrates on historical non-GAAP measures, which are used to describe the past performance of firms. Nonetheless, non-GAAP financial measures encompass more than just historical metrics, yet there is a dearth of evidence on non-GAAP guidance measures. Laurion and Sloan (2022) investigate non-GAAP earnings *forecasts*, primarily focusing on firms' motivations for utilizing the unreasonable efforts exception to strategically issue non-GAAP earnings guidance. Laurion and Sloan (2022) find that these firms, using the unreasonable efforts exception, have lower GAAP earnings and more exclusions that are overlooked by analysts and face more difficulty in meeting analysts' earnings expectations. Moreover, the authors find that these firms have higher growth expectations, higher short interest, and a greater reliance on equity financing, all of which provide incentives for managers to showcase strong earnings performance. Such evidence suggests that firms disclose non-GAAP earnings guidance for opportunistic reasons. Similarly, Chen et al. (2023) examine annual effective tax rates (ETR) forecasts and find that analysts weigh voluntary ETR forecasts more heavily, especially when voluntary ETR forecasts are non-GAAP based and when discrete items are present.

2.4.6 Non-GAAP Intensity

Instead of focusing on a single non-GAAP metric, two recent studies explore portfolios of non-GAAP metrics. This shift in focus is warranted because managers frequently disclose multiple non-GAAP metrics in a single filing. Gomez et al. (2023) explore non-GAAP income statements, which resemble those prepared under GAAP, yet many line items often differ from their GAAP counterparts. Gomez et al. (2023) find that about 15% of non-GAAP EPS disclosures include a non-GAAP income statement in their earnings releases between 2003 and 2010. They also find that firms are more likely to disclose a non-GAAP income statement when there is greater demand

for this information from capital market participants and when the information is likely more helpful. They further find that after firms stop disclosing full non-GAAP income statements at the direction of the SEC, the informativeness of non-GAAP earnings decreases, information asymmetry increases and analysts forecast accuracy (dispersion) decreases (increases). Based on their findings, it is reasonable to infer that other non-GAAP metrics within non-GAAP income statements might contain supplementary insights that complement non-GAAP EPS. Additionally, we can interpret their findings as indicating that non-GAAP income statements clarify the allocation of exclusions of non-GAAP EPS to various line items. Thus, it is the presentation style that matters. Brown et al. (2024) count the occurrences of keywords for non-GAAP disclosure in firms' MD&A disclosures and find that, on average, the MD&A has 4.898 non-GAAP keywords.[16] They also find that managers discuss non-GAAP measures more intensively in the MD&A when information from audited financial statements is less sufficient while controlling for the intensity of non-GAAP disclosures in earnings announcements. Their findings suggest that managers use non-GAAP portfolios to provide information when their financial statements are less adequate.

In sum, I categorize the non-GAAP earnings literature into three fundamental components: determinants, characteristics, and consequences. Through this organization, I thoroughly review essential insights derived from this body of literature. Moreover, I review recent studies on non-GAAP metrics other than non-GAAP earnings. This expansion allows for a more holistic examination of non-GAAP reporting practices. Overall, the literature review is essential for my subsequent essays.

[16] According to Brown et al. (2024), the set of keywords includes "nongaap," "non gaap," and "nongaap," tokens beginning with "EBIT" (common matches include "EBIT," "EBITA," "EBITDA," "EBITDAR," "EBITDAS," and "EBITDAX"), "adjusted" + (0, 1, or 2 other words) + "earnings"/"income"/"eps" (e.g., "adjusted net income" and "adjusted basic EPS"), and "free cash flow."

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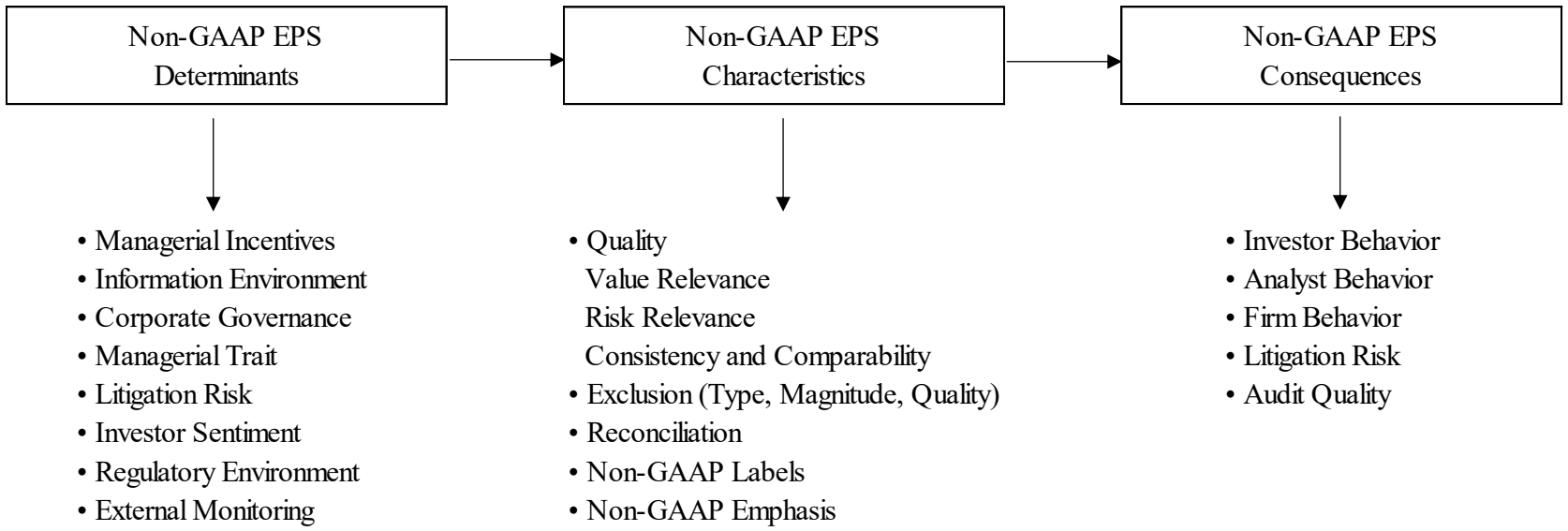
Figure 1: Non-GAAP Regulatory and Standard-Setting Timeline

Date	Regulation / Guidance	Objective	Source
4/26/2001	FEI/NIRI Earnings Press Release Guidelines	To suggest companies provide a tabular reconciliation of any non-GAAP results to GAAP	https://www.sec.gov/news/speech/spch485.htm
12/1/2001	Cautionary Advice Regarding the Use of "Pro Forma" Financial Information in Earnings Releases	To caution public companies on their use of this "pro forma" financial information and to alert investors to the potential dangers of such information	https://www.sec.gov/rules/other/33-8039.htm
7/1/2002	Sarbanes-Oxley Act	To require the SEC to adopt measures related to non-GAAP disclosures	https://www.govtrack.us/congress/bills/107/hr3763/text/ih
3/1/2003	**Regulation G**	To define non-GAAP financial measures To address general rules: (1) Presentation of the most directly comparable GAAP financial measure (2) Quantitative reconciliation of the non-GAAP financial measure to the most directly comparable GAAP financial measure	https://www.sec.gov/rules/final/33-8176.htm
3/1/2003	Amendment to • Item 10 of Regulation S-K • Item 10 of Regulation S-B • Exchange Act Form 20-F	To provide additional guidance for non-GAAP disclosures included in SEC filings	
1/11/2010	Non-GAAP Financial Measures Compliance and Disclosure Interpretations ("C&DIs")	To interpret and clarify its guidance on non-GAAP measures in a Q&A format	https://www.sec.gov/corpfin/non-gaap-financial-measures
7/8/2011	Updated C&DIs		
5/17/2016	Updated C&DIs		
10/17/2017	Updated C&DIs		
4/4/2018	Updated C&DIs		
12/1/2019	Statement on Role of Audit Committees in Financial Reporting and Key Reminders Regarding Oversight Responsibilities	To emphasize audit committees' role in financial reporting, particularly the oversight role on non-GAAP reporting	https://www.sec.gov/news/public-statement/statement-role-audit-committees-financial-reporting
3/25/2020	CF Disclosure Guidance: Topic No. 9	To reinforce the importance of compliance with existing regulations regarding non-GAAP measures during COVID-19 pandemic	https://www.sec.gov/corpfin/coronavirus-covid-19
12/13/2022	Updated C&DIs	To interpret and clarify its guidance on non-GAAP measures in a Q&A format	https://www.sec.gov/corpfin/non-gaap-financial-measures

Note: This figure is adapted from Table 1 in Black et al. (2018) and includes several regulatory updates.

Figure 2: A Framework for Analyzing Non-GAAP EPS Reporting



Chapter 3: The Quantity of Non-GAAP Metrics Used in Quarterly Earnings Releases: A Study on the Determinants

Abstract: We explore the determinants of the quantity of non-GAAP metrics disclosed in quarterly earnings releases based on a hand-collected sample of disclosures from 2016-2020. We find that managers are likely to disclose a larger quantity of non-GAAP metrics when their firms have more complex accounting reports and more extensive intangible assets. These findings suggest that when firms' information environment is relatively poor, investors likely have a greater demand for additional information, and managers provide more non-GAAP metrics to respond. Prior literature indicates that when GAAP earnings fall short, managers use non-GAAP earnings to mislead investors by convincing them that their non-GAAP earnings meet a desired outcome. In a subsample where firms have missed analysts' expectations, we find that when firms just miss the expectations, they are more likely to use a greater quantity of non-GAAP metrics, suggesting that managers' self-serving incentives play a role in distracting investors' attention by information overload.

Keywords: Non-GAAP reporting; Quantity of non-GAAP metrics; Voluntary disclosure; Financial statement complexity; Determinants

3.1 Introduction

In this study, we examine the determinants of the quantity of non-GAAP metrics disclosed in firms' quarterly earnings releases.

Over the past three decades, firms have increasingly issued more than one non-GAAP metric in quarterly earnings releases. For example, Audit Analytics (2018) reports that the average number of different non-GAAP metrics used per filing rose from 2.35 in 1996 to 7.45 in 2016.[17] However, there is little academic evidence explaining this trend. In addition, nearly all prior research on non-GAAP reporting focuses on non-GAAP earnings per share (EPS) or its equivalent (e.g., non-GAAP net income).[18] This contrasts with the business practice where it is increasingly common for companies to provide non-GAAP measures beyond non-GAAP EPS. Advancing knowledge on this new phenomenon is important because inferences drawn from non-GAAP earnings may not be generalizable to other non-GAAP metrics (Campbell et al., 2022). In addition, regulators, e.g., the SEC in the U.S. and the CSA in Canada, monitor the use of all non-GAAP measures, not just non-GAAP earnings. Therefore, our findings could be potentially informative to these regulatory bodies that have consistently expressed concerns over non-GAAP reporting.

Building on insights from the extant literature, we explore the extent to which managers' non-GAAP reporting is influenced by incentives of providing informative disclosure and/or self-serving. When a firm's information environment is relatively poor, investors likely have a greater demand for additional value-relevant information to help them assess the firm's performance and value. Managers may respond to this demand by disclosing non-GAAP metrics when the relative benefits outweigh the costs. In other words, the quantity of non-GAAP metrics increases when the demand for such information increases. On the other hand, some managers might disclose non-GAAP metrics for opportunistic reasons, which are driven by self-serving incentives. When they have greater self-serving incentives, managers may disclose more non-GAAP metrics to create an information overload, distracting investors' attention. Overall, we evaluate these two non-mutually

[17] Audit Analytics examined the S&P 500 companies that used non-GAAP metrics in both 1996 and 2016 on an annual basis. The analysis used data from 8-K Item 2.02 filings.

[18] Exceptions include studies examining EBITDA and adjusted EBITDA (Cormier et al., 2017; Rozenbaum, 2019), free cash flow (Adhikari and Duru, 2006; Adame et al., 2023), non-GAAP revenue (Campbell et al., 2022), non-GAAP income statements (Gomez et al., 2023) and non-GAAP intensity (Brown et al., 2024).

exclusive views in the context of understanding the quantity of non-GAAP metrics disclosed in quarterly earnings releases.

For our empirical analyses, we manually collect the quantity and types of non-GAAP metrics used by S&P 500 firms from quarterly 8-K-filed earnings releases in SEC's EDGAR for all quarters from 2016 to 2020. Our sample includes 6,580 firm-quarter observations covering a wide range of industries. We find that 91.67% of quarterly earnings releases report at least one non-GAAP metric, and the average number of non-GAAP metrics used per filing is 7.09 from 2016 to 2020. In addition, 63.7% of quarterly earnings releases typically include both non-GAAP earnings-related metrics and non-GAAP non-earnings-related metrics.

Before conducting determinant tests, we first examine short-window market reactions to non-GAAP disclosures to assess whether investors incorporate the information provided by additional non-GAAP metrics. After controlling the absolute value of earnings surprise, we find a strong positive relation between the change in the quantity of non-GAAP metrics and the absolute value of three-day cumulative abnormal returns around the earnings release date, suggesting that additional non-GAAP metrics lead to a stronger market reaction. In an additional analysis, we consider abnormal short-window trading volume as an alternative measure of stock-market reaction. We find a positive and significant trading-volume reaction, substantiating our findings based on stock-price reactions. Taking together, these findings suggest that investors, on average, find additional non-GAAP metrics incrementally valuable in assessing firms' accounting information, which makes the empirical inquiry of determinants more appealing.

We next examine the determinants of the quantity of non-GAAP metrics by regressing the number of non-GAAP metrics on a list of determinants (i.e., accounting reporting complexity, operational complexity, intangible intensity, the level of past accruals, and whether firms just miss expectations). Consistent with our informative view, we find that managers disclose a greater quantity of non-GAAP metrics in quarterly earnings announcements for firms: (1) with more complex accounting reporting and (2) with more extensive intangible assets. Furthermore, we conduct determinants tests using a change specification considering a strong persistence in firms' non-GAAP disclosure behavior. We find that the change in the quantity of non-GAAP metrics between two consecutive quarters is positively associated with the change in accounting reporting complexity and the change in the number of geographic segments. Collectively, these findings

support the prediction that managers disclose more non-GAAP metrics when investors' demand increases, and their incentive is to inform investors.

While managers disclose a greater quantity of non-GAAP metrics to inform investors, on average, we attempt to identify instances where determinants of the quantity of non-GAAP metrics may be associated with managerial opportunism. Prior literature suggests that managers use non-GAAP earnings opportunistically to meet analysts' consensus to manage investors' perceptions about their firm's performance (Bhattacharya et al., 2004; Black and Christensen, 2009; Doyle et al., 2013; Isidro and Marques, 2015). We thus consider a subsample where firms have missed analysts' expectations based on reported earnings to conduct determinant tests. We find that the quantity of non-GAAP metrics is still significantly and positively associated with accounting reporting complexity and intangible assets intensity. Simultaneously, we find that firms just missing analysts' expectations (i.e., by 5 cents per share or less) are more likely to disclose a greater quantity of non-GAAP metrics, indicating an attempt to mislead rather than to inform investors. This finding provides us some evidence that when firms have missed analysts' expectations, firms that just miss analysts' expectations are more likely to use a greater quantity of non-GAAP metrics than firms that miss the expectations further, to distract investors' attention through information overload, because such firms have greater self-serving incentives.

When we count the quantity of non-GAAP metrics used per filing (*Total_Metrics*), ratios/margins are counted separately from their dollar equivalents. For instance, adjusted operating income, adjusted operating margin, and adjusted operating income growth would be three separate non-GAAP metrics (i.e., *Total_Metrics* = 3). However, these three non-GAAP metrics essentially belong to the same category of non-GAAP metrics. Because the increase (decrease) in the quantity of non-GAAP metrics is not necessarily associated with the increase (decrease) in the quantity of non-GAAP categories, and vice versa, thus it is interesting to explore the factors associated with the quantity of non-GAAP categories (*Total_Categories*). We find that firms are likely to disclose more non-GAAP categories when there is greater demand for such information from investors and analysts. Moreover, at the same time, firms that just miss analysts' targets are likely to disclose more categories of non-GAAP metrics. This suggests that managers resort to different non-GAAP metrics to manage investors' perceptions when they just miss analysts' targets. Combined with results from our main determinant tests, this finding suggests that

when firms just miss the targets, they may increase the disclosure of non-GAAP categories but not necessarily the total number of non-GAAP metrics to influence investors' perceptions.

Finally, we provide several additional analyses. First, our determinant inferences remain robust if we alternatively measure a firm's intangible assets by excluding goodwill, and if we do not count EBIT or EBITDA or both when we identify non-GAAP metrics in earnings releases. Second, we find similar results if we include more control variables (i.e., proprietary cost, length of 10-Q, net file size of 10-Q, and PPE intensity) in the determinant regression model. Finally, our conclusions are robust to the exclusion of observations in 2020. This evidence suggests that our results are not impacted by the COVID-19 pandemic.

Our study contributes to the extant literature in several ways. First, our study complements the extant non-GAAP reporting literature. Prior literature focuses on non-GAAP earnings extensively (see Black et al., 2018 and Brosnan et al., 2024, for a review). However, other non-GAAP metrics have not been studied until recently. Gomez et al. (2023) investigate non-GAAP income statements (i.e., statements similar to GAAP income statements, but with many line items often differing from their GAAP counterparts) and find that firms voluntarily disclose non-GAAP income statements when firm and disclosure complexity, analyst following, and institutional ownership are higher and that non-GAAP income statements are informative. Brown et al. (2024) find that firms with less adequate financial statements discuss non-GAAP measures more extensively (i.e., higher occurrences of non-GAAP-related keywords) in their management discussion and analysis (MD&A) disclosures. Both studies imply that a greater quantity of non-GAAP metrics provides more informative insights. Our study, however, differs from theirs in that it directly and explicitly focuses on all distinct non-GAAP metrics in a quarterly earnings release. We manually collect a sample of non-GAAP disclosures and find that firms increase the quantity of non-GAAP metrics over time. We provide evidence that managers disclose a larger quantity of non-GAAP metrics when investors' demand increases. In addition, we find that investors recognize the incremental information in firms' non-GAAP disclosures at the disclosure date. These findings complement the results presented by Gomez et al. (2023) by showing that non-GAAP metrics beyond those in non-GAAP income statements can also be used to inform investors. These findings complement the results presented by Brown et al. (2024) by showing that, in addition to discussing non-GAAP metrics extensively, managers can also respond to investor demand by issuing a greater variety and quantity of these metrics.

Second, it is relevant for regulators, given that regulators consistently comment on the proper use of non-GAAP financial reporting to limit fraudulent disclosures. Although regulators', e.g., SEC's, orientation is "more disclosure is good,"[19] regulators also issue guidelines and take action to limit fraudulent disclosures. Furthermore, the significant increase in the use of non-GAAP measures has brought heightened scrutiny from regulators (e.g., the SEC) concerning how non-GAAP measures are calculated and the transparency of the related disclosures (PwC, 2021). A more thorough understanding of non-GAAP disclosures, in this study's context, the quantity of non-GAAP metrics, can inform regulators that, on average, managers include more non-GAAP measures in their quarterly earnings releases to inform investors. Additionally, it highlights that investors find this information useful.

Third, the findings of our study can help investors and financial analysts decide whether and to what extent they can rely on this type of disclosure when making investment and forecasting decisions. Our findings suggest that, on average, managers provide more non-GAAP metrics to inform investors and analysts. However, in a subsample of firms that have missed analysts' expectations based on reported earnings, we find that firms just missing expectations (i.e., by 5 cents per share or less) are more likely to disclose more non-GAAP metrics than firms falling farther short of expectations. In this case, investors and analysts should be cautious when deciding whether to use non-GAAP metrics in their exercises.

A discussion of prior research and hypotheses development can be found in the following section. The sample and descriptive statistics on non-GAAP disclosures are described in Section 3. The research design is discussed in Section 4. Empirical findings and additional tests are discussed in Section 5 and Section 6, respectively. We conclude in Section 7.

3.2 Literature Review and Hypothesis Development

3.2.1 Non-GAAP Earnings

Managers commonly claim that they disclose non-GAAP earnings by excluding non-core items (e.g., transitory items or one-time items) to reflect a sustainable performance and core operations. Because most non-GAAP exclusions relate to income-decreasing items (e.g., expenses, losses), critics of non-GAAP reporting argue that some managers disclose non-GAAP earnings for

[19] See details here https://www.sec.gov/our-goals

opportunistic reasons. Several studies investigate possible opportunistic use of non-GAAP earnings (e.g., Bhattacharya et al., 2004; Black and Christensen, 2009; Doyle et al., 2013; Isidro and Marques, 2015). For example, Doyle et al. (2013) provide evidence regarding how managers use non-GAAP earnings to meet or beat analyst forecasts; they find that managers strategically use positive exclusions (but not special items) to arrive at non-GAAP earnings that are higher than GAAP earnings to exceed analyst forecasts. Isidro and Marques (2015) find that managers are more likely to adjust non-GAAP earnings for recurring expenses, such as R&D expenses and depreciation, to meet earnings benchmarks in an environment where there is more pressure to achieve earnings benchmarks and less opportunity to manipulate GAAP earnings. Critics also argue that some managers calculate non-GAAP measures opportunistically by selectively excluding some recurring items that they claim are "non-operating" or "non-cash" in nature and unrelated to core performance. Empirical evidence shows that such non-GAAP adjustments are of low quality because of a positive association between these exclusions and firms' future performance (e.g., Doyle et al., 2003; Kolev et al., 2008; Bentley et al., 2018). Taken together, this line of research suggests that some managers report non-GAAP earnings opportunistically to mislead investors about performance by managing investors' perceptions of firm performance.

While there may still be examples of management attempting to use non-GAAP earnings opportunistically, extant evidence in recent years suggests that most non-GAAP earnings are informative rather than misleading (e.g., Curtis et al., 2014; Black and Christensen, 2018; Black et al., 2018; Leung and Veenman, 2018; Beardsley et al., 2021; Brosnan et al., 2024). Leung and Veenman (2018) examine the incremental information in loss firms' non-GAAP earnings; they find that their non-GAAP earnings are highly predictive of future performance and are valued by investors, while the expenses excluded from GAAP earnings are not. Comparing non-GAAP earnings of profitable firms to those of loss firms, Leung and Veenman (2018) find that loss firms' non-GAAP earnings are significantly more predictive and less strategic. Chen et al. (2021) examine how the qualitative characteristics of a non-GAAP earnings disclosure reveal the quality of the non-GAAP earnings metric itself. They find that more transparent qualitative information in non-GAAP disclosures is associated with more transitory non-GAAP exclusions and a lower likelihood that managers will aggressively exclude expenses in calculating non-GAAP earnings to meet or beat analysts' forecasts. Collectively, this line of research finds that non-GAAP earnings identify the portion of earnings that is persistent and thus allow investors to easily assess a firm's

(core) operating performance. Therefore, prior literature suggests that informative non-GAAP earnings are more persistent and more associated with current return and future firm performance than GAAP earnings.

3.2.2 Other Non-GAAP Metrics

Non-GAAP metrics include more than non-GAAP earnings, and as we report in more detail later, it is increasingly common for companies to provide non-GAAP measures beyond non-GAAP earnings. While most extant research on non-GAAP reporting concerns non-GAAP earnings, recent studies begin to focus on other non-GAAP metrics. Campbell et al. (2022) examine determinants and informativeness of non-GAAP revenue; they find that firms disclose non-GAAP revenue when GAAP revenue is incomparable with prior periods but not to compensate for poor GAAP performance. Furthermore, Campbell et al. (2022) find that non-GAAP revenue growth predicts future revenue growth better than GAAP revenue growth, and the market responds to this information. Rozenbaum (2019) finds that firms reporting EBITDA overinvest in capital and acquire excessive debt relative to their industry peers, suggesting that disclosing EBITDA leads to a systematic cost. Adame et al. (2023) find that both opportunistic and information motives explain firms' choice to disclose free cash flow in earnings announcements. Chen et al. (2023) study the reporting of the tax effects of non-GAAP exclusions and find that managers strategically select the tax rate applied to exclusions (in calculating non-GAAP earnings) to achieve after-tax earnings targets. Those studies suggest that firms disclose different non-GAAP metrics for varied reasons.

Two recent studies are closely related to our study. Gomez et al. (2023) explore factors motivating firms to disclose full non-GAAP income statements and the consequences of the SEC's pressure on managers to stop disclosing them. Gomez et al. (2023) find that firms with higher analyst coverage, higher institutional ownership, those with more complex disclosures, smaller firms, loss firms, and firms with lower leverage are more likely to report non-GAAP income statements. Their findings are consistent with the notion that firms are more likely to disclose non-GAAP income statements when there is greater demand for this information from capital market participants and when their GAAP disclosures are complex. Gomez et al. (2023) also find that removing full non-GAAP income statements impairs the informativeness of non-GAAP earnings and the overall informativeness of earnings announcements. Brown et al. (2024) provide evidence on non-GAAP disclosures in MD&As and find that firms with less adequate financial statements

discuss non-GAAP measures more extensively, and those firms discuss non-GAAP measures more in required topics, traditional topics, and intangibles topics.[20] Both studies imply that a greater number of non-GAAP metrics is informative.

Our study builds on evidence from these two studies in two ways. First, the percentage of firms reporting non-GAAP income statements has decreased from 22.81% in 2003 to 10.55% in 2010, consistent with increased SEC scrutiny of this practice during this period (Gomez et al., 2023). Additionally, not all non-GAAP reporting firms disclose a full non-GAAP income statement, and many firms encompass not only non-GAAP metrics within non-GAAP income statements but also extend to non-GAAP metrics across other financial statements. Non-GAAP disclosure is more extensive in the earnings announcement than in the MD&A (Brown et al., 2024). Therefore, our examination of the broader population of non-GAAP reporting firms with different quantities of non-GAAP metrics in earnings announcements, rather than non-GAAP income statements reporting firms alone or non-GAAP intensity in the MD&A, provides more generalizable evidence. Second, while Brown et al. (2024) consider various non-GAAP metrics beyond non-GAAP earnings, they count occurrences of case-insensitive keywords for non-GAAP disclosure in firms' MD&A. In contrast, we measure the actual number of different non-GAAP metrics disclosed.

3.2.3 Hypothesis Development

Our study extends prior literature by focusing on the general quantity of non-GAAP metrics, initially motivated by the proliferation of the quantity of non-GAAP metrics used per filing. In addition, the SEC monitors all non-GAAP financial measures, not a single non-GAAP metric. Furthermore, prior research suggests that inferences drawn from non-GAAP earnings regarding the determinants may not generalize to other non-GAAP measures (Campbell et al., 2022). As such, it is less clear why firms disclose non-GAAP measures and how they decide the quantity of non-GAAP measures to be disclosed. Such evidence can inform academic researchers, regulators, and practitioners about firms' motivations for entire non-GAAP reporting.

Prior studies suggest that managers' non-GAAP earnings reporting is influenced by incentives of providing informative disclosure and/or self-serving. Building upon those prior studies, we

[20] According to Brown et al. (2024), required topics include liquidity and capital resources, results of operations, risks & uncertainty, accounting standards, and boilerplate; traditional topics include taxes, investments and derivatives, impairment, employees and compensation, property and equipment, and financing; and intangible topics include business structure and changes, contracts and agreements, research and development, marketing, and technology.

predict that managers disclose a different quantity of non-GAAP metrics either to inform or to mislead investors.

When a firm's information environment is poor, investors are likely to have a greater demand for additional value-relevant information to help them assess the firm's performance and value. Managers may respond to such demand by issuing more management forecasts, providing longer yet more readable MD&A disclosures, and disclosing non-GAAP metrics. Compared with other voluntary disclosures, non-GAAP metrics explain current performance in a numeric way, which allows investors to capture a snapshot of the performance. Disclosing non-GAAP metrics is also less costly because these metrics are derived from actual GAAP numbers. In addition, conceptually, various non-GAAP metrics are not a simple extension of non-GAAP earnings. Instead, as the SEC's definition implies, non-GAAP measures are expected to capture a firm's performance, financial position, and cash flows. For instance, different from non-GAAP earnings (which concern a firm's bottom-line performance), non-GAAP revenues provide information about the firm's future revenue growth, incremental to GAAP revenue and non-GAAP earnings (Campbell et al., 2022). Free cash flow is often perceived as a metric for growth, whereas earnings per share is the usual metric for ongoing performance (Adame et al., 2023). Gomez et al. (2023) find that managers are more likely to disclose non-GAAP income statements in response to increased investor demand. Therefore, besides other voluntary disclosures, when investors' demand for information increases, managers are likely to increase the quantity of non-GAAP metrics used in earnings releases. We identify three situations in which investors' demand for information is likely high.

Complex accounting reports require investors to spend more time and effort to extract relevant information, making current information less informative. Investors are likely to demand more useful information from managers. Brown et al. (2023) find that managers of firms with more complex accounting reporting are likely to disclose non-GAAP earnings. Building upon this evidence, we predict that more complex firms tend to disclose more non-GAAP metrics, often excluding non-core items from GAAP-based measures. This expectation can be expressed as the following hypothesis:

H1a: Other things being equal, managers of firms with more complex accounting reporting are likely to disclose more non-GAAP metrics.

Complex operations increase the difficulty of translating economic activities into accounting disclosures. Therefore, operational complexity is another setting where we expect current information to be less informative. More business and/or geographic segments often suggest the presence of more complicated economic operations because segments typically have different services, products, customers, and/or processes. Investors may require additional information to help them understand the underlying economic activities of those firms. Thus, managers of those firms are likely to provide more non-GAAP metrics when investors' demand is increasing. This expectation can be expressed as the following hypothesis:

H1b: Other things being equal, managers of firms with more geographic or business segments are likely to disclose more non-GAAP metrics.

Firms with fundamentals that are hard to value are characterized by an opaque information environment. Consequently, investors may demand additional information from managers to help them assess the firm value (Cao et al., 2023). Managers of those firms are likely to provide more non-GAAP metrics when investors' demand is increasing. This expectation can be expressed as the following hypothesis:

H1c: Other things being equal, managers of hard-to-value firms are likely to disclose more non-GAAP metrics.

To inform investors might not be the sole motive for disclosing a larger quantity of non-GAAP metrics. Some managers might disclose a larger quantity of non-GAAP metrics for opportunistic reasons, which are driven by self-serving incentives. In other words, when managers' self-serving incentives increase, they are likely to disclose more non-GAAP metrics because investors' attention is more likely to be distracted due to information overload.

Managers want to achieve their operating goals without managing earnings or reporting non-GAAP measures to alter stakeholders' perceptions. However, when real operating performance alone fails to allow managers to meet their objectives, managers are highly likely to resort to perception management to influence stakeholders' perceptions (Black et al., 2017). The most common tools are (i) real earnings management, (ii) accruals management, and (iii) non-GAAP reporting. Black et al. (2017) find that the order of these options is accruals management, real earnings management, and non-GAAP reporting. Barton and Simko (2002) find that companies with higher net operating assets at the beginning of the period are more likely to miss analysts'

earnings expectations based on GAAP earnings at the end of the period. The extent of inflated net operating assets is called "balance sheet bloat" by Hirshleifer et al. (2004). Excessive balance sheet bloat limits managers' future flexibility to use accruals to manage earnings. This Barton and Simko measure captures the earnings management constraints. That is, to the extent that managers have used accruals to manage earnings in prior periods, they may be constrained to manage accruals in the future. Therefore, we expect that managers of companies with more constrained balance sheets (i.e., more accruals in the past) have less flexibility to manage accruals in the current period and, thus, are more likely to disclose more non-GAAP metrics to manage investor perceptions. This expectation can be expressed as the following hypothesis:

H2a: Other things being equal, managers of firms with higher levels of prior bloated balance sheet are likely to disclose more non-GAAP metrics.

Black et al. (2017) find that firms just missing expectations are significantly more likely to report non-GAAP earnings than companies that fall farther short of expectations. This evidence suggests that managers decide to disclose non-GAAP earnings to meet strategic earnings targets. We expect that firms just missing expectations are also likely to disclose more non-GAAP metrics because managers could derive personal benefits (such as compensation, reputation, etc.) from doing so, and non-GAAP disclosures are less costly and take place chronologically at a relatively later date. This expectation can be expressed as the following hypothesis:

H2b: Other things being equal, managers of firms just missing expectations are likely to disclose more non-GAAP metrics.

3.3 Sample and Descriptive Statistics

3.3.1 Data Collection

In this study, our primary focus is on the quantity of non-GAAP metrics. Unfortunately, there is currently no publicly available data on this specific aspect. [21] Consequently, we find it necessary to manually collect the dataset ourselves.

[21] Although Audit Analytics has a non-GAAP dataset that identifies the number of non-GAAP metrics used in quarterly earnings releases, it does not provide the names of these non-GAAP metrics for each earnings release. In other words, the non-GAAP dataset from Audit Analytics tells users how many non-GAAP metrics are used in one filing, but users do not know what firms disclose. Therefore, analyses using data from Audit Analytics are limited within the quantity of non-GAAP metrics.

We begin the data collection process with all firms included in the S&P500 because S&P500 firms are economically significant. The composition of this index changes frequently, so we choose November 1, 2021, as the date for establishing which firms to be included in our analyses. Table 1, Panel A provides a reconciliation between the S&P500 on November 1, 2021, and the final sample firms. Following prior non-GAAP literature, we remove financial institutions (99 firms) and utility firms (57 firms). We also remove firms that change the fiscal year-end during the sample period (1 firm) and those founded after the calendar year 2020 (3 firms). The final sample consists of 340 S&P500 firms. Each observation corresponds to a quarterly earnings release made during a calendar quarter from 2016 to 2020, regardless of when the fiscal quarter ended. Because of the dynamic nature of non-GAAP reporting, we choose earnings releases for the recent five years (2016-2020) to reflect the current non-GAAP reporting landscape.

……. [INSERT TABLE 1 ABOUT HERE] …….

We hand-collect non-GAAP metrics from quarterly earnings releases filed with the SEC in 8-Ks (with Item 2.02) on EDGAR. When earnings releases are unavailable on EDGAR, we collect them from firms' websites (this represents 0.84% of the total earnings releases collected). However, there are still 143 earnings releases that we could not find.[22] Therefore, our hand-collected sample includes 6,657 quarterly earnings releases representing 340 distinct firms. We manually read each quarterly earnings release. We identify and count the non-GAAP metrics and record this quantity as "*Total_Metrics*." A non-GAAP metric is counted if it meets the following criteria[23]:

(1) A non-GAAP metric must have an assigned value.[24]

(2) A non-GAAP metric appears to discuss the current fiscal quarter's performance.[25]

(3) A non-GAAP metric is used on a consolidated basis.

(4) Ratios/margins are counted separately from their dollar equivalents.[26]

[22] 143 earnings releases from 16 firms are missing because these firms have experienced spin-offs or mergers during the sample period.
[23] Following prior literature (Rozenbaum, 2019; Laurion, 2020) and SEC's Financial Reporting Manual, EBIT and EBITDA are counted as non-GAAP metrics when they appear in the earnings releases. See https://www.sec.gov/corpfin/cf-manual/topic-8
[24] Some earnings releases mention a non-GAAP metric but do not assign a value to this metric. In this case, this non-GAAP metric is not counted.
[25] A non-GAAP metric is disclosed but is for forward-looking performance (outlook) only. In this scenario, this non-GAAP metric is not counted.
[26] For example, operating income, operating margin, and operating income growth would be three separate metrics.

In this dataset comprising non-GAAP information, we encompass both earnings releases that disclose non-GAAP metrics and those that do not provide any non-GAAP information.

3.3.2 Sample Selection

We then merge the hand-collected dataset with other data sources (i.e., Compustat, CRSP, I/B/E/S, Thomson Reuters 13f database, Hoitash and Hoitash (2018)). We remove 77 firm-quarter observations that have missing data from other data sources for measuring variables for determinants tests (described in Section 4). Thus, the final sample contains 6,580 firm-quarter observations for 340 distinct firms. This sample serves as the starting point for all analyses in this study. The sample for determinants tests using the change specification reduces to 6,240 firm-quarter observations. Table 1, Panel B summarizes the sample selection procedures.

3.3.3 Descriptive Statistics on Non-GAAP Disclosures

Table 2 presents descriptive statistics on non-GAAP disclosures of the full sample (*N*=6,580). Panel A reveals that the proportion of firm-quarters disclosing non-GAAP metrics is increasing over the sample period, from 88.65% in 2016 to 93.57% in 2020. In addition, the average number of non-GAAP metrics used per filing increases from 6.49 in 2016 to 7.73 in 2020. Overall, for a sample of 6,580 quarterly earnings releases, 91.67% of them make non-GAAP disclosures, and the average quantity of non-GAAP metrics per filing is 7.09 over the period. For the subsample of firm-quarters that provide non-GAAP disclosure (that is, *Total_Metrics* > 0), the mean of *Total_Metrics* is 7.74 (untabulated).

……. [INSERT TABLE 2 ABOUT HERE] …….

Panel B reports frequency statistics on non-GAAP disclosures by industry. We categorize industries based on the 2-digit SIC classification. Non-GAAP disclosures are common across a wide range of industries, but the average quantity of non-GAAP metrics used per filing varies across industries. Manufacturing industries (SIC range: 20-39), on average, disclose the greatest number of non-GAAP metrics (*Total_Metrics* = 8.09). One explanation is that this SIC range consists of several high-technology industries, including Drugs (SIC codes 2833-2836), Computers (SIC codes 3570-3577), Electronics (SIC codes 3600-3674), and Precise Measurement Instruments (SIC codes 3810-3845). Prior studies show that technology industries are more likely to use non-GAAP metrics (e.g., Heflin and Hsu, 2008).

Panel C presents frequency statistics of different types of non-GAAP measures over the sample period. Non-GAAP net income or EPS is by far the most common non-GAAP measure (79.2%), followed by non-GAAP revenue (41.4%), free cash flow (35%), non-GAAP operating income (27.5%), EBITDA (24.7%), non-GAAP expenses (22.5%), non-GAAP effective tax rate (20.1%), adjusted EBITDA (18.6%), net debt (6.3%), EBIT (6.2%), adjusted EBIT (3.2%), and return on invested capital or ROIC (1.8%). In addition, the proportion of earnings releases disclosing each type of non-GAAP metric is also increasing over the sample period. For example, non-GAAP net income reporting frequency has continued to increase over time, from 75.3% in 2016 to 82.1% in 2020. This increasing trend in non-GAAP net income reporting is consistent with prior non-GAAP net income research (e.g., Figure 2 of Bentley et al., 2018). Recent studies have started to focus on non-GAAP measures other than non-GAAP net income. For example, Campbell et al. (2022) report that approximately 19% of sample firms from Compustat disclose non-GAAP revenue from 2015 to 2018. Adame et al. (2023) report that 14.1% of annual earnings announcements of S&P 1500 firms disclose free cash flows from 2004 to 2016. In our sample, the proportion of observations disclosing non-GAAP revenue (41.4%) and free cash flow (35%) is higher. This is possibly due to the more recent sample period and economically larger sample firms.

Panel D presents frequency statistics of four non-GAAP reporting scenarios over the sample period, including:

- YY—the scenario where managers provide both non-GAAP earnings-related metrics and other non-GAAP metrics.
- YN—the scenario where managers provide only non-GAAP earnings-related metrics.
- NY—the scenario where managers provide only other non-GAAP metrics.
- NN—the scenario where managers do not provide either non-GAAP earnings-related metrics or other non-GAAP metrics.

Non-GAAP earnings-related metrics are derived from GAAP earnings, but exclusions are slightly different. Non-GAAP earnings-related metrics include non-GAAP net income (or EPS), EBIT, adjusted EBIT, EBITDA, adjusted EBITDA, and adjusted operating income. Other non-GAAP metrics include non-GAAP revenue, free cash flow, net debt, non-GAAP expense-related measures, non-GAAP effective tax rate, and return on invested capital (ROIC), which are derived from different GAAP items. Non-GAAP expense-related measures include non-GAAP sales and

marketing expenses, non-GAAP research and development (R&D) expenses, non-GAAP selling, general, and administrative (SG&A) expenses, non-GAAP operating expenses, non-GAAP other expenses, and other metrics derived from GAAP income statement line-items. A single exclusion from GAAP earnings can affect several income statement line items (Gomez et al., 2023). For example, stock compensation expense can be a component of multiple line items, including the cost of goods sold and selling, general and administrative expenses. Firms reporting non-GAAP earnings along with non-GAAP expense-related metrics can present the distribution of exclusions.

Panel D shows that a large proportion of earnings releases (63.7%) disclose non-GAAP earnings-related metrics along with other non-GAAP metrics. 22.5% of observations disclose only non-GAAP earnings-related measures. This indicates that conditional on non-GAAP earnings disclosures (*N*=5,671), 74% of observations disclose other non-GAAP metrics as well. The collective prior evidence suggests that non-GAAP earnings disclosures are informative to investors, on average. However, prior literature does not provide evidence on whether other non-GAAP measures provide additional information. In addition, some studies use a dummy variable to determine whether managers disclose non-GAAP earnings. Those studies do not differentiate between non-GAAP earnings and other non-GAAP metrics. Thus, it is necessary to consider all non-GAAP measures in analyses. Consequently, we explore determinants of the quantity of non-GAAP metrics and analyze market reactions.

3.4 Research Design

3.4.1 Regression Model

To provide evidence on the determinants of the quantity of non-GAAP metrics, we estimate the following Tobit regression in our main tests:

$$Total\_Metrics_q = \beta_0 + \beta_1 logARC_q + \beta_2 nbseg_q + \beta_3 ngseg_q + \beta_4 Intangible_q + \beta_5 NOASales_q + \beta_6 JUSTMISS_q + Controls_q + \varepsilon \quad (1)$$

The quantity of non-GAAP metrics is the dependent variable. This dependent variable may take a value of zero if a firm does not disclose any non-GAAP metrics. Given that this variable is

truncated at left (i.e., the smallest value is zero for the dependent variable), a Tobit model is appropriate for this study.[27]

Since the decision to disclose non-GAAP information can take place chronologically at a relatively later date, the quantity of non-GAAP metrics is possibly related to current firm characteristics and financial performance. Thus, the dependent, independent, and control variables are measured at quarter *q*. Appendix A summarizes all our variable definitions.

3.4.2 Quantity of Non-GAAP Metrics

Quantity of non-GAAP metrics (*Total_Metrics*). *Total_Metrics* is a count of distinct non-GAAP metrics used in an earnings release. A larger *Total_Metrics* means that more non-GAAP metrics are disclosed in an earnings release. Conversely, *Total_Metrics* taking the value of zero means that no non-GAAP metrics are disclosed in the earnings release. This variable is the primary variable of interest in this study.

3.4.3 Determinants of the Quantity of Non-GAAP Metrics

Accounting reporting complexity (*ARC*). The dataset source of accounting reporting complexity (*ARC*) is the Hoitash and Hoitash (2018) dataset, which constructs *ARC* based on detailed accounting disclosures in eXtensible Business Reporting Language (XBRL) SEC filings.[28] XBRL relies on a taxonomy, an electronic dictionary of business reporting that defines tags that should be used to represent accounting concepts such as "revenues," "net inventory," and "raw materials."[29] In addition, the SEC allows firms to expand the taxonomy and create their own firm-specific tags to account for possible firm-specific accounting concepts under U.S. GAAP. In summary, each XBRL tag represents an accounting concept under U.S. GAAP. Hoitash and Hoitash (2018) measure *ARC* based on the count of distinct (within each disclosure) monetary XBRL tags in an SEC filing. A larger *ARC* means that more accounting concepts are disclosed in an SEC filing, resulting in a more complex SEC filing involving the difficulty of understanding, preparing, auditing, and analyzing financial reports.

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[27] A Tobit model, also known as a censored regression model, is designed to estimate linear relationships between variables when there is either left- or right-censoring in the dependent variable (also known as censoring from below and above, respectively).

[28] We thank Rani Hoitash and Udi Hoitash for providing their data publicly for researchers' use. We downloaded the data from http://www.xbrlresearch.com

[29] In 2009, the SEC passed the Interactive Data to Improve Financial Reporting rule, requiring companies to provide financial statement information in an XBRL format (SEC 2009). The use of XBRL (i.e., standard tags) enables comparability within and across firms.

Operational complexity (*OC*). We use two observable measures of operating complexity: the number of geographic segments (*ngseg*) and business segments (*nbseg*). The data is from Compustat Segment Files.

Hard-to-value firms *(Intangible)*. We use the intangible intensity (*Intangible*) to capture the hard-to-value firms because intangible assets are hard to value. It is calculated as the amount of intangible assets scaled by total assets.

Balance-sheet constraint measure (*NOASales*). Barton and Simko (2002) provide evidence that managers' previous earnings management choices affect their ability to opportunistically bias earnings in future periods. Barton and Simko (2002) measure the aggregate effect of previous earnings management choices using net operating assets (*NOA*). Firms with higher (lower) *NOA* have a lower (higher) ability to manage earnings in the future. We follow prior research and use *NOA* as a proxy for past earnings management (Black et al., 2017). It is computed as *NOA* scaled by sales at the end of quarter *q-1* (*NOASales*).

Just miss analysts' expectations (*JUSTMISS*). *JUSTMISS* is an indicator variable coded one if a firm misses analysts' expectation by 5 cents per share or less, and zero otherwise (Black et al., 2017).

3.4.4 Control Variables

Following prior literature, we include the following control variables that may influence firms' discretionary disclosure decisions (e.g., Lang and Lundholm, 1993; Campbell et al., 2022) and non-GAAP reporting decisions (e.g., Bentley et al., 2018).

Firm size (*SIZE*). Larger firms have lower costs of disseminating information and, thus, higher incentives to disclose more to investors (Lang and Lundholm, 1993; Guay et al., 2016).

Growth opportunity (*MTB*). Prior studies suggest that firms with more perceived growth opportunities (i.e., larger *MTB*) may have stronger incentives to shape market expectations through voluntary disclosures (e.g., Guay et al., 2016; Campbell et al., 2022).

Financial leverage (*Leverage*). Firms with higher leverage tend to have less informative earnings due to the increased likelihood of firm failures and increased possibility of earnings management. Thus, firms with higher leverage are more likely to include more non-GAAP metrics in their earnings releases than other firms (Lougee and Marquardt, 2004; Guay et al., 2016).

Special items (*SpecialItems*). Special items are mostly nonrecurring. Managers are likely to disclose more non-GAAP metrics when their firms have more special items. A negative coefficient is expected, as the value of special items is negatively signed.

Earnings volatility (*stdROA*). *stdROA* is the standard deviation of return on assets. We include *stdROA* as a proxy for earnings volatility that captures the informativeness of GAAP earnings, given the frequent inclusion of performance volatility measures in prior non-GAAP research (e.g., Black et al., 2017; Bentley et al., 2018). Survey evidence reveals that earnings volatility is negatively related to earnings predictability and, thus, the informativeness of GAAP earnings (Graham et al., 2005). Thus, we predict a positive association between *stdROA* and *Total_Metrics*.

Loss (*Loss*). *Loss* is an indicator variable taking value one if the quarterly net income is negative and zero otherwise. For firms reporting a "*Loss*," managers are likely to disclose more non-GAAP metrics either because they attempt to distract investors' attention away from bad news by discussing other positive outcomes or because they attempt to provide additional information to explain the bad news. Thus, we predict a positive association between *Loss* and *Total_Metrics*.

Peer Effects (*Peer_metrics*). Peer effects suggest that the average behavior of a group influences the behavior of individual group members. Following prior research (Durnev and Mangen, 2020; Seo, 2021), the more others report non-GAAP information, the more the focal firm is also pressured to report this kind of information. However, it is also possible that when peer firms disclose their non-GAAP metrics, investors may decrease their demand for such information from the focal firm because they know how to calculate such non-GAAP metrics from peer firms. Thus, we do not predict a directional association between *Peer_metrics* and *Total_Metrics.*

Analysts Following (*logNUMEST*). *logNUMEST* is the natural log of 1 plus the number of analysts contributing to the I/B/E/S earnings forecast for the current year. *logNUMEST* is a proxy for the richness of firms' information environments. However, we do not predict a directional association between *logNUMEST* and *Total_Metrics* because a richer information environment could decrease demand for voluntary disclosures or increase the supply of voluntary disclosures as firms try to guide analysts (Campbell et al., 2022).

Percentage of institutional investors (*%INST_HOLD*). *%INST_HOLD* is the percentage ownership of institutional holdings. We include *%INST_HOLD* as a proxy for the sophistication

of firms' investors. Prior literature provides evidence that managers provide more voluntary disclosures when faced with pressures from institutional investors. However, when there is a higher proportion of institutional investors, managers are likely to disclose fewer non-GAAP metrics either because the need for public, voluntary disclosures is reduced and thus *Total_Metrics* or because the monitoring effectiveness is increased. Thus, we do not predict a directional association between *%INST_HOLD* and *Total_Metrics*.

3.5 Empirical Results

3.5.1 Descriptive Statistics and Correlations

Table 3, Panel A presents descriptive statistics for all firm-quarter observations between 2016 and 2020 in the final sample. All continuous variables are winsorized at 1% and 99% across the sample with available data. For non-GAAP disclosures, 91.7% of firm-quarter observations in the sample disclose at least one non-GAAP metric (*NonGAAP_dummy* = 1), and the average number of non-GAAP metrics disclosed during the sample period is 7.092 (*Total_Metrics*). In addition, on average, companies report 282 distinct tags in their quarterly financial statements and notes. We also find that 21.5% of firm-quarter observations miss analysts' expectations, and 9.3% of firm-quarter observations in the sample miss the analyst consensus forecast by 5 cents per share or less. Conditional on firms that have missed analysts' targets, 43% of them miss the targets by 5 cents per share or less. For control variables, we note that, on average, peer firms disclose 6.957 non-GAAP metrics. The descriptive statistics of the control variables are generally consistent with those reported in the extant literature.

……. [INSERT TABLE 3 ABOUT HERE] …….

Table 3, Panel B presents Pearson (lower-left triangle) and Spearman (upper-right triangle) correlations of the variables used in main regression analyses. As expected, *Total_Metrics* is positively and significantly correlated with *logARC, nbseg, ngseg, Intangible,* and *NOASales*. However, the correlation between *Total_Metrics* and *JUSTMISS* is not significant. All other correlations are moderate in magnitude.

3.5.2 Market Reactions around Non-GAAP Disclosures

Audit Analytics (2018) reports that the average number of different non-GAAP metrics used per filing rose from 2.35 in 1996 to 7.45 in 2016. We also find an increasing trend in the quantity

of non-GAAP metrics used per filing from 2016 to 2020. Previous studies indicate that non-GAAP earnings are more informative than GAAP earnings (e.g., Black and Christensen, 2018; Beardsley et al., 2021). In addition, Gomez et al. (2023) find that removing non-GAAP income statements reduces the usefulness of non-GAAP earnings and lowers the informativeness of earnings announcements. Thus, one may expect the market to assign a higher value to a firm when more non-GAAP metrics are disclosed. However, since non-GAAP measures are also seen as potentially misleading, it is also possible that the market attributes a lower value to those firms who disclose more non-GAAP metrics.

Instead of being interested in whether more non-GAAP metrics move prices up or down, we focus on the amount of such information. Specifically, we are interested in whether a greater quantity of non-GAAP metrics induces greater market reactions. Additionally, according to Campbell et al. (2022), properly estimating the market response to non-GAAP information requires a measure of new information. As a result, we study the relation between the absolute value of three-day abnormal returns around the earnings release date (*ABS_CAR*) and the additional quantity of non-GAAP metrics in the quarterly earnings release (Δ*Total_Metrics*).

We estimate the following model, which controls for the absolute value of earnings surprise (*ABS_SUE*) and other variables suggested in the literature on short-window market reactions.

$$ABS\_CAR = \beta_0 + \beta_1 \Delta Total\_Metrics + \beta_2 ABS\_SUE + Controls + Industry + YearQtr + \varepsilon \quad (2)$$

ABS_CAR is the absolute value of the three-day cumulative market-adjusted return (using a value-weighted index) around each firm's quarterly earnings announcement, which is day 0. We use the change in the quantity of non-GAAP metrics (Δ*Total_Metrics*) between two quarters as a proxy for incremental non-GAAP information. In effect, we test whether additional non-GAAP metrics are useful to investors. If investors view the different quantity of non-GAAP metrics as different amount of information, then investors react more strongly to a greater change in the quantity of non-GAAP metrics. Otherwise, a null market reaction would be expected for changes in the quantity of non-GAAP metrics.

Column 1 of Table 4 presents the market reaction results for Model (2). Following prior research examining market reactions to earnings news, we cluster standard errors by firm and earnings announcement date (e.g., Hirshleifer et al., 2009; Campbell et al., 2022). The estimated

coefficient for Δ*Total_Metrics* is significantly positive (t-stat.=2.93), suggesting that the market reacts positively to the additional quantity of non-GAAP metrics used per filing.[30] Thus, investors reward firms with additional non-GAAP metrics disclosed in an earnings release.

……. [INSERT TABLE 4 ABOUT HERE] …….

An alternative widely used measure of the information conveyed to investors at earnings announcements is abnormal trading volume. Following prior literature (e.g., Hope et al., 2016; Hope et al., 2023), we measure abnormal trading volume as the average daily trading volume in the three-day event window [-1, 1] minus the average daily trading volume in the [-60, -11] window, scaled by the trading volume in the [-60, -11] period. We find that Δ*Total_Metrics* is positively associated with abnormal trading volume (*ABVOL*). Specifically, Column 2 of Table 4 shows that the coefficient on Δ*Total_Metrics* is positive (0.0086) and significant at the 0.10 level (two-tailed test). This finding corroborates the primary analysis based on stock-price reactions.

In sum, investors reward firms with more non-GAAP metrics disclosed in an earnings release, which raises questions about what drives managers to provide different quantity of non-GAAP metrics.

3.5.3 Determinants of the Quantity of Non-GAAP Metrics

To find out determinants, we examine the association between the quantity of non-GAAP metrics and several potential factors. Table 5, Panel A presents the results of estimating the Tobit model (1) using a level specification. In these regressions and all others, unless otherwise noted, we cluster standard errors by firm.[31] In addition, we include industry and year-quarter fixed effects. Column 1 includes only factors that capture the information environment. Column 2 includes only factors that capture potential opportunism. Column 3 includes all factors simultaneously. We find that *Total_Metrics* is most positively associated with factors capturing information environment that induces investors' increasing demand. For example, managers are likely to disclose more non-GAAP metrics when accounting disclosures are more complex (i.e., coefficient estimates of 1.8533 in column 1 and 1.8406 in column 3) and when the intangible intensity is increasing (i.e., coefficient estimates of 3.7806 in column 1 and 3.6743 in column 3). When opportunistic factors

[30] In an untabulated test, we include the interaction term of $\Delta Total\_Metrics$ and ABS_SUE, and the coefficient of this term is not significant. This result implies that the change in the quantity of non-GAAP metrics itself conveys additional information to the market, rather than that non-GAAP information helps investors to better understand the information content of earnings.

[31] Our sample consists of only five years and 20 quarters, resulting in an insufficient number of clusters for a time dimension.

are solely included in column 2, we find a significant and positive coefficient on *NOASales*. However, it loses its significance when we include informativeness factors in column 3.[32] Specifically, we find insignificant coefficients on *NOASales* and *JUSTMISS* in column 3.

……. [INSERT TABLE 5 ABOUT HERE] …….

In addition, we find that firms with greater leverage and earnings volatility are more likely to disclose more non-GAAP metrics as per the significantly positive coefficients on *Leverage* and *stdROA*, respectively. This is consistent with the prediction that firms with higher leverage and more volatile earnings tend to have less informative earnings and thus provide more non-GAAP metrics to inform investors. We also find a positive and significant coefficient on *logNUMEST*, consistent with the conjecture that managers increase the supply of non-GAAP metrics as they try to guide analysts. Interestingly, we find a significantly negative coefficient on *Peer_metrics*, suggesting that when peer firms disclose a greater number of non-GAAP metrics, investors' demand for the focal firm on such information is decreased. This is potentially because investors know how to calculate such non-GAAP metrics from peer firms. Overall, our results in Panel A of Table 5 suggest that the quantity of non-GAAP metrics is intended to fulfill investors' demand and improve the information environment rather than to mislead investors.

We observe that 70% of our observations show consistency in the quantity of non-GAAP metrics used per filing between two consecutive quarters. This raises a question about the factors motivating managers to adjust the quantity of non-GAAP metrics utilized per filing. Table 5, Panel B presents the results of estimating the linear regression model of the determinants of changes in the quantity of non-GAAP metrics (Δ*Total_Metrics*). Column 1 includes only factors that reflect changes in firms' information environment. Column 2 includes only factors that capture the change in potential opportunism. Column 3 includes all factors simultaneously. We find that Δ*Total_Metrics* is positively associated with the change in the accounting reporting complexity and the change in the number of geographic segments, as per the significantly positive coefficients on Δ*logARC* and Δ*ngseg*, respectively. In sum, our results in Table 5 suggest that managers' decisions on the quantity of non-GAAP metrics are sensitive to their firms' information

[32] We also follow prior research and classify firms using an indicator variable coded one for firms with *NOASales* above their industry-quarter median *NOASales* and zero otherwise (Black et al., 2017). As with Black et al. (2017), this industry-adjusted NOA indicator variable (*NOA_Dummy*) is a measure of past accruals management or the extent to which the balance sheet is constrained. We find similar results when we use *NOA_Dummy* instead of *NOASales* in the regression models.

environment and, thus, investors' demand. Using the ordinary least squares regression (OLS) and/or defining *JUSTMISS* as missing analyst expectations by 3 cents per share or less do not change our conclusions (untabulated).[33]

Managers usually make two sequential decisions: whether to issue non-GAAP metrics and how many metrics to issue. In our main tests, we combine these two decisions using a Tobit model. To address endogeneity concerns, we restrict our sample to firms with at least one non-GAAP metric in their quarterly earnings releases. The evidence from this analysis is consistent with our reported results. Another concern is that unobservable factors might codetermine the quantity of non-GAAP metrics (*Total_Metrics*) and accounting reporting complexity (*logARC*). Our results from the change specification can address this concern. To further address this concern, we include firm-fixed effects and time-fixed effects to control for omitted firm-specific and time-variant factors. We re-estimate model (1) and find significant and positive coefficients on *logARC*, which again suggests that the quantity of non-GAAP metrics increases with accounting reporting complexity (untabulated).

3.6 Additional Analyses

3.6.1 Determinants of the Quantity of Non-GAAP Metrics of Firms Missing Targets

Prior literature finds that firms that have missed analysts' expectations use non-GAAP earnings to mislead investors by convincing them that their non-GAAP earnings meet a desired outcome (Doyle et al., 2013; Isidro and Marques, 2015; Black et al., 2017). Hence, we explore whether determinants of the quantity of non-GAAP metrics for firms that have missed analysts' expectations are different. We focus on observations that have missed analysts' expectations. 21.5% of observations in the sample have missed analysts' expectations over the sample period, and thus, the subsample size is reduced to 1,412 firm-quarter observations. In this subsample, 89% of observations disclose non-GAAP metrics (*NonGAAP_dummy*=1), and 43% just miss analysts' expectations by 5 cents per share or less (*JUSTMISS*=1).

Table 6 presents the results of estimating the Tobit model (1) for the subsample. Column 1 includes only factors that reflect firms' information environment, column 2 includes only factors that capture potential opportunism, and column 3 includes all factors simultaneously. It shows that

[33] Due to the count nature of *Total_Metrics*, in an untabulated analysis, we use a Poisson regression with a level specification. We find that the coefficient on *logARC* is still significantly positive, consistent with the results in Table 5, Panel A.

managers are likely to disclose more non-GAAP metrics when accounting disclosures are more complex (i.e., coefficient estimates of 1.4718 in column 1 and 1.5175 in column 3) and when the intangible intensity is increasing (i.e., coefficient estimates of 4.1560 in column 1 and 4.0228 in column 3), consistent with our results in Panel A of Table 5. Notably, the coefficient on *JUSTMISS* turns significantly positive in column 2 (0.8748, t-stat.=2.85) and column 3 (0.7224, t-stat.=2.50). It suggests that firms that have missed analysts' expectations when they just miss expectations by 5 cents per share or less are more likely to disclose a greater quantity of non-GAAP metrics because investors' attention is more likely to be distracted due to information overload.[34] Thus, these firms are more likely to employ more non-GAAP metrics to mislead investors.

……. [INSERT TABLE 6 ABOUT HERE] …….

3.6.2 Determinants of the Quantity of Non-GAAP Categories

Ratios/margins are counted separately from their dollar equivalents when we count the quantity of non-GAAP metrics used per filing (*Total_Metrics*). For instance, adjusted operating income, adjusted operating margin, and adjusted operating income growth would be three separate metrics. However, these three non-GAAP metrics essentially belong to the same category of non-GAAP metrics. We identify twelve categories of non-GAAP metrics, including non-GAAP net income, EBIT, adjusted EBIT, EBITDA, adjusted EBITDA, adjusted operating income, non-GAAP revenue, non-GAAP expenses-related metrics, free cash flow, net debt, non-GAAP effective tax rate and return on invested capital (ROIC). Descriptive statistics of those types of non-GAAP metrics are presented in Table 2, Panel C.

In an untabulated analysis, we find that the quantity of non-GAAP categories involved per filing (*Total_Categories*) is also increasing, from 2.57 in 2016 to 3.19 in 2020. Because the increase (decrease) in the quantity of non-GAAP metrics is not necessarily associated with the increase (decrease) in the quantity of non-GAAP categories, and vice versa, thus it is interesting to explore the factors associated with the quantity of non-GAAP categories. Table 7 presents tests of the determinants of the quantity of non-GAAP categories used per filing, estimating the following regression:

[34] In untabulated analyses, we find similar results when we define *JUSTMISS* as missing analyst expectations by 3 cents per share or less.

$$Total\_Categories_q = \beta_0 + \beta_1 logARC_q + \beta_2 nbseg_q + \beta_3 ngseg_q + \beta_4 Intangible_q + \beta_5 NOASales_q + \beta_6 JUSTMISS_q + Controls_q + \varepsilon \quad (3)$$

Table 7, Panel A presents the results of determinants tests with a level specification by estimating the Tobit model (3). The quantity of non-GAAP categories is significantly and positively associated with factors capturing information environment that induces investors' increasing demand. For example, managers are likely to disclose more types of non-GAAP metrics when accounting disclosures are more complex (0.4639) and when the intangible intensity is increasing (1.6876). In addition, when analysts following is increased, the quantity of non-GAAP categories increases. Notably, firms that just miss the targets by 5 cents or less (*JUSTMISS*) are also likely to disclose more types of non-GAAP metrics (0.1218). However, the impact from opportunism factors is less than the impact from informative factors.

……. [INSERT TABLE 7 ABOUT HERE] …….

Table 7, Panel B presents the results of determinants tests with a change specification by estimating linear models. It shows that the increase in non-GAAP categories used per filing is associated with the increase in accounting reporting complexity. We also find that firms with greater changes in past accruals (Δ*NOASales*) are also likely to induce greater changes in the types of non-GAAP metrics (0.0165).

In untabulated analyses, we focus on a subsample of firms that have missed the targets. We find similar results to those in the full sample.

Collectively, we find that firms are likely to disclose more types of non-GAAP metrics when there is greater demand for this information from investors and analysts. However, at the same time, firms that just miss analysts' targets are likely to disclose a greater quantity of non-GAAP categories. This suggests that firms that *JUSTMISS* are likely to resort to different types of non-GAAP metrics instead of increasing the number of non-GAAP metrics to manage investors' perceptions about their performance.

3.6.3 Alternative Measures of Intangible Intensity

In Table 8, we use an alternative measure of intangible intensity (*Intangible_ALT*) to estimate Model (1). We exclude goodwill from intangible assets because one of the most common exclusion

items from non-GAAP metrics is the impairment from goodwill. Therefore, we aim to address concerns that goodwill in intangible assets is positively associated with the quantity of non-GAAP metrics. We continue to observe significant and positive coefficients on *logARC* and *Intangible_ALT*; thus, the inferences remain robust.

……. [INSERT TABLE 8 ABOUT HERE] …….

3.6.4 Alternative Measures of The Quantity of Non-GAAP Metrics

While the SEC defines EBITDA and EBIT as non-GAAP metrics[35], some people still argue that EBIT or EBITDA is not a non-GAAP metric. Our primary analyses in Table 5 include EBIT and EBITDA as non-GAAP metrics. In Table 9, we replace *Total_Metrics* with alternative measures by excluding EBIT, EBITDA, or both. In all three columns, results are consistent with our primary results in Table 5. Therefore, the inferences remain robust.

……. [INSERT TABLE 9 ABOUT HERE] …….

3.6.5 Determinants Tests with More Control Variables

In Table 10, we re-estimate Model (1) by including additional control variables, which are defined in Appendix A. Again, we find that increases in *logARC* and *Intangible* are associated with increases in *Total_Metrics*.

……. [INSERT TABLE 10 ABOUT HERE] …….

3.6.6 Excluding the Effect of the Pandemic

As a result of ongoing uncertainty associated with the unprecedented nature of coronavirus disease 2019 ("COVID-19"), companies may be faced with several financial reporting and disclosure challenges that result in the recognition of infrequent or unusual gains, charges or losses attributable to or as a direct result of, the pandemic and related economic conditions. Companies may be looking to present non-GAAP measures that eliminate the infrequent or unusual accounting impacts of COVID-19. To eliminate the potential impact of COVID-19 on the quantity of non-GAAP metrics, we focus on firm-quarters prior to the calendar year 2020, reducing the subsample size to 5,226 firm-quarter observations. Table 11 presents the re-estimated results of Model (1) for this subsample.

[35] See https://www.sec.gov/corpfin/cf-manual/topic-8

……. [INSERT TABLE 11 ABOUT HERE] …….

Consistent with Table 5, Panel A, we find significantly positive coefficients on *logARC* and *Intangible* when *Total_Metrics* is the dependent variable. In addition, consistent with Table 5, Panel B, we find a significantly positive coefficient on Δ*logARC*, but the coefficient on Δ*ngseg* loses its significance. Overall, the results in Table 11 suggest that inferences are robust after omitting the potential impact of COVID-19.

3.7 Conclusion

Although much is known about the informativeness of non-GAAP earnings disclosure, little is known about the informativeness of the quantity of non-GAAP metrics. Managers disclose an increasing quantity of non-GAAP metrics over the years. The significant increase in the use of non-GAAP measures has brought heightened scrutiny from regulators concerning how non-GAAP measures are calculated and the transparency of the related disclosures (PwC, 2021). In this study, we examine the determinants of the quantity of non-GAAP metrics in quarterly earnings releases.

Using a hand-collected sample of disclosures from 2016 to 2020, we present the first archival analysis of the determinants of the quantity of non-GAAP measures. We first find that short-window market reactions to the quarterly earnings releases increase in Δ*Total_Metrics*. This finding is consistent with the idea that investors find incremental non-GAAP metrics valuable in assessing firms' accounting information. We find consistent evidence when using abnormal trading volume as an alternative measure of information content. Regarding determinants tests, we find that firms disclose a greater quantity of non-GAAP metrics when they have more complex accounting reports and more extensive intangible assets. These results suggest that, on average, managers' decision on the quantity of non-GAAP metrics is motivated by investors' demand. That is, when a firm's information environment is poor, investors likely have a greater demand for additional value-relevant information, and managers thus provide more non-GAAP metrics to respond. Then, using a subsample of firms that have missed analysts' expectations, we find firms that just miss analysts' expectations behave opportunistically by disclosing more non-GAAP metrics than firms that fall farther short of expectations. In addition, these findings are robust to the inclusion of additional controls and various robustness tests.

This study is the first to explore the variations in the quantity of non-GAAP metrics in quarterly earnings releases. Our empirical findings suggest that managers disclose a larger quantity of non-

GAAP metrics to inform investors, and investors recognize the valuable information of non-GAAP metrics.

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Appendix A: Variable Definitions

Variable	Variable Definition
Primary Variables for Determinants Tests	
NonGAAP_dummy	An indicator variable equals to one if the firm reports a non-GAAP measure for quarter q, and zero otherwise.
Total_Metrics	The number of non-GAAP metrics disclosed in earnings releases of quarter q
ARC	The total number of distinct monetary XBRL tags in 10-Q filings [Hoitash and Hoitash (2018)]
logARC	The natural log of the total number of distinct monetary XBRL tags in 10-Q filings [Hoitash and Hoitash (2018)]
nbseg	The sum of reported business segments [Compustat Segment file]
ngseg	The sum of reported geographic segments [Compustat Segment file]
Intangible	The intangible (INTANQ) scaled by total assets (ATQ) [Compustat]
NOASales	The Barton and Simko (2002) balance-sheet constraint measure computed as net operating assets at end of quarter q scaled by sales (Compustat item SALEQ) in quarter q-1. Net operating assets is total shareholders' equity (SEQQ) less cash and marketable securities (CHEQ) plus the sum of total debt in current liabilities (DLCQ) and total long-term debt (DLTTQ) [Compustat]
NOA_Dummy	An indicator variable coded one for firms with *NOASales* values above their industry-quarter median *NOASales* values and zero otherwise. This industry-adjusted *NOASales* indicator variable is a measure of past accruals management (or the extent to which the balance sheet is constrained)
MISS	An indicator variable coded one if reported earnings misses the analyst consensus forecast and zero otherwise
JUSTMISS	An indicator variable coded one if reported earnings just misses the analyst consensus forecast (by 5 cents or less) and zero otherwise
Control Variables for Determinants Tests	
Size	The natural logarithm of total assets (ATQ) as of the fiscal quarter-end [Compustat]
MTB	The market value of equity plus book value of liabilities (PRCCQ*CSHOQ+LTQ) divided by book value of assets (ATQ) [Compustat]
Leverage	Total liabilities (LTQ) scaled by total assets (ATQ) [Compustat]

SpecialItems	Special items (SPIQ) scaled by total assets (ATQ) [Compustat]
stdROA	Standard deviation of ROA (IBQ/ATQ) over five preceding quarters [Compustat]
Loss	An indicator variable equals to one if net income (IBQ) is negative and zero otherwise [Compustat]
Peer_metrics	Average, across all peers of the focal firm, of the number of non-GAAP metrics used in each peer's quarterly earnings release, excluding the focal firm. Peers of a company are in the same 2-digit SIC industry as the company and exclude the company
NUMEST	The number of analysts who provide an earnings per share estimate (EPS) for the next (to be announced) financial year (FY1) [I/B/E/S]
logNUMEST	The natural log of (1+*NUMEST*)
%INST_HOLD	Percentage of shares outstanding held by institutional investors as of the fiscal quarter-end date [Thomson Reuters, CRSP]

Market Reaction Analysis	
ABS_CAR	The absolute value of the three-day market-adjusted buy-and-hold return around the earnings announcement date, which is day 0 [CRSP]
ABVOL	Average daily trading volume in 3-day window around earnings releases date in excess of the mean daily trading volume in the [-60, -11] trading day window and then scaled by the [-60, -11] period volume, Day 0 is defined as earnings releases date [CRSP]
SUE	Earnings surprise, measured as the actual EPS from I/B/E/S relative to the most recent mean analyst forecast consensus, scaled by beginning-of-the-period price [I/B/E/S]
ABS_SUE	Absolute value of *SUE*

Variables Used in Additional Analyses	
Total_Categories	The number of non-GAAP categories disclosed in earnings releases of quarter q. We identify twelve categories of non-GAAP metrics, including non-GAAP net income, EBIT, adjusted EBIT, EBITDA, adjusted EBITDA, adjusted operating income, non-GAAP revenue, non-GAAP expenses-related metrics, free cash flow, net debt, non-GAAP effective tax rate and return on invested capital (ROIC)
Intangible_ALT	Alternative measure for *Intangible*, excluding goodwill [Compustat]
Total_Metrics_alt1	When counting non-GAAP metrics, EBIT is not counted
Total_Metrics_alt2	When counting non-GAAP metrics, EBITDA is not counted

Total_Metrics_alt3	When counting non-GAAP metrics, EBIT and EBITDA are not counted
Length	The log of the total number of characters in the 10-Q filing after the Stage One Parse which eliminates HTML, ASCII-encoded materials, etc. [Loughran and McDonald's website]
lnNetFileSize	The log of net file size of the 10-Q file [Loughran and McDonald's website]
ProprietaryCost	R&D intensity, calculated as the R&D expense divided by total asset at the beginning of the fiscal year. Missing data is replaced by zero [Compustat]
PPE Intensity	One minus property, plant, and equipment scaled by total assets at the end of quarter t-1 [Compustat]

Tables

ESSAY I – TABLE 1: Sample Composition

Panel A: Selection criteria used to obtain sample firms	
Description	**Firms**
S&P 500 firms as of November 1, 2021	500
Exclude financial firms (SIC code between 6000 and 6999)	(99)
Exclude utility firms (SIC code between 4400 and 4999)	(57)
Exclude firms that are founded after the calendar year 2020	(3)
Exclude firms with fiscal-yearend change during the sample period	(1)
Final sample firms for which non-GAAP information was hand collected	340
Panel B: Sample selection procedures	
Description	**Firm-Quarters**
Initial sample with quarterly earnings announced between January 1, 2016, and December 31, 2020 (Firm-quarters for which non-GAAP information was hand collected)	6,657
Less: firm-quarters with missing data for accounting reporting complexity (ARC) from Hoitash and Hoitash (2018)	(45)
Less: firm-quarters with missing data for required control variables from Compustat	(1)
Less: firm-quarters with missing data for required control variables from the Thomson Reuters 13f database	(31)
Final full sample	6,580
Sample for Market Reaction Analysis	
Full sample	6,580
Less: firm-quarters with missing data for earnings surprise (SUE) from I/B/E/S	(21)
Final sample for market reaction analysis	6,559
Sample for Change Specification Analysis	
Full sample	6,580
Less: firm-quarters with missing data for quarter-to-quarter change	(340)
Final sample for change specification analysis	6,240

Panel A presents the selection criteria used to arrive at the sample firms for which non-GAAP information was hand-collected. Panel B outlines the sample selection procedures based on firm-quarters in the intersection of Compustat, CRSP, I/B/E/S, Thomson Reuters, and Hoitash and Hoitash (2018).

TABLE 2: **Descriptive Statistics on Non-GAAP Disclosures**

Panel A: Non-GAAP Disclosures Over Time

Year	Firm-Quarters	% of Firm-Quarters with Non-GAAP Disclosure	Average Total_Metrics
2016	1,277	88.65%	6.49
2017	1,294	89.88%	6.67
2018	1,315	92.40%	7.13
2019	1,340	93.66%	7.39
2020	1,354	93.57%	7.73
Full Sample	6,580	91.67%	7.09

Panel B: Non-GAAP Disclosures by Industry (2016 ~ 2020)

SIC	Industry	Firm-Quarters	% of Firm-Quarters with Non-GAAP Disclosure	Average Total_Metrics
01-09	Agriculture, Forestry and Fishing	6	100.00%	7.67
10-14	Mining	314	99.68%	6.78
15-17	Construction	120	59.17%	3.79
20-39	Manufacturing	3,760	94.34%	8.09
40-49	Transportation, Communications, Electric, Gas and Sanitary service	160	53.75%	2.61
50-51	Wholesale Trade	200	95.50%	7.64
52-59	Retail Trade	560	73.04%	3.86
70-89	Services	1,400	96.36%	6.56
99	Nonclassifiable	60	100.00%	5.37
	Full Sample	6,580	91.67%	7.09

Panel C: Types of Non-GAAP Metrics

Types	2016 (N=1,277)	2017 (N=1,294)	2018 (N=1,315)	2019 (N=1,340)	2020 (N=1,354)	Overall (N=6,580)
	% of the sample	% of the sample	% of the sample	% of the sample	% of the sample	% of the sample
Non-GAAP net income (or EPS)	75.3%	76.6%	80.2%	81.3%	82.1%	79.2%
EBIT	4.5%	5.6%	6.1%	6.7%	8.1%	6.2%
Adjusted EBIT	2.0%	2.6%	3.0%	3.4%	4.7%	3.2%
EBITDA	20.9%	22.2%	24.1%	26.9%	29.2%	24.7%
Adjusted EBITDA	15.1%	16.8%	18.2%	20.4%	22.2%	18.6%
Non-GAAP operating income	26.1%	26.0%	27.8%	28.9%	28.8%	27.5%
Non-GAAP revenue	36.4%	39.3%	40.5%	45.1%	45.3%	41.4%
Non-GAAP expenses	22.6%	21.6%	21.6%	23.1%	23.6%	22.5%
Free cash flow	30.1%	31.5%	34.1%	37.2%	41.7%	35.0%
Net debt	5.3%	5.6%	5.9%	6.3%	8.2%	6.3%
Non-GAAP effective tax rate	16.3%	18.0%	20.6%	22.2%	23.3%	20.1%
Return on invested capital (ROIC)	2.0%	1.9%	1.9%	1.7%	1.6%	1.8%

Panel D: Non-GAAP Reporting Scenarios							
Scenarios		**% of the Sample**					
Non-GAAP earnings	**Other non-GAAP metrics**	**2016 (N=1,277)**	**2017 (N=1,294)**	**2018 (N=1,315)**	**2019 (N=1,340)**	**2020 (N=1,354)**	**Overall (N=6,580)**
Y	Y	58.5%	59.9%	62.5%	66.7%	70.2%	63.7%
Y	N	23.7%	23.6%	25.3%	21.8%	18.4%	22.5%
N	Y	4.6%	5.2%	3.9%	4.1%	4.0%	4.3%
N	N	13.2%	11.4%	8.3%	7.4%	7.4%	9.5%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

This table presents descriptive statistics on non-GAAP disclosures of the full sample (*N*=6,580). Panel A presents frequency statistics over the sample period (2016-2020). Panel B presents frequency statistics by 2-digit SIC industry classification (excluding financial and utility industries). Panel C presents frequency statistics of different types of non-GAAP metrics over the sample period. Panel D presents frequency statistics of four non-GAAP reporting scenarios over the sample period, including:

a) YY—the scenario where managers provide both non-GAAP earnings-related metrics and other non-GAAP metrics.
b) YN—the scenario where managers provide only non-GAAP earnings-related metrics.
c) NY—the scenario where managers provide only other non-GAAP metrics.
d) NN—the scenario where managers do not provide any non-GAAP metrics.

Non-GAAP earnings-related metrics include non-GAAP net income, earnings, earnings per share (EPS); earnings before interest and taxes (EBIT), adjusted EBIT, earnings before interest, taxes, depreciation, and amortization (EBITDA), adjusted EBITDA and adjusted operating income, which are reported either on a level, per-share, or margin basis. Other non-GAAP metrics include non-GAAP revenue, free cash flow, net debt, non-GAAP expense-related measures, non-GAAP effective tax rate, and return on invested capital (ROIC).

Non-GAAP expense-related measures include non-GAAP sales and marketing expenses, non-GAAP research and development (R&D) expenses, non-GAAP selling, general, and administrative (SG&A) expenses, non-GAAP operating expenses, non-GAAP other expenses, and so on. A single exclusion from GAAP earnings can affect multiple income statement line items (Gomez et al., 2023). For example, stock compensation expense can be a component of several line items, including the cost of goods sold and selling and general and administrative expenses. Some firms report non-GAAP earnings with non-GAAP expense-related metrics to reflect the distribution of exclusions.

TABLE 3: Descriptive Statistics and Correlations

Panel A: Descriptive Statistics

Variable	N	Mean	Std Dev	Lower Quartile	Median	Upper Quartile
nonGAAP_dummy	6,580	0.917	0.276	1.000	1.000	1.000
Total_Metrics	6,580	7.092	5.151	3.000	6.000	10.000
ARC	6,580	281.784	121.915	192.000	251.000	347.000
logARC	6,580	5.554	0.414	5.257	5.525	5.849
nbseg	6,580	2.691	1.831	1.000	3.000	4.000
ngseg	6,580	3.869	2.757	2.000	3.000	5.000
Intangible	6,580	0.309	0.232	0.103	0.278	0.490
NOASales	6,580	3.936	3.042	1.721	3.272	5.153
MISS	6,580	0.215	0.411	0.000	0.000	0.000
JUSTMISS	6,580	0.093	0.290	0.000	0.000	0.000
SIZE	6,580	9.548	1.233	8.678	9.502	10.377
MTB	6,580	2.927	1.985	1.636	2.308	3.459
Leverage	6,580	0.625	0.220	0.483	0.610	0.758
SpecialItems	6,580	-0.003	0.007	-0.003	-0.001	0.000
stdROA	6,580	0.012	0.014	0.004	0.007	0.015
Loss	6,580	0.109	0.312	0.000	0.000	0.000
peer_metrics	6,580	6.957	2.935	5.477	7.313	8.680
NUMEST	6,580	18.880	7.532	14.000	18.000	23.000
logNUMEST	6,580	2.910	0.419	2.708	2.944	3.178
%INST_HOLD	6,580	0.803	0.157	0.735	0.835	0.910

Panel B: Correlations

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	*NonGAAP_dummy*		**0.480**	**0.214**	**0.152**	**0.189**	**0.285**	**0.176**	**0.057**	**-0.044**	-0.002	**0.119**	**-0.123**	**0.132**	**-0.193**	**0.039**	**0.051**	**0.191**	-0.013	**0.046**
2	*Total Metrics*	**0.415**		**0.250**	**0.091**	**0.228**	**0.330**	**0.177**	**0.100**	**-0.089**	-0.006	**0.142**	**-0.100**	**0.113**	**-0.273**	**0.063**	**0.045**	**0.293**	0.015	**0.054**
3	*logARC*	**0.231**	**0.256**		**0.172**	**0.170**	**0.169**	**0.210**	**0.143**	**0.045**	-0.010	**0.261**	**-0.310**	**0.079**	**-0.231**	**0.086**	**0.108**	**0.166**	**-0.033**	-0.019
4	*nbseg*	**0.146**	**0.059**	**0.179**		**0.195**	**0.274**	**0.126**	**0.090**	-0.017	-0.021	**0.159**	**-0.211**	-0.011	**-0.093**	**-0.086**	-0.009	**0.033**	**-0.148**	**-0.034**
5	*ngseg*	**0.145**	**0.146**	**0.148**	**0.142**		**0.140**	**0.114**	**0.052**	**-0.058**	-0.013	**0.084**	**-0.059**	**-0.104**	**-0.137**	0.019	**0.034**	**0.243**	**-0.056**	-0.008
6	*Intangible*	**0.264**	**0.301**	**0.163**	**0.240**	**0.051**		**0.374**	**0.308**	**-0.121**	0.000	-0.006	**-0.107**	-0.010	**-0.253**	**-0.171**	**-0.083**	**0.238**	**-0.204**	**0.182**
7	*NOASales*	**0.141**	**0.131**	**0.175**	**0.073**	**0.069**	**0.350**		**0.649**	**0.039**	0.012	**0.229**	**-0.394**	**-0.281**	**-0.140**	**-0.079**	**0.096**	**0.145**	**-0.084**	**0.054**
8	*NOA_dummy*	**0.057**	**0.097**	**0.138**	**0.086**	**0.060**	**0.342**	**0.578**		**-0.004**	0.008	**0.151**	**-0.313**	**-0.144**	**-0.108**	**-0.115**	**0.033**	**0.066**	-0.015	**0.090**
9	*MISS*	**-0.044**	**-0.088**	**0.047**	-0.011	**-0.024**	**-0.113**	**0.059**	-0.004		**0.612**	**0.051**	**-0.117**	-0.003	**0.036**	0.021	**0.057**	**-0.072**	**-0.045**	**-0.056**
10	*JUSTMISS*	-0.002	-0.013	-0.008	-0.022	-0.007	0.003	0.019	0.008	**0.612**		-0.024	-0.003	-0.002	0.016	**-0.021**	-0.011	-0.002	**-0.032**	**-0.034**
11	*SIZE*	**0.112**	**0.152**	**0.272**	**0.192**	**0.073**	0.010	**0.207**	**0.153**	**0.052**	**-0.029**		**-0.466**	**0.172**	**-0.078**	**-0.066**	**0.038**	0.016	**0.382**	**-0.400**
12	*MTB*	**-0.136**	**-0.107**	**-0.264**	**-0.213**	**-0.043**	**-0.195**	**-0.345**	**-0.309**	**-0.068**	0.007	**-0.451**		0.002	**0.185**	**0.097**	**-0.172**	**0.093**	**0.088**	-0.009
13	*Leverage*	**0.133**	**0.091**	**0.075**	-0.018	**-0.100**	**-0.033**	**-0.247**	**-0.145**	0.001	-0.004	**0.127**	0.016		**-0.086**	**0.033**	0.010	**-0.037**	-0.001	**-0.065**
14	*SpecialItems*	**-0.085**	**-0.118**	**-0.150**	**-0.045**	**-0.045**	**-0.070**	**-0.028**	-0.024	0.005	0.009	**-0.048**	**0.089**	**-0.062**		**-0.097**	**-0.217**	**-0.142**	**0.040**	**-0.049**
15	*stdROA*	**0.027**	**0.054**	**0.054**	**-0.054**	-0.019	**-0.145**	0.000	**-0.090**	0.015	-0.018	**-0.065**	**0.148**	0.002	**-0.202**		**0.294**	**0.098**	**0.054**	**-0.041**
16	*Loss*	**0.051**	**0.044**	**0.117**	-0.007	**0.032**	**-0.079**	**0.154**	**0.033**	**0.057**	-0.011	**0.032**	**-0.094**	0.006	**-0.403**	**0.306**		-0.013	0.015	-0.011
17	*Peer_metrics*	**0.213**	**0.281**	**0.158**	**0.035**	**0.178**	**0.249**	**0.124**	**0.086**	**-0.076**	-0.004	-0.009	**0.065**	**-0.049**	**-0.059**	**0.071**	0.009		**-0.085**	**-0.061**
18	*logNUMEST*	0.013	**0.064**	-0.012	**-0.129**	**-0.044**	**-0.152**	**-0.028**	0.012	**-0.059**	**-0.042**	**0.398**	0.005	0.007	0.006	0.021	0.009	**-0.068**		**-0.149**
19	*%INST_HOLD*	**0.029**	**0.044**	**-0.026**	**-0.063**	0.006	**0.128**	**0.052**	**0.062**	**-0.057**	**-0.042**	**-0.320**	**0.026**	-0.006	-0.009	0.005	**-0.028**	-0.018	-0.025	

Panel A presents descriptive statistics for variables used in the analyses. Panel B presents Pearson (below the diagonal) and Spearman (above the diagonal). Correlations in bold are statistically significant at $p<0.05$. All continuous variables are winsorized at the 1 percent and 99 percent levels. All variables are as defined in Appendix A.

TABLE 4: **Stock-Market Reactions around Non-GAAP Disclosure**

	(1)	(2)
	ABS_CAR	**ABVOL**
Δ*Total_Metrics*	**0.0009*** **	**0.0086***
	(2.93)	(1.76)
ABS_SUE	0.2703***	1.1845
	(3.32)	(0.92)
logARC	0.0011	0.0606
	(0.61)	(1.52)
nbseg	0.0004	0.0204*
	(0.89)	(1.91)
ngseg	-0.0000	-0.0080
	(-0.08)	(-1.32)
Intangible	0.0011	0.0226
	(0.25)	(0.24)
NOASales	0.0004	0.0015
	(1.40)	(0.26)
JUSTMISS	-0.0008	0.0054
	(-0.58)	(0.18)
SIZE	-0.0040***	-0.0634***
	(-4.44)	(-3.30)
MTB	-0.0012**	-0.0172
	(-2.06)	(-1.50)
Leverage	0.0010	-0.0230
	(0.25)	(-0.27)
SpecialItems	0.0092	0.0413
	(0.11)	(0.03)
stdROA	0.0588	-0.6110
	(1.29)	(-0.79)
Loss	0.0054***	-0.0401
	(2.88)	(-1.33)
peer_metrics	-0.0007	0.0207**
	(-1.60)	(2.01)
logNUMEST	-0.0018	0.0530
	(-0.70)	(1.17)
%INST_HOLD	-0.0088	-0.0976
	(-1.59)	(-0.84)
Constant	Yes	Yes

Industry FEs	Yes	Yes
Year-Qtr FEs	Yes	Yes
N	6,233	6,233
Adj. R^2	0.109	0.213

This table presents tests of market reactions to an additional quantity of non-GAAP metrics. Column (1) reports coefficient estimates from a regression of *ABS_CAR* on Δ*Total_Metrics* and other controls. Column (2) reports coefficient estimates from a regression of *ABVOL* on Δ*Total_Metrics* and other controls. Coefficient estimates are presented above t-statistics, which are in parentheses. Coefficients of interest are presented in bold font. All variables are defined in Appendix A, and all continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by earnings release date and firm. *, **, and *** indicate a statistically significant difference from zero at the 10%, 5%, and 1% level, respectively.

TABLE 5: **Determinants of the Quantity of Non-GAAP Metrics**

Panel A: Level Specification (Tobit Model)

Variable	Pred.	(1) Total Metrics	(2) Total Metrics	(3) Total Metrics
Informativeness				
logARC	+	1.8533***		1.8406***
		(4.21)		(4.28)
nbseg	+	-0.1044		-0.1016
		(-0.86)		(-0.82)
ngseg	+	0.0929		0.0927
		(1.22)		(1.21)
Intangible	+	3.7806***		3.6743***
		(3.15)		(2.88)
Potential Opportunism				
NOASales	+		0.1560*	0.0216
			(1.79)	(0.24)
JUSTMISS	+		0.0484	0.0237
			(0.22)	(0.11)
Control				
SIZE	+	0.4342*	0.5400**	0.4248*
		(1.68)	(2.12)	(1.66)
MTB	+	-0.0682	-0.1579	-0.0624
		(-0.48)	(-1.12)	(-0.44)
Leverage	+	3.0915***	3.7364***	3.1543***
		(3.01)	(3.56)	(3.04)
SpecialItems	-	-15.2191	-35.0644***	-15.8414
		(-1.32)	(-2.78)	(-1.34)
stdROA	+	21.1692*	18.7886	21.2115*
		(1.68)	(1.57)	(1.68)
Loss	+	0.1101	-0.0812	0.0877
		(0.24)	(-0.17)	(0.19)
Peer_metrics	?	-1.2665***	-1.3665***	-1.2680***
		(-8.69)	(-9.27)	(-8.72)
logNUMEST	?	1.1089**	0.9986*	1.1224**
		(2.00)	(1.80)	(2.03)
%INST_HOLD	?	0.8058	1.6960	0.7865
		(0.62)	(1.31)	(0.60)
Constant		Yes	Yes	Yes
Industry FEs		Yes	Yes	Yes
Year-Qtr FEs		Yes	Yes	Yes
N		6,580	6,580	6,580

Pseudo R^2		0.089	0.083	0.089

Panel B: Change Specification (OLS)

Variable	Pred.	(1) ΔTotal Metrics	(2) ΔTotal Metrics	(3) ΔTotal Metrics
Informativeness				
Δ*logARC*	+	0.6126***		0.6125***
		(7.03)		(7.04)
Δ*nbseg*	+	-0.0360		-0.0361
		(-1.07)		(-1.07)
Δ*ngseg*	+	0.0266*		0.0266*
		(1.78)		(1.78)
Δ*Intangible*	+	0.8242		0.7625
		(1.10)		(0.96)
Potential Opportunism				
Δ*NOASales*	+		0.0172	0.0085
			(0.82)	(0.38)
JUSTMISS	+		-0.0099	-0.0073
			(-0.17)	(-0.12)
Control				
Δ*SIZE*	+	0.1122	0.1097	0.0768
		(0.29)	(0.27)	(0.19)
Δ*MTB*	+	-0.1267**	-0.1230**	-0.1273**
		(-2.49)	(-2.40)	(-2.50)
Δ*Leverage*	+	0.4516	0.2978	0.4676
		(0.54)	(0.34)	(0.55)
Δ*SpecialItems*	-	-3.0295	-5.8718	-3.0209
		(-0.73)	(-1.38)	(-0.73)
Δ*stdROA*	+	7.6603*	9.1871**	7.6717*
		(1.96)	(2.35)	(1.96)
Loss	+	0.0027	0.0080	0.0006
		(0.04)	(0.11)	(0.01)
Δ*Peer_metrics*	?	0.0093	0.0204	0.0092
		(0.36)	(0.77)	(0.36)
Δ*logNUMEST*	?	-0.4211*	-0.2222	-0.4203*
		(-1.91)	(-1.05)	(-1.90)
Δ*%INST_HOLD*	?	0.3899	0.4530*	0.3956
		(1.55)	(1.79)	(1.57)
Constant		Yes	Yes	Yes
Industry FEs		Yes	Yes	Yes

Year-Qtr FEs	Yes	Yes	Yes
N	6,240	6,240	6,240
Adj. R^2	0.038	0.021	0.038

This table presents the results of estimating Tobit models using the level specification (Panel A) and linear models using the change specification (Panel B) with factors potentially associated with the quantity of non-GAAP metrics used in quarterly earnings releases (i.e., determinants tests). The dependent variables are the quantity of non-GAAP metrics (0 if a firm-quarter does not report non-GAAP metrics) in Panel A and quarter-to-quarter change in the quantity of non-GAAP metrics in Panel B. Coefficient estimates are presented above t-statistics, which are in parentheses. All variables in Panel A are defined in Appendix A, and all continuous variables are winsorized at the 1st and 99th percentiles. Variables in Panel B are measured as the difference between quarter q and q-1 for variables used in Panel A. Standard errors are clustered by firm. *, **, and *** indicate a statistically significant difference from zero at the 10%, 5%, and 1% level, respectively.

TABLE 6: **Determinants of the Quantity of Non-GAAP Metrics of Firms Missing Targets**

Variable	Pred.	(1) Total Metrics	(2) Total Metrics	(3) Total Metrics
Informativeness				
logARC	+	1.4718***		1.5175***
		(2.69)		(2.80)
nbseg	+	-0.1293		-0.1264
		(-0.94)		(-0.90)
ngseg	+	0.0213		0.0228
		(0.25)		(0.27)
Intangible	+	4.1560***		4.0228***
		(3.14)		(3.03)
Potential Opportunism				
NOASales	+		0.0733	-0.0299
			(0.92)	(-0.34)
JUSTMISS	+		0.8748***	0.7224**
			(2.85)	(2.50)
Control				
SIZE	+	0.2961	0.3805	0.3511
		(1.03)	(1.42)	(1.24)
MTB	+	-0.2430	-0.3555**	-0.2583*
		(-1.60)	(-2.43)	(-1.68)
Leverage	+	3.5862***	3.8360***	3.4364***
		(3.01)	(3.26)	(2.95)
SpecialItems	-	-8.0216	-23.8298	-6.1776
		(-0.44)	(-1.21)	(-0.34)
stdROA	+	20.2047*	18.8853	21.7385*
		(1.68)	(1.63)	(1.84)
Loss	+	-0.7723	-0.9481*	-0.6917
		(-1.57)	(-1.89)	(-1.44)
Peer_metrics	?	-1.1204***	-1.2148***	-1.1248***
		(-6.68)	(-7.57)	(-6.72)
logNUMEST	?	0.7908	0.5017	0.6641
		(1.34)	(0.85)	(1.12)
%INST_HOLD	?	1.4292	2.8501*	1.7751
		(0.90)	(1.79)	(1.09)
Constant		Yes	Yes	Yes
Industry FEs		Yes	Yes	Yes
Year-Qtr FEs		Yes	Yes	Yes
N		1,412	1,412	1,412
Pseudo R^2		0.107	0.101	0.108

This table presents the results of estimating Tobit models with factors potentially associated with the quantity of non-GAAP metrics used in quarterly earnings releases (i.e., determinants tests) for firm-quarters that missed analysts' expectations (*MISS*=1). In this subsample, 89% of firm-quarters disclose non-GAAP metrics (*NonGAAP_dummy*=1), and 43% of firm-quarters miss analyst

consensus forecast by 5 cents or less (*JUSTMISS*=1). The dependent variables are the quantity of non-GAAP metrics (0 if a firm-quarter does not report non-GAAP metrics). Coefficient estimates are presented above t-statistics, which are in parentheses. All variables are defined in Appendix A, and all continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by firm. *, **, and *** indicate a statistically significant difference from zero at the 10%, 5%, and 1% level, respectively.

TABLE 7: **Determinants of the Quantity of Non-GAAP Categories**

Panel A: Level Specification		
Variable	**Pred.**	**Total Categories**
Informativeness		
logARC	+	0.4639***
		(3.17)
nbseg	+	-0.0130
		(-0.30)
ngseg	+	0.0347
		(1.22)
Intangible	+	1.6876***
		(3.69)
Potential Opportunism		
NOASales	+	0.0168
		(0.60)
JUSTMISS	+	0.1218*
		(1.76)
Control		
SIZE	+	0.0264
		(0.26)
MTB	+	-0.0742*
		(-1.66)
Leverage	+	1.3705***
		(3.85)
SpecialItems	-	-6.7426*
		(-1.72)
stdROA	+	3.8209
		(1.10)
Loss	+	-0.1768*
		(-1.70)
Peer_metrics	?	-0.3242***
		(-7.06)
logNUMEST	?	0.3965*
		(1.87)
%INST_HOLD	?	-0.0795
		(-0.14)
Constant		Yes
Industry FEs		Yes
Year-Qtr FEs		Yes
N		6,580

Pseudo R^2	0.130

Panel B: Change Specification		
Variable	**Pred.**	**ΔTotal Categories**
Informativeness		
Δ*logARC*	+	0.1562***
		(4.07)
Δ*nbseg*	+	0.0007
		(0.06)
Δ*ngseg*	+	0.0045
		(0.61)
Δ*Intangible*	+	0.1224
		(0.47)
Potential Opportunism		
Δ*NOASales*	+	0.0165**
		(2.09)
JUSTMISS	+	-0.0390
		(-1.63)
Control		
Δ*SIZE*	+	-0.0102
		(-0.10)
Δ*MTB*	+	-0.0437**
		(-2.19)
Δ*Leverage*	+	0.3719
		(1.17)
Δ*SpecialItems*	-	-0.0406
		(-0.04)
Δ*stdROA*	+	1.6328
		(1.14)
Loss	+	0.0059
		(0.21)
Δ*Peer_metrics*	?	0.0061
		(0.59)
Δ*logNUMEST*	?	-0.1365*
		(-1.75)
Δ*%INST_HOLD*	?	0.0898
		(0.88)
Constant		Yes
Industry FEs		Yes
Year-Qtr FEs		Yes

N	6,240
Adj. R^2	0.027

This table presents the results of estimating Tobit models using the level specification (Panel A) and linear models using the change specification (Panel B) with factors potentially associated with the quantity of non-GAAP categories used in quarterly earnings releases (i.e., determinants tests). The dependent variables are the quantity of non-GAAP categories (0 if a firm-quarter does not report non-GAAP metrics) in Panel A and quarter-to-quarter change in the quantity of non-GAAP categories in Panel B. Non-GAAP categories are identified in Table 2 Panel C. Coefficient estimates are presented above t-statistics, which are in parentheses. All variables in Panel A are defined in Appendix A, and all continuous variables are winsorized at the 1st and 99th percentiles. Variables in Panel B are measured as the difference between quarter *q* and *q-1* for variables used in Panel A. Standard errors are clustered by firm. *, **, and *** indicate a statistically significant difference from zero at the 10%, 5%, and 1% level, respectively.

TABLE 8: **Determinants Tests with Alternative Measures of Intangible Intensity**

Variable	**Pred.**	**Total Metrics**
Informativeness		
logARC	+	1.8148***
		(4.14)
nbseg	+	-0.0540
		(-0.44)
ngseg	+	0.0881
		(1.14)
Intangible_ALT	**+**	**6.1378****
		(2.37)
Potential Opportunism		
NOASales	+	0.0501
		(0.58)
JUSTMISS	+	0.0226
		(0.10)
Control		
SIZE	+	0.3876
		(1.50)
MTB	+	-0.0997
		(-0.70)
Leverage	+	3.2886***
		(3.18)
SpecialItems	-	-16.4548
		(-1.43)
stdROA	+	16.5355
		(1.35)
Loss	+	0.0442
		(0.10)
Peer_metrics	?	-1.2873***
		(-8.78)
logNUMEST	?	1.1358**
		(2.07)
%INST_HOLD	?	1.1169
		(0.88)
Constant		Yes
Industry FEs		Yes
Year-Qtr FEs		Yes
N		6,580
Pseudo R^2		0.088

This table presents the results of estimating Tobit models (1) using the alternative measure of intangible intensity, which removes goodwill from intangible assets. All variables are defined in Appendix A, and all continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by firm. *, **, and *** indicate a statistically significant difference from zero at the 10%, 5%, and 1% level, respectively.

TABLE 9: **Determinants Tests with Alternative Measures of Total_Metrics**

Variable	Pred.	(1) Total_Metrics_alt1 (Exclude EBIT)	(2) Total_Metrics_alt2 (Exclude EBITDA)	(3) Total_Metrics_alt3 (Exclude Both)
Informativeness				
logARC	+	1.7930***	1.8254***	1.7773***
		(4.19)	(4.22)	(4.13)
nbseg	+	-0.1001	-0.0889	-0.0878
		(-0.82)	(-0.70)	(-0.70)
ngseg	+	0.1009	0.1068	0.1151
		(1.33)	(1.37)	(1.48)
Intangible	+	3.7327***	3.7085***	3.7701***
		(2.95)	(2.89)	(2.95)
Potential Opportunism				
NOASales	+	0.0266	-0.0165	-0.0106
		(0.30)	(-0.18)	(-0.12)
JUSTMISS	+	-0.0074	-0.0249	-0.0401
		(-0.03)	(-0.11)	(-0.18)
Control				
SIZE	+	0.4029	0.5260**	0.5039**
		(1.59)	(2.04)	(1.97)
MTB	+	-0.0470	-0.0277	-0.0122
		(-0.33)	(-0.19)	(-0.08)
Leverage	+	3.1257***	2.7855***	2.7587***
		(3.03)	(2.68)	(2.67)
SpecialItems	-	-15.8711	-15.9130	-16.0131
		(-1.35)	(-1.33)	(-1.34)
stdROA	+	21.4744*	21.2878*	21.5663*
		(1.70)	(1.67)	(1.69)
Loss	+	0.0851	0.2002	0.1944
		(0.18)	(0.43)	(0.41)
Peer_metrics	?	-1.2720***	-1.2740***	-1.2781***
		(-8.72)	(-8.90)	(-8.91)
logNUMEST	?	1.1635**	1.1788**	1.2196**
		(2.12)	(2.13)	(2.22)
%INST_HOLD	?	0.7959	0.6843	0.6916
		(0.61)	(0.52)	(0.53)
Constant		Yes	Yes	Yes
Industry FEs		Yes	Yes	Yes
Year-Qtr FEs		Yes	Yes	Yes

N	6,580	6,580	6,580
Pseudo R^2	0.089	0.089	0.088

This table presents the results of estimating Tobit models (1) using the alternative measures of Total_Metrics, which exclude EBIT or EBITDA or Both when counting non-GAAP metrics. All variables are defined in Appendix A, and all continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by firm. *, **, and *** indicate a statistically significant difference from zero at the 10%, 5%, and 1% level, respectively.

TABLE 10: **Determinants Tests with Additional Control Variables**

Variable	**Pred.**	**Total_Metrics**
Informativeness		
logARC	+	1.4623**
		(2.49)
nbseg	+	-0.0960
		(-0.77)
ngseg	+	0.0866
		(1.14)
Intangible	+	4.2593***
		(2.69)
Potential Opportunism		
NOASales	+	-0.0008
		(-0.01)
JUSTMISS	+	0.0210
		(0.10)
New Controls		
PPE_Intensity	+	-0.8444
		(-0.82)
ProprietaryCost	-	-3.7069
		(-0.21)
Length	+	-0.4996
		(-0.20)
lnNetFileSize	+	0.9067
		(0.34)
Control		
SIZE	+	0.4266*
		(1.68)
MTB	+	-0.0495
		(-0.34)
Leverage	+	3.0543***
		(2.88)
SpecialItems	-	-15.6006
		(-1.33)
stdROA	+	21.7378*
		(1.71)
Loss	+	0.0751
		(0.17)
Peer_metrics	?	-1.2703***
		(-8.71)
logNUMEST	?	1.1214**

		(2.02)
%INST_HOLD	?	0.7981
		(0.61)
Constant		Yes
Industry FEs		Yes
Year-Qtr FEs		Yes
N		6,561
Pseudo R^2		0.089

This table presents the results of estimating Tobit models (1), including more control variables, which include PPE_Intensity, ProprietaryCost, Length, *and lnNetFileSize*. All variables are defined in Appendix A, and all continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by firm. *, **, and *** indicate a statistically significant difference from zero at the 10%, 5%, and 1% level, respectively.

TABLE 11: **Robustness Tests: Excluding the Effect of the Pandemic**

		(1)			(2)
Variable	**Pred.**	**Total Metrics**	**Variable**	**Pred.**	**ΔTotal Metrics**
Informativeness			Informativeness		
logARC	+	1.9380***	Δ*logARC*	+	0.6499***
		(4.37)			(6.30)
nbseg	+	-0.0739	Δ*nbseg*	+	-0.0357
		(-0.60)			(-0.83)
ngseg	+	0.0911	Δ*ngseg*	+	0.0282
		(1.21)			(1.63)
Intangible	+	3.4805***	Δ*intangible*	+	0.2714
		(2.78)			(0.30)
Potential Opportunism			Potential Opportunism		
NOASales	+	-0.0129	Δ*NOASales*	+	-0.0052
		(-0.14)			(-0.16)
JUSTMISS	+	-0.0765	*JUSTMISS*	+	0.0036
		(-0.32)			(0.06)
Control			Control		
SIZE	+	0.4054	Δ*SIZE*	+	0.1107
		(1.59)			(0.23)
MTB	+	-0.1029	Δ*MTB*	+	-0.1476***
		(-0.68)			(-2.88)
Leverage	+	3.3179***	Δ*Leverage*	+	0.7418
		(3.19)			(0.84)
SpecialItems	-	-15.2809	Δ*SpecialItems*	-	-0.3786
		(-1.11)			(-0.07)
stdROA	+	22.6160*	Δ*stdROA*	+	9.8395**
		(1.67)			(2.32)
Loss	+	0.1197	*Loss*	+	-0.0151
		(0.22)			(-0.18)
Peer_metrics	?	-1.3048***	Δ*Peer_metrics*	?	0.0133
		(-8.22)			(0.45)
logNUMEST	?	1.1610**	Δ*logNUMEST*	?	-0.5056*
		(2.09)			(-1.78)
%INST_HOLD	?	0.5900	Δ*%INST_HOLD*	?	0.2789
		(0.44)			(1.05)
Constant		Yes	Constant		Yes
Industry FEs		Yes	Industry FEs		Yes
Year-Qtr FEs		Yes	Year-Qtr FEs		Yes
N		5,226	N		4,886

Pseudo R^2	0.092	Adj. R^2	0.037

This table presents the results of estimating Tobit models with factors potentially associated with the quantity of non-GAAP metrics used in quarterly earnings releases for firm-quarters before the pandemic (calendar year 2020). Column (1) shows the regression results using the level specification. Column (2) shows the regression results using the change specification. Coefficient estimates are presented above t-statistics, which are in parentheses. All variables are defined in Appendix A, and all continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by firm. *, **, and *** indicate a statistically significant difference from zero at the 10%, 5%, and 1% level, respectively.

Chapter 4: Non-GAAP Metrics and Properties of Analysts' Earnings Forecasts: The More, The Better?

Abstract: We explore the extent to which the quantity of non-GAAP metrics disclosed in quarterly earnings releases affects the characteristics of analysts' earnings forecasts. Using a hand-collected sample of non-GAAP disclosures from 2016-2020, we find that analysts' forecast accuracy is increasing, and their dispersion is decreasing for firms with a larger quantity of non-GAAP metrics (or categories). Among the twelve non-GAAP categories, non-GAAP revenue, non-GAAP operating income, and non-GAAP tax rate are associated with more accurate and less dispersed earnings forecasts; however, return on invested capital (ROIC) increases the disagreement among analysts and leads to less accurate earnings forecasts. Furthermore, we find that a greater quantity of non-GAAP metrics/categories is particularly beneficial to analysts who have less general experience and cover more industries in their portfolios.

Keywords: Non-GAAP reporting; Quantity of non-GAAP metrics; Analysts earnings forecasts

4.1 Introduction

It is widely recognized that a growing number of firms issue more than one non-GAAP metric in their quarterly earnings releases. For instance, Audit Analytics (2018) reports that the average number of different non-GAAP metrics used per filing rose from 2.35 in 1996 to 7.45 in 2016.[36] However, with a few exceptions, most prior studies on non-GAAP reporting focus on non-GAAP earnings per share (EPS) or its equivalent (e.g., non-GAAP net income). This contrasts with the business practice where it is increasingly common for firms to provide non-GAAP measures beyond non-GAAP EPS. Managers often assert that their non-GAAP metrics contain useful information that analysts and investors desire; however, there is limited substantiating evidence in this regard. Filling the void, in this paper, we explore the impact of the quantity of non-GAAP metrics on the properties of analysts' earnings forecasts, namely, their forecast accuracy and dispersion.

The relationship between the quantity of non-GAAP metrics and analysts' forecast accuracy and dispersion is uncertain *ex ante*. First, a larger quantity of non-GAAP metrics in firms' earnings releases may imply a greater quantity of information. According to the U.S. Securities and Exchange Commission (SEC), a non-GAAP financial measure is a numerical measure that excludes (or includes) amounts that are included (or excluded) in the most directly comparable GAAP measure presented in the statement of income, balance sheet, or statement of cash flows.[37] Therefore, non-GAAP measures, just like their comparable GAAP measures, comprehensively reflect a firm's performance, financial position, or cash flows. To the extent that non-GAAP measures provide a true and persistent picture of a firm, as managers often claim, by eliminating transient items, a greater quantity of non-GAAP metrics represents a larger quantity of *new* information with higher quality. Under this scenario, analysts' forecasts are likely to be more

[36] Audit Analytics examined the S&P 500 companies that used non-GAAP metrics in both 1996 and 2016 on an annual basis. The analysis used data from 8-K Item 2.02 filings.
[37] The definition of non-GAAP financial measures by the SEC can be viewed at https://www.sec.gov/rules/2003/03/conditions-use-non-gaap-financial-measures

accurate and less disperse when firms provide more non-GAAP measures. Second, there is admittedly an information overlap between non-GAAP and GAAP measures (e.g., non-GAAP revenues and GAAP revenues), and even among non-GAAP measures (e.g., non-GAAP EBIT, non-GAAP EBITDA, non-GAAP operating income, etc.). In other words, reporting non-GAAP measures does not necessarily convey a substantial amount of new information; rather, it is merely a presentation choice. Under this scenario, it is possible that a detailed presentation of various non-GAAP measures facilitates a more accurate interpretation of a firm's economic prospects and reduces ambiguity, whereby has a positive impact on analyst forecasts. It is also possible, however, that the potential overlap in information content raises processing costs, whereby has a negative impact on analyst forecasts. Finally, a common concern is that non-GAAP metrics are provided opportunistically and, hence, misleading. Even though some analysts may scrutinize and disregard lower-quality non-GAAP metrics (e.g., Bentley et al., 2018), others may still be misled. Under this scenario, a larger quantity of non-GAAP metrics is likely associated with less accurate, on average, and more dispersed earnings forecasts.

We manually collect non-GAAP metrics used by S&P 500 firms from quarterly 8-K-filed earnings releases in SEC's EDGAR for all quarters during 2016-2020. We find that the average number of non-GAAP metrics used per filing is 7.09 from 2016 to 2020. In an untabulated analysis, we also find that 63.7% of managers typically disclose both non-GAAP earnings-related metrics and non-GAAP non-earnings-related metrics in an earnings release.

We first test the association between the quantity of non-GAAP metrics disclosed by managers and analysts' forecast properties at a firm-quarter level. We find that a greater quantity of non-GAAP metrics enhances analysts' forecast accuracy and reduces analysts' forecast dispersion. This evidence suggests that non-GAAP metrics are useful in analysts' forecasting exercises. This is consistent with prior studies' findings in that there is a positive relation between firm disclosure, in general, and analysts forecast quality (e.g., Lang and Lundholm, 1996; Dhaliwal et al., 2012). To the extent that some non-GAAP measures are quite similar in nature, which we elaborate on in

a later section, we repeat our analyses using non-GAAP categories and find similar results. This research design choice also allows us to examine the usefulness of each individual non-GAAP category to analysts. We find that, among the twelve non-GAAP categories we identify, the presence of adjusted revenue, adjusted operating income, and adjusted tax rate leads to more accurate and less dispersed earnings forecasts, while the presence of return on invested capital (ROIC) leads to less accurate and more dispersed earnings forecasts.

Next, we investigate the characteristics (in terms of experience, available resources, and portfolio complexity) of analysts who may benefit from non-GAAP measures. After controlling for other factors affecting analysts' relative forecast accuracy, we find that a greater quantity of non-GAAP metrics/categories is particularly beneficial to analysts who have less general experience and cover more industries in their portfolios.

We conduct several additional analyses. First, we repeat our main tests using two-stage-least-squares regression (2SLS) to eliminate potential endogeneity concerns regarding the quantity of non-GAAP metrics, which is a choice made by managers. Specifically, we first run a regression with the quantity of non-GAAP metrics as the dependent variable and a list of potential determinants as the independent variables, following Chapter 3; we then use the predicted value from the determinant test at the first stage in our second stage test. We find that the association between the forecast accuracy (dispersion) and the predicted quantity of non-GAAP metrics is still significantly positive (negative) in this specification. Therefore, our primary inferences remain robust. Second, our primary inferences remain robust when we exclude EBIT or EBITDA, or both in our count of non-GAAP metrics. Last, we repeat our main tests by excluding observations in 2020 to eliminate the potential impact of the pandemic, and our results are unchanged.

Our study makes several contributions. First, we add new insights to the burgeoning literature on non-GAAP reporting. Prior studies generally focus on the impact of non-GAAP earnings on investors and analysts. Our study takes a different perspective and examines the consequences of

a greater quantity of non-GAAP metrics. This exercise is not trivial because non-GAAP measures are not limited to non-GAAP earnings (or equivalents). Our study is closely related to Gomez et al. (2023), which investigate non-GAAP income statements (i.e., statements similar to GAAP income statements but with many line items often differing from their GAAP counterparts) and find that after removing non-GAAP income statements, analyst forecasts become less accurate and more disperse. Our study, however, differs from theirs in that it directly focuses on all distinct non-GAAP metrics, which go beyond non-GAAP earnings and others found in non-GAAP income statements. Indeed, our results suggest that other non-GAAP measures are useful to analysts, beyond non-GAAP earnings. This is novel to the literature.

Second, while extensive research has examined the extent to which firm disclosure affects analyst forecasts, evidence concerning the impact of non-GAAP information on analyst behavior is limited. Therefore, our study enriches the extant literature on analyst forecasts.

Third, our findings that a larger quantity of non-GAAP metrics is useful to analysts when they make earnings forecasts should, to some extent, mitigate the common concern that non-GAAP disclosures tend to be used opportunistically. Therefore, our study is also relevant to regulators and standard setters, who have regularly expressed their concerns over the appropriateness and informativeness of non-GAAP measures.

The rest of the paper is organized as follows. The next section reviews relevant literature and develops our hypotheses. Section 3 describes our sample and research design. Section 4 presents empirical results. Section 5 provides additional analyses. Section 6 concludes.

4.2 Literature Review and Hypothesis Development

4.2.1 Analysts' Earnings Forecasts Properties

As sophisticated information intermediaries in capital markets, sell-side financial analysts provide information services, notably with their earnings forecasts (and other outputs such as stock recommendations), to help investors make investment decisions. Prior studies have found various

factors that affect the properties of analysts' earnings forecasts.[38] For example, more accurate forecasts are associated with larger firm size (Lang and Lundholm, 1996), less volatile earnings (Dichev and Tang, 2009), and greater analyst following (Lys and Soo, 1995). In addition, analysts who have more accurate prior forecasts (Mikhail et al., 2004), longer experience, extensive industry expertise, richer resources from their brokerage firms (Clement, 1999; Kadan et al., 2012), and superior ability to elicit information (Yezegel, 2023) also tend to have more accurate earnings forecasts. Analysts' assessment of a firm is not homogeneous, and the difference is captured by forecast dispersions, which reflects the difference of opinion among analysts regarding a firm's future performance (Tang and Yao, 2019).

To the extent that firm disclosure is a primary information resource for the capital market, it is commonly accepted that informative firm disclosure has a significant impact on analyst forecasts. For instance, Hoitash et al. (2021) find an inverse relation between accounting reporting complexity and analysts' forecast performance. In an international setting, Hope (2003) finds that financial disclosure quality is positively associated with analysts' forecast accuracy. Dhaliwal et al. (2012) document that corporate social responsibility disclosure is associated with higher analysts' forecast accuracy. Li and Nwaeze (2018) find that abnormal extensions in eXtensible Business Reporting Language (XBRL) are positively associated with forecast accuracy and negatively associated with forecast dispersion. Lehavy et al. (2011) find that less readable 10-Ks are associated with greater dispersion and lower accuracy due to a greater collective effort by analysts for those firms. Taken together, these studies suggest that high-quality firm disclosures are generally value-relevant to analysts.

[38] In this section, we highlight some of the most relevant papers and our objective is not to provide an exhaustive survey. Please see Ramnath, Rock and Shane (2008) for a more comprehensive review.

4.2.2 Non-GAAP Reporting

There has been a worldwide growth in managers' voluntary disclosure of non-GAAP financial information.[39] According to the SEC, if a firm takes a defined GAAP amount and removes a component of that amount that is also disclosed in the financial statements, the resulting amount is considered a non-GAAP measure. In addition to non-GAAP earnings (or non-GAAP EPS), non-GAAP measures also include non-GAAP revenues, free cash flow, non-GAAP effective tax rate, etc. With a few exceptions, however, the extant literature on non-GAAP predominantly focuses on non-GAAP EPS.[40] Because most non-GAAP exclusions are related to income-decreasing items (e.g., expenses, losses), regulators and standard setters, such as the SEC in the U.S. and the Canadian Standards Association (CSA) in Canada, have consistently expressed concerns over potential opportunistic non-GAAP reporting. One line of research strives to understand managers' motivations for disclosing non-GAAP earnings and empirically examine the properties of non-GAAP exclusions. More specifically, prior studies have identified two perspectives. The first is the "opportunism" explanation, which suggests that non-GAAP exclusions are motivated by the desire to manage investors' perceptions of firm performance. The second is the "predictive ability" or "informative" explanation, which suggests that non-GAAP exclusions result in an earnings measure that is more useful for predicting future firm performance. Substantial research documents that most non-GAAP earnings disclosures are informative (e.g., Curtis et al., 2014; Black and Christensen, 2018; Leung and Veenman, 2018; Beardsley et al., 2021). However, there is also evidence suggesting that some managers calculate non-GAAP measures opportunistically by selectively excluding some recurring items (e.g., stock-based compensation expense) that they claim are "non-operating" or "non-cash" in nature and unrelated to the core performance. Evidence

[39] Many firms disseminate non-GAAP financial information in earnings press releases with a Form 8-K (filed with the regulator). Non-GAAP information may also be released through oral, telephone, webcast or broadcast or other similar methods, including conference calls and investor presentations. In addition, non-GAAP information may be included on a firm's website or other electronic media. Further, non-GAAP information may be disclosed in periodic filings (e.g., 10-K or 10-Q), proxy statements, registration statements (e.g., S-1), or other SEC filings.

[40] Some exceptions include studies examining EBITDA and adjusted EBITDA (Cormier et al., 2017; Rozenbaum, 2019; Brown et al., 2022), free cash flows (Adhikari and Duru, 2006; Adame et al., 2023) and non-GAAP revenue (Campbell et al., 2022). We will provide a brief review on these studies later.

shows that such non-GAAP adjustments are of low quality because of a positive association between these exclusions and future firm performance (e.g., Doyle et al., 2003; Kolev et al., 2008; Bentley et al., 2018).

In addition, there is a limited number of studies focusing on non-GAAP measures other than earnings. For instance, Campbell et al. (2022) find that the decision to provide non-GAAP revenue disclosures is largely driven by economic fundamentals, and non-GAAP revenues provide investors with relevant information. Adame et al. (2023) report that both opportunistic and information motives explain firms' choice to disclose free cash flow in earnings announcements. Chen et al. (2023) study the reporting of the tax effects of non-GAAP exclusions and find that managers strategically select the tax rate applied to exclusions (in the calculation of non-GAAP earnings) in order to achieve after-tax earnings targets.

4.2.3 Non-GAAP Reporting and Analysts' Earnings Forecasts

Prior studies have attempted to uncover the effect of non-GAAP earnings on analysts' judgments and forecasts. Using an experiment, Frederickson and Miller (2004) find that analysts' stock price judgments do not differ when they receive both non-GAAP earnings and GAAP earnings in an earnings announcement and when they receive only GAAP earnings. This finding suggests that analysts' stock price judgments are not affected by the presence of non-GAAP earnings. Further responses to their debriefing questions indicate that those analysts use well-defined valuation models based on either earnings-multiples or cash flows. Using those models enables analysts to see through the non-GAAP earnings and focus only on the information relevant to their valuation models. In another experiment, however, Elliott (2006) finds that analysts assess higher earnings performance when the firm's earnings release places non-GAAP earnings ahead of GAAP earnings and provides a reconciliation between GAAP and non-GAAP earnings. Further analyses suggest that analysts view non-GAAP earnings as more reliable when managers reconcile them with GAAP earnings. Archival evidence suggests that non-GAAP earnings disclosed by

managers are generally useful to analysts. For example, Bhattacharya et al. (2003) find that non-GAAP earnings are more highly associated with analysts' one-quarter-ahead earnings forecast revisions than GAAP operating earnings, suggesting that non-GAAP earnings represent a more permanent measure of firm profitability than GAAP operating earnings. Collectively, those findings suggest that non-GAAP *earnings* from managers are useful to analysts.

Two recent studies are closely related to our study. Gomez et al. (2023) explore factors motivating firms to disclose full non-GAAP income statements and the consequences of the SEC's pressure on managers to stop disclosing them.[41] Gomez et al. (2023) find that firms with higher analyst coverage, higher institutional ownership, those with more complex disclosures, smaller firms, loss firms, and firms with lower leverage are more likely to report non-GAAP income statements. Gomez et al. (2023) also find that analyst forecasts become less accurate and more disperse after firms stop disclosing full non-GAAP income statements. Brown et al. (2024) provide evidence on non-GAAP disclosures in MD&As and find that firms with less adequate financial statements discuss non-GAAP measures more extensively. Those firms discuss non-GAAP measures more in required topics, traditional topics, and intangibles topics. Both studies imply that a greater number of non-GAAP metrics is informative. Gomez et al. (2023) especially imply that analysts' forecast accuracy diminishes as the number of non-GAAP metrics decreases.

Our study builds on evidence from these two studies in two ways. First, the percentage of firms reporting non-GAAP income statements has decreased from 22.81% in 2003 to 10.55% in 2010, consistent with the increased SEC scrutiny of this practice during this period (Gomez et al., 2023). Additionally, not all non-GAAP reporting firms disclose a full non-GAAP income statement, and many firms encompass not only non-GAAP metrics within non-GAAP income statements but also extend to non-GAAP metrics across other financial statements. Non-GAAP disclosure is more extensive in the earnings announcement than in the MD&A (Brown et al., 2024). Therefore, our

[41] According to Gomez et al. (2023), full non-GAAP income statements are similar to income statements prepared under GAAP except many line items often differ from their GAAP counterparts; please see their Appendix A1 for an example of a full non-GAAP statement.

examination of the broader population of non-GAAP reporting firms with different quantities of non-GAAP metrics in earnings announcements, rather than non-GAAP income statements reporting firms alone or non-GAAP intensity in the MD&A, provides more generalizable evidence. Second, while Brown et al. (2024) consider various non-GAAP metrics beyond non-GAAP earnings, they count occurrences of case-insensitive keywords for non-GAAP disclosure in firms' MD&A. In contrast, we measure the actual number of different non-GAAP metrics disclosed.

4.2.4 Hypothesis Development

Non-GAAP disclosures include more than non-GAAP earnings, and as we report in more detail later, it is increasingly common for firms to provide non-GAAP measures beyond non-GAAP earnings. Despite the cumulative development in the literature on our understanding of non-GAAP disclosures and the effect of non-GAAP *earnings* on analyst forecasts, there is limited evidence on the extent to which non-GAAP measures in general (instead of non-GAAP earnings in particular) affect analysts' forecasts. In this paper, we investigate the impact of the quantity of non-GAAP metrics on analysts' forecast accuracy and dispersion.

We argue that the relationship between the quantity of non-GAAP metrics and analysts' forecast accuracy and dispersion is uncertain *ex ante*. First, conceptually, various non-GAAP metrics are not a simple extension of non-GAAP earnings. Instead, as the SEC's definition implies, non-GAAP measures are expected to capture a firm's performance, financial position, and cash flows. For instance, different from non-GAAP earnings (which concern a firm's bottom-line performance), non-GAAP revenues provide information about the firm's future revenue growth, incremental to GAAP revenue and non-GAAP earnings (Campbell et al., 2022). GAAP earnings, and by extension non-GAAP earnings, and free cash flows are also different because they have different implications in valuations (e.g., Sloan, 1996). According to interviews of managers conducted by Adame et al. (2023), free cash flow is often perceived as a metric for growth, whereas earnings per share is the usual metric for ongoing performance. Adame et al. (2023) argue that,

even though relevant information is disclosed, it is still inherently challenging for investors to calculate free cash flows on their own; they further find that capital and intangible intensity are strong determinants of free cash flow disclosure. Further, prior studies suggest that non-GAAP exclusions, on average, make non-GAAP metrics, at least in the context of non-GAAP earnings, more informative or value-relevant (see, e.g., Black et al., 2018). This is consistent with managers' claim that their non-GAAP metrics contain useful information that analysts and investors desire. For instance, Adobe Inc. states the following in its quarterly earnings releases:[42] *Adobe believes these non-GAAP financial measures are useful because they allow for greater transparency with respect to key metrics used by management in its financial and operational decision-making. This allows institutional investors, the analyst community, and others to better understand and evaluate our operating results and future prospects in the same manner as management.* Therefore, one possibility is that a greater number of non-GAAP metrics represents a larger quantity of new information with higher quality. Under this scenario, a greater quantity of non-GAAP metrics may help not only to move analysts' forecasts close to future realized earnings (i.e., increasing forecast accuracy) but also to converge their expectations regarding a firm's future performance (i.e., reducing forecast dispersion). In other words, under this scenario, we would expect that analysts' forecasts are likely to be more accurate and less disperse when firms provide a larger quantity of non-GAAP measures.

Second, despite the documented information content, information conveyed in non-GAAP measures overlaps with that in other measures or even within themselves. For instance, non-GAAP EBIT (earnings before *interest* and *taxes*) and non-GAAP EBITDA (earnings before *interest*, *taxes*, *depreciation*, and *amortization*) are similar in that they both exclude certain same expenses from GAAP net income (e.g., interest and taxes expenses). In addition, both can provide a view of a company's operating performance. Consequently, reporting non-GAAP measures does not

[42] Adobe's quarterly earnings release for Q3 Fiscal 2022 can be viewed at https://www.adobe.com/pdf-page.html?pdfTarget=aHR0cHM6Ly93d3cuYWRvYmUuY29tL2NvbnRlbnQvZGFtL2NjL2VuL2ludmVzdG9yLXJlbGF0aW9ucy9wZGZzLzUxOTAyMjAyL2NhNzgzNGI1aHJlZndmLnBkZg==

necessarily convey a substantial amount of new information; rather, it is merely a presentation choice. The experimental findings by Frederickson and Miller (2004) demonstrate that analysts' judgments are not affected by the presence of non-GAAP earnings; however, Elliott (2006) shows that analysts' performance is improved with an emphasis on non-GAAP earnings and the presence of a quantitative reconciliation of the differences between the GAAP and non-GAAP earnings. Gomez et al. (2023) report that analyst forecasts become less accurate and more disperse after firms stop disclosing full non-GAAP income statements. A full non-GAAP income statement does not necessarily have all line items that are different from their corresponding GAAP numbers, but a non-GAAP income statement can illustrate how excluded items affect each income statement line item (Gomez et al., 2023). Taken together, these studies imply that the presentation style matters to analysts in that a detailed presentation of various non-GAAP measures could improve analysts' forecast experience. However, it is also possible that analysts may find themselves investing more time in distinguishing valuable or different information from managers' non-GAAP metrics. To the extent that a larger quantity of non-GAAP measures increases information processing costs, analysts' ability to correctly incorporate all pertinent information may be limited, and disagreement among analysts or ambiguity may also increase. For example, Lehavy et al. (2011) find that analysts' earnings forecasts are less accurate and more disperse for firms with less readable annual reports where information processing costs are higher. Under this scenario, analysts' forecasts are likely to be more accurate and less dispersed if a detailed presentation of various non-GAAP measures facilitates a more accurate interpretation of a firm's economic prospects and reduces ambiguity, or analysts' forecasts are likely to be less accurate and more disperse if the potential overlap in information content raises processing costs.

Finally, even though managers are found to report adjusted earnings metrics more cautiously after major regulatory changes on non-GAAP reporting, notably the Sarbanes–Oxley Act of 2002 and Regulation G of 2003 (see, e.g., Black et al., 2017), non-GAAP metrics may also be provided opportunistically and hence misleading, which could affect analysts' earnings forecasts from

another perspective. Bentley et al. (2018) compare non-GAAP earnings metrics disclosed by managers and those reported by analysts; they find that analysts may scrutinize and filter managers' numbers and disregard managers' lower-quality non-GAAP exclusions. Barth et al. (2012) find that opportunism is the primary explanation for managers to exclude stock-based compensation expense in their non-GAAP earnings; however, they also report that analysts tend to exclude such expenses to increase the predictive ability. Collectively, both studies suggest that some analysts may not blindly adopt the exclusions suggested by managers when they perceive managers' non-GAAP exclusions to be misleading and uninformative. As not all analysts may see through lower-quality non-GAAP exclusions, a larger quantity of non-GAAP metrics may be associated with less accurate and more dispersed analysts' earnings forecasts. Under this scenario, a larger quantity of non-GAAP metrics is likely associated with less accurate, on average, and more dispersed earnings forecasts.

Taking various scenarios into account, we make no directional prediction regarding the association between the quantity of non-GAAP metrics and analysts' forecast accuracy and dispersion, and present our hypotheses in the null form:

H1: Sell-side financial analysts' earnings forecast accuracy is not associated with the quantity of non-GAAP metrics disclosed in firms' earnings press releases.

H2: Sell-side financial analysts' earnings forecast dispersion is not associated with the quantity of non-GAAP metrics disclosed in firms' earnings press releases.

4.3 Sample and Research Design

4.3.1 Data Collection

In this study, our primary focus is on the quantity of non-GAAP metrics, which requires hand collection. We begin the data collection process with all firms included in the S&P500 because S&P500 firms are economically important. Since the S&P500 index composition changes from time to time, we choose November 1, 2021, as the date for establishing which firms to include in

the analysis. Following prior non-GAAP studies, we remove financial institutions (99 firms) and utility firms (57 firms). We also remove firms that change the fiscal year-end during the sample period (1 firm) and firms that are founded after the calendar year 2020 (3 firms). The final sample consists of 340 S&P500 firms. Table 1, Panel A summarizes these steps.

……. [INSERT TABLE 1 ABOUT HERE] …….

Because of the dynamic nature of non-GAAP reporting, we choose earnings releases for the recent five years (2016-2020) to study the current non-GAAP reporting landscape. Each observation corresponds to a quarterly earnings release made during a calendar quarter from 2016 to 2020, regardless of when the fiscal quarter ended. We hand collect non-GAAP metrics primarily from quarterly earnings releases filed with the SEC on EDGAR (with 8-K, Item 2.02). When earnings releases are not available on EDGAR, we collect them from firms' websites (this represents 0.84% of the total earnings releases collected). However, there are still 143 earnings releases (from 16 distinct firms) that we could not find.[43] These steps yield a final sample of 6,657 quarterly earnings releases for 340 distinct firms between January 2016 and December 2020. We manually examine each quarterly earnings release to identify and document the name of each non-GAAP metric, if applicable. A non-GAAP metric is counted and then included in the calculation of *Total_Metrics*, if it meets the following criteria:[44]

(5) A non-GAAP metric must have an assigned value.[45]

(6) A non-GAAP metric appears to discuss the current fiscal quarter's performance.[46]

(7) A non-GAAP metric is used on a consolidated basis.

[43] A primary reason is that these firms have experienced spin-offs or mergers during the sample period.
[44] Following prior literature (Rozenbaum, 2019) and the SEC's Financial Reporting Manual, EBIT and EBITDA are counted as non-GAAP metrics when they appear in the earnings releases. See https://www.sec.gov/corpfin/cf-manual/topic-8
[45] Some earnings releases mention a non-GAAP metric but do not assign a value to this metric. In this case, this non-GAAP metric is not counted.
[46] A non-GAAP metric is disclosed but is for forward-looking performance (outlook) only. In this scenario, this non-GAAP metric is not counted.

(8) Ratios/margins are counted separately from their dollar equivalents.[47]

In our dataset, we have both observations that disclose non-GAAP metrics and those that do not provide any non-GAAP information.

4.3.2 Sample Selection

We then merge our hand-collected non-GAAP dataset with analyst data from I/B/E/S. We obtain data for control variables, which we discuss in more detail later, from Compustat, CRSP, Thomson Reuters 13f database, and Hoitash and Hoitash (2018). We winsorize all continuous variables at 1 percent and 99 percent and provide variable definitions in Appendix A. After removing missing data from other data sources for measuring variables used in this study, our final sample consists of 6,559 firm-quarter observations. As we report in more detail later, we also conduct analyses at the analyst level; the sample used in that analysis consists of 97,129 analyst-firm-quarter observations. Table 1, Panel B summarizes our sample selection procedures. Since sample sizes differ for different tests due to various research designs and data requirements, we report the number of observations in all our tables for easy reading.

4.3.3 Research Design

Following prior literature (e.g., Lang and Lundholm, 1996), we use the following models to test the effect of the quantity of non-GAAP metrics disclosed by managers on the properties of analysts' one-quarter-ahead earnings forecasts for the full sample:

$$
\begin{aligned}
ACCURACY_{iq+1} &= \beta_0 + \beta_1 Total\_Metrics_{iq} + \beta_2 SIZE_{iq} + \beta_3 MTB_{iq} + \beta_4 stdROA_{iq} + \beta_5 LOSS_{iq} \\
&+ \beta_6 \%INST\_HOLD_{iq} + \beta_7 logNUMEST_{iq} + \beta_8 logARC_{iq} + \beta_9 nbseg_{iq} \\
&+ \beta_{10} ngseg_{iq} + Industry\ Fixed\ Effects + Year - Quarter\ Fixed\ Effects \\
&+ \varepsilon \qquad (1)
\end{aligned}
$$

[47] For example, adjusted operating income, adjusted operating margin, and adjusted operating income growth would be three separate metrics.

$$DISPERSION_{iq+1} = \beta_0 + \beta_1 Total\_Metrics_{iq} + \beta_2 SIZE_{iq} + \beta_3 MTB_{iq} + \beta_4 stdROA_{iq} + \beta_5 LOSS_{iq} + \beta_6 \%INST\_HOLD_{iq} + \beta_7 logNUMEST_{iq} + \beta_8 logARC_{iq} + \beta_9 nbseg_{iq} + \beta_{10} ngseg_{iq} + Industry\ Fixed\ Effects + Year - Quarter\ Fixed\ Effects + \varepsilon \quad (2)$$

The independent variables are measured with a lag relative to the dependent variables, reflecting the assumption that analysts make one-fiscal-quarter-ahead ($q+1$) earnings forecasts for firm i based on information in the current quarterly earnings announcement at q. Given that our research interest is non-GAAP information, we also focus on analysts' street earnings estimates (I/B/E/S variable EPS).[48] $ACCURACY_{iq+1}$ is calculated as the absolute difference between actual earnings per share at quarter $q+1$ and analysts' consensus forecast (median) for that quarter, deflated by the stock price at the end of quarter q, and then multiplied by a negative one. Therefore, higher values of *ACCURACY* represent higher forecast accuracy. $DISPERSION_{iq+1}$ is calculated as the standard deviation of analysts' all quarter $q+1$ forecasts for firm i, deflated by the stock price at the end of quarter q. Higher values of *DISPERSION* indicate greater disagreement among analysts. $Total\_Metrics_{iq}$ is the total number of non-GAAP metrics firm i discloses in its quarterly earnings release of quarter q, and it takes the value of 0 if the earnings release does not contain any non-GAAP metrics.

Following prior studies (e.g., Lang and Lundholm, 1996; Hope, 2003; Lehavy et al., 2011; Dhaliwal et al., 2012; Li and Nwaeze, 2018), we include several control variables that have been shown to be associated with analysts' forecast accuracy and dispersion. Prior literature finds that firms with better information environments are associated with greater accuracy and lower dispersion (Lang and Lundholm, 1996; Hope, 2003; Lehavy et al., 2011; Dhaliwal et al., 2012). There are several factors that reflect information availability about a firm: firm size (*SIZE*), growth

[48] Discussions on analysts' GAAP earnings forecasts could be found in Bradshaw et al. (2018).

potential (*MTB*), earnings volatility (*stdROA*), loss firms (*LOSS*), institutional ownership (*%INST_HOLD*), and analyst following (*logNUMEST*), which we include. We also include variables to control firms' information, business, and underlying complexity, which influences analyst performance. Prior literature finds that complexity is inversely associated with analysts' performance (Duru and Reeb, 2002; Lehavy et al., 2011; Bozanic and Thevenot, 2015; Hoitash et al., 2021). Complexity increases analysts' cost to process and interpret the firm's information. It is likely to lead to a more diverse set of interpretations about a firm, resulting in higher analyst forecast dispersion. In addition, complexity makes it more difficult to forecast earnings, so analysts' forecast accuracy is lower. The number of business and geographic segments (*nbseg, ngseg*), and accounting reporting complexity (*ARC*) are frequently used as proxies for complexity measures. Additionally, we include industry fixed effects and year-quarter fixed effects to account for variations in forecast accuracy and dispersion across specific industries and over time. Detailed definitions and descriptions of our variables are in Appendix A.

4.3.4 Descriptive Statistics

Table 2 presents descriptive statistics for our hand-collected non-GAAP dataset. We tabulate the trend of non-GAAP disclosures by year in Panel A. For a sample of 6,657 quarterly earnings releases, we find that 91.77% of firm-quarters have non-GAAP metrics, and the average number of non-GAAP metrics per filing is 7.16. We observe that the percentage of quarterly press releases including non-GAAP information is increasing over the sample period, from 88.87% in 2016 to 93.59% in 2020. In addition, the average quantity of non-GAAP metrics used per filing increases from 6.58 in 2016 to 7.78 in 2020.

……. [INSERT TABLE 2 ABOUT HERE] …….

Table 2, Panel B tabulates the frequency statistics on non-GAAP disclosures by industry. We categorize industries based on the 2-digit SIC classification. Non-GAAP disclosures are common across various industries, but the average quantity of non-GAAP metrics used per filing varies

across industries. Manufacturing industries, on average, disclose the largest number of non-GAAP metrics (*Total_Metrics = 8.18*).

We winsorize all continuous variables at the bottom and top one percentile to ensure that our results are not due to the influence of outliers. Panel A of Table 3 shows the descriptive statistics for the full sample at the firm-level. The mean (median) *ACCURACY* is -0.0055 (-0.0018). The interquartile range is between -0.0051 and -0.0006, indicating a left-skewed distribution primarily because, as in prior literature (Dhaliwal et al., 2012; Hoitash et al., 2021), we compute the absolute value of forecast errors which places the negative and positive values in the same quadrant.[49] The mean (median) *DISPERSION* is 0.0009 (0.0004). The mean (median) of *Total_Metrics* is 7.0886 (6.0000). Statistics on control variables used in our analyses are comparable to those reported in prior research. Panel B of Table 3 reports Spearman (upper-right triangle) and Pearson (lower-left triangle) correlations for the sample. We find a significantly positive (negative) correlation between *Total_Metrics* and *ACCURACY* (*DISPERSION*), suggesting that when managers issue a larger number of non-GAAP metrics, analysts forecast accuracy (dispersion) is more likely to increase (decrease). Next, we investigate the relation between the quantity of non-GAAP metrics and analysts' forecast accuracy and dispersion in a multivariate context.

……. [INSERT TABLE 3 ABOUT HERE] …….

4.4 Empirical Results

4.4.1 The Quantity of Non-GAAP Metrics and Analysts' Forecasts Properties

Table 4 presents results from estimating Equations (1) and (2), which explore the effect of the quantity of non-GAAP metrics on analysts' forecast accuracy and dispersion, respectively. In Column (1), where the dependent variable is *ACCURACY*, the coefficient on *Total_Metrics* is positive (0.00019) and highly significant ($p < 0.01$). Therefore, a greater quantity of non-GAAP

[49] Note that the sign of the *ACCURACY* variable does not indicate the direction of the forecast error. We first compute the absolute value of forecast errors and then multiply by −1 so that higher values indicate higher forecast accuracy.

metrics is associated with higher accuracy of analysts' forecasts. In Column (2), where the dependent variable is *DISPERSION*, the coefficient on *Total_Metrics* is negative (-0.00002) and highly significant ($p < 0.01$), suggesting that a larger quantity of non-GAAP metrics is negatively associated with forecast dispersion, consistent with the notion that a large quantity of non-GAAP metrics increases consensus among analysts regarding a firm's future performance. These results suggest that a greater quantity of non-GAAP metrics is useful to analysts.

……. [INSERT TABLE 4 ABOUT HERE] …….

The reported coefficients of the control variables are largely consistent with findings in existing research. More specifically, coefficients on growth potential (*MTB*), earnings volatility (*stdROA*), loss firms (*LOSS*), institutional ownership (*%INST_HOLD*), and analyst following (*logNUMEST*) are significant, indicating that these factors likely have a material impact on analysts' performance. In addition, consistent with Hoitash et al. (2021), we also find a negative (positive) and statistically significant association between *logARC* and *ACCURACY* (*DISPERSION*), suggesting that complexity has a negative impact on analysts' forecast properties.

4.4.2 The Quantity of Non-GAAP Categories and Analysts' Forecasts Properties

In our primary analysis, we count non-GAAP metrics as long as they satisfy our criteria (elaborated in the Data Collection subsection); as a result, ratios/margins are separated from their dollar equivalents when we count the quantity of non-GAAP metrics used per filing (*Total_Metrics*). For instance, adjusted operating income, adjusted operating margin, and adjusted operating income growth would be three separate metrics; however, these three non-GAAP metrics essentially belong to the same non-GAAP category (i.e., adjusted operating income). Therefore, in the next set of analyses, we group non-GAAP metrics into non-GAAP categories. More specifically, we identify twelve categories of non-GAAP metrics, including non-GAAP net income, EBIT, adjusted EBIT, EBITDA, adjusted EBITDA, adjusted operating income, non-GAAP revenue, non-GAAP expenses-related metrics, free cash flow, net debt, non-GAAP effective tax rate and return

on invested capital (ROIC). In an untabulated analysis, we find that the quantity of non-GAAP categories (*Total_Categories)* involved per filing is also increasing, from 2.57 in 2016 to 3.19 in 2020. Relative to the quantity of non-GAAP metrics, the quantity of non-GAAP *categories* additionally reflects the breadth of information diversity. This perspective is not trivial because a construct of diversity may more precisely capture the extent of the information content and/or the cost of the information process, both of which are important elements in our hypothesis development. Empirically, we estimate the following regressions:

$$ACCURACY_{iq+1} = \beta_0 + \beta_1 Total\_Categories_{iq} + \beta_2 SIZE_{iq} + \beta_3 MTB_{iq} + \beta_4 stdROA_{iq} + \beta_5 LOSS_{iq} + \beta_6 \%INST\_HOLD_{iq} + \beta_7 logNUMEST_{iq} + \beta_8 logARC_{iq} + \beta_9 nbseg_{iq} + \beta_{10} ngseg_{iq} + Industry\ Fixed\ Effects + Year - Quarter\ Fixed\ Effects + \varepsilon \quad (3)$$

$$DISPERSION_{iq+1} = \beta_0 + \beta_1 Total\_Categories_{iq} + \beta_2 SIZE_{iq} + \beta_3 MTB_{iq} + \beta_4 stdROA_{iq} + \beta_5 LOSS_{iq} + \beta_6 \%INST\_HOLD_{iq} + \beta_7 logNUMEST_{iq} + \beta_8 logARC_{iq} + \beta_9 nbseg_{iq} + \beta_{10} ngseg_{iq} + Industry\ Fixed\ Effects + Year - Quarter\ Fixed\ Effects + \varepsilon \quad (4)$$

Table 5 reports the regression findings. Column (1) shows a positive and statistically significant association between *Total_Categories* and *ACCURACY* ($p < 0.05$), and Column (2) shows a negative and statistically significant association between *Total_Categories* and *DISPERSION* ($p < 0.1$). Together, these findings suggest that a greater quantity of non-GAAP categories, reflecting greater information diversity, is useful to analysts.

……. [INSERT TABLE 5 ABOUT HERE] …….

4.4.3 The Effect of Individual Non-GAAP Category on Analysts' Forecast Properties

When we classify non-GAAP metrics, we also effectively standardize individual metrics in that now we have a fixed number of categories. This approach also allows us to investigate the extent to which each individual non-GAAP category affects analysts' forecast properties. To study this question, we estimate the following regressions:

$$\begin{aligned} ACCURACY_{iq+1} &= \beta_0 + \beta_1 Non-GAAP-Dummy_{iq} + \beta_2 SIZE_{iq} + \beta_3 MTB_{iq} + \beta_4 stdROA_{iq} \\ &+ \beta_5 LOSS_{iq} + \beta_6 \%INST\_HOLD_{iq} + \beta_7 logNUMEST_{iq} + \beta_8 logARC_{iq} \\ &+ \beta_9 nbseg_{iq} + \beta_{10} ngseg_{iq} + Industry\ Fixed\ Effects + Year \\ &- Quarter\ Fixed\ Effects + \varepsilon \end{aligned} \quad (5)$$

$$\begin{aligned} DISPERSION_{iq+1} &= \beta_0 + \beta_1 Non-GAAP-Dummy_{iq} + \beta_2 SIZE_{iq} + \beta_3 MTB_{iq} + \beta_4 stdROA_{iq} \\ &+ \beta_5 LOSS_{iq} + \beta_6 \%INST\_HOLD_{iq} + \beta_7 logNUMEST_{iq} + \beta_8 logARC_{iq} \\ &+ \beta_9 nbseg_{iq} + \beta_{10} ngseg_{iq} + Industry\ Fixed\ Effects + Year \\ &- Quarter\ Fixed\ Effects + \varepsilon \end{aligned} \quad (6)$$

where *Non-GAAP-Dummy* represents the twelve non-GAAP categories (non-GAAP net income, EBIT, adjusted EBIT, EBITDA, adjusted EBITDA, adjusted operating income, non-GAAP revenue, non-GAAP expenses-related metrics, free cash flow, net debt, non-GAAP effective tax rate, and ROIC). *Non-GAAP-Dummy* takes the value of one if the earnings release contains this specific non-GAAP category and zero otherwise. As we have twelve dummy variables, we estimate twelve models for Equation (5) and twelve models for Equation (6).

If each non-GAAP category has the same impact on analysts' forecast accuracy (dispersion), we would expect coefficients on all dummy variables to be positive (negative) and statistically significant for forecast accuracy (dispersion), similar to that reported in our main analyses.

Table 6, Panel A shows that coefficients on *Adjusted_Operating_Income, Adjusted_Revenue,* and *Adjusted_taxrate* are significantly positive, where *ACCURACY* is the dependent variable. These results suggest that analysts' forecasts become more accurate when those non-GAAP categories are disclosed in quarterly earnings releases. It is interesting to note that the coefficient on *Adjusted_EPS* is insignificant, even though it is positive as we would expect. This evidence corroborates our argument that other non-GAAP metrics, at least some of them, have information content beyond non-GAAP earnings. We also find that the coefficient on *ROIC* is significantly negative; therefore, analysts' forecasts become less accurate when the return on invested capital is disclosed in quarterly earnings releases. One potential reason for this is that *ROIC* can be influenced by factors outside of a company's operational performance, such as changes in interest rates or tax laws. Analysts may not always account for these external factors, leading to forecast errors and less accurate forecasts.

……. [INSERT TABLE 6 ABOUT HERE] …….

Table 6, Panel B reports regression results where *DISPERSION* is the dependent variable. Coefficients on *Adjusted_Operating_Income, Adjusted_Revenue,* and *Adjusted_taxrate* are significantly negative; therefore, when these non-GAAP categories are disclosed in quarterly earnings releases, analysts' forecasts are not only more accurate but also more converged. Further, the coefficient on *ROIC* is significantly positive. One potential reason is that analysts may interpret *ROIC* in a diverse way, leading to more dispersed forecasts.

Together, the findings in Table 6 suggest that the presence of adjusted revenue, adjusted operating income, and adjusted tax rate potentially increases the richness and informativeness of non-GAAP information, leading to more accurate and less dispersed earnings forecasts. On the other hand, the presence of return on invested capital increases the disagreement among analysts, leading to less accurate and more dispersed earnings forecasts.

4.4.4 Cross-Sectional Analysis: Experience, Resources Availability, and Portfolio Complexity

Our empirical results so far have suggested that, when firms provide a larger quantity of non-GAAP metrics in their quarterly earnings releases, analysts' one-quarter-ahead earnings forecasts are likely to be more accurate and less dispersed on a consensus level. Given our findings on the consensus level, it is possible that certain analysts' characteristics (i.e., analysts who have less experience, fewer resources, and more complex portfolios) could benefit more from non-GAAP disclosures, i.e., providing more accurate forecasts. Thus, in this subsection, we further explore the characteristics of analysts who could benefit from non-GAAP disclosures. We exclude forecast dispersion in our analysis because it can only be calculated at the firm-quarter (consensus) level.

To measure earnings forecast accuracy at the analyst level, we calculate a measure of relative forecast accuracy that compares an analyst's absolute forecast error to the mean absolute forecast error of all analysts following the same firm. Specifically, consistent with Clement (1999), we calculate the mean-adjusted absolute forecast errors as follows:[50]

$$MAFE_{ijq} = -1 \times \frac{AFE_{ijq} - \overline{AFE}_{jq}}{\overline{AFE}_{jq}} \quad (7)$$

AFE_{ijq} is the absolute earnings forecast error for firm j in quarter q, calculated as the absolute difference between the analyst i's forecast of one-quarter-ahead earnings and actual one-quarter-ahead earnings for firm j in quarter q. $\overline{AFE}_{jq}$ is the mean absolute forecast error across all analysts following firm j in quarter q. We multiply by the negative one so that more positive (negative) values for $MAFE_{ijq}$ correspond to more (less) accurate earnings forecasts of an analyst than the average analysts following the firm.

[50] Consistent with prior studies, we use mean-adjusted absolute forecast errors to control for firm-quarter effects, which control for variations in forecasting difficulty across firms and across quarters. This mean-adjustment thus allows us to meaningfully compare the accuracy of earnings forecasts across analysts following different firms and in different quarters.

To conduct the cross-sectional analysis, we examine the following regression at the analyst-firm-quarter level:

$$\begin{aligned} MAFE_{ijq+1} = {} & \beta_0 + \beta_1 MFEXP_{ijq} + \beta_2 MGEXP_{ijq} + \beta_3 MLOG\_BSIZE_{ijq} + \beta_4 MNCOM_{ijq} \\ & + \beta_5 MNSIC_{ijq} + \boldsymbol{\beta_6 MFEXP_{ijq} \times Total\_Metrics_{jq}} \\ & + \boldsymbol{\beta_7 MGEXP_{ijq} \times Total\_Metrics_{jq}} \\ & + \boldsymbol{\beta_8 MLOG\_BSIZE_{ijq} \times Total\_Metrics_{jq}} \\ & + \boldsymbol{\beta_9 MNCOM_{ijq} \times Total\_Metrics_{jq} + \beta_{10} MNSIC_{ijq} \times Total\_Metrics_{jq}} \\ & + \beta_{11} LMAFE_{ijq} + \beta_{12} MFREQ_{ijq} + \beta_{13} MAGE_{ijq} + \beta_{14} Total\_Metrics_{jq} \\ & + \varepsilon \end{aligned} \quad (8)$$

where $MAFE_{ijq+1}$ is defined in Equation (7).

Following prior studies (e.g., Clement, 1999), we focus on three analysts' attributes: analysts' experience, available resources, and portfolio complexity. More specifically, we include firm-specific experience (*FEXP*), general experience (*GEXP*), brokers' size (*LOG_BSIZE*), the number of firms followed by an analyst (*NCOM*), and the number of industries followed by an analyst (*NSIC*). Prior studies find that forecast accuracy increases with analysts' experience (Clement, 1999; Call et al., 2009). We measure firm-specific experience (*FEXP*) as the number of years (to date) the analyst covered the company. We measure general experience (*GEXP*) as the number of years (to date) since the analyst first appeared in the I/B/E/S database.[51] Prior research also suggests that analysts' forecasts become more accurate with increases in analyst's resources (Clement, 1999; Ertimur et al., 2007). Consistent with Ertimur et al. (2007), we calculate an analyst's resources (*LOG_BSIZE*) using the size of the brokerage firm employing the analyst, because larger brokerage firms provide superior resources to their analysts. We use the logarithm of the number of analysts employed by the brokerage that analyst *i* works during a calendar year and quarter, *LOG_BSIZE*, as an empirical proxy for the size of the brokerage firm. Prior research

[51] Since the I/B/E/S data set is left censored, it is not possible to tell how many years of experience analysts have before the first year of available data. To alleviate this concern, analysts who appear in the data set in the initial year of 1983 are removed from the initial I/B/E/S sample when calculating *GEXP*.

finds that the greater the number of firms (*NCOM*) and/or industries (*NSIC*) an analyst follows, the less attention he/she is able to devote to a specific individual firm (Clement, 1999; Ertimur et al., 2007). We define *NCOM* as the number of distinct firms for which analyst *i* issues quarterly earnings forecasts during the calendar year-quarter and *NSIC* as the number of distinct two-digit SICs for which analyst *i* supplies quarterly earnings forecasts during the calendar year-quarter. We also control other determinants of analyst forecast accuracy, including lagged mean-adjusted earnings forecast accuracy (*LMAFE*), forecast frequency (*FREQ*), and forecast age (*AGE*). Specifically, we measure forecast frequency (*FREQ*) as the number of forecasts an analyst issues for a company during a calendar year-quarter. We measure forecast age (*AGE*) as the number of days between the date the analyst issues the one-quarter-ahead earnings forecast and the date that the company reports its next quarterly earnings. Conforming to the dependent variable's specification (i.e., mean-adjustment), all control variables at the analyst-level are also mean-adjusted.

Since *Total_Metrics* has no variation in a given firm-quarter, our coefficients of interest are β_6, β_7, β_8, β_9, and β_{10}, which are coefficients on interaction terms between analysts' attributes and *Total_Metrics*. We predict that a greater quantity of non-GAAP metrics is particularly beneficial to analysts who have less experience, fewer resources, and more complex portfolios; consequently, we expect coefficients β_6, β_7, and β_8 to be negative, and coefficients β_9 and β_{10} to be positive.

Table 7, Panel A presents descriptive statistics on analysts' characteristics used in the regression. The average analyst in our sample has 13.059 years of general experience and 6.227 years of firm-specific experience and covers an average of 16.835 companies and 2.867 industries. In addition, the average number of analysts employed by one brokerage is 41.739. These statistics are comparable to those reported in prior studies (e.g., Hoitash et al., 2021; Yezegel, 2023).

……. [INSERT TABLE 7 ABOUT HERE] …….

Table 7, Panel B reports the regression results from estimating Equation (8). We find that two of the five coefficients of interest are statistically significant. More specifically, Column 1 shows that the coefficient β_7 on *Total_Metrics* × *MGEXP* is significantly negative (coefficient = -0.0022; t-statistic = -2.59) and that the coefficient β_{10} on *Total_Metrics* × *MNSIC* is significantly positive (coefficient = 0.0025; t-statistic = 2.10). These findings suggest that, for analysts with less general experience and those covering more industries in their portfolios, their forecast accuracy is improved when provided with a greater quantity of non-GAAP metrics. In Column 2, we replace *Total_Metrics* with *Total_Categories* and find similar results. Overall, evidence reported in Table 7 suggests that a greater quantity of non-GAAP metrics/categories is particularly beneficial to analysts who have less general experience and cover more industries in their portfolios.

4.5 Additional Analyses

4.5.1 2SLS to Mitigate Endogeneity Concerns

It is possible that the quantity of non-GAAP metrics is endogenous because it is a choice made by managers. Thus, it is important to test whether the potential endogeneity of the quantity of non-GAAP metrics affects the relation between analysts' forecast accuracy/dispersion and the quantity of non-GAAP metrics.

We employ a two-stage least squares (2SLS) framework to address the endogeneity concern. In the first stage, we conduct a determination test of the quantity of non-GAAP metrics. Following the model in Chapter 3, we estimate the following Tobit regression:[52]

$$Total\_Metrics_q = \beta_0 + \beta_1 logARC_q + \beta_2 nbseg_q + \beta_3 ngseg_q + \beta_4 Intangible_q + \beta_5 NOASales_q + \beta_6 JUSTMISS_q + Other\ Controls_q + \varepsilon \quad (9)$$

[52] We use a Tobit model because the quantity of non-GAAP metrics is left-truncated at zero for firms that do not disclose any non-GAAP metrics.

We include the following variables in the model above: accounting reporting complexity (*logARC*), the number of business segments (*nbseg*), the number of business segments (*ngseg*), the intangible intensity (*Intangible*), balance-sheet constraint measure (*NOASales*), a dummy variable for whether the firm misses analysts' expectations by 5 cents per share or less (*JUSTMISS*), firm size (*SIZE*), growth opportunity (*MTB*), financial leverage (*Leverage*), the number of special items (*SpecialItems*), earnings volatility (*stdROA*), a dummy variable for whether the firm's quarterly net income is negative (*Loss*), peer firms' number of non-GAAP metrics (*Peer_metrics*), the number of analysts following (*logNUMEST*) and the percentage ownership of institutional holdings (*%INST_HOLD*). In the second stage, we re-estimate Equations (1) and (2) to test the association between the forecast accuracy and the predicted quantity of non-GAAP metrics from the first stage.

Table 8 reports the 2SLS results. At the first stage, we find that the quantity of non-GAAP metrics (*Total_Metrics*) is significantly and positively associated with the accounting reporting complexity (*logARC*) and the intangible intensity (*Intangible*), suggesting that managers disclose a larger quantity of non-GAAP metrics with the desire to inform investors. At the second stage, we find that the association between the forecast accuracy and the predicted quantity of non-GAAP metrics remains significantly positive (*Total_Metrics*^ = 0.0006, p-value < 0.000), and the association between the forecast dispersion and the predicted quantity of non-GAAP metrics is significantly negative (*Total_Metrics*^ = -0.0001, p-value < 0.000). This result is consistent with our primary results in Table 4. Therefore, our primary inferences remain robust.

……. [INSERT TABLE 8 ABOUT HERE] …….

4.5.2 Alternative Measures of the Quantity of Non-GAAP Metrics

While the SEC defines EBITDA and EBIT as non-GAAP metrics,[53] it could be argued that EBIT or EBITDA is not a non-GAAP metric because no "adjustment" is made. In other words,

[53] See https://www.sec.gov/corpfin/cf-manual/topic-8

EBIT and EBITDA are just interim items (albeit not GAAP-stipulated) in a GAAP income statement. To address this issue, we exclude EBIT and EBITDA, either separately or simultaneously, in our calculation of *Total_Metrics*. We find that this alternative measurement approach does not change our results (untabulated). Therefore, our inferences from Table 4 remain robust.

4.5.3 Excluding the Effect of the Pandemic

To eliminate the potential impact of COVID-19 on the quantity of non-GAAP metrics and in turn, analysts' performance, we focus on firm-quarters prior to calendar year 2020. This reduces the sample size to 4,745 firm-quarter observations. We repeat our analyses using this subsample and find that our inferences remain robust after omitting the potential impact of COVID-19 (untabulated).

4.6 Conclusion

In this study, we examine the association between the quantity of non-GAAP metrics and analysts' forecast properties. We rely on a hand-collected sample in which we identify the quantity and names of non-GAAP metrics used in quarterly earnings releases from the first quarter of 2016 to the fourth quarter of 2020. We find that analysts' earnings forecast accuracy is increasing, and their forecast dispersion is decreasing for firms with a larger quantity of non-GAAP metrics. We also find similar results for a larger quantity of non-GAAP categories. In addition, among the twelve non-GAAP categories we identify, the presence of adjusted revenue, adjusted operating income, and adjusted tax rate increases the richness and informativeness of non-GAAP information, leading to more accurate and less dispersed earnings forecasts. However, the presence of return on invested capital (ROIC) increases the disagreement among analysts, leading to less accurate and more dispersed earnings forecasts. We further find that a greater quantity of non-GAAP metrics (and categories) is particularly beneficial to analysts who have less general experience and cover more industries in their portfolios. To address the endogeneity concern regarding the supply of the

quantity of non-GAAP metrics, we run a two-stage least squares (2SLS) and find consistent results relative to our primary findings. In addition, our results remain robust when we use (1) alternative measures of the quantity of non-GAAP metrics, and (2) a subsample that excludes observations from the pandemic.

Our research adds new insights to the literature on non-GAAP reporting by examining the consequences of a greater quantity of non-GAAP metrics. Our study also enriches the extant literature on analyst forecasts by providing evidence concerning the impact of non-GAAP information on analyst behavior. Moreover, our research produces insights relevant to regulators and standard setters, who have been concerned about the appropriateness and informativeness of non-GAAP disclosures.

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Appendix A: Variable Definitions

Variables	Variable Definition
Dependent Variables	
ACCURACY	The negative value of the absolute difference between actual earnings per share at quarter *q+1* and median forecast per share using all quarter *q+1* forecasts, and then deflated by the price per share at quarter *q*. [I/B/E/S]
DISPERSION	The standard deviation of analyst forecasts for firm *i* for quarter *q+1*, deflated by the price per share [I/B/E/S]
MAFE	A measure of relative forecast accuracy that compares an analyst's absolute forecast error to the mean absolute forecast error of all analysts following the same firm. We multiply *MAFE* values by negative one, so larger values are consistent with more accurate earnings forecasts [I/B/E/S]
Independent Variables	
Total_Metrics	The number of non-GAAP metrics disclosed in earnings releases of quarter *q* [hand-collected]
Total_Categories	The number of non-GAAP categories disclosed in earnings releases of quarter *q*. We identify twelve categories of non-GAAP metrics, including non-GAAP net income, EBIT, adjusted EBIT, EBITDA, adjusted EBITDA, adjusted operating income, non-GAAP revenue, non-GAAP expenses-related metrics, free cash flow, net debt, non-GAAP effective tax rate and return on invested capital (ROIC) [hand-collected]
Firm-Level Control Variables	
SIZE	The natural logarithm of total assets (ATQ) at fiscal quarter *q* [Compustat]
MTB	The market value of equity plus book value of liabilities (PRCCQ*CSHOQ+LTQ) divided by book value of assets (ATQ) [Compustat]
stdROA	Standard deviation of ROA (IBQ/ATQ) over five preceding quarters [Compustat]
LOSS	An indicator variable equals to one if net income (IBQ) is negative and zero otherwise [Compustat]
%INST_HOLD	Percentage of shares outstanding held by institutional investors as of the fiscal quarter-end date [Thomson Reuters, CRSP]
NUMEST	The number of analysts who provide an earnings per share estimate (EPS) for the next (to be announced) financial year (FY1) [I/B/E/S]
logNUMEST	The natural log of (1+*NUMEST*)
ARC	The total number of distinct monetary XBRL tags in 10-Q filings [Hoitash and Hoitash (2018)]

logARC	The natural log of the total number of distinct monetary XBRL tags in 10-Q filings [Hoitash and Hoitash (2018)]
nbseg	The sum of reported business segments [Compustat Segment file]
ngseg	The sum of reported geographic segments [Compustat Segment file]

Analyst-Level Control Variables

LMAFE	One-period lagged mean-adjusted earnings forecast accuracy
FEXP	The number of years (to date) the analyst covered the company [I/B/E/S]
GEXP	The number of years (to date) since the analyst first appeared in the I/B/E/S database [I/B/E/S]
BSIZE	The number of analysts employed by the brokerage firm that analyst *i* works during the calendar year-quarter [I/B/E/S]
LOG_BSIZE	The logarithm of *BSIZE*
NCOM	The number of distinct firms for which analyst *i* issues quarterly earnings forecast during the calendar year-quarter
NSIC	The number of distinct two-digit SICs for which analyst *i* supplies quarterly earnings forecast during the calendar year-quarter
AGE	The number of days between the date that the analyst issued the earnings forecast for fiscal quarter *q+1* (i.e., FPI=6) and the date that the company reported its quarterly (*q+1*) earnings (i.e., the quarterly earnings announcement date)
FREQ	The number of distinct days that the analyst issued a forecast for the company during the calendar year-quarter
MFEXP	Mean-adjusted *FEXP*
MGEXP	Mean-adjusted *GEXP*
MLOG_SIZE	Mean-adjusted *LOG_SIZE*
MNCOM	Mean-adjusted *NCOM*
MNSIC	Mean-adjusted *NSIC*
MAGE	Mean-adjusted *AGE*
MFREQ	Mean-adjusted *FREQ*

Variables used in 2SLS

Intangible	The intangible (INTANQ) scaled by total assets (ATQ) [Compustat]
NOASales	The Barton and Simko (2002) balance-sheet constraint measure computed as net operating assets at end of quarter q scaled by sales (Compustat item SALEQ) in quarter q-1. Net operating assets is total shareholders' equity (SEQQ) less cash and marketable securities

	(CHEQ) plus the sum of total debt in current liabilities (DLCQ) and total long-term debt (DLTTQ) [Compustat]
JUSTMISS	An indicator variable coded one if reported earnings just misses the analyst consensus forecast (by 5 cents or less) and zero otherwise
Leverage	Total liabilities (LTQ) scaled by total assets (ATQ) [Compustat]
SpecialItems	Special items (SPIQ) scaled by total assets (ATQ) [Compustat]
Peer_metrics	Average, across all peers of the focal firm, of the number of non-GAAP metrics used in each peer's quarterly earnings release, excluding the focal firm. Peers of a company are in the same 2-digit SIC industry as the company and exclude the company

Tables

ESSAY II – TABLE 1: Sample Derivation and Composition

Panel A: Selection criteria used to obtain sample firms

Description	Firms
S&P 500 firms as of November 1, 2021	500
Exclude financial firms (SIC code between 6000 and 6999)	(99)
Exclude utility firms (SIC code between 4400 and 4999)	(57)
Exclude firms that are founded after the calendar year 2020	(3)
Exclude firms with fiscal-yearend change during the sample period	(1)
Final sample firms for which non-GAAP information was hand collected	340

Panel B: Sample selection procedures

Description	Obs
Firm-quarter level sample	
Initial sample with quarterly earnings announced between January 1, 2016, and December 31, 2020 (Firm-quarters for which non-GAAP information was hand collected)	6,657
Less: No Hoitash and Hoitash (2018) data for accounting reporting complexity (ARC)	(45)
Less: No Compustat, CRSP or I/B/E/S data	(53)
Final Sample	6,559
Analyst-firm-quarter level sample	
Obtain one-quarter-ahead earnings forecasts issued by analysts covering the companies in the firm-quarter level sample. Retain the last estimate issued by each analyst with a non-anonymous I/B/E/S analyst and brokerage code (i.e., analysts and estimator variables unequal to zero.)	97,129

This table outlines the steps involved in our sample selection process. Panel A presents the selection criteria used to arrive at the sample firms for which non-GAAP information was hand-collected. Panel B outlines the sample selection procedures based on firm-quarters and analyst-firm-quarters at the intersection of I/B/E/S, Compustat, CRSP, Thomson Reuters, and Hoitash and Hoitash (2018).

TABLE 2: **Descriptive Statistics on Non-GAAP Disclosures**

Panel A: Non-GAAP Disclosures Over Time

Sample	Firm-Quarters	% of Firm-Quarters with Non-GAAP Disclosure	Average Total_Metrics
Full sample	6,657	91.77%	7.16
2016	1,303	88.87%	6.58
2017	1,319	90.07%	6.75
2018	1,332	92.49%	7.20
2019	1,345	93.68%	7.48
2020	1,358	93.59%	7.78

Panel B: Non-GAAP Disclosures by Industry (2016~2020)

SIC	Industry	Firm-Quarters	% of Firm-Quarters with Non-GAAP Disclosure	Average Total_Metrics
01-09	Agriculture, Forestry and Fishing	6	100.00%	7.67
10-14	Mining	314	99.68%	6.91
15-17	Construction	120	59.17%	3.79
20-39	Manufacturing	3,834	94.44%	8.18
40-49	Transportation, Communications, Electric, Gas and Sanitary service	160	53.75%	2.61
50-51	Wholesale Trade	200	95.50%	7.76
52-59	Retail Trade	560	73.04%	3.86
70-89	Services	1,403	96.36%	6.57
99	Nonclassifiable	60	100.00%	5.37
	Total	6,657	91.77%	7.16

This table presents descriptive statistics of our hand-collected non-GAAP dataset (*N*=6,657). Panel A presents frequency statistics over the sample period (2016-2020). Panel B presents frequency statistics by 2-digit SIC industry classification (excluding financial and utility industries).

TABLE 3: **Summary Statistics and Correlation Matrix**

Panel A: Summary Statistics

Variable	N	Mean	Std Dev	Lower Quartile	Median	Upper Quartile
ACCURACY	6,559	-0.0055	0.0117	-0.0051	-0.0018	-0.0006
DISPERSION	6,559	0.0009	0.0019	0.0002	0.0004	0.0008
Total_Metrics	6,559	7.0886	5.1541	3.0000	6.0000	10.0000
SIZE	6,559	9.5481	1.2348	8.6744	9.5086	10.3824
MTB	6,559	2.9279	1.9872	1.6354	2.3070	3.4591
Leverage	6,559	0.6248	0.2191	0.4823	0.6098	0.7569
stdROA	6,559	0.0122	0.0137	0.0040	0.0074	0.0147
Loss	6,559	0.1092	0.3119	0.0000	0.0000	0.0000
%INST_HOLD	6,559	0.8043	0.1532	0.7352	0.8349	0.9099
NUMEST	6,559	18.8873	7.5360	14.0000	18.0000	23.0000
logNUMEST	6,559	2.9103	0.4187	2.7081	2.9444	3.1781
ARC	6,559	281.8344	121.8546	192.0000	251.0000	347.0000
logARC	6,559	5.5547	0.4138	5.2575	5.5255	5.8493
nbseg	6,559	2.6884	1.8320	1.0000	3.0000	4.0000
ngseg	6,559	3.8693	2.7506	2.0000	3.0000	5.0000

Panel B: Spearman/Pearson Correlations

Spearman (upper)/Pearson (lower) (N = 6,559)

No	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1	*ACCURACY*		**-0.453**	**0.061**	**-0.098**	**0.319**	-0.012	**-0.126**	**-0.151**	0.008	**0.035**	**-0.183**	**-0.044**	-0.021
2	*DISPERSION*	**-0.606**		**-0.050**	**0.204**	**-0.468**	**0.096**	**0.172**	**0.222**	**-0.051**	**-0.068**	**0.166**	0.012	**-0.138**
3	*Total_Metrics*	**0.069**	**-0.088**		**0.142**	**-0.100**	**0.113**	**0.063**	**0.045**	**0.053**	0.013	**0.250**	**0.091**	**0.228**
4	*SIZE*	**-0.163**	**0.199**	**0.152**		**-0.466**	**0.172**	**-0.066**	**0.038**	**-0.401**	**0.383**	**0.261**	**0.159**	**0.084**
5	*MTB*	**0.212**	**-0.255**	**-0.107**	**-0.451**		0.002	**0.097**	**-0.172**	-0.006	**0.087**	**-0.310**	**-0.211**	**-0.059**
6	*Leverage*	**-0.026**	**0.041**	**0.091**	**0.127**	0.015		**0.033**	0.010	**-0.064**	-0.002	**0.079**	-0.011	**-0.104**
7	*stdROA*	**-0.065**	**0.141**	**0.054**	**-0.065**	**0.148**	0.002		**0.294**	**-0.039**	**0.055**	**0.086**	**-0.086**	0.019
8	*Loss*	**-0.167**	**0.306**	**0.044**	**0.032**	**-0.094**	0.006	**0.306**		-0.014	0.013	**0.108**	-0.009	**0.034**
9	*%INST_HOLD*	**0.132**	**-0.163**	**0.047**	**-0.326**	**0.026**	-0.008	0.005	**-0.032**		**-0.148**	-0.020	**-0.037**	-0.006
10	*logNUMEST*	**0.090**	**-0.133**	**0.063**	**0.399**	0.005	0.005	0.022	0.008	**-0.025**		**-0.034**	**-0.147**	**-0.058**
11	*logARC*	**-0.178**	**0.115**	**0.256**	**0.272**	**-0.264**	**0.075**	**0.054**	**0.117**	**-0.025**	-0.012		**0.172**	**0.170**
12	*nbseg*	**-0.088**	**0.050**	**0.059**	**0.192**	**-0.213**	-0.018	**-0.054**	-0.007	**-0.062**	**-0.128**	**0.179**		**0.195**
13	*ngseg*	**-0.027**	-0.010	**0.146**	**0.073**	**-0.043**	**-0.100**	-0.019	**0.032**	0.008	**-0.045**	**0.148**	**0.142**	

This table presents descriptive statistics of the variables used in our study (Panel A) and pair-wise correlation between model variables (Panel B). Our sample spans from 2016 to 2020. For ease of interpretation, Panel A also reports summary statistics based on the raw values of the variables in addition to the natural logarithm transformation used in this study. Panel B presents Pearson (below the diagonal) and Spearman (above the diagonal), and bold values indicate the significance at the 0.05 level. All continuous variables are winsorized at the 1 percent and 99 percent levels. See Appendix A for variable definitions.

TABLE 4: **The Quantity of Non-GAAP Metrics and Analysts' Forecast Properties**

	(1) ACCURACY	(2) DISPERSION
Total Metrics	**0.00019*** **	**-0.00002*** **
	(4.30)	**(-3.14)**
SIZE	-0.00009	0.00007
	(-0.22)	(0.88)
MTB	0.00074***	-0.00013***
	(6.23)	(-4.40)
stdROA	-0.02969**	0.00858***
	(-1.98)	(2.73)
Loss	-0.00281***	0.00104***
	(-3.99)	(5.85)
%INST_HOLD	0.00483*	-0.00086
	(1.91)	(-1.56)
logNUMEST	0.00246*	-0.00072***
	(1.67)	(-3.09)
logARC	-0.00344***	0.00016*
	(-5.98)	(1.67)
nbseg	0.00004	-0.00004
	(0.22)	(-1.16)
ngseg	-0.00008	-0.00002
	(-0.63)	(-0.90)
Constant	Yes	Yes
Industry FEs	Yes	Yes
Year-Qtr FEs	Yes	Yes
N	6,559	6,559
Adj. R^2	0.298	0.450

This table reports the OLS estimation results of Equations (1) and (2), which involve the regression of measures of analysts' forecast properties (*ACCURACY* and *DISPERSION*) on the quantity of non-GAAP metrics (*Total_Metrics*), control variables, and industry and year-quarter fixed effects. Coefficient estimates are presented above t-statistics, which are in parentheses. All variables are defined in Appendix A, and all continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by firm. *, **, and *** indicate a statistically significant difference from zero at the 10%, 5%, and 1% level, respectively.

TABLE 5: **The Quantity of Non-GAAP Categories and Analysts' Forecast Properties**

	(1) ACCURACY	(2) DISPERSION
Total_Categories	**0.00037****	**-0.00006***
	(2.26)	**(-1.95)**
SIZE	-0.00002	0.00006
	(-0.05)	(0.80)
MTB	0.00076***	-0.00014***
	(6.20)	(-4.44)
stdROA	-0.02757*	0.00832***
	(-1.79)	(2.61)
Loss	-0.00272***	0.00103***
	(-3.88)	(5.77)
%INST_HOLD	0.00510**	-0.00089
	(2.00)	(-1.63)
logNUMEST	0.00251*	-0.00072***
	(1.70)	(-3.11)
logARC	-0.00325***	0.00014
	(-5.48)	(1.46)
nbseg	0.00003	-0.00003
	(0.15)	(-1.09)
ngseg	-0.00008	-0.00002
	(-0.60)	(-0.89)
Constant	Yes	Yes
Industry FEs	Yes	Yes
Year-Qtr FEs	Yes	Yes
N	6,559	6,559
Adj. R^2	0.295	0.448

This table reports the OLS estimation results of Equations (3) and (4), which involve the regression of measures of analysts' forecast properties (*ACCURACY* and *DISPERSION*) on the quantity of non-GAAP categories (*Total_Categories*), control variables, and industry and year-quarter fixed effects. Coefficient estimates are presented above t-statistics, which are in parentheses. All variables are defined in Appendix A, and all continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by firm. *, **, and *** indicate a statistically significant difference from zero at the 10%, 5%, and 1% level, respectively.

TABLE 6: The Effect of Individual Non-GAAP Category on Analysts' Forecast Properties

Panel A: Regression Results with DV = ACCURACY

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
						DV = ACCURACY						
adjusted_eps	0.0004											
	(0.74)											
ebit		-0.0008										
		(-0.71)										
adjusted_ebit			-0.0009									
			(-0.40)									
ebitda				-0.0003								
				(-0.59)								
adjusted_ebitda					-0.0001							
					(-0.25)							
adjusted_operating_income						0.0008*						
						(1.93)						
adjusted_revenue							0.0019***					
							(3.62)					
free_cash_flow								0.0010				
								(1.60)				
net_debt									0.0016			
									(1.48)			
adjusted_exp										0.0003		
										(0.72)		
adjusted_taxrate											0.0013**	
											(2.49)	
roic												-0.0063**
												(-2.01)
SIZE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0001	-0.0000	0.0000	0.0000	-0.0001	0.0001
	(0.05)	(0.09)	(0.06)	(0.00)	(0.03)	(0.04)	(-0.22)	(-0.04)	(0.07)	(0.03)	(-0.14)	(0.20)
MTB	0.0007***	0.0007***	0.0007***	0.0007***	0.0007***	0.0007***	0.0007***	0.0007***	0.0007***	0.0007***	0.0007***	0.0007***
	(5.98)	(5.82)	(5.76)	(5.98)	(5.99)	(5.95)	(5.86)	(5.73)	(6.01)	(5.97)	(6.06)	(6.07)
stdROA	-0.0279*	-0.0273*	-0.0270*	-0.0276*	-0.0273*	-0.0282*	-0.0243	-0.0251*	-0.0275*	-0.0277*	-0.0293*	-0.0274*
	(-1.84)	(-1.80)	(-1.76)	(-1.81)	(-1.80)	(-1.84)	(-1.58)	(-1.68)	(-1.82)	(-1.82)	(-1.92)	(-1.82)
Loss	-0.0028***	-0.0027***	-0.0028***	-0.0028***	-0.0028***	-0.0027***	-0.0029***	-0.0027***	-0.0027***	-0.0028***	-0.0027***	-0.0028***
	(-3.90)	(-3.89)	(-3.89)	(-3.92)	(-3.90)	(-3.84)	(-4.06)	(-3.84)	(-3.89)	(-3.91)	(-3.87)	(-3.93)
%INST_HOLD	0.0053**	0.0053**	0.0053**	0.0054**	0.0054**	0.0053**	0.0050**	0.0054**	0.0053**	0.0054**	0.0055**	0.0056**
	(2.05)	(2.07)	(2.03)	(2.10)	(2.10)	(2.05)	(2.01)	(2.08)	(2.05)	(2.09)	(2.12)	(2.18)
logNUMEST	0.0026*	0.0025*	0.0026*	0.0026*	0.0026*	0.0025*	0.0025*	0.0025*	0.0026*	0.0026*	0.0025*	0.0025*
	(1.70)	(1.70)	(1.71)	(1.72)	(1.72)	(1.68)	(1.71)	(1.72)	(1.74)	(1.72)	(1.66)	(1.69)
logARC	-0.0031***	-0.0030***	-0.0030***	-0.0030***	-0.0030***	-0.0030***	-0.0032***	-0.0031***	-0.0031***	-0.0031***	-0.0031***	-0.0030***
	(-5.35)	(-5.07)	(-5.07)	(-5.19)	(-5.22)	(-5.21)	(-5.40)	(-5.28)	(-5.30)	(-5.26)	(-5.28)	(-5.23)
nbseg	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.18)	(0.16)	(0.17)	(0.16)	(0.18)	(0.12)	(0.22)	(0.05)	(0.16)	(0.21)	(0.10)	(0.22)
ngseg	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
	(-0.55)	(-0.58)	(-0.54)	(-0.55)	(-0.54)	(-0.63)	(-0.73)	(-0.48)	(-0.58)	(-0.55)	(-0.63)	(-0.64)

Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Qtr FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	6,559	6,559	6,559	6,559	6,559	6,559	6,559	6,559	6,559	6,559	6,559	6,559
Adj. R^2	0.293	0.294	0.293	0.293	0.293	0.294	0.298	0.295	0.294	0.293	0.295	0.298

Panel B: Regression Results with DV = DISPERSION

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
						DV = DISPERSION						
adjusted_eps	0.0000											
	(0.09)											
ebit		0.0002										
		(0.93)										
adjusted_ebit			0.0004									
			(0.81)									
ebitda				0.0000								
				(0.21)								
adjusted_ebitda					0.0000							
					(0.34)							
adjusted_operating_income						-0.0002***						
						(-3.74)						
adjusted_revenue							-0.0003***					
							(-3.55)					
free_cash_flow								-0.0001				
								(-1.32)				
net_debt									-0.0002			
									(-0.94)			
adjusted_exp										-0.0001		
										(-1.25)		
adjusted_taxrate											-0.0002*	
											(-1.79)	
roic												0.0013**
												(2.28)
SIZE	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000
	(0.73)	(0.69)	(0.72)	(0.74)	(0.74)	(0.74)	(0.94)	(0.78)	(0.71)	(0.75)	(0.85)	(0.62)
MTB	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***
	(-4.33)	(-4.19)	(-4.14)	(-4.24)	(-4.24)	(-4.28)	(-4.30)	(-4.20)	(-4.35)	(-4.29)	(-4.34)	(-4.39)
stdROA	0.0083***	0.0083**	0.0082**	0.0083***	0.0083***	0.0086***	0.0078**	0.0080**	0.0083***	0.0084***	0.0085***	0.0083***
	(2.61)	(2.59)	(2.54)	(2.59)	(2.59)	(2.68)	(2.44)	(2.53)	(2.62)	(2.64)	(2.67)	(2.60)
Loss	0.0010***	0.0010***	0.0010***	0.0010***	0.0010***	0.0010***	0.0010***	0.0010***	0.0010***	0.0010***	0.0010***	0.0010***
	(5.79)	(5.79)	(5.80)	(5.81)	(5.80)	(5.76)	(5.91)	(5.75)	(5.77)	(5.84)	(5.77)	(5.83)
%INST_HOLD	-0.0009*	-0.0009*	-0.0009	-0.0009*	-0.0009*	-0.0009*	-0.0009	-0.0009*	-0.0009*	-0.0009*	-0.0009*	-0.0010*
	(-1.67)	(-1.68)	(-1.63)	(-1.70)	(-1.72)	(-1.66)	(-1.62)	(-1.70)	(-1.66)	(-1.70)	(-1.72)	(-1.78)
logNUMEST	-0.0007***	-0.0007***	-0.0007***	-0.0007***	-0.0007***	-0.0007***	-0.0007***	-0.0007***	-0.0007***	-0.0007***	-0.0007***	-0.0007***
	(-3.10)	(-3.09)	(-3.10)	(-3.11)	(-3.09)	(-3.05)	(-3.14)	(-3.15)	(-3.13)	(-3.11)	(-3.08)	(-3.10)
logARC	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	(1.12)	(1.05)	(1.01)	(1.16)	(1.16)	(1.12)	(1.35)	(1.26)	(1.24)	(1.19)	(1.22)	(1.16)
nbseg	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
	(-1.12)	(-1.11)	(-1.14)	(-1.11)	(-1.13)	(-1.03)	(-1.17)	(-1.01)	(-1.13)	(-1.19)	(-1.09)	(-1.25)

ngseg	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
	(-0.93)	(-0.88)	(-0.92)	(-0.93)	(-0.92)	(-0.75)	(-0.82)	(-0.97)	(-0.90)	(-0.89)	(-0.88)	(-0.87)
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Qtr FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	6,559	6,559	6,559	6,559	6,559	6,559	6,559	6,559	6,559	6,559	6,559	6,559
Adj. R^2	0.447	0.447	0.448	0.447	0.447	0.449	0.452	0.447	0.447	0.447	0.448	0.454

This table reports the OLS estimation results of Equation (5) in Panel A and Equation (6) in Panel B. Coefficient estimates are presented above t-statistics, which are in parentheses. All variables are defined in Appendix A, and all continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by firm. *, **, and *** indicate a statistically significant difference from zero at the 10%, 5%, and 1% level, respectively.

TABLE 7: Cross-Sectional Analysis: Experience, Resources Availability, and Portfolio Complexity

Panel A: Descriptive Statistics on Analysts' Characteristics

Variable	N	Mean	Std Dev	Lower Quartile	Median	Upper Quartile
FEXP	97,129	6.227	5.296	1.843	4.841	9.281
GEXP	97,129	13.059	8.450	6.442	11.786	18.344
BSIZE	97,129	41.739	31.354	14.000	38.000	66.000
LOG_BSIZE	97,129	3.304	1.083	2.639	3.638	4.190
NCOM	97,129	16.835	6.579	13.000	16.000	21.000
NSIC	97,129	2.867	1.729	2.000	3.000	4.000
AGE	97,129	70.196	28.068	48.000	83.000	90.000
FREQ	97,129	1.905	0.971	1.000	2.000	2.000

Panel B: Regression Results

		(1)	(2)
	Pred. sign	**MAFE**	**MAFE**
MFEXP	+	0.0025	-0.0019
		(0.36)	(-0.21)
MGEXP	+	0.0141*	0.0171
		(1.71)	(1.62)
MLOG_BSIZE	+	0.0045	0.0008
		(0.28)	(0.04)
MNCOM	–	0.0289**	0.0388**
		(2.02)	(2.19)
MNSIC	–	-0.0333***	-0.0424***
		(-2.77)	(-2.86)
Coefficients of Interest			
Total_Metrics × MFEXP	–	-0.0001	
		(-0.22)	
Total_Metrics × MGEXP	–	-0.0022***	
		(-2.59)	
Total_Metrics × MLOG_BSIZE	–	0.0005	
		(0.31)	
Total_Metrics × MNCOM	+	-0.0014	
		(-0.92)	
Total_Metrics × MNSIC	+	0.0025**	
		(2.10)	
Total_Categories × MFEXP	–		0.0011

			(0.47)
Total_Categories × MGEXP	–		-0.0065**
			(-2.36)
Total_Categories × MLOG_BSIZE	–		0.0025
			(0.52)
Total_Categories × MNCOM	+		-0.0072
			(-1.54)
Total_Categories × MNSIC	+		0.0097**
			(2.54)
LMAFE	+	0.1403***	0.1403***
		(18.11)	(18.12)
MAGE	–	-0.1980***	-0.1981***
		(-23.70)	(-23.73)
MFREQ	+	-0.0412***	-0.0412***
		(-5.87)	(-5.89)
Total_Metrics	+	0.0005	
		(1.14)	
Total_Categories	+		0.0019
			(1.31)
Constant		Yes	Yes
Industry FEs		No	No
Year-Qtr FEs		No	No
N		97,129	97,129
Adj. R^2		0.036	0.036

This table presents the results of the cross-sectional analysis. Panel A reports descriptive statistics on analysts' characteristics used in this analysis. Panel B reports the results of Equation (8). Coefficient estimates are presented above t-statistics, which are in parentheses. All variables are defined in Appendix A, and all continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by analyst. *, **, and *** indicate a statistically significant difference from zero at the 10%, 5%, and 1% level, respectively.

TABLE 8: **2SLS to Mitigate Endogeneity Concerns**

	Stage 1 **Total Metrics**	
logARC	1.846	***
	(4.29)	
Intangible	3.651	***
	(2.85)	
nbseg	-0.101	
	(-0.82)	
ngseg	0.088	
	(1.16)	
JUSTMISS	-0.013	
	(-0.06)	
NOASales	0.021	
	(0.24)	
SIZE	0.431	*
	(1.68)	
MTB	-0.061	
	(-0.43)	
Leverage	3.149	***
	(3.03)	
SpecialItems	-15.493	
	(-1.31)	
stdROA	21.185	*
	(1.68)	
Loss	0.082	
	(0.18)	
Peer_metrics	-1.269	***
	(-8.70)	
logNUMEST	1.120	***
	(2.03)	
%INST_HOLD	0.990	
	(0.74)	
Constant	Yes	
Industry FEs	Yes	
Year-Qtr FEs	Yes	
N	6,559	
Pseudo R^2	0.089	

	Stage 2			
	ACCURACY		**DISPERSION**	
*Total Metrics^*	0.0006	***	-0.0001	***
	(3.45)		(-3.57)	
SIZE	-0.0004		0.0001	
	(-0.77)		(1.4)	
MTB	0.0008	***	-0.0001	***
	(6.83)		(-4.9)	
stdROA	-0.0360	**	0.0098	***
	(-2.27)		(3.03)	
Loss	-0.0029	***	0.0011	***
	(-4.15)		(6.02)	
%INST_HOLD	0.0036		-0.0006	*
	(1.53)		(-1.12)	
logNUMEST	0.0021		-0.0006	***
	(1.53)		(-3.02)	
logARC	-0.0045	***	0.0004	***
	(-6.12)		(3.00)	
nbseg	0.0001		-0.000	
	(0.32)		(-1.28)	
ngseg	-0.0001		-0.000	
	(-0.95)		(-0.61)	
Constant	Yes		Yes	
Industry FEs	Yes		Yes	
Year-Qtr FEs	Yes		Yes	
N	6,559		6,559	
Adj. R^2	0.301		0.456	

This table reports the results of the association between the quantity of non-GAAP metrics (*Total_Metrics*) and analysts' forecast accuracy (*ACCURACY*) and forecast dispersion (*DISPERSION*) using 2SLS. All variables are defined in Appendix A, and all continuous variables are winsorized at the 1st and 99th percentiles. (Robustness standard errors). *, **, and *** indicate a statistically significant difference from zero at the 10%, 5%, and 1% level, respectively.

Chapter 5: Proposal - Management Forecasts: Why Do Managers Issue Multiple Non-GAAP Forward-Looking Measures?

5.1 Introduction

In this proposed research, we explore non-GAAP forward-looking (or guidance) measures and primarily examine managers' decisions to issue different quantities of non-GAAP guidance measures.

In sharp contrast to voluminous previous research on non-GAAP historical measures, studies on non-GAAP guidance measures are scant (exceptions being Laurion and Sloan, 2022; Chen et al., 2023). Research by Laurion and Sloan (2022) and Chen et al. (2023) indicates that determinants differ for issuing non-GAAP earnings guidance and non-GAAP effective tax rates (ETR) guidance; furthermore, analysts respond differently to these two types of non-GAAP guidance measures. Moreover, various other non-GAAP guidance measures exist, including guidance on non-GAAP revenues, free cash flow, EBITDA, expenses, and more. It is also observed in business practice that companies' financial outlook includes multiple types of non-GAAP guidance metrics simultaneously. In addition, the SEC sends comment letters to companies regarding their non-GAAP guidance measures, often requesting companies to disclose the facts and identify that the information is unavailable if companies have excluded a quantitative reconciliation for the forward-looking non-GAAP measures in reliance on the "unreasonable efforts" exception. Therefore, in this proposal, we focus on non-GAAP guidance measures and examine why managers issue different quantities of non-GAAP guidance metrics.

The reasons managers issue different quantities of non-GAAP guidance metrics are uncertain *ex ante*. First, managers may provide more non-GAAP guidance measures to provide additional information. Many prior studies find management forecasts informative (see Hirst, 2008 and Beyer et al., 2010 for a review). Abramova et al. (2020) and Brown et al. (2024) find that managers provide more management guidance metrics and forward-looking statements to enhance their firms' information environment. In addition, disaggregated earnings guidance and detailed forecasts provide additional evaluation benchmarks and improve financial reporting quality (Lansford et al., 2013; Merkley et al., 2013). Moreover, most studies find non-GAAP historical metrics informative (Black et al., 2018). Following this view, we would expect managers to issue more non-GAAP guidance metrics to enhance the information available to investors. However,

managers also face incentives and cognitive limitations that can lead to biased forecasts. Some managers may issue additional non-GAAP guidance metrics to mask the lack of informativeness in these metrics. Laurion and Sloan (2022) suggest that managers may use non-GAAP EPS guidance opportunistically. In addition, with less stringent regulation, managers have greater flexibility in using non-GAAP guidance measures, potentially issuing them for opportunistic purposes rather than informative ones. Thus, following this view, we expect managers to issue more non-GAAP guidance metrics for opportunistic reasons.

To answer this question, we analyze management non-GAAP forward-looking metrics issued in quarterly earnings releases. We manually collect non-GAAP guidance metrics issued by S&P 500 firms from quarterly 8-K-filed earnings releases in SEC's EDGAR for all quarters during 2016-2019. We find that 67.24% of quarterly earnings releases include management guidance for the full year. Furthermore, among these management annual forecasts, 83.30% of them issue non-GAAP guidance metrics. Given that managers issue non-GAAP guidance, we find that the average number of non-GAAP guidance metrics used per filing is 2.17 from 2016 to 2019. The three most common metrics in non-GAAP guidance are non-GAAP EPS, non-GAAP revenues, and free cash flow.

This study contributes to the extant literature in several ways. First, this study extends prior non-GAAP reporting literature by exploring non-GAAP guidance measures. This paper also answers the call from Black et al. (2018) to focus on non-GAAP metrics other than non-GAAP earnings-related measures. Second, to the extent that current regulations give managers broad discretion to issue forecasts that exclude certain recurring expenses and to rely on the unreasonable efforts exception to omit GAAP reconciliations (Laurion and Sloan, 2022), the findings of this study will also be of interest to standard setters and regulators by investigating managers' motivations for extensively issuing non-GAAP guidance metrics. Third, this study extends prior management forecast literature. Substantial prior studies have shown that management forecasts provide more information to investors than any other accounting source (Beyer et al., 2010). A common theme among these studies is the focus on (quantitative) earnings forecasts. The non-earnings management forecasts are often overlooked in disclosure research. Isolating different categories of forward-looking metrics (i.e., GAAP or non-GAAP) allows us to investigate why managers make the disclosure choices we observe. While several studies have examined certain types of non-earnings forecasts individually (e.g., revenue or cash flow guidance) and

distinguished earnings forecasts from GAAP to non-GAAP (e.g., Laurion and Sloan, 2022), our goal is to study a comprehensive sample of forward-looking metrics (both GAAP and non-GAAP) to assess how and why non-GAAP guidance metrics differ from GAAP guidance metrics in terms of both determinants and consequences.

The rest of the proposal is organized as follows. The next section reviews relevant literature and develops our hypotheses. Section 3 describes our data collection procedures and provides descriptive statistics about management forecasts and non-GAAP guidance measures. Section 4 discusses our future plans.

5.2 Literature Review and Theoretical Development

5.2.1 Management Earnings Forecasts

Management earnings forecasts have garnered substantial academic attention for several decades. Because earnings forecasts are voluntary disclosures, prior studies document various incentives for why firms issue forecasts. Managers often issue earnings forecasts to avoid litigation risk (Rogers and Van Buskirk, 2009; Cao and Narayanamoorthy, 2011; Bourveau et al., 2018; Houston et al., 2019), to reduce information asymmetry (Coller and Yohn, 1997; Hui et al., 2009), to mitigate negative effects from complex information environment (Guay et al., 2016), to maintain the practice (Graham et al., 2005; Hutton and Stocken, 2021), to signal their superior ability to anticipate changes in the economic environment (Baik et al., 2011), to reduce their career concerns (Pae et al., 2016), to manage earnings expectations (Matsumoto, 2002; Cotter et al., 2006), or to affect stock-based compensation (Cheng and Lo, 2006). Some other factors include informativeness of earnings (Lennox and Park, 2006), peer pressure (Seo, 2021), institutional ownership (Lin et al., 2018; Tsang et al., 2019), societal trust (Guan et al., 2020), manager-specific influences (Bamber et al., 2010b), and macroeconomic uncertainty (Kim et al., 2016). Although there are benefits to disclosing management earnings forecasts, there are also associated costs. For instance, Wang (2007) finds that proprietary costs (e.g., captured by R&D expenditures) are a deterrent to management earnings forecasts. Huang et al. (2017) find that large reductions in the U.S. import tariff rates are associated with a significant decrease in management earnings forecasts by the U.S. domestic firms, and the decrease is more pronounced when the tariff rate reduction triggers a greater increase in imports and when the forecasts are likely to incur higher proprietary costs.

Management earnings forecasts are issued for various reasons and thus produce various related outcomes. Substantial studies have shown that management earnings forecasts provide more information to investors than any other accounting source (Hirst et al., 2008; Beyer et al., 2010). Earnings forecasts are associated with stock price changes (Nagar et al., 2003), lower cost-of-capital (Cao et al., 2017), minimized costs of subsequent litigation (Field et al., 2005), and analyst forecasts revisions (Jennings, 1987). Importantly, these outcomes depend on management earnings forecasts' determinants and characteristics (e.g., good/bad news conveyed in forecasts, forecast accuracy, forecast form, and accompanying forecasts).

5.2.2 Management Non-Earnings Forecasts

Some studies have explored different types of *non-earnings* forecasts. Most of these studies choose a particular type of metric, and then base their sample on a search for that type of metric. Han and Wild (1991) study management revenue forecasts issued with management earnings forecasts and find that revenue forecasts convey incremental information beyond that in earnings forecasts. Koo and Lee (2018) also study revenue forecasts and find that the presence of an influential chief marketing officer in top management is positively associated with the likelihood of a firm issuing a management revenue forecast. Acito et al. (2021) investigate management sales forecasts and find that sales forecasts contain unique information about future sales, and higher market power firms are more likely to disclose sales forecast information. Wasley and Wu (2006) examine the determinants of management cash flow forecasts and find that management issues cash flow forecasts to signal good news in cash flow, to meet investor demand for cash flow information, and to pre-commit to a certain composition of earnings in terms of cash flow versus accruals. Lu and Tucker (2012) examine management capital expenditure forecasts (CAPEX) and strategic plans and find that firms are more likely to provide CAPEX guidance and strategic plans and withhold earnings guidance when earnings decline. Chen et al. (2023) study annual effective tax rates (ETR) forecasts and find that analysts weigh voluntary ETR forecasts more heavily, especially when voluntary ETR forecasts are non-GAAP based and when discrete items are present. Hutton et al. (2003) examine the supplementary disclosures with management earnings forecasts and find that good news earnings forecasts are only informative when accompanied by verifiable supplementary disclosures (i.e., forecasts of sales, EBIT, EBITDA, gross margins, SG&A costs, effective tax rates, cash flows, etc.). Lansford et al. (2013) examine disaggregated earnings guidance (i.e., simultaneous guidance for earnings, revenue, and key expenses) and find that

disaggregated earnings guidance is associated with firm characteristics (e.g., low-value relevance of earnings) rather than period-specific factors (e.g., good-news vs. bad-news earnings guidance) and disaggregated earnings guidance enriches a firm's information environment and has a positive impact on analyst forecasts. Merkley et al. (2013) also investigate disaggregated earnings guidance and find that forecast disaggregation increases the credibility (believability) of earnings forecasts. Bozanic et al. (2018) classify management forecasts as either earnings-related or non-earnings-related, and find that, like earnings forecasts, non-earnings-related forecasts generate significant investor and analyst responses. However, unlike earnings forecasts, non-earnings-related forecasts are issued more frequently when uncertainty is higher. Chapman and Green (2018) focus on six types of commonly provided guidance (i.e., CAPEX, cash flows, EBITDA, EPS, operating margin, and tax rates) and find that when analysts request new guidance or ask about prior guidance, managers are more likely to provide similar guidance in future quarters. Taking together, consistent with Lang and Sul (2014), various types of forecast disclosure are likely to be associated with various incentives.

5.2.3 Management Non-GAAP Forecasts

Nearly all research on non-GAAP reporting focuses on historical non-GAAP measures, which managers voluntarily disclose to describe the past performance of firms. Collective evidence suggests that historical non-GAAP measures (i.e., non-GAAP earnings, non-GAAP revenue, and free cash flow) are informative to investors, on average, and indeed provide various information. However, non-GAAP financial measures extend beyond historical metrics, and evidence on non-GAAP guidance measures is scarce. While the SEC mandates a reconciliation between historical non-GAAP measures and their GAAP counterparts, this requirement does not extend to forward-looking non-GAAP metrics if providing such reconciliation requires "unreasonable efforts." Thus, without reconciliations, managers could engage in potentially misleading behavior.

Laurion and Sloan (2022) investigate non-GAAP earnings forecasts and primarily explore the characteristics of firms that provide non-GAAP earnings guidance but decline to provide the corresponding GAAP earnings guidance by relying on the "unreasonable efforts" exception.[54]

[54] Regulation G requires companies to provide a reconciliation of the differences between the non-GAAP measure disclosed or released with the most directly comparable GAAP measure. Regarding forward-looking information, a quantitative reconciliation is only required to the extent available without unreasonable efforts. If all of the information necessary is not available without unreasonable efforts, the registrant must identify the information that is unavailable and disclose probable significance. The related guidance is available at https://www.sec.gov/corpfin/cf-manual/topic-8

Laurion and Sloan (2022) find that many of these firms exclude significant recurring expenses from their non-GAAP guidance, particularly stock-based compensation expenses and intangible asset amortization. Furthermore, the authors find that analysts tend to perceive these non-GAAP exclusions as aggressive, often declining to include them in their street earnings forecasts.

In addition, Chen et al. (2023) study management voluntary annual effective tax rates (ETR) forecasts and find that managers are more likely to provide voluntary non-GAAP ETR forecasts when discrete items (i.e., unusual, or infrequent events that are discretely recognized as they occur) are present, when there is higher tax rate complexity, and when the firm has tax haven subsidiaries. These findings suggest that firms with higher tax complexity are more likely to provide voluntary non-GAAP ETR forecasts. Moreover, Chen et al. (2023) find that analysts strongly respond to those non-GAAP ETR forecasts. In sum, those two studies indicate that managers have varying motivations for disclosing non-GAAP earnings guidance and non-GAAP ETR guidance.

5.2.4 Theoretical Development

Management issues its financial forecasts with GAAP, non-GAAP, or a combination of both. Prior studies have investigated why managers issue different guidance measures, primarily focusing on GAAP metrics or failing to differentiate between GAAP and non-GAAP metrics. The extant literature has established that managers have diverse reasons to issue guidance metrics. Our study extends prior literature by differentiating between GAAP and non-GAAP guidance and concentrating specifically on non-GAAP guidance. This distinction is warranted. Prior studies show that some managers disclose earnings forecasts to enhance the information available to investors and to reduce information asymmetries between managers and investors, while other managers engage in opportunistic disclosure behavior (Miller, 2009). An important factor in the difference between non-GAAP and GAAP guidance measures is the non-GAAP exclusions, over which managers have discretion (Laurion and Sloan, 2022). Due to these non-GAAP exclusions, managers may provide more accurate non-GAAP guidance, as exclusions may not pertain to the company's core performance (Chen et al., 2023). In contrast, these exclusions enable managers to potentially provide misleading non-GAAP guidance by opportunistically omitting certain items (Laurion and Sloan, 2022). Thus, differentiating between GAAP and non-GAAP guidance measures can help determine whether GAAP, non-GAAP, or both types of guidance are informative or misleading.

Two studies are closely related to our research (Laurion and Sloan, 2022; Chen et al., 2023). However, our study differs from these studies by examining the portfolio of non-GAAP guidance measures within a single management guidance. As outlined in the subsequent section, non-GAAP guidance measures include more than non-GAAP earnings guidance and non-GAAP ETR guidance, and managers often issue multiple non-GAAP guidance metrics. As discussed in the previous subsection, management chooses to disaggregate guidance and/or provide supplemental information alongside earnings guidance for various reasons. Thus, it is reasonable for managers to disclose varying quantities of non-GAAP guidance measures for reasons different from reporting a specific metric. In this proposed research, our research question is why managers issue different quantities of non-GAAP guidance metrics.

On the one hand, we argue that managers issue a greater quantity of non-GAAP guidance measures to enhance the information available to users. According to Abramova et al. (2020), the number of management forecasts is positively related to firm leverage, firm size, and analyst following, and is negatively related to returns, losses, the absolute change in earnings, and stock return volatility. These firm characteristics suggest that managers tend to issue additional guidance metrics when the firms' information environment is poor, implying that managers issue more guidance metrics to provide information. Brown et al. (2024) find that firms with less adequate financial statements provide a larger number of forward-looking statements in their MD&A section, aiming to alleviate the information gap and assist investors in projecting future performance. In addition, Lansford et al. (2013) find that disaggregated earnings guidance (i.e., simultaneous guidance for earnings, revenue, and key expenses) significantly enriches a firm's information environment. Merkley et al. (2013) find that disaggregation detail (i.e., supporting forecasts of detailed income statement line items) increases the credibility (or believability) of management earnings forecasts. Moreover, according to Hirst et al. (2007), disaggregation provides additional benchmarks against which managers can be evaluated and thereby constrains actions that managers can take to achieve their earnings targets, thus increasing financial reporting quality. In addition, many prior studies find that non-GAAP historical metrics are informative because these metrics, by excluding transient items, are closely related to firms' core performance (see Black et al., 2018 for a review). Extending the scope beyond conventional non-GAAP metrics to include non-GAAP guidance metrics, which similarly exclude hard-to-predict transient items, has the

potential to enhance informativeness. Therefore, under this scenario, we expect that firms are likely to issue more non-GAAP guidance measures to enhance the information available to investors.

However, managers may face other incentives and cognitive limitations that can lead them to issue biased forecasts (e.g., Rogers and Stocken, 2005; Bamber et al., 2010a). We argue that managers may provide additional non-GAAP guidance measures to conceal the lack of informativeness inherent in non-GAAP guidance metrics. Laurion and Sloan (2022) suggest that managers issue non-GAAP EPS guidance for opportunistic reasons. Prior studies suggest that managers increase financial reporting complexity (i.e., longer documents) to obscure the true nature of the company's financial health (Li, 2008). Additional non-GAAP guidance metrics inherently contribute to the lengthening of documents. Thus, increasing the amount of information does not necessarily imply better disclosure or greater usefulness for users. In addition, law enforcement tends to be less stringent in regulating non-GAAP guidance measures, thus granting managers greater latitude in their use of non-GAAP guidance measures. Following this view, we expect that firms are likely to issue more non-GAAP guidance measures for opportunistic reasons.

5.3 Sample and Descriptive Statistics

5.3.1 Data Collection

We begin the data collection process with all firms included in the S&P500 because S&P500 firms are economically important. The composition of this index changes frequently, so we choose November 1, 2021, as the date for establishing which firms to include in the analysis.[55] Following prior non-GAAP literature, we remove financial institutions (99 firms) and utility firms (57 firms). We also remove firms that change the fiscal year-end during the sample period (1 firm). We finally remove firms that were founded after the end of the sample period, specifically after the calendar year 2019 (5 firms). The final sample consists of 338 S&P500 firms. Because of the dynamic nature of non-GAAP reporting, we choose quarterly earnings releases from 2016 to 2019 to reflect the current non-GAAP reporting landscape. We do not include the calendar year 2020 because many companies announced the withdrawals of their management guidance in 2020 (Hope et al., 2023). In contrast, guidance withdrawals were rare previously.

[55] The data collection commenced in November 2021, and consequently, we opted for November 1, 2021, as the starting point to compile the SP500 list.

We collect management forecasts from quarterly earnings press releases filed with the SEC in 8-Ks (with Item 2.02) on EDGAR. When earnings releases are unavailable on EDGAR, we collect them from firms' websites (this represents 0.84% of the total earnings releases collected). However, there are still 109 quarterly earnings releases that we could not find. Therefore, our hand-collected sample covers earnings releases of 5,299 firm-quarters, which represent 338 distinct firms. We focus on earnings press releases because management forecasts are often issued with earnings announcements (Anilowski et al.,2007). That is, firms announce earnings for quarter *q* in year *t* and, at the same time, provide guidance on earnings and/or other metrics for quarter *q+1* in year *t* and/or for the full year *t.*

We use a keyword search to identify sections or sentences potentially containing voluntary management forecasts in firms' quarterly earnings releases. Our search uses two criteria: (1) keywords ("guidance" or "outlook") and (2) forward-looking verbs (e.g., "expect," "predict," "forecast," "project," "see," "will be," and "anticipate"). In addition, to be identified as having forecasts, managers' forecasts could be in the form of a point estimate, a bounded range, a minimum value, a maximum value, or nonnumerical qualitative forecasts (i.e., earnings will be higher next quarter). Each press release is read to identify whether it contains a voluntary management forecast. When management forecasts are present in a press release, we carefully read those sections or sentences and collect the forecasting categories (GAAP or non-GAAP) and the forecasting horizons (quarterly or annually).[56] We also count the types of forecasts (earnings, revenues, dividends, cash flow, etc.) in that quarter. Appendix A provides two examples of management forecasts found in earnings releases.

5.3.2 Data Description

Our hand-collected sample includes 5,299 firm-quarter observations from 2016 to 2019, with or without management forecasts. Table 1 reports the frequency distribution of management forecasts by year. To provide a comprehensive overview of management forecasts, Panel A and B report management forecasts based on various characteristics: the frequency of management forecasts, the frequency of forecasts using GAAP and non-GAAP metrics, and the average number of GAAP and non-GAAP forecast metrics used. Panel A describes these characteristics for

[56] Some companies additionally provide forecasts for key performance indicators (KPIs). Furthermore, there is also a fraction of firm-quarters that provide forecasts for other horizons (e.g., two quarters ahead or long-term). Nevertheless, these observations are beyond the scope of our study.

management annual forecasts, and Panel B provides the same details for quarterly forecasts. Table 1 shows that, during our sample period, 67.24% (33.55%) of firm-quarter observations provide annual (one-quarter-ahead) forecasts. Panel A shows that 56.01% (58.62%) of firm-quarter observations use non-GAAP (GAAP) metrics in management annual forecasts. On average, management annual forecasts use 1.21 (1.73) non-GAAP (GAAP) metrics. In addition, the incidence of management non-GAAP guidance is increasing, from 51.96% in 2016 to 59.03% in 2019. We also observe increases in the quantity of non-GAAP guidance metrics used, from 1.04 in 2016 to 1.36 in 2019.

……. [INSERT TABLE 1 ABOUT HERE] …….

Panel B reports a similar increasing trend in the frequency of one-quarter-ahead management forecasts. However, the frequency of quarterly forecasts (i.e., overall forecasts, forecasts with non-GAAP metrics, and forecasts with GAAP metrics) is lower than that of annual forecasts. In addition, the average number of non-GAAP guidance metrics used for quarterly forecasts is 0.54, which is lower than that for annual forecasts.

In addition, to better understand the types and intensity of non-GAAP guidance measures within management annual forecasts, Panel C presents the frequency of non-GAAP guidance measures belonging to a given type. Even though non-GAAP EPS guidance is the most common, we observe many other non-GAAP guidance measures, such as non-GAAP revenues guidance, free cash flow guidance, non-GAAP tax rates guidance, and more. Almost every type of non-GAAP guidance measure is slightly more prevalent from 2016 to 2019. The results also indicate variations in the type of non-GAAP guidance metrics management forecasting.

Table 2 reports the joint incidence of management annual forecasts and quarterly forecasts (Panel A), annual management GAAP forecasts and non-GAAP forecasts (Panel B), and quarterly management GAAP forecasts and non-GAAP forecasts (Panel C). Panel A provides evidence on the joint incidence of annual and quarterly forecasts, and it reveals that most quarterly earnings releases (43.7%) contain management forecasts for the full year alone. A small portion of earnings releases (10.1%) include quarterly forecasts alone. In addition, 23.5% of earnings releases include both annual and quarterly forecasts and 22.7% of earnings releases do not include annual or quarterly management forecasts. Panel B provides evidence on the joint incidence of management annual forecasts with GAAP and non-GAAP metrics and reveals that 58.6% (3,106/5,299) of the

observations have a management GAAP forecast. By construction, the fraction of observations with management non-GAAP forecasts is 56.0% of the overall sample. However, conditional on the presence of a management GAAP forecast, the frequency of management non-GAAP forecasts is 80.84% (2,511/3,106), compared with 19.16% (595/3,106) without a prevailing management non-GAAP forecast. Of the firm-quarter observations with management non-GAAP forecasts, 84.60% (2,511/2,968) have a prevailing management GAAP forecast, compared with 15.40% (457/2,968) without a prevailing management non-GAAP forecast. Panel C provides evidence on the joint incidence of management quarterly forecasts with GAAP and non-GAAP metrics. Compared with the frequency of management annual forecasts, there are fewer observations forecasting performance for one quarter ahead. However, conditional on a management quarterly GAAP forecast, the frequency of non-GAAP forecasts is very high at 72.92% (1,166/1,599). These results from Table 2 underscore the prevalence of non-GAAP guidance metrics.

……. [INSERT TABLE 2 ABOUT HERE] …….

Table 3 provides descriptive statistics for a subsample of management non-GAAP forecasts for the full year. There are 2,968 firm-quarter observations from 2016 to 2019 with a management annual non-GAAP forecast. We find that conditional on management non-GAAP forecasts for the full year, 84.60% also include annual GAAP forecasts. The average number of GAAP metrics included is 2.40, and the average number of non-GAAP metrics included is 2.17. In addition, we find that 79.35% of management annual non-GAAP forecasts predict non-GAAP EPS. Other common non-GAAP metrics are non-GAAP revenues (36.89%), free cash flow (18.67%), non-GAAP tax rates (15.77%), EBITDA (13.17%), adjusted EBITDA (11.35%), non-GAAP expenses (7.65%), non-GAAP operating income (6.33%), EBIT (3.44%), adjusted EBIT (2.39%), net debt (0.34%) and ROIC (0.13%). In untabulated results, we find that when non-GAAP EPS guidance is present, 62.51% (1,472/2,355) of those forecasts are accompanied by other non-GAAP guidance metrics, and 59.31% (873/1,472) of those forecasts are accompanied by non-GAAP revenue guidance.

……. [INSERT TABLE 3 ABOUT HERE] …….

5.4 Future Expansion Plans

Extending the proposed research question, we also plan to investigate some related aspects. For instance, we plan to investigate the consequences of management non-GAAP forecasts, such

as firms' future performance, stock reactions, analysts' earnings forecasts properties, analysts' revenue forecasts properties, and analysts' stock recommendation profitability. Those questions are important for several reasons. First, research on those questions helps identify how investors interpret these forecasts on a non-GAAP basis and whether they understand the adjustments managers have made. Management guidance plays an important role in shaping investors' decision-making processes. By studying the impact of these non-GAAP forecasts, investors can better evaluate the risks associated with relying on potentially optimistic guidance. Second, regulators and standard setters have expressed concerns over the non-GAAP reporting. However, for instance, the SEC enforcement of the Regulation G requirements relating to non-GAAP forward-looking measures is relatively limited (Laurion and Sloan, 2022). Thus, research on the consequences of management non-GAAP forecasts can inform regulators whether they need stricter guidelines or enhanced disclosure requirements for non-GAAP forecast measures.

In addition, we also want to focus on a particular metric: free cash flow guidance. Free cash flow is a key input for firm valuation (Adame et al., 2023). In their preliminary study, Adame et al. (2019) find that market participants respond incrementally to information in free cash flow and the market response to free cash flow news has increased over time. Adame et al. (2023) also highlight that investors are interested in free cash flow and use it in their valuation models. They find evidence of both opportunistic motives (e.g., especially for initial disclosures) and information motives (e.g., more for ongoing disclosure) in the choice to disclose free cash flow. However, there is still very little evidence regarding free cash flow and free cash flow forward-looking measures. While the SEC mandates a reconciliation between GAAP and non-GAAP metrics for past performance, this requirement does not extend to forward-looking non-GAAP metrics if providing such reconciliation requires "unreasonable efforts." In such a setting where managers could engage in potentially misleading behavior, we aim to explore the motivations behind managers' voluntary disclosure of free cash flow guidance, which is a common non-GAAP guidance metric.

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Appendix A – Examples of Non-GAAP Forecasts

Example 1: Excerpts from Gartner's Earnings Supplement dated May 3, 2022[57]

Gartner's non-GAAP guidance measures include adjusted EPS, adjusted EBITDA, and free cash flow; it provides reconciliations between GAAP and non-GAAP guidance.

Financial Outlook Reconciliation: GAAP Diluted EPS to Adjusted EPS

(Unaudited)	2022 Guidance
GAAP Diluted EPS [(a)]	≥ $7.61
Adjustments (after-tax):	
Amortization of acquired intangibles	~ 0.92
Acquisition and integration charges and other non-recurring items [(b)]	~ 0.32
Adjusted EPS [(a)]	**≥ $8.85**

[(a)] GAAP Diluted EPS and Adjusted EPS are calculated based on approximately 81M of diluted shares for 2022.

[(b)] Consists of direct and incremental expenses related to acquisitions, facility-related exit costs, gain or loss on de-designated swaps and other non-recurring items.

Financial Outlook Reconciliation: GAAP Cash Provided by Operating Activities to Free Cash Flow

(Unaudited; $ in millions)	2022 Guidance
GAAP cash provided by operating activities	≥ $1,100
Capital expenditures	~ (115)
Free Cash Flow	**≥ $985**

Financial Outlook Reconciliation: GAAP Net Income to Adjusted EBITDA

(Unaudited; $ in millions)	2022 Guidance
GAAP net income	≥ $616
Interest expense, net [(a)]	~ 122
Other (income) expense, net	~ (36)
Tax provision	~ 169
Operating income	≥ 872
Adjustments	
Stock-based compensation expense	~ 96
Depreciation, accretion, and amortization	~ 196
Acquisition and integration charges and other non-recurring items [(b)]	~ 71
Adjusted EBITDA	**≥ $1,235**

[(a)] Assumes approximately $4M of amortization of deferred financing fees, which is reported in interest expense, net in the Company's Consolidated Statement of Operations.

[(b)] Consists of direct and incremental expenses related to acquisitions, facility-related exit costs and other non-recurring items.

[57] https://investor.gartner.com/static-files/38a66838-4008-4db3-8097-8f7998d1cb20

Example 2: Excerpts from Biogen's Earnings Supplement dated July 20, 2022[58]

Biogen's non-GAAP guidance measures include adjusted EPS; it does not reconcile GAAP and non-GAAP guidance. This company explicitly relies on the "unreasonable effort" exception.

Biogen

Biogen Reports Second Quarter 2022 Results

Full Year 2022 Financial Guidance

For the full year 2022, Biogen is updating its revenue and Non-GAAP diluted EPS guidance ranges as follows:

Non-GAAP guidance Metric

	Prior Guidance	Updated Guidance
Total revenue	$9.7 to $10.0 billion	$9.9 to $10.1 billion
1 Non-GAAP diluted EPS	$14.25 to $16.00	$15.25 to $16.75

"Unreasonable Effort" Exception

Biogen does not provide guidance for GAAP reported financial measures (other than revenue) or a reconciliation of forward-looking Non-GAAP financial measures to the most directly comparable GAAP reported financial measures because the Company is unable to predict with reasonable certainty the financial impact of items such as the transaction, integration, and certain other costs related to acquisitions or large business development transactions; unusual gains and losses; potential future asset impairments; gains and losses from our equity security investments; and the ultimate outcome of pending significant litigation without unreasonable effort. These items are uncertain, depend on various factors, and could have a material impact on GAAP reported results for the guidance period. For the same reasons, the Company is unable to address the significance of the unavailable information, which could be material to future results.

[58] https://www.sec.gov/Archives/edgar/data/875045/000087504522000020/0000875045-22-000020-index.htm

Tables

PROPOSAL – TABLE 1: Frequency of Management Forecasts

The table reports the frequency distribution of management annual forecasts by year (Panel A), management quarterly forecasts by year (Panel B), and the frequency of a single non-GAAP guidance measure by year (Panel C). The sample consists of 5,299 firm-quarter observations from 2016 to 2019 with hand-collected data.

Panel A: Frequency distribution of management *annual* forecasts by year

		Voluntary Management Annual Forecasts				
Year	N	% of management annual forecasts	% of forecasts with non-GAAP metrics	% of forecasts with GAAP metrics	Average Number of Non-GAAP Forecasts Metrics	Average Number of GAAP Forecasts Metrics
2016	1,303	65.23%	51.96%	56.10%	1.04	1.60
2017	1,319	66.64%	55.57%	58.07%	1.19	1.73
2018	1,332	68.84%	57.36%	60.44%	1.26	1.84
2019	1,345	68.18%	59.03%	59.78%	1.36	1.76
Total	5,299	67.24%	56.01%	58.62%	1.21	1.73

Panel B: Frequency distribution of management *quarterly* forecasts by year

		Voluntary Management Quarterly Forecasts				
Year	N	% of management quarterly forecasts	% of forecasts with non-GAAP metrics	% of forecasts with GAAP metrics	Average Number of Non-GAAP Forecasts Metrics	Average Number of GAAP Forecasts Metrics
2016	1,303	33.38%	24.79%	29.78%	0.51	0.81
2017	1,319	33.59%	25.17%	30.78%	0.54	0.86
2018	1,332	33.48%	25.75%	29.81%	0.55	0.80
2019	1,345	33.76%	25.80%	30.34%	0.53	0.77
Total	5,299	33.55%	25.38%	30.18%	0.54	0.81

Panel C: Frequency distribution of management *annual non-GAAP guidance* metrics

Year	2016	2017	2018	2019	Total
N	1,303	1,319	1,332	1,345	5,299
% of voluntary management annual forecasts with Adjusted EPS	41.06%	43.75%	45.20%	47.66%	44.44%
% of voluntary management annual forecasts with Adjusted Revenues	18.42%	21.38%	21.40%	21.41%	20.66%
% of voluntary management annual forecasts with Free Cash Flow	9.21%	9.17%	10.81%	12.57%	10.46%
% of voluntary management annual forecasts with Adjusted Tax Rates	5.37%	8.57%	10.74%	10.56%	8.83%
% of voluntary management annual forecasts with EBITDA	5.30%	6.75%	8.03%	9.37%	7.38%
% of voluntary management annual forecasts with Adjusted EBITDA	4.30%	5.91%	6.76%	8.40%	6.36%
% of voluntary management annual forecasts with Adjusted Operating Income	3.38%	3.49%	3.75%	3.57%	3.55%
% of voluntary management annual forecasts with Adjusted Expenses	3.30%	4.47%	4.50%	4.83%	4.28%
% of voluntary management annual forecasts with EBIT	2.30%	2.27%	1.58%	1.56%	1.92%
% of voluntary management annual forecasts with Adjusted EBIT	1.23%	1.29%	1.28%	1.56%	1.34%
% of voluntary management annual forecasts with Net Debt	0.15%	0.15%	0.45%	0.00%	0.19%
% of voluntary management annual forecasts with ROIC	0.00%	0.00%	0.08%	0.22%	0.08%

TABLE 2: **Joint Incidence of Management Forecasts**

The table reports the frequency of firm-quarters with a management annual forecast and a quarterly forecast (Panel A), a management annual GAAP forecast and a management annual non-GAAP forecast (Panel B), and a management quarterly GAAP forecast and a management quarterly non-GAAP forecast (Panel C). The sample is based on 5,299 firm-quarter observations from 2016 to 2019 with hand-collected data.

Panel A: Joint incidence of management forecasts for the full year and next quarter

	With Annual Forecasts	Without Annual Forecasts	Total
With Quarterly Forecasts	N=1,245 23.5%	N=533 10.1%	N=1,778 33.6%
Without Quarterly Forecasts	N=2,318 43.7%	N=1,203 22.7%	N=3,521 66.4%
Total	N=3,563 67.2%	N=1,736 32.8%	N=5,299 100%

Panel B: Joint incidence of management GAAP forecasts and non-GAAP forecasts for the full year

	With GAAP based Forecasts	Without GAAP based Forecasts	Total
With non-GAAP based Forecasts	N=2,511 47.4%	N=457 8.6%	N=2,968 56.0%
Without non-GAAP based Forecasts	N=595 11.2%	N=1,736 32.8%	N=2,331 44.0%
Total	N=3,106 58.6%	N=2,193 41.4%	N=5,299 100%

Panel C: Joint incidence of management GAAP forecasts and non-GAAP forecasts for next quarter

	With GAAP based Forecasts	Without GAAP based Forecasts	Total
With non-GAAP based Forecasts	N=1,166 22.0%	N=179 3.4%	N=1,345 25.4%
Without non-GAAP based Forecasts	N=433 8.2%	N=3,521 66.4%	N=3,954 74.6%
Total	N=1,599 30.2%	N=3,700 69.8%	N=5,299 100%

TABLE 3: **Descriptive Statistics for a Subsample of Management Annual Non-GAAP Forecasts**

The table reports descriptive statistics related to management non-GAAP guidance. The sample consists of 2,968 firm-quarter observations from 2016 to 2019 with a management annual non-GAAP forecast.

Year	**2016**	**2017**	**2018**	**2019**	**Total**
N	677	733	764	794	2,968
% of forecasts with GAAP metrics	82.42%	84.58%	85.34%	85.77%	84.60%
Average Number of GAAP Forecasts Metrics	2.28	2.40	2.48	2.43	2.40
Average Number of Non-GAAP Forecasts Metrics	2.00	2.14	2.20	2.30	2.17
% of forecasts with Adjusted EPS	79.03%	78.72%	78.80%	80.73%	79.35%
% of forecasts with Adjusted Revenues	35.45%	38.47%	37.30%	36.27%	36.89%
% of forecasts with Free Cash Flow	17.73%	16.51%	18.85%	21.29%	18.67%
% of forecasts with Adjusted Tax Rates	10.34%	15.42%	18.72%	17.88%	15.77%
% of forecasts with EBITDA	10.19%	12.14%	14.01%	15.87%	13.17%
% of forecasts with Adjusted EBITDA	8.27%	10.64%	11.78%	14.23%	11.35%
% of forecasts with Adjusted Expenses	6.35%	8.05%	7.85%	8.19%	7.65%
% of forecasts with Adjusted Operating Income	6.50%	6.28%	6.54%	6.05%	6.33%
% of forecasts with EBIT	4.43%	4.09%	2.75%	2.64%	3.44%
% of forecasts with Adjusted EBIT	2.36%	2.32%	2.23%	2.64%	2.39%
% of forecasts with Net Debt	0.30%	0.27%	0.79%	0.00%	0.34%
% of forecasts with ROIC	0.00%	0.00%	0.13%	0.38%	0.13%

Chapter 6: Conclusion

This dissertation consists of two essays, which explore the quantity of non-GAAP metrics disclosed in firms' quarterly earnings releases, and one proposal, which investigates managers' non-GAAP forward-looking metrics. I manually collect non-GAAP metrics from quarterly earnings releases filed with the SEC in 8-Ks (with Item 2.02) on EDGAR from 2016 to 2020.

The first essay examines the determinants of the quantity of non-GAAP metrics disclosed in firms' quarterly earnings releases. I first find a positive and significant abnormal return reaction and a positive and significant trading-volume reaction to additional non-GAAP metrics, suggesting that investors, on average, find additional non-GAAP metrics incrementally valuable in assessing firms' accounting information. Next, I find that managers disclose a greater quantity of non-GAAP metrics in quarterly earnings announcements for firms: (1) with more complex accounting reporting and (2) with more extensive intangible assets, using both a level specification and a change specification. These findings support the prediction that managers disclose a greater number of non-GAAP metrics when investors' demand increases, and their incentive is to inform investors. In a subsample where firms have missed analysts' expectations based on reported earnings, I find that the quantity of non-GAAP metrics is still significantly and positively associated with accounting reporting complexity and intangible assets intensity. Simultaneously, I find that firms just missing analysts' expectations (i.e., by 5 cents per share or less) are more likely to disclose a greater quantity of non-GAAP metrics, indicating an attempt to mislead rather than to inform investors. This finding provides us some evidence that when firms have missed analysts' expectations, firms that just miss analysts' expectations are more likely to use a greater quantity of non-GAAP metrics than firms that miss the expectations further, to distract investors' attention through information overload, because such firms have greater self-serving incentives.

The second essay examines the impact of the quantity of non-GAAP metrics on analysts' forecast accuracy and dispersion. I find that analysts' forecast accuracy is increasing, and their dispersion is decreasing for firms with a larger quantity of non-GAAP metrics (or categories). Among the twelve non-GAAP categories, non-GAAP revenues, non-GAAP operating income, and non-GAAP tax rate are associated with more accurate and less dispersed earnings forecasts. However, return on invested capital (ROIC) increases the disagreement among analysts and leads to less accurate earnings forecasts. Furthermore, I find that a greater quantity of non-GAAP

metrics/categories is particularly beneficial to analysts who have less general experience and cover more industries in their portfolios.

Finally, I propose a study to examine managers' decisions to issue different quantities of non-GAAP forward-looking (or guidance) measures, which have been overlooked in the literature. Subsequently, I plan to investigate the consequences of management non-GAAP forecasts, including firms' future performance, stock reactions, analysts' earnings forecasts properties, analysts' revenue forecasts properties, and analysts' stock recommendation profitability. After a comprehensive examination of the portfolio of non-GAAP guidance measures, I will focus on a particular metric: free cash flow guidance, an important measure for investors.

Overall, this dissertation analyzes the quantity of non-GAAP metrics and finds that managers primarily use a greater quantity of non-GAAP metrics to inform investors. Furthermore, it finds that investors and analysts recognize the valuable information these additional non-GAAP metrics provide. In the future, I plan to investigate managers' non-GAAP forward-looking measures.