# External Information Environment and Non-GAAP Reporting: Insights from Options Markets

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# ABSTRACT

This study examines how options trading activities influence the disclosure and quality of non-GAAP earnings information. We find that a higher options trading volume is associated with an increased likelihood of non-GAAP earnings disclosure and an improvement in the quality of such disclosures. Specifically, the negative relationship between non-GAAP exclusions and future operating performance is mitigated as options trading volume increases. These results are robust to endogeneity concerns. Our additional analyses reveal that companies with greater options trading volumes tend to increase capital expenditures while reducing the use of recurring excluded items. We also find that under pessimistic market sentiment, managers provide higher quality non-GAAP disclosures. Our findings suggest that the information environment created by options trading motivates companies to provide more transparent and higher quality non-GAAP earnings information, contributing to our understanding of how external information environments shape voluntary disclosure practices in modern capital markets.

Keywords: Non-GAAP Disclosure; Options Trading; Voluntary Disclosure; Information Environment; Earnings Quality

"Your investor relations folks, your CFO, they love the non-GAAP measures because they tell a better story. It's something that we are really looking at. — whether we need to rein that in a bit even by regulation... We have a lot of concern in that space."

Mary Jo White, Former SEC Chairperson,

speaking at a U.S. Chamber of Commerce conference in Washington, D.C. (2016)

# 1. Introduction

Non-GAAP earnings disclosures have become increasingly prevalent in corporate financial communications over the past two decades. According to Audit Analytics, the percentage of S&P 500 companies reporting non-GAAP earnings grew dramatically from 56% in 2006 to 96% in 2016.<sup>1</sup> This surge in non-GAAP reporting has attracted significant attention from regulators and market participants. While the prevalence and importance of non-GAAP earnings are well documented, questions remain about the factors that influence both the incidence and quality of such disclosures. Prior research has primarily focused on internal determinants, such as managerial incentives and corporate governance mechanisms. However, the role of the external information environment in shaping non-GAAP reporting practices remains relatively unexplored. This gap in our understanding is particularly noteworthy given that firms' disclosure decisions are inherently influenced by the information already available in the market.

One crucial aspect of the external information environment is the options market, which has long been recognized as a vital venue for information transmission in financial markets (Black, 1975; Diamond & Verrecchia, 1987; Easley et al., 1998; Pan & Poteshman, 2006). The informational role of options trading has been extensively

<sup>&</sup>lt;sup>1</sup> Source: https://blog.auditanalytics.com/academic-literature-review-accounting-reporting-complexity-and-non-gaap-earnings-disclosure/

documented, with studies showing that options markets incorporate information about future corporate events (Cao et al., 2005), enhance price discovery (Chakravarty et al., 2004), and improve stock price informativeness (Cao et al., 2024). Hu (2014) also finds that information in the options market is transmitted through market makers' hedging in the underlying market. Taken together, the presence of informed trading in options markets may create pressure on managers to align their voluntary disclosures with market expectations or to provide additional context for market participants' interpretation of firm performance.

Two competing theoretical perspectives offer insights into how firms might respond to the information environment created by options trading. The learning perspective suggests that when markets are saturated with information, firms may choose to withhold additional disclosures, instead relying on the market to interpret and disseminate existing information (Chen et al., 2021c). Conversely, the voluntary disclosure perspective posits that managers may opt to disclose information when market dynamics—such as high levels of private information affecting stock prices—create a risk that investors could misinterpret non-disclosure as a signal of unfavorable news (Beyer et al., 2010; Verrecchia, 2001).

Against this backdrop, our study investigates how options trading activities influence both the likelihood and quality of non-GAAP earnings disclosures. We employ a comprehensive research design utilizing a large sample of U.S. publicly listed companies from 2003 to 2020. Our empirical strategy involves two main analyses: we examine how options trading volume affects a company's probability of disclosing non-GAAP earnings. Second, we assess the quality of non-GAAP earnings by examining their predictive power for future operating performance, following the approaches of Doyle et al. (2003) and Kolev et al. (2008). To address potential endogeneity concerns

between non-GAAP earnings and option trading, we employ instrumental variable approaches and conduct various robustness tests, including analyses of different time periods that might affect options trading (e.g., financial crisis, short-selling restrictions) and difference-in-differences test to examine the effect of option listings on the usage of non-GAAP earnings.

Our empirical analyses yield several important findings that illuminate the relationship between options trading volume and non-GAAP earnings disclosures. Our first key finding documents a significant positive association between options trading volume and the likelihood of non-GAAP earnings disclosure. This finding suggests that companies are more inclined to provide non-GAAP earnings information when there is higher options trading activity, potentially in response to the increased presence of informed traders in the market. Second, we find that the negative relationship between non-GAAP exclusions and future operating performance is mitigated as options trading volume increases. This indicates that companies subject to more active options trading tend to exclude less persistent items in their non-GAAP earnings calculations, resulting in more reliable and informative disclosures.

To deepen our understanding of these primary findings, we conduct several additional analyses. First, we investigate how options trading affects specific accounting items in financial statements. Building on Blanco and Wehrheim's (2017) finding that options trading volume conveys information about a company's innovation activities, we examine whether firms increase their capital expenditures in response to higher options trading volume. Our results confirm this relationship, showing that increased options trading volume is associated with higher capital expenditures. Importantly, we find that the interaction between options trading and capital expenditure reduces the use of recurring excluded items, suggesting that the informational role of options trading

leads firms to be more conservative in their use of recurring exclusions.

We further decompose excluded items into temporary and recurring components to better understand their relationship with future performance. This analysis reveals that under higher options trading volume, the negative relationship between recurring items and future performance diminishes, indicating that managers become more cautious in their use of excluded items when options trading activity is high.

To assess the quality of non-GAAP earnings from a different perspective, we follow Bradshaw et al. (2018) to examine the relationship between options trading volume and firms' propensity to meet or beat analysts' forecasts. Our results show a negative relationship between options trading volume and meeting analysts' expectations when GAAP earnings fall short of these expectations, suggesting that options trading may discourage aggressive non-GAAP reporting practices.

We also explore how market sentiment influences non-GAAP reporting quality. Following Leung and Veenman (2018), who note that firms tend to disclose higher quality non-GAAP earnings during loss periods, we employ the methodology of Easley et al. (1998) and Pan and Poteshman (2006) to examine this relationship. Using the putto-call ratio as a proxy for market sentiment, we find that under pessimistic market signals (indicated by higher put volume relative to call volume), managers disclose higher-quality non-GAAP earnings.

Finally, we examine the interplay between non-GAAP earnings disclosures and management forecasts, as both represent important voluntary disclosure mechanisms. While Chen et al. (2021c) documents that higher options trading volume leads to a reduction in management forecasts, our analysis reveals a different dynamic in the context of voluntary disclosure choices. We find that firms issuing management forecasts

are more likely to disclose non-GAAP earnings, suggesting a complementary relationship between these two disclosure types. However, this relationship remains unaffected by options trading volume, indicating that managers' decisions to use these two disclosure mechanisms jointly are independent of the information environment created by options markets. This finding enriches our understanding of how firms coordinate different voluntary disclosure strategies and suggests that managers may view non-GAAP disclosures and management forecasts as serving distinct communicative purposes in their financial reporting practices.

Collectively, our findings provide strong evidence that options trading volume plays a significant role in shaping both the incidence and quality of non-GAAP earnings disclosures. The information environment created by options trading activities appears to influence managerial decisions regarding voluntary disclosures, leading to more transparent and higher quality non-GAAP reporting practices.

Our study makes several important contributions to the existing literature. First, we offer a new perspective on the relationship between external factors and non-GAAP reporting quality. While previous studies suggest that managers may opportunistically use non-GAAP earnings to meet external informational needs (Brown et al., 2012; Doyle et al., 2013; Black et al., 2018), our findings indicate that the presence of informed trading in options markets promotes higher quality disclosures. Second, we extend the voluntary disclosure literature by examining how external information environments influence managerial disclosure decisions. While previous research has primarily focused on internal factors and managerial incentives (e.g., Brown et al., 2012; Doyle et al., 2013), our study demonstrates how the transmission of private information through external sources affects the occurrence and quality of information disclosure.

Third, we contribute to the growing body of research on the informational role of

options markets. While Chen et al. (2021c) found that higher options trading volumes lead managers to reduce their disclosure of earnings forecasts, our findings reveal different managerial responses in the context of non-GAAP earnings disclosures. Finally, we enhance the non-GAAP earnings literature by providing an unexplored perspective on the factors influencing the use and quality of such disclosures. Our results suggest that the external information environment, as proxied by options trading volume, plays a significant role in shaping non-GAAP reporting practices.

The remainder of this paper is organized as follows: Section 2 reviews the relevant literature and develops our hypotheses. Section 3 describes our research design, including sample selection, data sources, regression models, and main empirical results. Section 4 presents the results of various robustness tests. Section 5 explores additional analyses. Section 6 concludes with a summary of key findings and implications.

# 2. Literature Review and Hypothesis Development

#### 2.1 Research on Non-GAAP Earnings Disclosure

The disclosure of non-GAAP earnings information, as a crucial form of voluntary disclosure, has exhibited significant growth over the past two decades. Research on non-GAAP earnings disclosure typically falls into three main categories: value relevance, managerial motivations, and regulatory impacts.

#### 2.1.1 Value Relevance of Non-GAAP Earnings

A significant body of literature has focused on assessing the relevance of non-GAAP earnings to market participants. Bradshaw and Sloan (2002) analyzed the relevance of GAAP earnings versus non-GAAP performance to market investors and discovered that non-GAAP performance showed a stronger correlation with long-term stock returns and earnings responsiveness than traditional GAAP earnings. This finding was corroborated by Bhattacharya et al. (2003), who demonstrated that pro forma earnings are more informative and persistent than GAAP operating earnings.

Brown and Sivakumar (2003) further supported this view by showing that non-GAAP earnings measures are superior to GAAP earnings in terms of predictive ability and value relevance. Lougee and Marquardt (2004) found that firms are more likely to disclose pro forma earnings when GAAP earnings are less informative or when firms have greater incentives to inform investors. Bowen et al. (2005) examined the emphasis placed on pro forma versus GAAP earnings in press releases and found that managers emphasize the metric that portrays better firm performance. Frankel et al. (2011) showed that non-GAAP earnings disclosures are associated with meeting or beating analyst forecasts and future firm performance.

More recent studies have continued to support the value relevance of non-GAAP earnings. Curtis et al. (2014) observed that non-GAAP performance measures that exclude temporary gains provide a more accurate prediction of a company's future core earnings. Chen et al. (2021b) found that firms with more prominent non-GAAP disclosures have higher quality non-GAAP earnings, suggesting that the manner of presentation also plays a role in the informational value of these disclosures.

#### 2.1.2 Managerial Motivations for Non-GAAP Earnings Disclosure

While non-GAAP earnings can provide valuable information, research has also investigated whether managers possess opportunistic motivations to manipulate these disclosures. Brown et al. (2012) observed that firms are more likely to increase excluded amounts and emphasize non-GAAP earnings information when investor sentiment is positive, suggesting potential opportunistic behavior. Doyle et al. (2013) found evidence that managers opportunistically define non-GAAP earnings to meet or beat analyst forecasts. This finding was further supported by Black et al. (2017), who discovered that companies with poor earnings performance prior to earnings management, especially those failing to meet analyst expectations, often resort to non-GAAP measures to align with these expectations.

More recent studies have further explored the personal characteristics of managers and their influence on non-GAAP reporting. Abdel-Meguid et al. (2021) noted that more narcissistic CEOs tend to exclude more expense items, which typically results in lower quality non-GAAP earnings. This finding highlights the potential impact of individual managerial traits on financial reporting practices. Hsu et al. (2022) examined the relationship between non-GAAP earnings and stock price crash risk. They found that firms with lower quality non-GAAP earnings exclusions face higher crash risk, suggesting that the quality of non-GAAP reporting can have significant implications for firm risk and market perceptions.

#### 2.1.3 Regulatory Impacts on Non-GAAP Earnings Disclosure

The third stream of research comes from the regulatory perspective, exploring how regulations influence both the disclosure and the quality of non-GAAP earnings information. Heflin and Hsu (2008) studied the impact of Regulation G's enactment in 2003 on the frequency of non-GAAP disclosures. Their findings revealed a notable decrease in the frequency of disclosures, a reduction in the amounts excluded, and a diminished likelihood of meeting analyst expectations following the implementation of the regulation. Kolev et al. (2008) observed a decrease in the repetitiveness of exclusion items after Regulation G was implemented, suggesting an improvement in the quality of non-GAAP reporting. Jennings and Marques (2011) found that the quality of non-GAAP earnings improved and their use became less opportunistic following the SEC interventions in the early 2000s.

Bond et al. (2017) examined the market reaction to non-GAAP earnings disclosures around the implementation of new SEC regulations. They found that the market response to non-GAAP earnings became more pronounced following regulatory changes, suggesting that increased oversight may have enhanced the credibility of these disclosures.

Overall, the existing literature on non-GAAP earnings disclosure presents a complex picture. While these disclosures can provide valuable information to market participants, there are also concerns about potential opportunistic use by managers. Regulatory interventions have played a role in shaping disclosure practices, but questions remain about the optimal approach to oversight.

#### **2.2 Options Trading and Information Environment**

2.2.1 Options Trading and Stock Price Informativeness

Options markets have long been recognized as important venues for information transmission in financial markets. Ross (1976) theoretically established that options serve as a critical conduit for information in markets characterized by information asymmetry. Black (1975) and Diamond and Verrecchia (1987) posited that informed traders are attracted to options markets due to their inherent leverage and lower transaction costs compared to stock trading. This notion was further supported by empirical evidence from Easley et al. (1998), who demonstrated that options trading activities can improve the efficiency of price responses in the stock market. Cao (1999) extended this idea, arguing that agents holding private information can capitalize more effectively on their insights in markets that offer options, thereby increasing the informativeness of prices. Chakravarty et al. (2004) found that price discovery occurs in both the stock and options markets, with the options market's contribution to price

discovery being about 17%. Pan and Poteshman (2006) showed that options trading volume contains information about future stock price movements, particularly when distinguishing between open-buy and open-sell option volume.

Cao et al. (2005) provided evidence of a positive correlation between options trading volume on the day before a merger announcement and the subsequent merger premium, indicating that options markets incorporate information about future corporate events. Roll et al. (2009) demonstrated that options trading volume is positively related to future stock returns and negatively related to bid-ask spreads, suggesting that options trading enhances the informational efficiency of stock prices. More recently, Blanco and Wehrheim (2017) discovered that greater options trading volumes are positively associated with a company's future patent registrations, suggesting that options trading may also convey information about firms' innovative activities. Cao et al. (2024) observed that a more active options market, with higher trading volumes, enhances the informativeness of stock prices.

#### 2.2.2 Options Trading and Corporate Disclosure

Skinner (1990) observed that companies listed for options trading are inclined to disclose more private information, suggesting a potential link between options markets and corporate transparency. Chen et al. (2021c) investigated how options trading volume affects managerial earnings forecasts. They found that a higher options trading volume is associated with a lower likelihood and frequency of management forecasts, suggesting that managers may learn from the information in options markets and reduce their own voluntary disclosures.

The theoretical underpinnings of the relationship between options trading and corporate disclosure can be found in information asymmetry and voluntary disclosure theories. Verrecchia (2001) and Beyer et al. (2010) suggested that managers may engage in voluntary disclosure to mitigate information asymmetry and maximize shareholder wealth, proposing that if managers withhold private information, investors may suspect the presence of negative undisclosed information. Easley and O'Hara (2004) highlighted that firms can influence their cost of capital by affecting the precision and quantity of information available to investors. However, excessive unconfirmed information can foster uncertainty among investors regarding the accuracy of the private information they possess relative to that held by managers. In the context of options trading, the presence of informed trading in options markets may influence managerial decisions regarding voluntary disclosures, such as the disclosure of non-GAAP earnings information. An increase in options trading volume potentially signals a higher level of private information circulating in the market. This information environment may put pressure on managers to provide more transparent and higher quality disclosures to align with market expectations or to correct potential mispricing.

In short, the literature above suggests that options trading plays a significant role in firms' information environments. It affects stock price informativeness, may influence corporate disclosure decisions, and interacts with information asymmetry and voluntary disclosure.

#### 2.3 Research Hypothesis Development

Drawing upon the literature reviewed in Sections 2.1 and 2.2, we develop two main hypotheses regarding the relationship between options trading volume and non-GAAP earnings disclosures.

2.3.1 Options Trading Volume and Non-GAAP Earnings Disclosure Propensity

The first hypothesis addresses how options trading volume might influence a

company's propensity to disclose non-GAAP earnings. As discussed earlier, options trading volume can be indicative of the level of private information in the market (Chakravarty et al., 2004; Easley et al., 1998; Pan and Poteshman, 2006). That is, a high options trading volume suggests that there is substantial private information circulating in the market about a company's future prospects.

In such an environment, managers face two potential pressures. First, they may be uncertain about the accuracy or completeness of the information held by market participants. Second, they may feel compelled to align their disclosures with market expectations. Both of these pressures could motivate managers to use non-GAAP earnings disclosures as a means of communicating their perspective on the company's core earnings.

This reasoning is consistent with the voluntary disclosure theory proposed by Verrecchia (2001) and Beyer et al. (2010), which suggests that managers might engage in voluntary disclosure to mitigate concerns among external investors. Furthermore, as Easley and O'Hara (2004) pointed out, firms can influence their cost of capital by affecting the precision and quantity of information available to investors. Non-GAAP earnings disclosures could serve as a tool for managers to achieve this goal.

Notably, Chen et al. (2021c) found a negative relationship between options trading volume and the frequency of management forecasts, suggesting that managers might learn from the market and reduce their voluntary disclosures. Nonetheless, we argue that non-GAAP earnings disclosures differ from management forecasts in that they provide information about current performance rather than future expectations and thus may be used differently by managers in response to high options trading volumes.

Based on these considerations, we formulate our first hypothesis:

# H1: The likelihood that a company will disclose non-GAAP earnings information increases with the options trading volume.

2.3.2 Options Trading Volume and Non-GAAP Earnings Quality

The quality of non-GAAP earnings can be assessed by examining the persistence and predictive power of non-GAAP exclusions for future performance (Doyle et al., 2003; Kolev et al., 2008). A high options trading volume suggests close market monitoring and a high level of informed trading. This monitoring could influence the quality of non-GAAP disclosures in two ways: First, increased oversight may deter opportunistic manipulation of non-GAAP exclusions (Blanco and Wehrheim, 2017). Second, higher reputational costs may be associated with low-quality disclosures in an environment of enhanced market assessment ability (Verrecchia, 2001). Furthermore, Hayunga and Lung (2014) found that options experienced abnormal trading before analyst consensus revisions, which means that when options convey information, the company's disclosed information should be relevant. This suggests that high options trading volumes could be associated with more informative and higher quality non-GAAP disclosures.

However, it is important to note that the relationship between options trading volume and non-GAAP earnings quality might not be straightforward. As Chen et al. (2021c) observed, under the influence of extensive stock information in options trading, managers tend to learn from the market rather than disclose additional information. This learning effect could reduce the quality of non-GAAP disclosures if managers become less inclined to provide detailed explanations or adjustments.

Despite this potential counterargument, we believe that the increased scrutiny and potential reputational costs associated with high options trading volumes are likely to dominate. Therefore, we propose our second hypothesis:

# H2: The quality of a company's non-GAAP earnings information increases with the options trading volume.

These hypotheses posit that options trading volume is positively associated with both the likelihood and quality of non-GAAP earnings disclosures. The subsequent empirical analysis tests these hypotheses, contributing to our understanding of how the external information environment, as reflected in options trading activity, influences corporate disclosure decisions and quality.

#### 3. Data, Methodology, and Main Empirical Results

#### 3.1. Data and Research Design

The data for our study spanned from 2003 to 2020 leveraging non-GAAP earnings data from Bentley et al. (2018). This dataset, initiated in 2003, was compiled from 8-K reports voluntarily disclosed by U.S. publicly listed companies. We sourced options trading data from OptionMetrics, which provides comprehensive information on all options traded on U.S. listed stocks since 1996. This database includes daily transaction details such as closing best bid and ask prices, trading volume, strike prices, and open interest. Financial data are obtained from Compustat. Non-GAAP earnings data are from directly from earnings press releases (Bentley, Christensen, Gee, and Whipple 2018). Initially, our Compustat dataset comprised 198,040 observations. After merging with non-GAAP earnings and OptionMetrics, we removed 72,669 observations. An additional 39,465 observations were excluded due to missing financial data and financial industry, resulting in a final sample of 85,906 firm-quarter observations.

To test our first hypothesis, which examines whether options trading volume influences the likelihood of companies disclosing non-GAAP earnings, we employ empirical models adapted from previous research on non-GAAP earnings disclosure (Chen et al., 2021a; Heflin and Hsu, 2008). Our primary dependent variable is the disclosure of non-GAAP earnings information (*NGP\_Dis*), while our key explanatory variable is options trading volume (*OptionTrading*). The first empirical model is as follows:

$$NGP\_Dis_{it} = \beta_0 + \beta_1 OptionTrading_{it} + \beta_2 Size_{it} + \beta_3 Intangible_{it} + \beta_4 BV_{it} + \beta_5$$

$$Neg\_Spi_{it} + \beta_6 Lev_{it} + \beta_7 ABS\_Spi_{it} + \beta_8 Growth + \beta_9 Loss_{it}$$
(1)
$$+ \beta_{10} Roa\_std_{it} + \beta_{11} Age_{it} + \beta_{12} Lag\_NGP\_Dis + Fixed Effects + \varepsilon_{it}$$

We calculate *OptionTrading* following methods established in previous studies (Blanco and Wehrheim, 2017; Chen et al. (2021c); Naiker et al., 2013; Roll et al., 2009). This calculation aggregates the dollar trading volume of all options contracts for each company each quarter. Specifically, we multiply the daily trading volume of all options contracts by the midpoint between the best bid and ask prices and then sum these values for all trading days within the quarter. This value is then incremented by one and transformed using the natural logarithm to address potential skewness.

Our model incorporates various control variables identified in seminal works by Lougee and Marquardt (2004) and Heflin and Hsu (2008). These include company size (*Size*), intangible assets (*Intangible*), book-to-market ratio (*BV*), special items are negative (*Neg\_Spi*), debt ratio (*Lev*), the absolute value of special items to total assets (*Abs\_Spi*), sales growth rate (*Growth*), net loss (*Loss*), earnings volatility (*Roa\_std*), the company's age (*Age*). To mitigate the learning effect from option market, we place previous non-GAAP disclosure in the equation (*Lag\_NGP\_Dis*).

To assess the quality of non-GAAP earnings disclosures, as outlined in our second hypothesis, we refer to models from Doyle et al. (2003), Kolev et al. (2008), Curtis et al. (2014), Abdel-Meguid et al.(2021) and Chen et al. (2021a). Our model evaluates the predictive power of non-GAAP exclusions for future financial performance, specifically examining the relationship between options trading volume and future operating income (*Future\_OI*), future net income (*Future\_NI*), and futures operating cash flows (*Future\_CFO*). The empirical model employed is as follows:

Future\_OI<sub>it+1</sub> (Future\_NI<sub>it+1</sub>/Future\_CFO<sub>it+1</sub>) = 
$$\beta_0 + \beta_1 Exclu_{it} + \beta_2$$
  
OptionTrading<sub>it</sub> +  $\beta_3$  OptionsTrading \* NGP\_Exclu<sub>it</sub> +  $\beta_4 NGP_Earn_{it} + \beta_5$  OptionsTrading \*NGP\_Earn<sub>it</sub> +  $\beta_6 Size_{it} + \beta_6$  (2)  
Roa\_std<sub>it</sub>+ $\beta_7 Growth_{it} + \beta_8 BV_{it} + \beta_9 Loss_{it} + \beta_{10} Age_{it}$   
+ Fixed Effects + $\varepsilon_{it}$ 

Our analysis focuses on the relationship between the interaction term of total exclusions and options trading volume with future earnings. All our empirical models control for industry and year fixed effects, with standard errors clustered at the firm level to account for potential within-firm correlation of residuals.

#### **3.2 Descriptive Statistics and Correlation Analysis**

Table 1 presents the descriptive statistics for the main variables used in our empirical analysis. Our primary dependent variable, non-GAAP earnings disclosure, has a mean value of 0.4562, indicating that approximately 45.62% of our sample firms report non-GAAP earnings on a quarterly basis. This substantial proportion underscores the prevalence and importance of non-GAAP reporting practices among U.S. publicly listed companies. The options trading variable has a mean value of 14.0612, which corresponds to an average trading volume of approximately \$1.2785 million per firm-quarter. This significant trading activity suggests that options markets play a substantial role in the information environments of our sample firms. Negative special items accounting for 44.59% of observations. This indicates that a majority of firms reporting

special items are doing so for negative events or transactions, which may have implications for the use and interpretation of non-GAAP earnings metrics.

#### [Table 1 about here]

Table 2 presents the correlation matrix for our main variables. Panel A shows the correlations for variables used in testing Hypothesis 1, while Panel B presents the correlations for variables used in testing Hypothesis 2. In Panel A, we observe a positive and statistically significant correlation between non-GAAP earnings disclosure and options trading volume, with Pearson and Spearman correlation coefficients of 0.1198 and 0.1243 respectively. This preliminary evidence is consistent with our first hypothesis, suggesting that a higher options trading volume is associated with a greater likelihood of non-GAAP earnings disclosure.

We also note significant positive correlations between non-GAAP earnings disclosure and both negative special items and the absolute value of special items to total assets. These correlations are consistent with prior literature suggesting that firms are more likely to disclose non-GAAP earnings when they experience unusual or nonrecurring items.

In Panel B, we observe negative correlations between non-GAAP exclusions (*NGP\_Exclu*) and future operating income, future net income, and future operating cash flows. These correlations (Pearson: -0.1928, -0.1070 and -0.1788 Spearman: -0.2220, -0.0836 and -0.2240 for future operating income, future net income, and future operating cash flows, respectively) are consistent with findings reported by Doyle et al. (2003), suggesting that items excluded from non-GAAP earnings may have predictive power for future performance.

[Table 2 about here]

#### **3.3 Main Empirical Results**

This section presents our main empirical findings, addressing our two primary hypotheses regarding the relationship between options trading volume and non-GAAP earnings disclosures.

#### 3.3.1 Options Trading and Non-GAAP Earnings Disclosure

Table 3 reports the results of our logistic regression analysis examining the relationship between options trading volume and the likelihood of non-GAAP earnings disclosure. The results reveal a significant positive association between options trading volume and non-GAAP earnings disclosure. The coefficient on options trading volume is 0.0396 with a T-value of 6.0823, which is statistically significant at the 1% level. This finding supports our first hypothesis, suggesting that companies are more inclined to disclose non-GAAP earnings as options trading volume increases.<sup>2</sup>

To gauge the economic significance of this result, we calculate that a one standard deviation increases in options trading volume (3.1199) is associated with a 0.1236  $(3.1199 \times 0.0396)$  increase in the probability of non-GAAP earnings disclosure. Given that the average probability of non-GAAP earnings disclosure in our sample is 0.4562, this change represents a relative increase of 27.08%. This substantial effect underscores the economic importance of options trading volume in influencing non-GAAP disclosure decisions.

These findings are consistent with Hypothesis 1 (i.e., as more private information

<sup>&</sup>lt;sup>2</sup> Following Roll et al. (2009), Naiker et al. (2013), Blanco and Wehrheim (2017), and Chen et al. (2021c), we primarily use dollar trading volume to measure options trading activity. Our results remain robust when using share trading volume instead (coefficient = 0.0193; Z-value =2.821). Additionally, while our main analysis calculates options trading volume based on earnings announcement dates (Compustat RDQ), we also employ an alternative approach using the Compustat datadate. This alternative specification yields consistent results, showing a significant positive relationship between *OptionTrading* and *NGP\_Dis* (coefficient = 0.0199; Z-value = 3.0434), further supporting Hypothesis 1. Due to space constraints, these additional results are not tabulated but are available upon request from the authors.

circulates in the market, as indicated by higher options trading volumes, managers are more likely to use non-GAAP earnings information to convey their perspective on core earnings). This may be driven by managers' desire to align with or respond to market expectations or to provide additional context for interpreting the firm's performance in light of the information environment reflected in options trading activity.

#### [Table 3 about here]

### 3.3.2 Options Trading and Non-GAAP Earnings Quality

Table 4 presents the results of our analysis examining the impact of options trading volume on the quality of non-GAAP earnings disclosures, as measured by the relationship between non-GAAP exclusions and future performance.

Consistent with prior literature, we find a significant negative relationship between non-GAAP earnings exclusions and future earnings, net income and cash flows. The coefficients on non-GAAP exclusions are -1.0628, -1.1071 and -1.6984 for future operating income, future net income, and future operating cash flows, respectively, with T-values of -3.9479, -3.7272 and -3.4658. This suggests that items excluded from non-GAAP earnings have predictive power for future performance, indicating that firms may be excluding some recurring items in their non-GAAP calculations.

However, our key finding relates to the interaction between options trading volume and non-GAAP exclusions (*OptionTrading\*NGP\_Exclu*). The coefficients on this interaction term are positive and statistically significant for future operating income (coefficient = 0.0328, T-value = 3.4291), future net income (coefficient = 0.0576, Tvalue = 3.1751) and future operating cash flows (coefficient = 0.0983 T-value = 3.2204). These results support our second hypothesis (i.e., that the negative relationship between non-GAAP exclusions and future performance is mitigated as options trading volume increases). This finding suggests that when the options trading volume is high, reflecting a more informed market environment, managers disclosing non-GAAP earnings appear to exclude items that are less predictive of future performance. We also find a positive association between option trading and non-GAAP earnings (*OptionTrading* \**NGP\_Earn*) exhibits a positive and significant correlation with future performance, with coefficients of 0.0780, 0.0682, and 0.1759 and T-values of 2.0746, 1.6786 and 2.5964, respectively, indicating that option trading could increase the persistence of future earnings. This could be driven by the increased scrutiny associated with a higher options trading volume or by the reputational benefits of providing high-quality voluntary disclosures in such an environment.<sup>3</sup>

#### [Table 4 about here]

In summary, our empirical results provide strong support for both of our hypotheses. They suggest that options trading volume not only influences the likelihood of non-GAAP earnings disclosure but also appears to enhance the quality of these disclosures. These findings contribute to our understanding of how the external information environment, as reflected in options market activity, shapes corporate disclosure decisions and practices.

# 4. Robustness Tests

This section presents a series of robustness tests to address potential concerns and

<sup>&</sup>lt;sup>3</sup> Our findings remain robust to alternative specifications of options trading volume. When using share trading volume instead of dollar volume, the interaction term maintains a significant positive relationship with *Future\_OI* (0.0652, T-value = 2.7133) *Future\_NI* (0.0672, T-value = 2.6311) and *Future\_CFO* (0.1067, T-value = 2.7559). Similarly, when we calculate options trading volume using the Compustat datadate method rather than earnings announcement dates, the results continue to support Hypothesis 2. The interaction term shows a significant positive relationship with *Future\_OI* (0.0503, T-value = 3.3349), *Future\_NI* (0.0549, T-value = 3.2689) and *Future\_CFO* (0.0861, T-value = 3.0380). These consistent results across different measurement approaches underscore the robustness of our findings. Additional details on these analyses are available upon request from the authors.

strengthen the reliability of our main findings. We begin by addressing endogeneity concerns, followed by tests using alternative samples, and conclude with an examination of the impact of option listings.

#### 4.1 Endogeneity

A primary concern in our study is the potential endogeneity between non-GAAP earnings disclosures and options trading volume. Unlike management forecasts, non-GAAP earnings provide not only quantitative data but also insights into the calculations, sources, and justifications for these figures. This rich detail could substantively influence stock prices and subsequently increase options trading volume, thereby introducing endogeneity concerns.

To mitigate the impact of endogeneity, we employ instrumental variables following the approach of Roll et al. (2009), Blanco and Wehrheim (2017), and Chen et al. (2021c). We use two instrumental variables: options moneyness and open interest. Options moneyness is calculated as the average absolute difference between the exercise price of all options contracts and the underlying asset price for each company each quarter, subsequently converted into a natural logarithm. Open interest is the sum of all unexercised options contracts for each company each quarter, also transformed using a natural logarithm.<sup>4</sup> We implement a two-stage least squares (2SLS) approach. In the first stage, we use these instrumental variables to estimate the expected options trading volume. We then utilize these estimates in the second stage to further examine non-GAAP earnings disclosure and quality.

Table 5 presents the empirical results of our 2SLS analysis. Models (1) and (2) show

<sup>&</sup>lt;sup>4</sup> Options trading considers leverage and position holding, so options trading volume is highly correlated with the options strike price and open interest, but it is not related to future managerial voluntary disclosure behavior.

the first-stage estimation outcomes, revealing a positive and significant correlation between our instrumental variables (*Moneyness* and *Open\_Interest*) and options trading volume. Models (3) and (4) provide the second-stage empirical results.

#### [Table 5 about here]

Both instrumental variables are positive and significantly associated with Option trading. The coefficient of *Open\_Interest* is 1.2965 with T-Value of 244.2471 and *Monyness* is 1.6971 with T-Value of 174.2494. The estimated option trading volume (*Option\_predict*) from both instrument variables are positively and significantly associated with non-GAAP earnings disclosure (coefficient = 0.387, T-value = 2.8578; 0.1397, T-value = 6.7893)

Table 6 explores the relationship between the estimated options trading volume and non-GAAP earnings quality, utilizing our instrumental variables approach. The empirical results reveal that when option open interest is employed as an instrumental variable, the interaction term (*Option\_predict \* NGP\_Exclu*) demonstrates a positive and partially significant relationship with *Future\_OI, Future\_NI and Future\_CFO*, evidenced by coefficients of 0.0488, 0.0484 and 0.0712 and T-values of 1.8313,1.6698 and 1.5332, respectively. Additionally, when moneyness is used as the instrumental variable, the interaction term (*Option\_predict \* NGP\_Exclu*) exhibits a positive and significant correlation with future performance, with coefficients of 0.0868, 0.0878 and 0.1627 and T-values of 2.5793, 2.3887 and 3.2799, respectively.

#### [Table 6 about here]

These findings provide strong support for our main results, suggesting that the relationship between options trading volume and non-GAAP disclosure practices persists even after accounting for potential endogeneity. This strengthens our confidence

in the causal nature of the relationship we have identified.

#### **4.2 Alternative Samples**

Our study focuses on how options trading volume affects the use of non-GAAP earnings. However, specific periods within our sample timeframe might have influenced our main results. To verify the robustness of our original findings, we exclude periods that could have uniquely impacted options trading volume.

First, we consider the Regulation SHO Pilot Program, which partially lifted shortselling restrictions and may have led to a change in put options trading as short-selling became more accessible. Chen et al. (2020) found that put option volumes increased under short-selling restrictions, suggesting a potential substitution effect between options trading and short-selling. Second, we account for the SEC's Tick Size Pilot Program in 2016, which impacted stock liquidity and consequently affected options trading volume, pricing, and liquidity. Griffith et al. (2020) observed that changes in tick size increased transaction costs for stocks, influencing options trading costs. Lastly, we consider the 2008 financial crisis, during which Li et al. (2017) found that more informed investors tended to increase options trading. Moreover, with some stocks under a shortsale ban during this period, investors resorted to using put options for short-selling (Grundy et al., 2012).

Table 7 presents the empirical results of these alternative sample analyses. For brevity, we only report the coefficient on our variable of interest, options trading volume. Panel A of Table 7 shows the findings for non-GAAP earnings disclosure. Across all three alternative samples (excluding the financial crisis, the Regulation SHO Pilot Program period, and the Tick Size Pilot period), we continue to find a significant positive relationship between options trading volume and non-GAAP earnings disclosure. Panels B and C examine the quality of non-GAAP earnings, specifically analyzing future operating income (*Future\_OI*), future net income (*Future\_NI*) and future operating cash flows (*Future\_CFO*) as the main variables. Even after excluding these potentially influential periods from our analysis, our original empirical findings remain consistent. The interaction between options trading volume and non-GAAP exclusions continues to show a positive and significant relationship with future performance measures.

### [Table 7 about here]

These results again provide strong support for the robustness of our main findings. They demonstrate that the relationship between options trading volume and non-GAAP disclosure practices persists across different market conditions and regulatory environments. This consistency strengthens our confidence in the generalizability of our results and mitigates concerns that our findings might be driven by specific market anomalies or regulatory changes during our sample period.

#### 4.3 Option Listing

Our study primarily investigates the relationship between non-GAAP earnings and options trading volume, exploring whether option listings on an exchange influence the disclosure of non-GAAP earnings information. Given that a company's engagement in options trading is contingent upon exchange listing, this research employs a matched sample difference-in-differences methodology to assess the impact of option listings on the usage of non-GAAP earnings among comparable firms.

Our approach is motivated by Skinner (1990), who observed that companies listed for options trading are inclined to disclose more private information. Following the research designs of Naiker et al. (2013) and Chen et al. (2021c), we identify the timing of option listings on exchanges.<sup>5</sup> We also refer to the methods for propensity score

<sup>&</sup>lt;sup>5</sup> We define a firm's option listing date as the day the firm initially appeared in the OptionMetrics database. This approach ensures a consistent and objective criterion for determining when a firm's options become

matching from Shipman et al. (2017) as well as DeFond et al. (2017).

In estimating the effects of being listed for options trading, we utilize control variables from Mayhew and Mihov (2004), Hu (2018), and Chen et al. (2021c). These control variables include the natural logarithm of the market value, the natural logarithm of the average daily stock trading volume, the natural logarithm of the standard deviation of daily stock returns, the average daily percentage bid-ask spread at market close, and industry fixed effects based on the two-digit SIC code and year fixed effects.<sup>6</sup>

After matching, companies listed on the options exchange are coded as 1 (*Treat*), and those not listed are coded as 0. *Post* is a dummy variable set to 1 for the years after the option listing and 0 for the years before. Our focus is on the interaction term (*Treat\*Post*), which captures the effect of option listing on non-GAAP disclosure. Table 8 presents the empirical results of this analysis.

The interaction term (*Treat\*Post*) shows a significantly positive effect (coefficient = 0.3438; Z-value = 1.9611), suggesting that companies listed on the options exchange are more inclined to use non-GAAP earnings information. This finding is consistent with our main results and provides additional support for the idea that the options market environment influences non-GAAP disclosure practices.

#### [Table 8 about here]

These results complement our main findings by demonstrating that not only does the volume of options trading matter but the very presence of listed options for a company's stock is associated with increased non-GAAP disclosure. This suggests that

actively traded.

<sup>&</sup>lt;sup>6</sup> For market value calculations, we use data from the end of the previous month. Other control variables, including stock trading volume, stock price volatility, and bid-ask spread, are measured over three distinct timeframes: the past 12 months, the previous month, and month t-12. This multi-period approach allows us to capture both long-term trends and short-term fluctuations in these market characteristics.

the information environment created by options markets, even before considering trading volume, may influence managerial disclosure decisions.

# 5. Additional Analyses

Having established our main findings and conducted robustness tests in the previous sections, we now extend our analysis to explore additional dimensions of the relationship between options trading and non-GAAP reporting. This section presents a series of additional analyses that further explore the mechanisms underlying our main results and investigate related aspects of corporate disclosure in the context of options markets.

#### 5.1 Capital Expenditure

Laurion (2020) indicated that the exclusion items of non-GAAP earnings are often closely related to the firm's real activities. Furthermore, Blanco and Wehrheim (2017) found that options trading volume conveys information about firm innovation, suggesting that such trading signals may reflect the firm's innovative activities. Therefore, we investigate whether options trading volume conveys such information by examining its relationship with capital expenditures. This analysis is conducted using both the full sample and a subsample that discloses non-GAAP earnings. In addition, Dai, Qiao, and Xia (2024) suggest that options trading volume not only transmits private information but also reduces the likelihood of managers disseminating biased information. Therefore, we further examine whether the impact of options trading volume on capital expenditures affects the use of recurring items.

As shown in Table 9, the empirical results indicate a significantly positive relationship between options trading volume and capital expenditures in both the full sample (coefficient = 0.012, T-value = 8.4787) and the restricted sample (coefficient = 0.0013, T-value = 7.0061). This implies that when options trading volume conveys

information, firms increase their capital expenditures reported in financial statements. Regarding the impact on recurring items, the interaction term between options trading volume and capital expenditures is found to be significantly negative (coefficient = -0.0048, T-value = 1.6789), suggesting that higher options trading volume may reduce the reliance on recurring items. This finding is consistent with the results of Dai et al. (2024).

#### [Table 9 about here]

#### 5.2 Decomposition of Non-GAAP Exclusions

To enhance our understanding of the relationship between options trading and non-GAAP reporting quality, we decompose non-GAAP exclusions into two distinct categories: special items and recurring items. This approach is consistent with established methodologies in the literature (Doyle et al., 2003; Kolev et al., 2008). By examining these categories separately, we aim to identify the specific components of non-GAAP exclusions that are most affected by options trading activity.

We modify our main empirical model from Section 4 to incorporate these disaggregated exclusions. Specifically, we replace the aggregate non-GAAP exclusions variable with separate variables for special item exclusions (*Exclu\_Spi*) and recurring item exclusions (*Exclu\_Recur*). We also include interaction terms between these exclusion types and options trading volume to capture any differential effects.

Table 10 presents the results of this analysis. We find a significant positive relationship between the interaction of recurring exclusions and options trading volume for future operating income (coefficient = 0.0914, T-value = 2.6883), future net income (coefficient = 0.1091, T-value = 30206) and future operating cash flows (coefficient = 0.2115, T-value = 3.7356). This suggests that a higher options trading volume is

associated with a reduction in the use of recurring items as exclusions, potentially indicating improved quality of non-GAAP reporting. However, the interaction term for special items only Model (1) reach statistical significance. This finding implies that the impact of options trading on non-GAAP reporting quality is primarily driven by changes in the treatment of recurring items rather than special items.

These results extend our main findings by providing a further analysis of how options trading influences non-GAAP reporting practices. The differential impact on recurring versus special items suggests that managers may be more cautious about excluding recurring items when the options trading volume is high, potentially due to increased market scrutiny or a desire to provide more transparent financial information.

#### [Table 10 about here]

#### 5.3 Aggressive Non-GAAP Reporting and Meeting Analyst Expectations

Building on our primary analysis, we further investigate whether options trading volume influences managers' propensity to engage in aggressive non-GAAP reporting practices, particularly in the context of meeting or beating analyst expectations. Prior research has highlighted the importance of analyst forecasts in shaping market perceptions and managerial reporting decisions (e.g., Francis et al., 2002; Franco and Hope, 2011; Frankel et al., 2006; Graham et al., 2005; Lang and Lundholm, 1996). We extend this line of inquiry by examining how the informational and monitoring role of options trading intersects with managers' use of non-GAAP exclusions to meet analyst targets.

Following the methodology of Bradshaw et al. (2018), we introduce new dependent variables: *Meet\_Fall* (Meet or Beat analyst forecast), an indicator variable that equals one if management-disclosed non-GAAP earnings are equal to or higher than analysts' consensus street forecasts but IBES actual GAAP earnings are lower than analysts'

consensus GAAP forecasts, and zero otherwise<sup>7</sup>.

Table 11 presents the results of this analysis. We observe a significantly negative relationship between option trading volume and Meet or Beat analyst forecast (coefficient = -0.02, Z-Value = -2.7008). This suggests that a higher options trading volume is associated with a decreased likelihood of aggressive non-GAAP reporting practices.

#### [Table 11 about here]

#### 5.4 Options Market Sentiment and Non-GAAP Reporting

To further explore the informational role of options markets in non-GAAP reporting, we examine how options market sentiment influences both the propensity to disclose non-GAAP earnings and the quality of such disclosures. Building on the work of Easley et al. (1998) and Pan and Poteshman (2006), we utilize the put-to-call ratio as a proxy for market sentiment, with a higher put volume relative to call volume indicating more pessimistic expectations.

We construct a binary variable, *BadNews*, which equals 1 if the trading volume of put options exceeds that of call options and 0 otherwise. This measure captures the relative pessimism in the options market, allowing us to investigate whether firms respond differently to negative sentiment through their non-GAAP reporting practices. We modify our main empirical models to include *BadNews* and its interactions with our primary variables of interest.

Table 12 presents the results of this analysis. Model (1) reveals that companies are more likely to disclose non-GAAP earnings information under pessimistic market expectations (coefficient = -0.0714, Z-Value = -2.7384). This finding is consistent with

<sup>&</sup>lt;sup>7</sup> Earnings data are from the IBES database.

the notion that managers may use non-GAAP disclosures as a communication tool to provide additional context when market sentiment is negative. Models (2), (3) and (4) examine the impact of pessimistic market sentiment on the quality of non-GAAP exclusions. Interestingly, we find that under pessimistic conditions, non-GAAP earnings exclusions do exhibit a significant relationship with future earnings (*BadNews* \* *NGP\_Exclu*; coefficients of 0.3191, 0.3759, and 0.5132 and T-values of 2.2845, 2.5668, 2.4977 for future operating income, future net income, and future operating cash flows, respectively). The results are more likely to consist with Leung and Veenman (2018)'s finding that is firm probability to assist investors disaggregate accounting items into component that have impact on forecast and valuation.

#### [Table 12 about here]

#### 5.5 Non-GAAP Earnings and Management Forecasts

In this section, we explore the potential interplay between non-GAAP earnings disclosures and management forecasts, both of which are important voluntary disclosure mechanisms. While Chen et al. (2021c) suggested that a higher options trading volume may lead to a reduction in management forecasts, the relationship between options trading, non-GAAP disclosures, and management forecasts remains an open empirical question. To investigate this relationship, we examine whether management forecasts serve as a substitute for or complement to non-GAAP earnings disclosures, particularly in the context of options trading activity.

Table 13 presents the results of this analysis. Model (1) shows a significant positive relationship between issuing management forecast ( $Mgt\_forecast$ ) and the non-GAAP earnings (coefficient = 0.5448; Z-value = 14.9448), suggesting a little complementary effect between non-GAAP disclosures and management forecasts. In Model (2), we incorporate the interaction between management forecasts and options trading volume.

The interaction term is not statistically significant (coefficient = -0.0109; Z-value = -0.8678), indicating that the relationship between non-GAAP disclosures and management forecasts does not substitution or complementary under options trading volume.

#### [Table 13 about here]

The additional analyses in this section extend our investigation beyond the primary hypotheses, offering a more comprehensive examination of how options trading influences non-GAAP reporting practices. We explore various aspects of this relationship, including the composition of exclusions, market sentiment effects, informed trading impacts, and interactions with other disclosure mechanisms. These investigations not only reinforce our main findings but also shed light on the intricate ways in which options trading shapes corporate disclosure strategies.

# 6. Conclusion

To address the growing concerns about the quality and transparency of such disclosures in modern capital markets, our study investigates how options trading volume, as an external source of information, influences the use and quality of non-GAAP earnings disclosures. We document that increased options trading volume is associated with both a higher likelihood of non-GAAP earnings disclosure and improved disclosure quality. This relationship is evidenced by the mitigating effect of options trading volume on the negative association between non-GAAP exclusions and future operating performance, suggesting that heightened market scrutiny enhances the reliability and informativeness of non-GAAP disclosures.

Our additional analyses provide further insights into this relationship. First, we find that firms with higher options trading volume increase their capital expenditures while reducing the use of recurring excluded items, indicating more conservative reporting practices. Second, under pessimistic market conditions, as indicated by higher put-to-call ratios, managers tend to provide higher quality non-GAAP disclosures. These findings collectively suggest that the information environment created by options trading promotes more transparent and reliable financial reporting practices.

This research contributes to the ongoing discourse on the quality and credibility of non-GAAP earnings (e.g., Bhattacharya et al., 2003; Black et al., 2017; Bradshaw and Sloan, 2002) and makes several important contributions to the literature. While prior research has primarily focused on how managers might opportunistically use non-GAAP earnings to meet external informational needs, our findings reveal that the presence of informed trading in options markets can actually enhance disclosure quality. We extend the voluntary disclosure literature by demonstrating how external information environments shape managerial reporting decisions, complementing existing research that has mainly examined internal factors and managerial incentives. Moreover, our findings contribute to the growing literature on the informational role of options markets by documenting their unique impact on non-GAAP reporting practices, distinct from their effect on other forms of voluntary disclosure such as management forecasts.

Our findings have important implications for understanding the role of market mechanisms in shaping corporate disclosure practices. They suggest that active options markets can serve as an effective external monitoring mechanism, potentially complementing traditional regulatory oversight in promoting high-quality financial reporting.

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Variable	Definition
<i>OptionTrading</i>	The natural logarithm of the total options trading dollar volume plus 1, calculated for each company from the day after the previous quarter's earnings announcement to the current quarter's earnings announcement date.
Moneyness	The natural logarithm of the average absolute difference between the stock price and the option strike price, calculated for each company from the day after the previous quarter's earnings announcement to the current quarter's earnings announcement date.
OpenInterest	The natural logarithm of the average number of open option contracts, calculated for each company from the day after the previous quarter's earnings announcement to the current quarter's earnings announcement date.
BadNews	An indicator variable equal to 1 if the trading volume of put options exceeds that of call options and 0 otherwise.
NGP_Dis	An indicator variable equal to 1 if the earnings announcement contains a non-GAAP earnings per share disclosure and 0 otherwise.
Size	The natural logarithm of total assets at the end of the quarter.
Intangible	The ratio of intangible assets to total assets.
BM	The book-to-market ratio, calculated as the book value of equity divided by the market value of equity.
Growth	The quarter-over-quarter sales growth rate, calculated as (current quarter sales - previous quarter sales) / previous quarter sales.
Lev	The debt-to-equity ratio, calculated as total liabilities divided by total equity at the end of the fiscal quarter.
Roa_std	The standard deviation of return on assets (ROA) over the past 16 quarters. ROA is calculated as income before extraordinary items scaled by beginning-of-year total assets.
Loss	An indicator variable equal to 1 if earnings before extraordinary items for the year is negative and 0 otherwise.
Abs_Spi	The absolute value of special items divided by total assets.
Neg_Spi	An indicator variable equal to 1 if the company reports negative special items and 0 otherwise.
Accrual	The difference between income before extraordinary items and operating cash flows, scaled by beginning-of-year total assets.
Age	The number of years since the company first appeared in Compustat.
Future_OI	One-year-ahead operating income (income before depreciation and amortization), scaled by beginning-of-year total assets.
Future_CFO	One-year-ahead operating cash flows, scaled by beginning-of-year total assets.
NGP_Earn	Non-GAAP earnings per share multiplied by the number of diluted shares outstanding, divided by total assets.

**Appendix 1: Variables and Definitions** 

NGP_Exclu	The difference between non-GAAP earnings and income before extraordinary items, multiplied by the number of diluted shares outstanding and divided by total assets.
Exclu_Spi	Special items divided by total assets.
Exclu_Recur	Total recurring exclusions divided by total assets.
MBE	An indicator variable equal to 1 if non-GAAP earnings exceed the mean of IBES street earnings and 0 otherwise.
Coverage	The number of financial analysts following the firm in the quarter preceding the earnings announcement date.
Capital Expenditure	Capital expenditure divided by lag assets.
Impairment	impairment losses divided by lag assets.
Restructre	Restructure expense divided by lag assets.
RD	research and development (R&D) expenses divided by lag assets.

Variable	mean	sd	p25	p50	p75	Ν
NGP_Dis	0.4562	0.4981	0	0	1	85906
OptionTrading	14.0612	3.1199	12.1819	14.1903	16.2241	85906
Size	7.1837	1.7212	5.9708	7.0995	8.2982	85906
Intangible	0.2012	0.2137	0.0171	0.1282	0.3289	85906
Growth	0.0585	0.3537	-0.0477	0.0238	0.1017	85906
BV	3.5781	8.6851	1.4916	2.4807	4.3273	85906
NegSPi	0.4459	0.4971	0	0	1	85906
Lev	0.5396	0.3157	0.3372	0.5187	0.6863	85906
Abs_Spi	0.0052	0.0210	0	0.0001	0.0027	85906
Loss	0.2842	0.4510	0	0	1	85906
Ros_std	0.0407	0.3361	0.0079	0.0156	0.0343	85906
Age	22.7114	17.1471	9	18	30	85906
Future_OI	0.0335	0.1154	0.0108	0.0451	0.0814	46089
Future_CFO	0.2001	0.2466	0.1018	0.2021	0.3173	46089
Future_Ni	0.0208	0.1376	-0.0055	0.0388	0.0781	46089
NGP_Exclu	0.0106	0.0409	0.0011	0.0049	0.0129	46089
NGP_Earn	0.0152	0.0286	0.0066	0.0151	0.0255	46089

 Table 1 Descriptive Statistics for Main and Control Variables

This table presents descriptive statistics for the main and control variables used in our primary regression analyses. Detailed definitions of all variables are provided in Appendix 1.

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Variables	(1)	(2)	(3)	(4)	(5)	(9)	(2)	(8)	(6)	(10)	(11)	(12)
$(1) NGP_Dis$	1	0.1243*	0.2129*	$0.2902^{*}$	0.0062	$0.0087^{*}$	$0.3674^{*}$	$0.0892^{*}$	$0.3772^{*}$	-0.0198*	-0.0506*	$0.0393^{*}$
		(0.0000)	(0.0000)	(0.0000)	-(0.0681)	-(0.0108)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
(2) OptionTrading	$0.1198^{*}$	1	$0.5452^{*}$	-0.0103*	$0.0528^{*}$	$0.2856^{*}$	$0.0531^{*}$	$0.1445^{*}$	$0.0379^{*}$	$-0.1163^{*}$	-0.0293*	$0.1193^{*}$
	(0.0000)		(0.0000)	-(0.0025)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
(3) Asset	0.2119*	0.5513*	1	$0.2301^{*}$	-0.0232*	-0.0401*	$0.2056^{*}$	$0.4110^{*}$	$0.1589^{*}$	-0.3127*	-0.4388*	$0.4120^{*}$
	(0.0000)	(0.0000)		(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
(4) Intan	0.2744*	-0.0067*	$0.2042^{*}$	1	0.0043	$0.0183^{*}$	0.3119*	$0.1052^{*}$	$0.2888^{*}$	-0.1450*	-0.2175*	$0.0703^{*}$
	(0.0000)	-(0.0482)	(0.0000)		-(0.2036)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
(5) BV	0.0075*	$0.1114^{*}$	-0.0193*	-0.0152*	1	$0.0951^{*}$	-0.0158*	0.0309*	-0.0183*	-0.1120*	$0.0280^{*}$	-0.0639*
	-(0.0272)	(0.0000)	(0.0000)	(0.0000)		(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
(6) Neg_Spi	0.3672*	0.0498*	$0.1985^{*}$	$0.2850^{*}$	-0.0306*	1	-0.0721*	$0.0195^{*}$	-0.0986*	-0.0974*	$0.0149^{*}$	-0.0889*
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)		(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
(7) Lev	0.0530*	$0.1111^{*}$	$0.2508^{*}$	0.0840*	-0.0216*	$0.1243^{*}$	1	$0.1584^{*}$	0.7727*	$0.0801^{*}$	$-0.0304^{*}$	$0.0861^{*}$
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)		(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
(8) Abs_Spi	$0.1026^{*}$	-0.0172*	-0.0426*	$0.0312^{*}$	-0.0217*	$0.1922^{*}$	$0.0744^{*}$	1	$0.1594^{*}$	-0.0038	-0.1165*	$0.1370^{*}$
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.000)	(0.0000)	(0.0000)		(0.000.0)	-(0.2656)	(0.0000)	(0.0000)
(9) Growh	-0.0406*	0.0237*	-0.0644*	-0.0168*	0.0193*	-0.0212*	$0.0594^{*}$	0.0203*	1	0.1337*	$0.0331^{*}$	$0.0738^{*}$
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)		(0.0000)	(0.0000)	(0.0000)
(10) Loss	-0.0199*	-0.1225*	-0.3125*	-0.1135*	0.0001	$0.0801^{*}$	0.0403*	$0.1994^{*}$	-0.0274*	1	0.4053*	-0.2233*
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	-(0.9723)	(0.0000)	(0.0000)	(0.0000)	(0.0000)		(0.0000)	(0.0000)
$(11) Roa_std$	-0.0298*	$-0.0101^{*}$	-0.0883*	-0.0314*	$0.0251^{*}$	-0.0196*	0.0017	$0.0095^{*}$	$0.0168^{*}$	$0.0770^{*}$	1	-0.2785*
	(0.0000)	-(0.0029)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	-(0.6229)	-(0.0054)	(0.0000)	(0.0000)		(0.0000)
(12) Age	0.0498*	$0.1312^{*}$	$0.4628^{*}$	0.0169*	-0.0397*	$0.0832^{*}$	$0.1101^{*}$	-0.0302*	-0.0594*	-0.2104*	-0.0563*	1
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.000)	(0.0000)	(0.0000)	(0.0000)	(0.000)	(0.0000)	(0.0000)	

<b>Panel B Pearson</b>	(bottom) :	and Spear	man (top)	correlati	ons for Ec	J. (2)						
Variables	(1)	(2)	(3)	(4)	(5)	(9)	(2)	(8)	(6)	(10)	(11)	(12)
$(1)$ Future_OI	1	$0.6304^{*}$	$0.9185^{*}$	-0.2220*	0.2222*	$0.6966^{*}$	0.2190*	-0.2062*	$0.0554^{*}$	$0.3406^{*}$	-0.5238*	0.1850*
		(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
$(2)$ Future_CFO	$0.6994^{*}$	1	$0.6067^{*}$	-0.0836*	$0.2415^{*}$	0.5759*	$0.1321^{*}$	-0.1148*	0.0370*	$0.2867^{*}$	-0.3633*	$0.0346^{*}$
	(0.000)		(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.000)	(0.0000)
$(3)$ Future_NI	$0.9069^{*}$	$0.6454^{*}$	1	-0.2240*	$0.2082^{*}$	0.6447*	$0.1992^{*}$	-0.1935*	$0.0622^{*}$	0.3269*	-0.4934*	$0.1620^{*}$
	(0.0000)	(0.0000)		(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
(4) $NGP\_Exclu$	-0.1928*	-0.1070*	-0.1788*	1	-0.0148*	-0.0038	-0.2791*	$0.2511^{*}$	0.0393*	$0.1098^{*}$	$0.5128^{*}$	-0.2304*
	(0.000)	(0.0000)	(0.0000)		(0.0015)	(0.4178)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
(5) <i>OptionTrading</i>	0.1728*	$0.2136^{*}$	$0.1554^{*}$	-0.0207*	1	$0.2331^{*}$	0.5989*	-0.0086	0.0513*	$0.2694^{*}$	-0.1179*	$0.1563^{*}$
	(0.0000)	(0.0000)	(0.0000)	(0.0000)		(0.0000)	(0.0000)	(0.0645)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
(6) $NGP\_Earn$	$0.6024^{*}$	$0.6042^{*}$	0.5427*	-0.0365*	$0.1831^{*}$	1	$0.0881^{*}$	-0.1221*	0.2458*	$0.4030^{*}$	-0.5626*	$0.0485^{*}$
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)		(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.000)
(7) Size	0.2443*	$0.1683^{*}$	$0.2125^{*}$	-0.1122*	0.5943*	$0.1283^{*}$	1	-0.3644*	-0.0432*	-0.0026	$-0.2616^{*}$	$0.4486^{*}$
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)		(0.0000)	(0.0000)	(0.5720)	(0.0000)	(0.0000)
(8) $Roa_{std}$	-0.0849*	-0.0602*	-0.0750*	$0.0261^{*}$	-0.0125*	-0.0557*	-0.0838*	1	0.0378*	-0.0204*	$0.3122^{*}$	-0.2276*
	(0.0000)	(0.0000)	(0.000)	(0.0000)	-(0.0072)	(0.0000)	(0.0000)		(0.0000)	(0.0000)	(0.0000)	(0.000)
(9) Growh	0.005	-0.0117*	0.0061	-0.0043	$0.0324^{*}$	$0.1716^{*}$	-0.0273*	0.0257*	1	$0.1164^{*}$	$-0.1034^{*}$	-0.0836*
	-(0.2836)	-(0.0120)	-(0.1866)	-(0.3580)	(0.0000)	(0.0000)	(0.0000)	(0.0000)		(0.0000)	(0.0000)	(0.0000)
(10) BV	$0.0432^{*}$	$0.0664^{*}$	0.0515*	$0.0242^{*}$	$0.1100^{*}$	$0.0666^{*}$	-0.0168*	0.0051	$0.0193^{*}$	1	-0.1408*	-0.0926*
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	-(0.0003)	-(0.2760)	(0.0000)		(0.0000)	(0.0000)
(11) <i>Loss</i>	-0.4581*	-0.3593*	-0.4209*	0.3358*	-0.1242*	-0.4364*	-0.2601*	0.0717*	-0.0770*	0.0018	1	$-0.1818^{*}$
	(0.000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	-(0.6944)		(0.0000)
(12) <i>Age</i>	$0.1581^{*}$	$0.0361^{*}$	$0.1386^{*}$	-0.0831*	$0.1699^{*}$	$0.0429^{*}$	$0.4901^{*}$	-0.0593*	-0.0474*	-0.0451*	-0.1679*	1
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	
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This table presents Pearson and Spearman correlation coefficients for the main and control variables used in testing Hypothesis 1 (Panel A) and Hypothesis 2 (Panel B), corresponding to Eqs. (1) and (2). Asterisks (\*) indicate statistical significance at the 5% level or better (two-tailed). Detailed variable definitions are provided in Appendix 1.

Dep	NGP_D	is
Variables	(1)	(2)
<b>OptionTrading</b>	0.0470***	0.0396***
	(4.7737)	(6.0823)
Size	0.2067***	0.0999***
	(7.5241)	(5.7862)
Intangible	1.7223***	0.9528***
	(10.9425)	(9.6006)
BV	0.0031	0.0029**
	(1.6258)	(2.0467)
Neg_SPi	1.2209***	1.1671***
	(34.4419)	(36.8275)
Lev	-0.0315	-0.1306**
	(-0.3706)	(-2.2317)
ABS_Spi	6.9793***	10.1233***
	(10.9944)	(15.1184)
Growh	-0.1816***	0.0311
	(-6.7414)	(0.9822)
Loss	-0.0251	0.0210
	(-0.5097)	(0.5671)
Roa_std	-0.1369	-0.0877
	(-1.5027)	(-0.8424)
Age	-0.0053***	-0.0022*
	(-2.6876)	(-1.8417)
Lag_NGP_Dis		3.6209***
		(86.6008)
Constant	-3.5200***	-2.8867***
	(-5.4019)	(-4.2166)
Year fixed effect	Included	Included
Industry Fixed effect	Included	Included
Observations	85,906	85,906
Pseudo R-squared	0.196	0.507

**Table 3 Options Trading and Non-GAAP Disclosures** 

This table presents the results of estimating the relationship between options trading and the probability of non-GAAP earnings disclosure. Z-values, reported in parentheses, are adjusted for heteroscedasticity and clustered by firm. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable definitions are provided in Appendix 1.

Dep	Future_OI	Future_NI	Future_CFO
Variables	(1)	(2)	(3)
	5 7	· · ·	
NGP Exclu	-1.0628***	-1.1071***	-1.6984***
—	(-3.9479)	(-3.7272)	(-3.4658)
OptionTrading	-0.0029***	-0.0023**	0.0035**
	(-3.5581)	(-2.4449)	(2.1085)
<b>OptionTrading</b> *NGP Exclu	0.0563***	0.0576***	0.0983***
	(3.4291)	(3.1751)	(3.2204)
NGP_Earn	1.0587	1.3364*	2.5176**
	(1.6329)	(1.8497)	(2.3164)
<b>OptionTrading*NGP_Earn</b>	0.0780**	0.0682*	0.1759***
	(2.0746)	(1.6786)	(2.5964)
Size	0.0099***	0.0082***	-0.0000
	(9.0158)	(5.9642)	(-0.0146)
Roa_std	-0.0173	-0.0185	-0.0369*
	(-1.1041)	(-1.0614)	(-1.7811)
Growh	-0.0458***	-0.0497***	-0.1329***
	(-8.0166)	(-7.1128)	(-11.2528)
BV	0.0002**	0.0004 * * *	0.0007***
	(2.2728)	(3.5888)	(2.9169)
Loss	-0.0381***	-0.0459***	-0.0587***
	(-6.0791)	(-6.2188)	(-5.7547)
Age	0.0003***	0.0003***	-0.0001
	(6.3725)	(6.3217)	(-0.8946)
Constant	0.0261*	0.0186	0.1115**
	(1.6908)	(1.0146)	(2.2761)
Year fixed effect	Included	Included	Included
Industry Fixed effect	Included	Included	Included
Observations	46,089	46,089	46,089
Adjusted-Rsquared	0.476	0.386	0.453

**Table 4 Future Performance Test and Options Trading** 

This table presents the results of estimating the relationship between options trading (*OptionsTrading*) and the persistence of non-GAAP exclusions using Eq. (2). The dependent variables are one-year-ahead operating income (*Future\_OI*), one-year-ahead net income(*Future\_NI*) and one-year-ahead operating cash flows (*Future\_CFO*). T-values, reported in parentheses, are adjusted for heteroscedasticity and clustered by firm. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable definitions are provided in Appendix 1.

Dep	OptionT	rading	NGP	Dis
-		-	 OpenInterest	Moneyness
Variables	(1)	(2)	(3)	(4)
<b>OpenInterest</b>	1.2965***	<u> </u>		<u> </u>
	(244.2471)			
Moneyness		<b>1.6971***</b>		
		(174.2494)		
<b>Option_predict</b>			<b>0.0387***</b>	0.1397***
			(2.8578)	(6.7893)
Size	0.7504***	0.8742***	0.2664***	0.2016***
	(145.1660)	(152.3007)	(8.7894)	(5.5074)
Intangible	-1.0782***	-1.7226***	1.5760***	1.5759***
	(-32.8129)	(-47.7062)	(10.4582)	(10.5316)
BV	0.0321***	0.0141***	0.0037*	0.0023
	(46.6304)	(18.3333)	(1.9487)	(1.2731)
Neg_SPi	-0.1613***	-0.1158***	1.2073***	1.2372***
	(-12.3127)	(-7.9803)	(35.1635)	(35.6645)
Lev	-0.3712***	0.1582***	-0.0408	-0.0189
	(-18.3655)	(7.0638)	(-0.4877)	(-0.2295)
ABS_Spi	-0.9969***	0.2025	7.0277***	6.8812***
	(-3.4353)	(0.6306)	(11.6830)	(11.3550)
Growh	0.1986***	0.3769***	-0.1786***	-0.2203***
	(11.6135)	(19.9390)	(-6.8574)	(-7.8844)
Loss	-0.5608***	0.6027***	-0.0146	-0.0653
	(-36.9914)	(36.3917)	(-0.3076)	(-1.3093)
Roa std	0.0557***	0.2416***	-0.1953**	-0.1911**
—	(3.3171)	(13.0179)	(-2.0051)	(-2.2101)
Age	-0.0143***	-0.0164***	-0.0065***	-0.0055***
0	(-35.1403)	(-36.3312)	(-3.4455)	(-2.8093)
Lag Open interest predict			-0.0380***	
			(-3.2493)	
Lag Moneyness predict			× ,	-0.0909***
				(-5.4600)
Constant	2.1420***	5.6276***	-3.8962***	-4.1029***
	(18.5617)	(44.2026)	(-11.7100)	(-11.9452)
Year fixed effect	Included	Included	Included	Included
Industry Fixed effect	Included	Included	Included	Included
Observations	99,699	99,699	97,355	97,011
Adjusted-Rsquared	0.651	0.572		-
Pseudo R-squared			0.190	0.192

#### Table 5 Two-Stage Least Squares Regression and Non-GAAP Disclosure

This table presents the results of a two-stage least squares (2SLS) regression using moneyness and open interest as instrumental variables. The analysis tests the association between non-GAAP disclosure and predicted options trading using a contemporaneous specification. T-values, reported in parentheses, are adjusted for heteroscedasticity and clustered by firm. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable definitions are provided in Appendix 1.

lable 0 1 WO-Stage Least square	cs regression an	U NUII-GAAF E	armugs Quamy			
Dep	$Future_OI$	$Future_{NI}$	Future_CFO	$Future_OI$	$Future_{NI}$	$Future\_CFO$
		<b>OpenInterest</b>			Moneyness	
Variables	(1)	(2)	(3)	(4)	(5)	(9)
NGP_Exclu	-0.9725**	-0.9871**	-1.3339*	-1.4445***	-1.4809***	-2.5083***
	(-2.4630)	(-2.3450)	(-1.9561)	(-2.8735)	(-2.6892)	(-3.3404)
Open_interest_predict	-0.0074***	-0.0072***	-0.0013			
	(-4.6189)	(-3.9031)	(-0.4599)			
NGP_Exclu * Option_predict	0.0488*	0.0484*	0.0712			
	(1.8313)	(1.6698)	(1.5332)			
NGP Earn	1.9454*	$2.1319^{**}$	4.3347**	0.9369	1.3556	1.8336
I	(1.9457)	(2.0247)	(2.4291)	(0.8966)	(1.1999)	(1.2099)
NGP_Earn* Option_predict	0.0117	0.0089	0.0501			
1	(0.1637)	(0.1181)	(0.3785)			
Moneyness_predict				0.0011	0.0029*	$0.0113^{***}$
				(0.7349)	(1.8131)	(3.7915)
NGP Exclu* Option predict				0.0868***	0.0878**	0.1627***
				(2.5793)	(2.3887)	(3.2799)
NGP_Earn* Option_predict				0.0885	0.0670	$0.2362^{**}$
				(1.3387)	(0.9571)	(2.3678)
Constant	0.0353	0.0292	$0.1101^{**}$	0.0139	-0.0015	$0.0883^{*}$
	(1.5906)	(1.1742)	(1.9853)	(0.6359)	(-0.0618)	(1.6672)
Observations	46,571	46,571	46,571	46,571	46,571	46,571
Adjusted-Rsquared	0.478	0.388	0.445	0.479	0.389	0.461

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The analysis examines the association between non-GAAP earnings quality (measured by future operating income and cash flow) and predicted options trading, using a contemporaneous specification. T-values, reported in parentheses, are adjusted for heteroscedasticity and clustered by firm. \*\*\*, \*\*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable This table presents the results of a two-stage least squares (2SLS) regression using moneyness and open interest as instrumental variables. definitions are provided in Appendix 1.

<b>Table 7 Impact of Different Period</b>	ls on Options Trading Us	age
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Panel A	(1)	(2)	(3)
Variables Dep=NGP Dis	FinaceCrisis	ShortSell	TickSize
<b>OptionTrading</b>	0.0410***	0.0385***	0.0364***
	(6.0587)	(5.7811)	(5.5202)
Conrtols	Included	Included	Included
Fixed effect	Included	Included	Included
Observations	77,724	75,968	72,854
Pseudo R-squared	0.512	0.519	0.498
Panel B	(1)	(2)	(3)
Variables Dep=Future OI	FinaceCrisis	ShortSell	TickSize
NGP Exclu	-1.2506***	-1.0653***	-1.0022***
—	(-3.9826)	(-3.8825)	(-2.8939)
OptionTrading	-0.0028***	-0.0030***	-0.0029***
1 0	(-3.3329)	(-3.5150)	(-3.0971)
<b>OptionTrading*NGP</b> Exclu	0.0621***	0.0560***	0.0540**
	(3.4266)	(3.3076)	(2.5219)
Conrtols	Included	Included	Included
Fixed effect	Included	Included	Included
Observations	42,264	42,124	38,507
Adjusted-Rsquared	0.498	0.469	0.489
Panel C	(1)	(2)	(3)
Variables Dep=Future_NI	FinaceCrisis	ShortSell	TickSize
NGP_Exclu	-1.3371***	-1.1131***	-0.9824***
	(-3.8470)	(-3.6729)	(-2.6800)
OptionTrading	-0.0022**	-0.0023**	-0.0022**
	(-2.4741)	(-2.3473)	(-2.0221)
OptionTrading*NGP_Exclu	0.0651***	0.0577***	0.0520**
	(3.2499)	(3.0844)	(2.2687)
Conrtols	Included	Included	Included
Fixed effect	Included	Included	Included
Observations	42,264	42,124	38,507
Adjusted-Rsquared	0.416	0.388	0.394
Panel D	(1)	(2)	(3)
Variables Dep=Future_CFO	FinaceCrisis	ShortSell	TickSize
NGP_Exclu	-1.3371***	-1.1131***	-0.9824***
	(-3.8470)	(-3.6729)	(-2.6800)
OptionTrading	-0.0022**	-0.0023**	-0.0022**
	(-2.4741)	(-2.3473)	(-2.0221)
<b>OptionTrading*NGP_Exclu</b>	<b>0.0651***</b>	0.0577***	0.0520**
	(3.2499)	(3.0844)	(2.2687)
Conrtols	Included	Included	Included
Fixed effect	Included	Included	Included
Observations	42,264	42,124	38,507

Adjusted-Rsquared	0.416	0.388	0.394
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This table presents the results of robustness tests examining the association between options trading and non-GAAP earnings, excluding periods that may significantly affect options trading: (1) the financial crisis (2007-2008), (2) the SHO Pilot Program period (2005-2007), and (3) the Tick Size Pilot period (2016-2018). Panel A shows the association between non-GAAP earnings disclosure and options trading. Panels B and C report the association between the average magnitude of non-GAAP exclusions for firms with options trading and future operating income and future cash flows, respectively. T-values, reported in parentheses, are adjusted for heteroscedasticity and clustered by firm. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable definitions are provided in Appendix 1.

Dep	NGP_Dis		
Variables			
Treat	-0.2154		
	(-1.3804)		
Post	0.0816		
	(0.6248)		
Treat*Post	0.3438**		
	(1.9611)		
Size	0.3631***		
	(7.2428)		
Intan	-0.0001		
	(-1.0926)		
BV	0.0103***		
	(2.8866)		
Neg_Spi	1.0892***		
	(12.1176)		
Lev	-0.2505*		
	(-1.6689)		
Abs_Spi	7.3992***		
	(6.4425)		
Growh	-0.0692		
	(-0.7037)		
Loss	0.2314***		
	(2.5839)		
Roa_std	-0.1735		
	(-1.0280)		
Age	-0.0042		
	(-1.0068)		
Lag.NGP_Dis	3.4418***		
	(25.7056)		
Constant	-7.3078***		
	(-6.6631)		
Year Fixed effect	Included		
Industry Fixed effect	Included		
Observations	12,142		
Pseudo R-squared	0.519		

**Table 8 Non-GAAP Disclosure and Option Listing** 

This table presents the results of a difference-in-differences analysis examining the impact of option listing on non-GAAP disclosure. It shows the association between non-GAAP disclosure and firms with listed options in the years following their option listing. Z-values, reported in parentheses, are adjusted for heteroscedasticity and clustered by firm. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable definitions are provided in Appendix 1.

Dep	Capital Expenditure		Recurring Item
Variables	(1) Full sample	(2) Restricted sample	(3)
<b>Option Trading</b>	0.0012***	0.0013***	0.0003**
	(8.4787)	(7.0061)	(2.3855)
Capx			0.0154
			(0.3632)
<b>OptionTrading*Capx</b>			-0.0048*
			(-1.6789)
Size	-0.0018***	-0.0022***	-0.0001
	(-4.7573)	(-4.5370)	(-0.6501)
Intangible	-0.0336***	-0.0338***	-0.0006
	(-17.6769)	(-14.9654)	(-0.6741)
NGP_Earn			-0.0583***
			(-2.9397)
NGP_Exclu			0.4724***
_			(13.1179)
Neg_Spi			-0.0048***
			(-14.1692)
Abs_Spi			-0.2555***
			(-9.4056)
Loss	-0.0051***	-0.0036***	0.0011
	(-8.2823)	(-5.1602)	(1.6265)
Roa_std	-0.0004	0.0006	0.0008
	(-0.6561)	(0.3301)	(0.7370)
Age	0.0033***	0.0080***	-0.0082***
	(6.6855)	(6.7885)	(-5.6224)
Restructre	-0.0002***	-0.0001***	-0.0000*
	(-7.2280)	(-5.1394)	(-1.9010)
Impairment			27.0367***
			(4.8797)
BV			0.0816***
			(3.2855)
RD	0.0000**	0.0000	0.0000***
	(2.1429)	(0.9075)	(2.6802)
Growh	-0.1152***	-0.1242***	0.1486***
	(-9.4778)	(-6.3277)	(6.0208)
Lev	0.0050***	0.0062***	
	(4.3142)	(3.8893)	
Constant	0.0520***	0.0425***	-0.0144**
	(10.5173)	(7.5629)	(-2.4790)
Year Fixed effect	Included	Included	Included
Industry Fixed effect	Included	Included	Included
Observations	99,345	45,885	45,885
Adjusted-Rsquared	0.283	0.350	0.315

# Table 9 Option Trading and Capital Expenditure

Robust t-statistics in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Dep	Future_OI	Future NI	Future_CFO
Variables	(1)	(2)	(3)
OptionTrading	-0.2533**	-0.2765*	-0.0439
	(-2.2568)	(-1.9024)	(-0.1706)
Exclu_Spi	0.0002	0.0009	0.0100***
	(0.2214)	(1.0799)	(6.6012)
<b>OptionTrading</b> *Exclu_Spi	0.0139**	0.0129	0.0084
	(2.1983)	(1.5301)	(0.5242)
Exclu_Recur	-2.6973***	-2.8765***	-5.2858***
	(-4.4941)	(-4.5089)	(-5.9017)
<b>OptionTrading</b> * Exclu_Recur	0.0914***	0.1091***	0.2115***
	(2.6883)	(3.0206)	(3.7356)
NGP_Earn	2.1523***	2.4079***	4.6180***
	(5.1589)	(4.7270)	(5.8946)
OptionTrading *NGP_Earn	0.0128	0.0044	0.0511
	(0.5285)	(0.1606)	(1.0140)
Size	0.0074***	0.0059***	-0.0044*
	(7.7776)	(4.5700)	(-1.8528)
Roa_std	-0.0133	-0.0147	-0.0297*
	(-1.0544)	(-1.0107)	(-1.9440)
Growh	-0.0595***	-0.0623***	-0.1569***
	(-11.1751)	(-9.4586)	(-13.5759)
BV	0.0003***	0.0005***	0.0008 * * *
	(3.4115)	(4.3883)	(3.4825)
Loss	-0.0254***	-0.0342***	-0.0363***
	(-4.1876)	(-4.7930)	(-3.4990)
Age	0.0003***	0.0003***	-0.0002
_	(6.4242)	(6.1336)	(-1.2954)
Constant	-0.0281*	-0.0370*	0.0007
	(-1.6542)	(-1.8502)	(0.0151)
Year Fixed effect	Included	Included	Included
Industry Fixed effect	Included	Included	Included
Observations	46.089	46.089	46,089
Adjusted-Rsquared	0.533	0.422	0.495

**Table 10 Analysis of Different Types of Exclusions** 

This table presents the results of estimating the relationship between different types of exclusions, options trading, and future performance using Eq. (2). The dependent variables are one-year-ahead operating income, one-year-ahead net income and one-year-ahead operating cash flows. T-values, reported in parentheses, are adjusted for heteroscedasticity and clustered by firm. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable definitions are provided in Appendix 1.

Dep	Meet_Fall	
Variables		
<b>Option Trading</b>	-0.0200***	
	(-2.7008)	
MV	0.0029	
	(0.1199)	
Profitable	1.2093***	
	(23.8711)	
Growth	-0.0012**	
	(-1.9741)	
Coverage	-0.0062*	
	(-1.9074)	
Accrual	-1.6362***	
	(-9.2508)	
Size	0.1394***	
	(6.0458)	
Loss	0.9673***	
	(26.5018)	
Roa_std	0.1849	
	(1.6411)	
Intangible	0.0000	
	(1.3925)	
Constant	-1.9923***	
	(-4.0944)	
Year Fixed effect	Included	
Industry Fixed effect	Included	
Observations	47,284	
Pseudo R-squared	0.0446	

#### **Table 11 Meeting or Beating Analyst Forecasts**

This table presents the results of estimating the relationship between options trading, and meet or beat analysts' forecasts. *Meet\_Fall* is an indicator variable equal to 1 if non-GAAP earnings exceed IBES actual street earnings and GAAP earnings is less than IBES GAAP earnings and 0 otherwise. Z-values, reported in parentheses, are adjusted for heteroscedasticity and clustered by firm. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable definitions are provided in Appendix 1.

Dep	NGP_Dis	Future_OI	Future NI	Future_CFO
Variables	(1)	(2)	(3)	(4)
Bad news	-0.0714***	-0.0026	-0.0093	0.0070
—	(-2.7384)	(-0.3519)	(-1.1503)	(0.5846)
NGP Exclu		-0.4256***	-0.4711***	-0.5684***
—		(-3.7199)	(-3.7977)	(-3.0830)
Bad news*NGP Exclu		0.3191**	0.3759**	0.5132**
		(2.2845)	(2.5668)	(2.4977)
NGP Earn		2.1906***	2.3255***	5.1799***
_		(9.6717)	(9.4446)	(14.3088)
Bad news*NGP Earn		-0.2809	-0.2258	-0.6257
		(-0.6133)	(-0.4499)	(-0.8245)
Size	0.1541***	0.0080***	0.0070***	0.0088***
	(10.4415)	(9.4333)	(7.0507)	(4.2453)
Intangible	0.8655***			
-	(8.8683)			
BV	0.0042***	0.0002**	0.0004***	0.0010***
	(2.9448)	(2.0901)	(3.5224)	(4.0348)
Neg_Spi	1.1562***			
	(36.5418)			
Lev	-0.1375**			
	(-2.3271)			
Abs_Spi	10.2292***			
	(15.2028)			
Growh	0.0483	-0.0442***	-0.0483***	-0.1258***
	(1.5227)	(-7.4123)	(-6.5993)	(-10.6213)
Loss	0.0296	-0.0375***	-0.0447***	-0.0540***
	(0.8013)	(-6.6235)	(-6.5867)	(-5.7968)
Roa_std	-0.0698	-0.0172	-0.0184	-0.0305*
	(-0.8312)	(-1.0749)	(-1.0408)	(-1.7715)
Age	-0.0031***	0.0003***	0.0003***	-0.0003*
	(-2.5801)	(6.0961)	(6.0981)	(-1.8075)
Lag_NGP_Dis	3.6228***			
	(86.4077)			
Constant	-2.7162***	0.0021	-0.0000	0.0895*
	(-4.0301)	(0.1591)	(-0.0030)	(1.9166)
Year Fixed effect	Included	Included	Included	Included
Industry Fixed effect	Included	Included	Included	Included
Observations	85,906	46,089	46,089	46,089
Pseudo R-squared	0.507			
Adjusted-Rsquared		0.470	0.385	0.444

Table 12 Impact of Pessimistic Expectations on Non-GAAP Reporting

This table presents the association between pessimistic market sentiment, non-GAAP disclosure, and non-GAAP earnings quality. *BadNews* (pessimistic expectations) is an indicator variable equal

to 1 if the volume of put options exceeds the volume of call options and 0 otherwise. Standard errors, reported in parentheses, are adjusted for heteroscedasticity and clustered by firm. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable definitions are provided in Appendix 1.

Dep	NGP Dis		
Variables	(1)	(2)	
	· ·	i	
Mgt forecast	0.5448***	0.6589***	
	(14.9448)	(3.5956)	
OptionTrading	, , , , , , , , , , , , , , , , , , ,	0.0381***	
1 0		(5.5633)	
Mgt forecast*OptionTrading		-0.0109	
		(-0.8678)	
Size	0.2158***	0.0951***	
	(18.7186)	(5.5580)	
Intangible	0.7104***	0.9196***	
6	(8.7625)	(9.3308)	
BV	1.1493***	1.1760***	
	(42.1447)	(36.9751)	
Neg Spi	-0.1551***	-0.0800	
0_1	(-3.1707)	(-1.3644)	
Lev	7.9836***	10.1345***	
	(19.8385)	(15.1079)	
Abs Spi	0.0755***	0.0390	
_ 1	(2.8929)	(1.2284)	
Growh	0.0954***	0.0464	
	(3.1765)	(1.2629)	
Loss	-0.0282	-0.0733	
	(-0.7728)	(-0.8268)	
Roa std	-0.0043***	-0.0019	
_	(-4.0148)	(-1.5747)	
Age	3.5336***	3.5860***	
C	(99.5100)	(86.2789)	
Lag.NGP_Dis	-3.8654***	-2.8805***	
- —	(-6.7640)	(-4.1393)	
Constant	0.5448***	0.6589***	
	(14.9448)	(3.5956)	
Observations	124,583	85,906	
Pseudo R-squared	0.516	0.510	

**Table 13 Manager Forecasts and Non-GAAP Earnings** 

This table presents the association between non-GAAP disclosure and management forecasts. Model (1) and Models (2) examine the relationship between non-GAAP disclosure and management forecasts. Z-values, reported in parentheses, are adjusted for heteroscedasticity and clustered by firm. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable definitions are provided in Appendix 1.