INSIDER STOCK PLEDGE AND VOLUNTARY NON-GAAP DISCLOSURES: EVIDENCE FROM US FIRMS

HAOWEN DENG

MPhil

The Hong Kong Polytechnic University

2023

The Hong Kong Polytechnic University

School of Accounting and Finance

Insider Stock Pledge and Voluntary Non-GAAP Disclosures: Evidence from US Firms

Haowen Deng

A thesis submitted in partial fulfilment of the requirements for the degree of Master of Philosophy

May 2023

CERTIFICATE OF ORIGINALITY

I hereby declare that this thesis is my own work and that, to the best of my knowledge and belief, it reproduces no material previously published or written, nor material that has been accepted for the award of any other degree or diploma, except where due acknowledgement has been made in the text.

_____ _____ (Signed)

HAOWEN DENG_____ (Name of student)

ABSTRACT

We investigate whether firms change their voluntary non-GAAP disclosure practices following insider stock pledge. We find that managers' propensity to disclose non-GAAP number increase and the quality of non-GAAP reporting improves for pledging firms, suggesting managers voluntarily document high-quality information to stakeholders to alleviate concerns arising from pledging. Our results are robust to propensity score matching, entropy-balancing and staggered difference-in-difference identification. Cross-sectional analyses indicate that these changes in non-GAAP reporting are concentrated among firm a with high risk-taking and more conservative accounting. Collectively, our evidence is consistent with managers increased risk-aversion following insider stock pledge, providing new implications on the pledging behavior in response to ongoing criticism of pledging in the U.S. Overall, our evidence provides new insights on the determinants of non-GAAP reporting practices. Through investigating the information quality of non-GAAP disclosures, this study has further shed light on the behavioral motivations underlying insider stock pledging among U.S. companies, offering a reasonable explanation for the rationality and effectiveness of such stock pledge activities.

Keywords: Insider stock pledge, non-GAAP reporting, Disclosure, Margin call

ACKNOWLEDGEMENT

I am deeply grateful to the many people who have supported me in the completion of this thesis. First and foremost, I owe a special debt of gratitude to my chief supervisor, Professor Colin Zeng, and co-supervisor, Professor Qiang Wu, for their unwavering support and encouragement. Their thorough and patient guidance and mentorship have been invaluable, and I am fortunate to have had the opportunity to work with such brilliant and dedicated scholars. Professor Wu's passion for research and his commitment to real-world impact have inspired me to think creatively and push beyond my limits. Professor Zeng's ability to think outside the box and his flexible approach to problem-solving have been instrumental in helping me overcome challenges and grow as a researcher.

I would also like to express my gratitude to Professor Haimeng Teng for her valuable insights, feedback, and patient instruction, which have greatly improved the quality of this thesis. Her expertise and guidance have been essential to my success.

I am also deeply appreciative of the support and encouragement I have received from the courses and staff in the School of Accounting and Finance at the Hong Kong Polytechnic University. In particular, I would like to thank Professor Nancy Su, our School Head, for her unwavering support and encouragement.

Lastly, I would like to extend my heartfelt thanks to my family, colleagues, and friends for their love and support, especially during the difficult times of the Covid-19 pandemic. Your encouragement and faith in me have been a source of strength and inspiration, and I am forever grateful.

Table of Content

1 INTRODUCTION

This paper examines the effect of insider stock pledging on firms' voluntary non-GAAP earnings disclosure practices. An increasing body of literature indicates that non-GAAP earnings disclosures by managers are typically informative but can also be misleading (Bhattacharya et al. 2003; Black & Christensen 2009; Black et al. 2021; Bradshaw & Sloan 2002; Curtis et al. 2014; Bradshaw et al. 2018). Although regulators have expressed reservations about the use of non-GAAP disclosures, they have become more frequent than ever before (Bentley et al. 2018; Black et al. 2021). Furthermore, some standard setters consider non-GAAP disclosures to be an indication of potential improvements in GAAP. Despite the skepticism of regulators, most recent research concludes that non-GAAP reporting is typically intended to inform rather than mislead investors (e.g., Bentley et al. 2018; Black et al. 2021).

The extant literature predominantly focuses on firm-level characteristics and determinants of non-GAAP reporting, leaving a gap in our understanding of the internal forces that drive non-GAAP reporting. While previous studies have examined the role of CEOs in disclosing non-GAAP reporting (such as CEO personality and compensation structure), it is important to note that non-GAAP reporting is an ultimate decision made by managers and chosen by management (Abdel-Meguid et al. 2021; Black et al. 2021). CFO incentives have also been found to play a non-negligible role in the preparation of non-GAAP reporting (Bansal et al. 2013), and all c-suite executives could potentially influence financial reporting decisions (Hambrick 2007). Our research contributes to the literature by examining the relationship between a contentious and under-researched corporate practice, insider pledging, and the likelihood of voluntary non-GAAP earnings disclosures. Specifically, we investigate whether insider stock pledging is associated with the exclusion of expenses from non-GAAP earnings and whether these exclusions are more significant. We further test whether non-GAAP earnings disclosures driven by pledging are informative or opportunistic.

Corporate insiders often utilize their ownership of company stock as collateral for personal bank loans in many global markets (Chan et al. 2018; Dou et al. 2019).[1] This practice of stock pledging not only provides additional working capital for firms to avoid missing out on trading opportunities due to low cash margins but also provides benefits to the pledgers. By pledging their shares, the insiders can diversify their personal wealth without compromising their control rights over the company (Dou et al. 2019; Xu et al. 2019; Pang & Wang 2020).

[1] Larcker and Tayan (2010) conducted a study to investigate the extent to which managers and directors are permitted to pledge their shares in firms. Their findings revealed that over 20 percent of firms permitted pledging by these stakeholders. Building upon this research, Anderson and Puelo (2015) conducted a study using a sample of 500 large U.S. firms to confirm the prevalence of this phenomenon. Their study indicated that between 2006 and 2011, 23 percent of the sampled firms had at least one executive pledging their shares, with influential directors being the most common group to engage in such practices. In various markets including India, China, and Taiwan, a significant proportion of publicly listed firms, ranging from 35% to 50%, allow insiders to pledge their shares. This practice is also prevalent in other markets such as Australia, Hong Kong, Singapore, and the United Kingdom.

In recent years, the practice of stock pledging, wherein personal company shares are offered as collateral for personal loans, has raised substantial corporate governance concerns among regulators, proxy advisers, and institutional investors, despite its perceived benefits for firm insiders.[2] According to a survey conducted by Institutional Shareholder Service (ISS) in 2012, stock pledging by corporate insiders has been viewed as a problematic practice by half of institutional investors in the U.S. This perspective is largely based on an abundance of anecdotal evidence linking stock pledges to severe corporate governance practices.[3] The existing literature has thoroughly investigated the adverse effects of stock pledging on corporate governance, including heightened equity volatility, conservative corporate policies, reduced incentives for equity compensation, and the potential for earnings management.[4] Despite the prevalence of stock pledging and its detrimental outcomes, empirical research examining the impact of stock pledging on firms' voluntary disclosure practices is notably deficient. Thus, this study seeks to contribute to the literature by examining the influence of stock pledging by corporate insiders on firms' propensity to disclose information voluntarily and the quality of non-GAAP earnings.

Stock pledging exposes corporate insiders to the pressure of margin calls, which are triggered when stock prices fall below a certain level. As a result, insiders must either pledge additional shares or liquidate shares at fire sale prices, which can threaten their control rights and harm their personal

[2] Although it is intriguing and significant to comprehend the utilization of pledged loans and the motivation behind why insiders put up such collateral, the examination of the rationales for insiders pledging their shares necessitates the disclosure of personal information and details about the loan usage that are currently unavailable due to limitations in data access.

[3] The phenomenon of insider share pledging has been linked to various corporate scandals and financial distress. For instance, Jennings (2003) posits that the share pledges by WorldCom's CEO may have contributed to the company's downfall. Similarly, Dou et al. (2019) report that Chesapeake Energy's CEO and co-founder was forced to sell shares worth $569 million to meet a margin call in 2008, leading to a 40 percent decrease in the stock price within one week and instigating a class action lawsuit by investors. Additionally, Pang and Wang (2020) highlight Satyam in India and Steinhoff in South Africa as the largest accounting scandals associated with insider share pledging. In Australia, insider share pledging by directors has been linked to the downfall of ABC Learning Centres, the largest childcare service provider worldwide, which was subsequently placed under receivership.

[4] See Shen and Zhang (2020), Anderson and Puleo (2020), Larcker and Tayan (2020), Dou et al. (2019) and Singh (2019b)

wealth. Defaulting on loan obligations can also lead to severe reputational damage beyond financial losses (Dou et al. 2019; Pang & Wang, 2020). This pressure incentivizes pledgers to pressure managers to inflate reported earnings numbers (Singh b, 2018; DeJong et al. 2018). Bhattacharya et al. (2004) find that firms increasingly use non-GAAP earnings disclosures as earnings and stock prices decline. Compared to conventional earnings management tools (e.g., accruals and real earnings management), non-GAAP earnings disclosures are less detectable due to less stringent monitoring (Zhang and Zheng 2011; Black et al. 2017; Guggenmos et al. 2022; Hsu et al. 2022). Non-GAAP earnings disclosures may be less costly for firms due to lenient regulatory restrictions, a higher level of managerial discretion, and the information advantage gained from using ex post information (Graham et al. 2005, Doyle et al. 2013; Frankel et al. 2011; Black et al. 2017), making it an ideal candidate to help achieve the objectives of corporate insiders. We predict that stock pledging is associated with a higher likelihood of issuing non-GAAP disclosures.

The impact of stock pledging on the quality of non-GAAP earnings is subject to ambiguity. On one hand, stock pledging inherently gives rise to conflicts of interest between insiders and shareholders (Shen et al. 2021), leading to value expropriation from insiders such as tunneling resources from firms (Kao et al. 2004) and wealth transfer from outside shareholders to insiders (Bradshaw & Sloan, 2002; Dou et al. 2019; Anderson & Puleo 2020; Pang & Wang 2020). To mitigate these concerns, pledging insiders may urge managers to voluntarily disclose informative non-GAAP earning metrics that provide more value-relevant core earnings information. In other words, while managers have the ability to aggressively and opportunistically manipulate non-GAAP earnings, they are less likely to do so because they value long-term stock appreciation and control rights (DeJong et al. 2018). On the other hand, management may consider non-GAAP reporting as a low-cost substitute for earnings management, diverting investors' attention and causing them to focus on more optimistic earnings indicators, thereby supporting the company's stock price (Hsu et al. 2022). Managers may opportunistically exercise their discretion in defining non-GAAP exclusions

to mislead investors' perception of firms' operating performance. Therefore, these arguments leave the quality of non-GAAP reporting as an empirical question.

In our empirical study, we first estimate a probit model to examine the likelihood of non-GAAP earnings disclosures when insiders pledge their shares. To mitigate the reverse causality issue stemming from the difficulty of identifying the exact date of stock pledging by insiders, we adopt a lead-lag setting. We find that there is a significant increase in the probability of a firm disclosing a non-GAAP earnings metric following insider pledging. Specifically, we observe that a firm is 5.7 percentage points more likely to disclose a non-GAAP number in the year following insider pledging. Furthermore, we investigate the relationship between the proportion of shares pledged and the likelihood of non-GAAP earnings disclosures. Our findings indicate that there is a positive association between the proportion of shares pledged and the propensity to disclose non-GAAP earnings metrics. This suggests that firms are more likely to disclose non-GAAP earnings metrics when the proportion of shares pledged as loans is high.

We then examine the magnitude of aggressive non-GAAP reporting. To measure managers' non-GAAP reporting aggressiveness, we adopt the methodology employed by Black et al. (2021), Brown et al. (2011), and Christensen et al. (2020), which includes two key indicators: (1) managers' non-GAAP exclusions convert a GAAP loss to a non-GAAP profit; and, (2) the magnitude of managers' recurring non-GAAP exclusions[5]. We find that firms with insider stock pledging become less aggressive in their non-GAAP reporting choices. Second, we find evidence that insider stock pledge is negatively associated with the magnitude of managers' recurring exclusions, which suggests that pledging insiders are less aggressive in excluding expenses from non-GAAP earnings.

[5] The category of exclusions that have traditionally been most criticized, as it doesn't incorporate generally believe transitory items. Managers recurring exclusions are more likely to reflect aggressiveness of exclusions than non-GAAP total exclusions (Brown et al. 2012).

In this study, we aim to investigate the underlying motivations behind the increased frequency of non-GAAP reporting, specifically whether companies use it to better inform or mislead investors. To assess the quality of non-GAAP earnings exclusions, we adopt the value relevance test introduced by Feng et al. (2023). "High-quality" exclusions should be less value relevant than "low-quality" exclusions. Our measure of value relevance is based on the association between book value and earnings with price, as established by Collins, Maydew, and Weiss (1997). To test for value relevance, we regress stock price on book value, non-GAAP earnings, and non-GAAP exclusions. We argue that if exclusions are truly transitory, they should not be value relevant, and our findings support this claim for firms with insider pledging. Hence, we conclude that the increase in non-GAAP reporting is likely motivated by a desire to better inform investors, rather than to mislead them.

Additional analyses indicate the robustness of our findings to endogenous insider pledging choices, as demonstrated through the application of propensity score matching (PSM) and entropy balancing. The occurrence of stock pledging is not random, and firms that engage in stock pledging may differ from those that do not along several dimensions. Following Pang and Wang (2020), we adopt a nearest-neighbor propensity score matching approach to mitigate the functional form misspecification problem. Specifically, we match firms with insiders who pledge stocks (treatment group) with those without such pledging (control group) based on their propensity scores, performing a 1-to-1 match each year. The results of multivariable regressions using the matched sample confirm our baseline findings. We also utilize the entropy balancing approach to tackle endogeneity concerns stemming from potential selection bias with respect to insider pledging. This method creates a control sample of firms that do not have insider pledging and exhibit covariate balance with the sample of firms that do have insider pledging. The key advantage of entropy balancing over PSM is that it ensures covariate balance, which eliminates the issue of biased PSM estimates (Shipman et al. 2017; McMullin and Schonberger 2019).

To address the issue of endogeneity caused by "time-invariant omitted variables," this study employs a staggered difference-in-difference approach. We examine whether the shock of insider stock pledge initiation affects managers' non-GAAP reporting decisions. We hypothesize that the occurrence of insider pledging influences long-term managers' choice of non-GAAP reporting. Managers may tend to voluntarily disclose non-GAAP reporting to inform stakeholders that pledged loans are in good use, or aggressively use non-GAAP reporting to depict a better business performance that mitigate margin call concern. Our results confirm our hypothesis, suggesting that stock pledge is associated with more voluntary non-GAAP reporting.

Next, we perform two sets of cross-sectional analyses to provide better understanding of how stock pledge changes managers' incentives to use non-GAAP reporting and quality of these disclosures. Prior research finds margin calls may cause insiders to suffer personal liquidity shocks or to forgo private benefits of control, suggesting that pledging is associated with reduced firm risk-taking (Dou et al. 2019). Higher corporate risk-taking is associated with greater pressure of margin call. We conjecture that pledging insiders' propensity to disclose non-GAAP reporting is more significant when firms risk level is high. We construct several measures of corporate risk-taking following Dou et al. empirical design: 1) capital expenditures, 2) the number of industry segments in which a firm operates, 3) Herfindahl index, and 4) R&D investments. Consistent with our predictions, we find that increase in likelihood of non-GAAP reporting are concentrated in subsamples that have high corporate risk-taking. Secondly, to offer further evidence on the quality of non-GAAP reporting subsequent to insider stock pledge, we incorporate accounting conservatism to perform cross-sectional analyses. In line with our hypothesis, managers exhibit a greater inclination to disclose non-GAAP reporting when utilizing conservative accounting in their financial reporting. This implies that managers tend to disclose informative non-GAAP reporting following insider stock pledge.

Our study makes two primary contributions to the existing literature. Firstly, we extend previous research on opportunistic or informative motives in non-GAAP reporting within the U.S. context by formally examining the impact of stock pledging on non-GAAP disclosure decisions. Secondly, our research enhances our understanding of how insiders react to ongoing criticisms of pledging by voluntarily disclosing non-GAAP numbers. Previous studies on pledging in various emerging markets have identified potential avenues through which stock pledging can result in aggressive earnings manipulation and increased agency conflicts (Bradshaw & Sloan 2002; Dou, et al. 2019; Anderson & Puleo 2020; Pang & Wang 2020). Our findings suggest that in the U.S. market, pledging is accompanied by informative financial reporting strategies. In other words, in the U.S. context, managers do not perceive equity pledge as a means to circumvent compensation system constraints and exploit minority interests. Rather, managers tend to pledge equity when they can and seek ways to avoid potential problems from declining share prices. In summary, our study advances our comprehension of the complex relationships between stock pledging, financial reporting strategies, and agency conflicts. By identifying the role of informative motives in the U.S. market, our findings contribute to the ongoing debate on the impact of equity pledge on corporate governance practices.

The paper is organized as follows. Section 2 provides institutional background on and related literature about stock pledge and non-GAAP reporting, and Section 3 outlines our hypothesis development. Section 4 presents the sample selection procedure and descriptive statistics. In Section 5, 6, and 7 we discuss the research design and the empirical results. We conclude the paper in Section 8.

2 INSTITUTIONAL BACKGROUND AND LITERATURE REVIEW

2.1 Institutional Background on Stock Pledges

A pledger signs bilateral loan borrowing contract with lender to initiate a loan by legally offering his/her shares as collateral. Pledging shareholders preserve titles and voting rights to their shares and may utilize loan proceeds to fund personal consumptions rather than using as firm loans. With regard to evaluation of shares riskiness, lenders stipulate loan-to-value ratio, which is usually set within the range of 50 to 80 percent of the market value of the pledged shares at the specified date. Although the loans are typically non-recourse, pledgers are restrained by margin call mechanism that requires to maintain the pledged share value above a prescribed threshold, and the value of stocks are marked-to-market on a daily basis. Once stock prices drop below the threshold that triggers margin call, pledgers have to either pledge additional shares to satisfy margin requirement or suffer from forced sales by lenders who are entitled to liquidate the pledged shares if borrowers don't abide by margin call requirement or default on the loan.

Stock pledging has emerged as a popular financing tool among individuals and companies worldwide. By pledging shares, borrowers can access funds without relinquishing ownership of their shares, thus potentially allowing them to participate in any future appreciation of the shares. The extent of stock pledging in different countries is influenced by a variety of factors, such as the regulatory and legal frameworks, cultural and economic conditions, and financial market sophistication. Countries with well-established financial markets and legal systems, including the United States, Germany, France, and the United Kingdom, tend to have a more developed stock pledging industry. These countries typically have robust legal frameworks for stock pledge agreements and strong protections for lenders in the event of default. Notable examples of

companies that have utilized stock pledging to secure financing include Tesla, which pledged shares of its stock to obtain a $1.8 billion loan in 2020, and Alibaba, which pledged shares of its subsidiary Ant Group to secure a $10 billion loan in 2021.

In January 2006, the Securities and Exchange Commission (SEC) published a report acknowledging the potential role of stock pledge by WorldCom's CEO in the company's collapse. The report highlighted the impact of such pledges on insider motivations and their ability to make informed decisions, prompting the SEC to seek public feedback on the regulation of insider stock pledges. Following internal discussions, the SEC implemented disclosure requirements for stock pledges made by insiders of publicly listed companies on August 29, 2006. In contrast to prior literature that relied on manually collected data from a limited number of S&P 1500 firms, Shen et al. (2021) present a comprehensive dataset that covers almost all listed firms[6]. This allows for a more precise and convincing analysis of stock pledging behavior and its impact on voluntary disclosure.

Given much of similarity of institutional background of stock pledging, disclosure requirements and the denotation of “corporate insiders” in the U.S. are practically largely different from other countries. The current cross-country distinctions in the types of "insiders" and inconformity in disclosure requirements for stock pledging could lead to varying implications for firms. For instance, controlling shareholders who are ultimate decision-makers of firms are considered insiders in China and India, while in Taiwan, insiders refer to directors, named executives, and blockholders. On the other hand, in the United States, insiders only include named executives and directors who are required to report pledging behavior. This inconsistency in the definition of insiders is associated with different forms of agency problems in different countries. For example, the manager-shareholder conflict of interest in the US provides a unique setting to understand the

[6] Specifically, Singh (2018) documents a remarkable earnings inflations conducted by pledging insiders, with approximately 15% inflation of the total earnings of the firm, manifesting a strong incentive of pledging insiders to inflate earnings.

implications of pledging on firm value and managerial incentives, instead of the conflict between controlling shareholders and minority shareholders in China, India, and Taiwan.

Furthermore, the disclosure requirements for stock pledging also differ across countries. In China, firms are required to disclose stock pledging details if a single shareholder pledges more than 5% of all outstanding shares. Similarly, India mandates that controlling shareholders disclose their pledging behavior within 14 working days. However, Taiwan legislation requires more detailed and restricted disclosure, where concrete pledging disclosure containing timing, size, and identity of pledging must be reported within 5 business days, and pledged shares over 50% of all shareholdings will lose their voting rights. In contrast, in the US, after August 29, 2006, SEC mandated pledging disclosure by insiders, and such disclosures are typically placed in an inconspicuous part of the proxy statement, at the footnote to the table of beneficial ownership. These systematic differences in details of pledging disclosure make research about pledging consequences in the US relatively underexplored and unknown compared to other countries.

2.2 Literature review on stock pledge

Several studies have investigated the economic implications of stock pledging. Chen et al. (2018) and Li et al. (2019) provide qualitative evidence suggesting that stock pledge intensifies conflicts of interest between small stockholders and blockholders when large shareholders exploit information asymmetry to gain advantages over minor shareholders. This, in turn, impairs firm valuation and leads to increased stock volatility. Kao et al. (2004) find a negative correlation between collateralized shares and firm performance. Chen et al. (2007) document that pledging by controlling shareholders leads to moral hazard problems caused by direct stock price manipulation, high-risk investment project selection, and aggressive earnings management. Wang and Chou

(2018) demonstrate that insider pledging distorts insider incentives, resulting in changes in the firm's stock price and the percentage of institutional holding.

The margin call mechanism of stock pledging creates incentives for pledgers to seek ways to boost stock prices. Empirical evidence suggests that managers tend to manipulate accounting earnings in an upward direction to avoid margin call risks associated with pledged shares. Research by Singh (2018), DeJong et al. (2018), and Deren & Ke (2018) document the propensity of managers to manipulate earnings when pledging their shares. Studies have also shown that managers preferentially exhaust the least costly accrual-based earnings management options before shifting to real earnings management options. Concurrently, stock pledging has been associated with earnings inflation resulting from accrual earnings management to prevent margin calls. Huang and Xue (2016) observe income smoothing by pledged firms, while Xu et al. (2020) report that such firms tend not to engage high-quality auditors due to their earnings manipulation and opaque financial reporting practices. Despite the ample evidence of opportunistic stock pledging in the Chinese market, it remains unclear how pledging affects U.S. firms due to differences in institutional background and disclosure requirements. This study, to the best of our knowledge, is the first to examine how insider pledging affects the likelihood of voluntary non-GAAP disclosure and provides new insights into the underlying equity incentives of pledging when examining the changes in non-GAAP exclusions' quality.

2.3 Literature review on non-GAAP Earnings

The transparency and quality of disclosure in non-GAAP financial measures have been a topic of debate among scholars due to the absence or incompleteness of regulations. Although non-GAAP measures provide a meaningful depiction of a firm's value and performance resulting from core

business activities, their reporting is not subject to formal examination by auditors, unlike GAAP earnings numbers (Frankel et al. 2011). Non-GAAP reporting is perceived to be the final financial and accounting decision-making disclosed with managers' intention. The chronological hierarchy also provides non-GAAP reporting choices with greater opportunities for managerial discretion, as they are the last to be considered before the earnings announcement, while real activity decisions are ongoingly executed during the fiscal period, and accounting choices are decided within the fiscal period ends and closing process of preparation of financial statement (Black et al. 2017).

Rather than using accrual manipulation, real activities manipulation, and expectations management as tools to meet or slightly exceed consensus analyst forecasts, managers are more likely to use discretion in defining non-GAAP earnings to exceed the analysts' forecast, leading to the inability of analysts to differentiate between informative and opportunistic managerial exclusions (Graham et al. 2005, Doyle et al. 2013). The use of ex-post information and less regulatory restriction are associated with the opportunistic use of non-GAAP reporting to surpass analyst expectations, rather than presenting a more accurate measure of a business's core operating performance to inform investors (Black & Christensen 2009). Bhattacharya et al. (2003) and Lougee and Marquardt (2004) show that managers tend to disclose non-GAAP earnings when firm performance is poor, consistent with aggressive use of non-GAAP reporting.

In recent decades, US firms have increasingly used non-GAAP earnings disclosures as alternative measures of earnings performance. These disclosures are prepared by individual firms and aim to provide pro forma figures that better capture a business's core operating performance. Manager-disclosed metrics, as these non-GAAP measures are commonly known, are often referred to as "street earnings" by analysts. The term "street earnings" is used interchangeably with "pro forma earnings" provided in press releases and "core earnings." Non-GAAP metrics typically exclude large, one-off, non-recurring, non-cash costs that are considered transitory and uninformative, such as asset write-downs, organizational restructuring, amortization of intangibles, and impairments.

Despite the abundant evidence of potential opportunism, recent academic studies have found an increasing and prominent tendency of informative use of non-GAAP reporting in an ongoing improved regulatory environment (Black et al. 2018b; Curtis et al. 2014; Bentley et al. 2018). Public firms' managers use non-GAAP earnings disclosures more frequently when GAAP earnings disclosures are less informative (Guggenmos et al. 2022; Brown et al. 2020). The use of non-GAAP exclusions has been found to reduce firms' opportunistic GAAP reporting (Guggenmos et al. 2022). Leung and Veenman (2018) have documented that loss firms use non-GAAP reporting more informatively. Curtis et al. (2014) have also found that the most pervasive motivation for non-GAAP earnings disclosures is to inform stakeholders.

Bentley et al. (2018) utilized a comprehensive dataset that combined programmatic searching and hand-collection to provide evidence that IBES non-GAAP earnings figures differ systematically from managers' disclosed non-GAAP earnings in terms of both aggressiveness and quality. Thus, the dataset created by Bentley and his team enables a more precise identification of exclusions made by managers and leads to a more dependable inference about the causal relationship between non-GAAP reporting and insider pledging. Taking advantage of this new dataset, our study contributes to the pro forma earnings literature by investigating insider pledging, a recent and inadequately examined factor that affects managers' non-GAAP reporting decisions. We also expand the understanding of how managers' incentives to pledge their shares by examining the quality and informativeness of exclusions made by managers.

3 HYPOTHESIS DEVELOPMENT

We extend the non-GAAP literature by examining the relation between insider stock pledge and the use of non-GAAP earnings disclosures. Specifically, we hypothesize that managers in firms with insider stock pledge are more inclined to use exclusions in order to portray a higher non-GAAP earnings figure, which can lead to an improvement in stakeholders' expectations.

Stock pledging may incentivize managers to upwardly adjust earnings numbers due to margin call pressure (Singh b, 2018). Margin calls arise when stock prices fall below a certain level, prompting pledgers to sell their pledged shares. If the number of shares sold is sufficiently high, controlling shareholders may lose control of the firm (Xu et al. 2019; Chan et al. 2018). However, meeting margin calls can be challenging for insiders as the initial motivation for pledging stems from inadequate liquidity (Dou et al., 2019). Thus, the pressure of margin calls may prompt pledgers to inflate earnings numbers (Graham et al. 2005; Frankel et al. 2011; Doyle et al. 2013; Black et al. 2017). Additionally, inflated earnings numbers and improved stock price performance may enable insiders to obtain and sustain cheaper additional loans if they revise their pledging contract (DeJong et al. 2018).

Compared to real/accrual earnings management, non-GAAP reporting represents a voluntary disclosure that is typically less costly to implement. This is because non-GAAP metrics can draw on ex post information and enjoy more lenient regulatory restrictions, allowing managers greater discretion and flexibility to manipulate results (Guggenmos et al. 2022; Hsu et al. 2022)

The adjustable nature of non-GAAP exclusions offers even more flexibility in their determination, allowing managers to tailor the figures to their desired outcomes. Such flexibility is legally permissible, given the discretion afforded to managers in determining non-GAAP metrics (Abdel-Meguid et al. 2021; Doyle et al. 2013).

Given these advantages, insiders who have pledged an interest in their firms may view non-GAAP earnings as an attractive and accessible avenue for creating a more favorable appearance of their

companies. Through the selective exclusion of expenses, non-GAAP reporting can help enhance the perceived financial performance of the firm, ultimately benefiting those with a stake in the company. We propose that the act of stock pledging is linked to a company's inclination to reveal non-GAAP earnings to project a more favorable portrayal of their financial performance. In light of this, we formulate our primary hypothesis as follows:

H1: *Insider stock pledge exhibits a positive association with a firm's non-GAAP reporting.*

Both aggressive and informative disclosure rationales for voluntary disclosure of non-GAAP earnings may lead to our hypothesis H1. However, there exists a certain degree of tension in our prediction regarding the aggressiveness of non-GAAP exclusions. It is not immediately apparent ex-ante regarding the magnitude and aggressiveness of non-GAAP exclusions.

Voluntary disclosure of non-GAAP measures is ultimately a decision made by management, which may serve as an opportunity to enhance stakeholders' perceptions of the firm. However, concerns regarding margin call incentives can lead insiders to manage investors' perceptions through various forms of earnings management (Dechow et al. 2010). While weighing the costs and risks of earnings management, insiders may indirectly encourage the voluntary disclosure of alternative performance measures, such as non-GAAP earnings, due to their high malleability and low discernibility. Managers may view non-GAAP reporting as a safer and easier method to influence investors' perception of the firm's performance, resulting in the tendency for recurring exclusions to be aggressive.

Stock pledging also presents insiders with the opportunity to diversify their personal investment portfolios[7], thereby mitigating potential declines in stock prices associated with idiosyncratic risk

[7] Concentrated ownership is more likely to pledge their shares, with approximately six times of their ownership compared to those insiders who do not have share pledging (Singh, 2018).

exposure to their firms while avoiding a reduction in their wealth as stock prices increase. Given that insiders' wealth is heavily tied to the firm's stock performance, they have a strong incentive to boost the firm's stock price to safeguard their interests and avoid potential margin call risks. Therefore, managers may adopt an aggressive approach in using non-GAAP measures to exclude income-decreasing items.

Non-GAAP disclosures that present an upwardly biased picture of a firm's performance may cause discomfort among auditors. In such cases, the auditors may face potential liability for not identifying misleading non-GAAP disclosures. Consequently, firms that use such disclosures and are found to have been misleading may incur significant scrutiny (Hoogervorst 2016). In 2012, Institutional Shareholder Service (ISS) conducted a survey addressing corporate governance issues related to the practice of pledging shares[8]. Half of the institutional investors in the U.S. who responded to the survey considered stock pledging to be a problematic practice. ISS criticized the practice, stating that it destroys the incentive purposes of equity compensation by partially insulating insiders from the risks of the company. Additionally, stock pledging brings substantial costs to firms due to increased public and institutional scrutiny (Shen et al. 2021; Singh 2018). These concerns about stock pledging are widely perceived by investors as valid. As a result, there is a reduced likelihood that firms will continue to aggressively report inflated financial performance. (Shen et al. 2021)

Anderson and Puleo (2020) establish a positive association between stock pledging and equity risk, contending that pledging allows insiders to partially hedge downside risk, thereby preventing wealth destruction and reducing managerial risk aversion. Previous literature by Wang and Chou

[8] The practice of stock pledging has come under scrutiny for its potential to undermine the incentive effects of equity compensation. Insiders may be insulated from the risks of the company, while firms may face significant costs due to heightened public and institutional scrutiny (Shen, Wang, & Zhou, 2021; Singh, 2018). The Institutional Shareholder Services (ISS) has strongly denounced this practice, arguing that even small amounts of pledged stock can compromise the integrity of equity compensation plans. ISS has asserted that "any amount of pledged stock is not a responsible use of equity" (ISS, 2012).

(2018), Anderson and Puleo (2020), and Pang and Wang (2020) supports this claim. Pledging insiders are also likely to undertake riskier, positive NPV projects that mitigate principal-agent conflicts. The alignment of interests eases type II agency problems, thus lowering the likelihood of opportunistic and aggressive incentives to mislead outside investors in non-GAAP disclosures.

On the other hand, pledging insiders have significant incentives to limit margin call risk ex ante. Margin call risk prompts pledging insiders to pursue long-term benefits over short-term stock price appreciation. The literature by Badertscher (2011) demonstrates that initial upward earnings manipulation, followed by earnings inflation reversal and stock crash, has severe consequences for all stakeholders. Additionally, margin calls are public information that can harm pledgers' reputation and control rights, as highlighted by Singh (2018). Pledgers, who usually value control rights, long-term benefits, and their reputation, are less likely to engage in myopic earnings inflation and become more risk-averse.

Increased scrutiny may prevent pledging insiders from disclosing opportunistic non-GAAP numbers, suggesting a more informative use of non-GAAP earnings disclosure in both scenarios from pledging.

The relationship between insider stock pledge and the quality of non-GAAP earnings disclosures by management is an empirical question that requires further investigation, as there is no conclusive evidence to support either a positive or negative association. We formulate our second hypothesis as follows:

H2: *Insider stock pledge is associated with less aggressive use of non-GAAP reporting the lower magnitude of exclusions.*

Our third hypothesis pertains to the value relevance of non-GAAP exclusions. Value relevance refers to the ability of earnings to explain variations in stock prices or returns (Francis et al. 2004; Feng et al. 2023). While prior evidence suggests that managers' total recurring exclusions tend to

reflect recurring items that predict future expenses (Frankel et al. 2011; Kolev et al. 2008), we expect that these exclusions will be, on average, highly value relevant if managers indeed exclude substantial amounts of recurring items. If non-GAAP total recurring exclusions are indeed transitory, they should not be of high quality or value relevant.

We also anticipate that pledging insiders have incentives to use non-GAAP reporting informatively at the appropriate time to create a positive image for stakeholders. Thus, we predict that managers' recurring exclusions with insider stock pledge will be less value relevant. Therefore, our hypothesis is as follows:

H3: *Insider stock pledge is associated with lower persistence of managers' recurring exclusions.*

4 DATA AND DESCRIPTIVE ANALYSES

4.1 Sample selection

In our study, we utilize Bentley et al.'s (2018) quarterly non-GAAP EPS figures for the 2003-2020 period, which were obtained through a programmatic search and hand-collection. This dataset is particularly useful in capturing managers' reporting choices and incentives more accurately than analyst forecast providers such as IBES, which tend to reflect analysts' beliefs regarding managers' reporting choices. To construct yearly non-GAAP numbers, we follow Bentley's methodology, given the availability of quarterly non-GAAP earnings figures[9].

[9] We express our gratitude for the helpful summation method suggested by Jeremy Bentley for constructing the yearly non-GAAP EPS number. Additionally, we acknowledge Kurt Gee for providing us with the non-GAAP EPS dataset developed by Bentley et al. (2018). Companies that disclose quarterly non-GAAP reporting generally provide the yearly non-GAAP number in the fourth-quarter SEC 8-K

To supplement our analysis, we also use Shen et al.'s (2021) comprehensive dataset, which contains information about insider stock pledging for U.S. public traded firms. This novel dataset is combined with all publicly listed firms that have identifiable financial information from Compustat. To compute variables describing firm characteristics and corporate governance measures, we supplement our stock pledge data with financial statement variables from Compustat, CRSP, Thomson Reuters 13 F, and Audit Analytics. We require that all relevant information be available for a firm-year to be included in our final sample.

We also apply several restrictions to our sample, including the exclusion of financial firms with SIC codes between 6000 and 6999, utility firms with SIC codes between 4900 and 4999, negative book values, and firms with a minimum book value of total assets below $10 million, following the approach used by Baker and Wurgler (2002). After these restrictions are applied, our final sample consists of 26,435 firm-year observations (representing 4,261 unique firms) with 11,690 non-GAAP disclosers (representing 2,440 unique firms) over the period 2006-2019.

4.2 Descriptive statistics

Figure 1 displays the frequency of non-GAAP disclosures and stock pledging over the course of our sample period. The incidence of non-GAAP reporting has exhibited a steady increase over time,

filings, prominently displayed before the first paragraph of the main contents. To validate the summation method, we manually reviewed numerous examples that at least report the fourth-quarter 8-K filings The fourth-quarter 8-K filings usually disclosed both quarter and full year non-GAAP numbers. In cases where non-GAAP numbers were missing, we utilized GAAP diluted earnings after extraordinary items (*EPSFIQ*) to fill the gaps and construct the yearly non-GAAP number, which was then compared with the exact yearly non-GAAP number reported in the 8-K filings. Our approach produced an exact yearly non-GAAP number in most instances. However, for firms that do not disclose the fourth-quarter non-GAAP number, we were unable to verify our summation method through manual checks to determine the yearly non-GAAP number. Nonetheless, our year non-GAAP justification is supported by available data for manual checks, making it a credible and reasonable proxy for the yearly non-GAAP number.

rising from approximately 30% in 2006 to surpass 50% in 2014, after which it remains stable up to 2019. This upward trend in non-GAAP reporting frequency aligns with earlier findings in non-GAAP research, such as depicted in Figure 2 of Bentley et al. (2018). Conversely, the frequency of stock pledging has remained relatively consistent over time. The frequency reached its highest point around 2015 and reached a low point in 2006, which marked the first time that the SEC compelled publicly listed firms to disclose the number of shares pledged by their insiders, including directors and named executive officers, in their annual proxy statements.

Table 1 presents the descriptive statistics for the variables used in the study, covering all firm-year observations from 2007 to 2019. To mitigate the impact of extreme outliers, we apply the 1% and 99% winsorization to all continuous variables. The results indicate that approximately 44% of the firm-years in the sample disclose non-GAAP earning metrics, and insider stock pledging is observed in around 3.9% of the firm-years. Using the summation method to generate year-level non-GAAP earnings figures, we find that the average non-GAAP earnings per share reported by firms is $1.875. Comparing this with the GAAP EPS figure, we observe that non-GAAP earnings are inflated by an average exclusion of 63.3 cents per share of total expense (TOTALEXCL). This finding is consistent with previous literature that suggests non-GAAP earnings per share exceed GAAP earnings per share. Table 1 also presents the distributions of other control variables, which are similar to those reported in prior research. Due to space constraints, these variables are not described in detail here.

Table 2 presents pair-wise correlations results. We find that *STOCKPLEDGE* and *SP_RATIO* has a positive and statistically significant association with non-GAAP indicator ($P< 0.01$), providing preliminary support that pledging insiders are more likely to disclose non-GAAP reporting and more shares pledged increase the likelihood of non-GAAP reporting. We also note that insider pledging is positively associated with ROA, leverage ratio and market value of firm, which is consistent with Shen et al.'s findings.

5 RESEARCH DESIGN AND EMPIRICAL ANALYSES

5.1 The likelihood of non-GAAP disclosures

To test our first hypothesis (H1), I estimate Eq. 1 following probit model to investigate the relation between insiders' pledging and propensity to disclose non-GAAP earning number. We specify our probit model as follows:

$$Prob(NG_{i,t}) = \alpha + \beta STOCKPLEDGE_{i,t-1} + \gamma Controls_{i,t-1} + Industry\ Fixed\ Effect + Year\ Fixed\ Effect + \varepsilon_{i,t} \quad (1)$$

$$Prob(NG_{i,t}) = \alpha + \beta SP\_RATIO_{i,t-1} + \gamma Controls_{i,t-1} + Industry\ Fixed\ Effect + Year\ Fixed\ Effect + \varepsilon_{i,t} \quad (2)$$

The dependent variable, $NG_{i,t}$, following Black et al (2017), is the binary variable equals one if the firm provides a non-GAAP earnings disclosure during any quarters of the fiscal year, and zero otherwise. *STOCKPLEDGE* equals one if a firm disclose any insider pledge behavior during the year and zero otherwise. *SP_RATIO* is insider pledge ratio, which is the proportion of shares pledged by all insiders during the year, and is set at 0 if firms do not associate with insider stock pledge. Controls include a number of variables found in prior literature to influence on non-GAAP reporting decisions: firm size (*SIZE*), book-to-market ratio (*BTM*), leverage (*LEVERAGE*), profitability(*ROA*), growth in sales (*GROWTH*), management earnings forecast guidance (*GUIDANCE*), earnings variability (*STDROA*), stock illiquidity, cash flow volatility, stock return (*RET*), auditor quality (*BIGNAUIDT*), institutional ownership (*INSTHOLD*) and the absolute value

of accruals earnings management based on the modified jones model (*ABSAC*). Appendix A provides detailed definitions for all variables used in our empirical analyses. Additionally, we include industry fixed effects and fiscal year fixed effects to control for industry-level time-invariant unobservable characteristics and unobserved heterogeneity over time. We also cluster standard errors at firm-level.

Since the NG is a binary variable, I estimate the probit model of Eq. 1 and Eq. 2 using our full sample without firm fixed effects to avoid the incidental parameter problem (e.g., Neyman and Scott 1948; Wooldridge 2002). Finally, we cluster standard errors by firm. To facilitate economic intuition of the coefficients, we provide average marginal effects in column 2 and 3 in Table 1. We estimate the average marginal effect by calculating marginal effects and standard errors for key variable of interest in Eq.1 and Eq.2 and then averaging across all observations. We also regress the probit model without adding any controls to avoid the wrong attribution of confounding variables that lead to spurious correlations.

5.2 The aggressiveness and magnitude of non-GAAP reporting

Our first analysis focuses on the aggressiveness of non-GAAP reporting. We examine whether managers use their discretion in exclusions to convert a GAAP loss to a non-GAAP profit. Second, we explore the magnitude of non-GAAP total exclusions ($TOTALEXCL$) following Abdel-Meguid et al. (2021) model specification. *TOTALEXCL* is calculated as the difference between yearly non-GAAP number and GAAP bottom-line items. To capture the analyst's effect on deciding exclusions, control whether firms miss another earnings related targets---reporting a GAAP operating profit, and control the likelihood that disclosure propensity will be higher for firms that report non-GAAP number in the previous fiscal year, we follow Brown et al. 2011 model specification to add *LAG_PF*,

NEG_FE and *GAAPOP_LOSS* in our magnitude test as a robustness check.[10] *LAG_PF* equals one if the firm reports non-GAAP earnings in the previous fiscal year and zero otherwise, *NEG_FE* is one if GAAP EPS from operation is less than mean analyst earnings forecast and zero otherwise, and *GAAPOP_LOSS* is one if GAAP EPS from operation is a loss, and zero otherwise. Following prior studies (e.g., Doyle et al. 2003; Brown et al. 2012), we restrict our sample to firm-years in which managers disclose a non-GAAP number, to ensure that our results are not affected by managers' decision to provide non-GAAP EPS. We estimate the following probit in Eq. 3 and OLS regressions in Eq. 4 and 5:

$$Prob(PROFIT_{i,t}) = \alpha + \beta STOCKPLEDGE_{i,t-1} + \gamma Controls_{i,t-1} + Industry\ Fixed\ Effect + Year\ Fixed\ Effect + \varepsilon_{i,t-1} \quad (3)$$

$$TOTALEXCL_{i,t} = \beta_0 + \beta_1 STOCKPLEDGE_{t-1} + Controls_{t-1} + Industry\ Fixed\ Effect + Year\ Fixed\ Effect + \varepsilon_{i,t-1} \quad (4)$$

$$MGR\_EXCRECUR_{i,t} = \beta_0 + \beta_1 STOCKPLEDGE_{t-1} + \beta_2 BELOWLINE_{i,t-1} + \beta_3 SPECIALEXCL_{i,t-1} + Controls_{t-1} + Industry\ Fixed\ Effect + Year\ Fixed\ Effect + \varepsilon_{i,t-1} \quad (5)$$

$$TOTALEXCL_{i,t} = \beta_0 + \beta_1 STOCKPLEDGE_{t-1} + \beta_2 LAG_{NG\ t-1} + \beta_3 NGE_{FE\ t-1} + \beta_4 GAAPOP_{LOSS_{t-1}} + Controls_{t-1} + Industry\ Fixed\ Effect + Year\ Fixed\ Effect + \varepsilon \quad (6)$$

$$MGR\_EXCRECUR_{i,t} = \beta_0 + \beta_1 STOCKPLEDGE_{t-1} + \beta_2 LAG_{NG\ t-1} + \beta_3 NGE_{FE\ t-1} + \beta_4 GAAPOP_{LOSS_{t-1}} + \beta_2 BELOWLINE_{i,t-1} + \beta_3 SPECIALEXCL_{i,t-1} + Controls_{t-1} + Industry\ Fixed\ Effect + Year\ Fixed\ Effect + \varepsilon \quad (7)$$

where *PROFIT* equals one if GAAP EPS is a loss while non-GAAP EPS is a profit (or zero) and zero otherwise. *TOTALEXCL* is managers' total exclusions. Next, we follow Christensen et al.

[10] Our inference keeps unchanged when we shrink our sample size with regard to the considerations of analysts' effect, prior non-GAAP reporting propensity, and managers' intention to avoid a GAAP loss.

(2021) and decompose non-GAAP exclusions into managerial recurring exclusions (*MGR_EXCRECUR*), exclusions for discontinued operations ($SPECIALEXCL$), and below-the-line exclusions ($BELOWLINE$). This decomposition enables us to isolate those exclusions likely to reflect aggressive managerial adjustments. Managerial recurring exclusions are mostly likely to reflect managers' aggressive use of exclusions.

Second, we investigate whether stock pledge is associated with the value relevance of non-GAAP exclusions (H2b). We follow Collins et al. (1997) and conduct our tests based on Ohlson's (1995) widely-used framework, where firm value is a function of the book value of equity and accounting earnings. We estimate the following regression:

$$PRICE_{i,t} = \beta_0 + \beta_1 BV_{i,t} + \beta_2 NGEPS_{i,t} + \beta_3 TOTALEXCL_{i,t} + \beta_4 STOCKPLEDGE_{i,t-1} + \beta_5 BV_{i,t} \times STOCKPLEDGE_{i,t-1+} + \beta_6 NGEPS_{i,t} \times STOCKPLEDGE_{i,t-1} + \beta_7 TOTALEXCL_{i,t} \times STOCKPLEDGE_{i,t-1} + \varepsilon_{i,t} \quad (8)$$

$$PRICE_{i,t} = \beta_0 + \beta_1 BV_{i,t} + \beta_2 NGEPS_{i,t} + \beta_3 MGR\_EXCRECUR_{i,t} + \beta_4 STOCKPLEDGE_{i,t-1} + \beta_5 BV_{i,t} \times STOCKPLEDGE_{i,t-1+} + \beta_6 NGEPS_{i,t} \times STOCKPLEDGE_{i,t-1} + \beta_7 MGR\_EXCRECUR_{i,t} \times STOCKPLEDGE_{i,t-1} + BELOWLINE_{i.t} + SPECIALEXCL_{i,t} + BELOWLINE_{i.t} \times STOCKPLEDGE_{i,t-1} + SPECIALEXCL_{i,t} \times STOCKPLEDGE_{i,t-1} Controls + \varepsilon_{i,t} \quad (9)$$

where *Price* is the fiscal year-end closing price, adjusted for stock splits and stock dividends for firm i at time t; *BV* is common equity per share for firm i at time t. *TOTALEXCL* is managers' total exclusions and *MGR_EXCRECUR* is managers' total recurring exclusions per share. we expect the incremental coefficient β7 to be positive, indicating higher quality managers' recurring exclusions when firms have insider pledging. Recall that if non-GAAP exclusions are non-recurring one would expect them to have no value relevance.

6 MAIN RESULTS

Table 3 presents the estimation results from estimating Eq. 1. In column 1, I only include industry fixed effect and year fixed effect to avoid results driven by bad controls. The coefficient on *STOCKPLEDGE* is significant and positive. Then, I find evidence of a significantly positive coefficient on the $STOCKPLEDGE$ ($\beta = 0.215, z - statistic = 3.10$) and *SP_RATIO* ($\beta = 0.272, z - statistic = 2.14$) in the column 2 and 3. This evidence indicates that the likelihood that a firm will provide a non-GAAP disclosure increases in the year following insider stock pledge and heavier proportion of pledge increase the likelihood of non-GAAP reporting. The marginal effect suggests that relative to firms without insider stock pledge, firms are about 6.4% more likely to disclose a non-GAAP number in the year following insider stock pledge and 1% increase in stock pledge ratio increase the likelihood of disclosing a non-GAAP number about 0.7%. These effects amount to a 14.5% (6.4%/44%) and 1.5% (0.7%/44%) increase from the unconditional yearly mean of non-GAAP reporting frequency following insider stock pledge and one percent increase in stock pledge ratio, respectively.

we next present the results of our study on the level of aggressiveness exhibited by companies in their non-GAAP reporting, as outlined in Equation 3. To create an indicator variable, we followed the method used by Bhattacharya et al. (2003) and coded PROFIT as 1 if GAAP EPS represents a loss while non-GAAP EPS represents a profit (or zero), and 0 otherwise. The results obtained from estimating Equation 3 are presented in Table 4. The coefficient estimate on *STOCKPLEDGE* is -0.185 (with a z-statistic of -1.66), indicating that insider stock pledge is significantly and negatively associated with the likelihood of managers using earnings exclusions to convert GAAP losses into non-GAAP profits. Moreover, the marginal effects show that firms that experience drops in

coverage are 1.9% more likely to use non-GAAP exclusions to turn a GAAP loss into a non-GAAP profit than control firms. This represents a 30% decrease (1.9% ÷ 6.25%) compared to the average likelihood of firms using exclusions to convert GAAP losses into non-GAAP profits.

Table 5 reports the OLS regression results for both magnitude tests. The findings from Equations 3 and 4 reveal a statistically significant and negative association between *STOCKPLEDGE* and TOTALEXCL. Specifically, the estimated coefficient on *STOCKPLEDGE* in Column 1 (β1 = 0.0112, t-statistic = 1.77) and Column 2 (β1 = 0.0114, t-statistic = 1.81) suggests that managers tend to exclude recurring and nonrecurring expenses that increase income for every standard deviation increase in insider stock pledge. This outcome implies that investor sentiment has a substantial impact on managers' pro forma adjustments, which is economically noteworthy, given that the non-GAAP reporting sample's average *TOTALEXCL* is 63.3 cents per share.

In Table 6, we report value relevance tests of non-GAAP reporting that further extend our analysis of the relation between insider stock pledge and the quality of voluntarily disclosed non-GAAP earnings. We regress price on book values, non-GAAP earnings, managers recurring exclusions ($MGR\_EXCRECUR$), indicator variables of insider stock pledge and their interaction terms. The result in Table 6 indicate that non-GAAP earnings (EPSNG) and book value (BV) are, on average, value relevant for firms without insider stock pledge (β2 = 8.275, t = 12.66; β1=0.494, t=3.04). we find that pledging firms increase the value-relevance of book value (β5=0.414, t= 1.82), implying that firms' exclusions are of nonrecurring items, which is consistent with Collins et al.'s (1997) finding. we observe that managers' recurring exclusions are associated with firms without insider stock pledge (β3 = –1.432, t = –3.06), but the incremental influence of insider stock pledge on the value relevance of exclusions is to effectively render them uninformative, which is consistent with these exclusions being more transient and less persistent for pledging firms. For example, the coefficient on managers total recurring exclusions is –1.432, while the coefficient on the interaction between managers total recurring exclusions and insider stock pledge is 2.160. Additional tests

suggest that the sum of these two coefficients is not statistically different from zero, indicating that managers total recurring exclusions for pledging firms are not value relevant. Thus, the results are consistent with H3, namely that exclusions are more likely to result in high-quality non-GAAP earnings when firms are associated with insider stock pledge.

7 ROBUSTNESS TESTS

In this section, we conduct a set of robustness tests to strengthen our baseline findings.

7.1 Propensity-score matching

Firms with or without insider stock pledge may differ along many dimensions. Our research controls for these differences from wide range of firm-specific dimensions. However, because the design is implemented using the traditional multiple regression (MR) analysis, it requires proper specification of the relation between outcome variables and explanatory variables. If the relation is misspecified, then our analysis will suffer from a specific type of endogeneity called "functional form misspecification" (Shipman et al. 2017). This type of endogeneity can be mitigated, however, by using an alternative identification strategy—propensity-score matching (Rosenbaum and Rubin 1983). Propensity score matching helps us to further mitigate cross-sectional differences between the two groups, especially those that may affect or are correlated with the likelihood of insider stock pledge or non-GAAP reporting. We therefore implement propensity-score matching and reexamine our results to gauge the robustness of our evidence. Specifically, we perform a 1-to-1 match of firms whose insiders have stocks under pledge (treatment group) with firms whose insiders do not pledge stocks (control group) each year based on their propensity scores. The propensity scores provide a group of controls that are otherwise similar to the treatment firms, except on the treatment

status. Using propensity score matching, we find that our results remain consistent with our baseline results.

7.2 Entropy balancing

Second, we employ an entropy balancing (EB) technique in a further attempt to correct endogenous selection based on observed variables. Notably, in our sample, only 3.9% of the firm-years have insider stock pledge, suggesting that our sample size reduces by nearly 90 percent after propensity score matching. In comparison, the entropy balancing technique identifies a weight for each observation in a control sample, such that the full sample is preserved, and the distributions of covariates are almost identical between groups (Hainmueller, 2012; McMullin and Schonberger, 2020)[11]. By employing the entropy-balancing method, all observations without insider stock pledge are reweighted to match observations with insider stock pledge, based on the same set of variables used in PSM.

Table X provides the summary statistics after entropy balancing. Columns (1) to (4) show that after incorporating the new weighting scheme, the mean and variance are almost identical between the firms with and without insider share pledge. As shown in columns (5) and (6), the standardized differences are near zero and variance ratios near one for all covariates, suggesting that entropy balancing eliminates imbalance in both the first and the second moments. Panel B presents the results after implementing entropy balancing. We continue to find that the coefficient on

[11] The utilization of continuous weights in entropy balancing guarantees a near-perfect balance of covariates between the control and treated samples by ensuring similar higher-order moments of covariate distributions, as mentioned by Hainmueller (2012). Compared to propensity score matching, entropy balancing permits less researcher discretion by emphasizing the setting of a convergence tolerance for the algorithm. In contrast, Shipman et al. (2017) highlight that researchers have more flexibility with PSM. Finally, the approach of assigning continuous weights to all control observations in entropy balancing, rather than integer weights in PSM, is expected to reduce idiosyncratic noise.

STOCKPLEDGE is positive and significant at the X% level, suggesting that insider stock pledge motivates voluntary non-GAAP reporting. The result is qualitatively similar to our baseline result.

7.3 Difference-in-differences analysis using insider stock pledge

The initiation of insider stock pledging can be considered a significant event in corporate governance, as it signals to stakeholders that the firm may engage in unethical practices such as expropriation of investor wealth and excessive risk-taking. Stock pledging doesn't randomly occur, and managers are likely to associated with ex ante managerial preparations for possible quagmires of pledging before committing to it. In our untabulated data, we found that only 10% of firms occasionally have insider stock pledging, while others continue to pledge for years after the initial insider stock pledging event, supporting our hypothesis[12].The effect of pledging could persist beyond the pledging-initiation years, which may contaminate the pre-pledging years because they can be post-pledging years of prior pledging. That is to say, when firms engage in share pledging, the impact of pledging on the tendency of non-GAAP disclosure may endure in the future, even in the absence of pledging in subsequent years. Given the uncertainty surrounding the timing of contract termination, the presence of historical shares pledged, regardless of any ongoing pledging, can systematically alter the incentives for non-GAAP disclosures.

To investigate the potential impact of insider stock pledging on managerial use of non-GAAP reporting, we propose that insider stock pledging initiation can be regarded as quasi-natural

[12] On the contrary, for firms that their proxy statements are identified to have a non-pledging policy, nearly none of them has subsequent stock pledge initiation in the following year (Shen et al. 2021).

experiments to determine whether there are long-term effects of the event. Such an approach can help to address concerns that insider stock pledging may systematically alter managerial behavior.

To perform this test, we construct a treatment sample of companies that is identified to have stock pledge in any fiscal year during the full sample periods and control group that never have stock pledge. we also require there must be at least one observation in the pre- and post-transition period. Under parallel assumption, we analyze the dynamic effect of the insider stock pledge on managers' propensity to disclose non-GAAP reporting. By tracing the changes of non-GAAP disclosure strategies around the stock pledge initiation, we can verify (1) whether there are omitted factors that influence the non-GAAP reporting strategies of the treated and control groups differentially before the stock pledge, and (2) whether and when the actual effect of stock pledge takes on after the stock pledge initiation. Specifically, we augment the model specification by incorporating a series of relative year dummies as the major independent variables. We define *AfterT4* as equal to one for the years on or beyond the fourth year after the stock pledge initiation until the fifth year, and *BeforeT4* as equals to one for all of the years on or prior to the fourth year until the fifth year before the stock pledge initiation. The dummy for the one year before the stock pledge initiation (*T-1*) is excluded as the benchmark. Specifically, we perform the following staggered DID regression model:

$$NG_{i,t} = InsiderSP\_POST_{\ i,t} + Control_{i,t} + Year\ Fixed\ Effects + Firm\ fixed\ Effects + \varepsilon_{i,t}$$

My primary variable of interest, *InsiderSP_POST* is a DID estimator that is coded as an indicator variable that equals to 1 on or after the year that firms initially have insider stock pledge, and otherwise. Since pledging initially occurs in different firms in different years, *InsiderSP_POST* is

1 for firms in different years by construction. We control firm-fixed effect and fiscal-year fixed effect.

The DID regression results are presented in Table 8. We find a positive and significant coefficient on *InsiderSP_POST* in Column (1), suggesting increase in non-GAAP reporting after firm initiates stock pledge. The coefficients on the relative year dummies are insignificant before the year of stock pledge initiation in Column (2). That is, the treated and control groups are not systematically different prior to the stock pledge initiation and they have no differential pre-trends in the non-GAAP reporting. Therefore, it is unlikely that the relation between stock pledge and non-GAAP reporting are driven by other unobservable factors. There is also no evidence that managers anticipate the initiation of stock pledge and change the non-GAAP reporting strategies ex ante. This lends empirical support for the "parallel trend" assumption that is crucial for the validity of DID analysis. We apply the same regression specification to subsamples and present the result of the [-5, +5] years window in Column (3), and we still find a positive and significant coefficient on *InsiderSP_POST*. Taken together, the results confirm our baseline findings that insider stock pledge generally led to change in managers' propensity to disclose non-GAAP reporting.

8 CROSS-SECTIONAL TESTS

Our results thus far suggest that insider stock pledge influence both the likelihood and quality of non-GAAP reporting. We next conduct two sets of cross-sectional tests to validate our main results and to better understand the mechanisms, and explore the channels through which insider stock pledge can influence managers' incentives to use non-GAAP reporting.

8.1 The level of firm risk-taking

First, following Dou et al. (2019) findings, pledging insiders have strong incentives to avoid margin call risk ex ante through influencing the level of a firm's risk-taking for the sake of control right benefits. In other words, when the level of corporate risk-taking is high, pledging insiders are stressed with triggering margin call, thus having strong incentives to seek possible ways, such as voluntary non-GAAP reporting to prevent margin call. We construct several measures of corporate risk-taking 1) capital expenditures scaled by beginning-of-year total (Bargeron, Lehn, and Zutter 2010); 2) the number of industry segments in which a firm operates, constructed for each sample year; 3) Herfindahl index based on the percentage of a firm's sales; 4) R&D scaled by beginning-of-year total assets as our measure of risk-increasing investments. We apply the same regression specification in Eq.(1) to each subsample of risk-taking measures. The results are shown in Table 8. We find that in higher risking-taking firms, managers are more likely to disclose non-GAAP reporting, consistent with our main analyses that higher margin call pressure incentivizes managers to disclose non-GAAP reporting.

9 MECHANISM TESTS

Regardless of whether the increase in the likelihood of non-GAAP disclosure resulting from equity pledge by companies is driven by corporate managers' intention to avoid the pressure of being unable to meet margin requirements during stock price declines or to better inform investors about the company's operational situation and mitigate investors' concerns related to information asymmetry regarding equity pledge activities, the ongoing relationship between the loan providers and the pledgor enables them to exhibit a instant response to potential margin pressures. To further examine the impact of equity pledge on managers' disclosure of non-GAAP measures, we

incorporate proxy representing the intrinsic mechanisms of equity pledge, namely, the magnitude of margin call pressure measured by the share pledge ratio conditioned on previous fiscal year stock return (*pledge under pressure*)[13], and perform cross-sectional test conditional on dividends growth reflecting potential margin system pressures to further investigate the effect of equity pledge on non-GAAP disclosure.[14]

Irrespective of whether the increase in the likelihood of non-GAAP disclosure resulting from equity pledges made by companies is driven by corporate managers' intent to avoid the pressure of failing to meet margin requirements during stock price declines or to better inform investors about the company's operational situation and alleviate investors' concerns regarding information asymmetry related to equity pledge activities, the ongoing relationship between loan providers and the pledgor empowers them to promptly respond to potential margin pressures. To further scrutinize the impact of equity pledge on managers' disclosure of non-GAAP measures, we incorporate a proxy that represents the intrinsic mechanisms of equity pledge. Specifically, we employ the magnitude of margin call pressure, which is measured by the share pledge ratio conditioned on the stock return from the previous fiscal year (referred to as pledge under pressure). Additionally, we conduct a cross-sectional test that is contingent on dividend growth, as it reflects potential margin system pressures. This test enables us to further investigate the effect of equity pledge on non-GAAP disclosure. Through these analytical approaches, we aim to refine our understanding of the relationship between equity pledge and non-GAAP disclosure, thereby offering valuable insights to stakeholders.

Panel A in Table 10 reports the results of probit regressions using *pledge under pressure* to proxy significant margin call pressure. The coefficient on *pledge under pressure* is significant and

[13] Following Chan et al. (2018) definition of *pledge under pressure,* we set the prior fiscal year buy-and-hold stock return threshold associated with surge in margin call pressure at lower than -15%, and 0 otherwise. Our results are robust when diverse benchmarks of threshold (e.g., -12% and -18%) are applied to define prior returns.

[14]

positive, and the effect on non-GAAP disclosure likelihood is even stronger when margin call pressure is significant. Panel B in table 10 explores the cross-sectional influence of dividend growth on the effect of change in likelihood of non-GAAP disclosure following insiders stock pledge. Table 11 partitions our sample based on whether there is an increase in prior year (cash) dividend growth. We find a more pronounced effect in increased likelihood of non-GAAP reporting when firms cease to increase dividend. Moreover, the Chi-squared test suggests that the coefficient is significantly different. Taken together, we find the incentive to report non-GAAP earning numbers is particularly strong when a margin call is more likely to be triggered.

10 ADDITIONAL ANALYSES

10.1 Crash risk, non-GAAP reporting frequency and stock pledge

Recent study find that managers' non-GAAP disclosures increase the likelihood of a firm's crash risk, and such effect concentrates on instances where non-GAAP exceed GAAP earnings, indicating that some managers use non-GAAP reporting to withhold bad news from investors. If stock pledge is associated with aggravated information asymmetry that facilitates the expropriation of wealth from investors to pledgers, pledging may induce greater crash risk as investors signal pledging as a value-destroying activity. After replicating the baseline regression of Hus et al.'s paper, we test the effect of prior year pledging on subsequent stock price crash risk. We find that pledging significantly reduces the stock price crash risk and such effect is particularly strong in subsamples that non-GAAP reporting frequency is high.

10.2 CEO pledging and significant pledging

Our results are robust to confine the definition of stock pledging to CEO pledging as CEO has substantial influence on decision to report non-GAAP earning number. We redefine the firms that have insider pledging when firm's CEO pledge their shares in the fiscal year and 0 otherwise. In untabulated supplemental analyses, we find our inferences do not change.

Shareholders concern about the pledging behavior only when firm insiders pledge a significant number of shares. To perform validation tests of the significant stock pledge, we replace *STOCKPLEDGE* with significant pledging as our variable of interest that at least firm-level pledged shares constitute 1% of all shares outstanding in a given year.

11 CONCLUSIONS

This study examines the impact of insider stock pledge on firms' voluntary non-GAAP disclosures, focusing on changes in their likelihood and quality. The stock pledge mechanism, which triggers margin calls and poses a threat to insiders' control rights and personal wealth in the event of a significant drop in stock price, creates strong incentives for managers to manage expectations and inflate earnings to hedge against the risk of pledging. Non-GAAP reporting, which offers a range of benefits, including flexibility, relevance, and comparability, provides a more cost-effective alternative to direct earnings and perception management. Our empirical analysis confirms our hypothesis that firms are more likely to disclose non-GAAP measures in the year following insider stock pledge.

We also investigate the aggressiveness and quality of non-GAAP reporting, following insider stock pledge, to better understand whether the effect of insider stock pledge on non-GAAP reporting reflects managers' attempts to inform or mislead investors given the criticism of pledging in the U.S. We find that firms with insider stock pledges engage in less aggressive non-GAAP reporting and have improved value-relevant non-GAAP exclusions. This is consistent with previous research

of our U.S. stock pledge data provider indicating that pledging insiders in the U.S. use the proceeds for diversifying purchases, which effectively hedges firm risk. Our results suggest that firms under margin call pressure are providing informative non-GAAP earnings. We also investigate the mechanisms that exacerbate or alleviate margin call pressure. Our findings indicate that the increase in non-GAAP reporting and improvement in non-GAAP reporting quality are concentrated in subsamples with high corporate risk-taking and more conservative accounting, which is consistent with increased margin call pressure.

To address sample selection bias and reverse causality, we employ several additional tests, including propensity score matching, entropy balancing, and staggered DID. Despite the use of these validated methods, we acknowledge the limitations of our insider stock pledge dataset, particularly the unavailability of the exact date of pledging and the use of loan proceeds from the proxy statement in the SEC Edgar database. Nevertheless, our study contributes significantly to the literature on stock pledge by providing compelling evidence on the impact of stock pledge on firms' voluntary disclosure strategies in the U.S. Additionally, we extend the literature on non-GAAP reporting by identifying insider stock pledge as a crucial factor affecting managers' decisions regarding non-GAAP reporting. Our study highlights the importance of managers' ex ante risk-aversion to triggering a margin call in shaping high-quality non-GAAP reporting.

REFERENCES

Abdel-Meguid, A., J. N. Jennings, K. J. Olsen, and M. T. Soliman. 2021. The Impact of the CEO's Personal Narcissism on Non-GAAP Earnings. *The Accounting Review* 96 (3):1-25

Anderson, R., and M. Puleo. 2020. Insider share-pledging and equity risk. *Journal of Financial Services Research* 58:1-25

Badertscher, B. A. 2011. Overvaluation and the choice of alternative earnings management mechanisms. *The Accounting Review* 86 (5):1491-1518

Baker, M., and J. Wurgler. 2002. Market timing and capital structure. *The journal of finance* 57 (1):1-32

Bansal, N., A. Seetharaman, and X. F. Wang. 2013. Managerial risk-taking incentives and non-GAAP earnings disclosures. *Journal of Contemporary Accounting & Economics* 9 (1):100-121

Bargeron, L. L., K. M. Lehn, and C. J. Zutter. 2010. Sarbanes-Oxley and corporate risk-taking. *Journal of Accounting and Economics* 49 (1-2):34-52

Bentley, J. W., T. E. Christensen, K. H. Gee, and B. C. Whipple. 2018. Disentangling managers' and analysts' non-GAAP reporting. *Journal of Accounting Research* 56 (4):1039-1081

Bhattacharya, N., E. L. Black, T. E. Christensen, and C. R. Larson. 2003. Assessing the relative informativeness and permanence of pro forma earnings and GAAP operating earnings. *Journal of Accounting and Economics* 36 (1-3):285-319

Black, D. E., and T. E. Christensen. 2009. US Managers' Use of 'Pro Forma' Adjustments to Meet Strategic Earnings Targets. *Journal of Business Finance & Accounting* 36 (3-4):297-326

Black, D. E., T. E. Christensen, J. T. Ciesielski, and B. C. Whipple. 2021. Non-GAAP earnings: A consistency and comparability crisis? *Contemporary Accounting Research* 38 (3):1712-1747

Black, E. L., T. E. Christensen, T. Taylor Joo, and R. Schmardebeck. 2017. The relation between earnings management and non-GAAP reporting. *Contemporary Accounting Research* 34 (2):750-782

Bradshaw, M. T., T. E. Christensen, K. H. Gee, and B. C. Whipple. 2018. Analysts' GAAP earnings forecasts and their implications for accounting research. *Journal of Accounting and Economics* 66 (1):46-66

Bradshaw, M. T., and R. G. Sloan. 2002. GAAP versus the street: An empirical assessment of two alternative definitions of earnings. *Journal of Accounting Research* 40 (1):41-66

Brown, N. C., T. E. Christensen, W. B. Elliott, and R. D. Mergenthaler. 2012. Investor sentiment and pro forma earnings disclosures. *Journal of Accounting Research* 50 (1):1-40

Chan, K., H.-K. Chen, S.-y. Hu, and Y.-J. Liu. 2018. Share pledges and margin call pressure. *Journal of Corporate Finance* 52:96-117

Chen, A., L. Kao, and Y.-K. Chen. 2007. Agency costs of controlling shareholders' share collateral with Taiwan evidence. *Review of Pacific Basin Financial Markets and Policies* 10 (02):173-191

Christensen, T. E., E. Gomez, M. Ma, and J. Pan. 2021. Analysts' role in shaping non-GAAP reporting: evidence from a natural experiment. *Review of Accounting Studies* 26:172-217

Collins, D. W., E. L. Maydew, and I. S. Weiss. 1997. Changes in the value-relevance of earnings and book values over the past forty years. *Journal of Accounting and Economics* 24 (1):39-67

Curtis, A. B., S. E. McVay, and B. C. Whipple. 2014. The disclosure of non-GAAP earnings information in the presence of transitory gains. *The Accounting Review* 89 (3):933-958

Dechow, P., W. Ge, and C. Schrand. 2010. Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of Accounting and Economics* 50 (2-3):344-401

DeJong, D. V., K. Liao, and D. Xie. 2020. Controlling shareholder's share pledging and accounting manipulations. *Available at SSRN 3274388*

Deren, X., and L. Ke. 2018. Share pledging by controlling shareholders and real earnings management of listed firms. *China Journal of Accounting Studies* 6 (2):109-119

Dou, Y., R. W. Masulis, and J. Zein. 2019. Shareholder Wealth Consequences of Insider Pledging of Company Stock as Collateral for Personal Loans. *The Review of Financial Studies* 32 (12):4810-4854

Doyle, J. T., J. N. Jennings, and M. T. Soliman. 2013. Do managers define non-GAAP earnings to meet or beat analyst forecasts? *Journal of Accounting and Economics* 56 (1):40-56

Feng, Z., J. R. Francis, Y. Shan, and S. L. Taylor. 2023. Do High-Quality Auditors Improve Non-GAAP Reporting? *The Accounting Review* 98 (1):215-250

Francis, J., R. LaFond, P. M. Olsson, and K. Schipper. 2004. Costs of equity and earnings attributes. *The Accounting Review* 79 (4):967-1010

Frankel, R., S. McVay, and M. Soliman. 2011. Non-GAAP earnings and board independence. *Review of Accounting Studies* 16:719-744

Graham, J. R., C. R. Harvey, and S. Rajgopal. 2005. The economic implications of corporate financial reporting. *Journal of Accounting and Economics* 40 (1-3):3-73

Guggenmos, R. D., K. Rennekamp, K. Rupar, and S. Wang. 2022. The relationship between non-GAAP earnings and aggressive estimates in reported GAAP numbers. *Journal of Accounting Research* 60 (5):1915-1945

Hainmueller, J. 2012. Entropy balancing for causal effects: A multivariate reweighting method to produce balanced samples in observational studies. *Political analysis* 20 (1):25-46

Hambrick, D. C. 2007. Upper echelons theory: An update: Academy of Management Briarcliff Manor, NY 10510, 334-343.

Hoogervorst, H. 2015. Mind the Gap (Between non-GAAP and GAAP). *March* 31:2015

Hsu, C., R. Wang, and B. C. Whipple. 2022. Non-GAAP earnings and stock price crash risk. *Journal of Accounting and Economics* 73 (2-3):101473

Huang, Z., and Q. Xue. 2016. Re-examination of the effect of ownership structure on financial reporting: Evidence from share pledges in China. *China Journal of Accounting Research* 9 (2):137-152

Jennings, M. M. 2003. The critical role of ethics: recent history has shown that when individual ethics are compromised, corporate ethics fail and financial disaster is not far behind. *Internal Auditor* 60 (6):46-52

Kao, L., J. R. Chiou, and A. Chen. 2004. The agency problems, firm performance and monitoring mechanisms: the evidence from collateralised shares in Taiwan. 12 (3):389-402

Khan, M., and R. L. Watts. 2009. Estimation and empirical properties of a firm-year measure of accounting conservatism. *Journal of Accounting and Economics* 48 (2-3):132-150

Kolev, K., C. A. Marquardt, and S. E. McVay. 2008. SEC scrutiny and the evolution of non-GAAP reporting. *The Accounting Review* 83 (1):157-184

Larcker, D. F., and B. Tayan. 2010. Pledge (and hedge) allegiance to the company. *Rock Center for Corporate Governance at Stanford University closer look series: Topics, issues and controversies in corporate governance no. Cgrp-11*

Leung, E., and D. Veenman. 2018. Non-GAAP earnings disclosure in loss firms. *Journal of Accounting Research* 56 (4):1083-1137

Li, M., C. Liu, and T. Scott. 2019. Share pledges and firm value. *Pacific-Basin Finance Journal* 55:192-205

Lougee, B. A., and C. A. Marquardt. 2004. Earnings informativeness and strategic disclosure: An empirical examination of "pro forma" earnings. *The Accounting Review* 79 (3):769-795

McMullin, J., and B. Schonberger. 2022. When good balance goes bad: A discussion of common pitfalls when using entropy balancing. *Journal of Financial Reporting* 7 (1):167-196

McMullin, J. L., and B. Schonberger. 2020. Entropy-balanced accruals. *Review of Accounting Studies* 25 (1):84-119

Neyman, J., and E. L. Scott. 1948. Consistent estimates based on partially consistent observations. *Econometrica: Journal of the Econometric Society*:1-32

Ohlson, J. A. 1995. Earnings, book values, and dividends in equity valuation. *Contemporary Accounting Research* 11 (2):661-687

Pang, C., and Y. Wang. 2020. Stock pledge, risk of losing control and corporate innovation. *Journal of Corporate Finance* 60:101534

Rosenbaum, P. R., and D. B. Rubin. 1983. The central role of the propensity score in observational studies for causal effects. *Biometrika* 70 (1):41-55

Shen, Y., W. Wang, and F. Zhou. 2021. Insider pledging in the U.S. *Journal of Financial Stability* 53:100830

Shipman, J. E., Q. T. Swanquist, and R. L. Whited. 2017. Propensity score matching in accounting research. *The Accounting Review* 92 (1):213-244

Singh, P. P. 2018a. Does pledging of shares by controlling shareholders always destroy firm value? *Available at SSRN 2989818*

———. 2018b. The inside job: Share pledges by insiders and earnings management. *Available at SSRN 3294165*

Wang, Y.-C., and R. K. Chou. 2018. The impact of share pledging regulations on stock trading and firm valuation. *Journal of Banking & Finance* 89:1-13

Wooldridge, J. M. 2002. Inverse probability weighted M-estimators for sample selection, attrition, and stratification. *Portuguese economic journal* 1 (2):117-139

Xu, J., Y. Zhang, and Y. Xie. 2020. Controlling shareholder's share pledging and firm's auditor choice. *Emerging Markets Finance and Trade* 56 (4):750-770

Xu, R., J. Chang, C. Li, and W. Wang. 2019. Research on the influence of equity pledge on stock price crash risk: based on financial shock of 2015 stock market crisis. *Economic and Political Studies* 7 (4):480-505

Zhang, H., and L. Zheng. 2011. The valuation impact of reconciling pro forma earnings to GAAP earnings. *Journal of Accounting and Economics* 51 (1-2):186-202

APPENDIX

APPENDIX A: VARIABLE MEASUREMENT

Variable definition	Measurement
Key variables:	
NG	Equals one if the firm provides a non-GAAP earnings disclosure in the current year and zero otherwise.
STOCKPLEDGE	Equals one of firms' insiders pledge their shares in the current year and zero otherwise.
SP_RATIO	The percentage of shares pledged by insiders as the loan.
EPSNG	The manager adjusted (non-GAAP) diluted EPS from the press release.
EPSGAAPOP	The GAAP diluted EPS from operations.
EPSBXI	The GAAP diluted earnings before extraordinary items.
EPSAXI	The GAAP diluted earnings after extraordinary items.
EPSIBES	Actual earnings from I/B/E/S
Mean_analyst	Consensus street (EPS) forecast
PROFIT	Indicator variable that equals to one if the non-GAAP adjustments convert a GAAP operating loss into a non-GAAP profit; zero otherwise.
TOTALEXCL	Managers' total exclusions per share (EPSNG – EPSAXI).
MGR_EXCRECUR	TOTALEXCL minus the sum of SPECIALEXCL and BELOWLINE.
BELOWLINE	Below-the-line exclusions per share (EPSBXI – EPSAXI).
SPECIALEXCL	Special items exclusions per share (EPSGAAPOP – EPSBXI).
PRICE	The fiscal year-end closing price, adjusted for stock splits and stock dividends for firm i at time t
BV	Common equity per share for firm i at time t.
Control variables:	
RET	Cumulative monthly stock return over the past 12 months.

INSTHOLD	Percentage of shares owned by the institutional investors as reported on the Thomson Reuters 13f Institutional Holdings database.
GUIDANCE	An indicator variable equals to one for firm-year with at least one outstanding management earnings forecast, zero otherwise.
BIGNAUDIT	An indicator variable equals to one if the firm is audited by a Big N audit firm, zero otherwise.
BTM	Total assets divided by market vaule of equity plus book value of debt
LEVERAGE	Total debt (Compustat data item DLTT plus data item DLC) divided by total assets (Compustat data item AT).
SIZE	The natural logarithm of total assets at the end of the year
GROWTH	Growth in yearly sales
ROA	Return on assets (IB/AT) of the current year
STDROA	The standard deviation of return on assets computed over the five past years ending with the current year
ABSAC	The absolute value of abnormal accruals estimated based on the modified Jones model as in Kothari et al. (2015)
Controls in additional tests	
CAPEX	Capital expenditure scaled by prior year-end total assets
Industry Segments	Number of industry segments under which the firm reports product sales
R&D	Research and development expenditure scaled by prior year-end total assets
Segment HHI	Sum of the squared percentages of total sales deriving from each of firm's industry product segments
CSCORE	The firm-level conservatism measure as in Khan and Watts (2009)

APPENDIX B: Sample Selection

	Firm-years
The initial non-GAAP earnings sample from 2003 to 2020	113,320
Less	
The stock pledge dataset after combing with Compustat Annually file from 2005 to 2019	(27,145)
Observations with insufficient data to calculate control variables	(57,743)
Observations in financial (SIC 6000–6999) and utilities (SIC 4900–4999) industries	(2473)
Observations with total assets less than $10 millions	(312)
Final sample	25,647

FIGURE

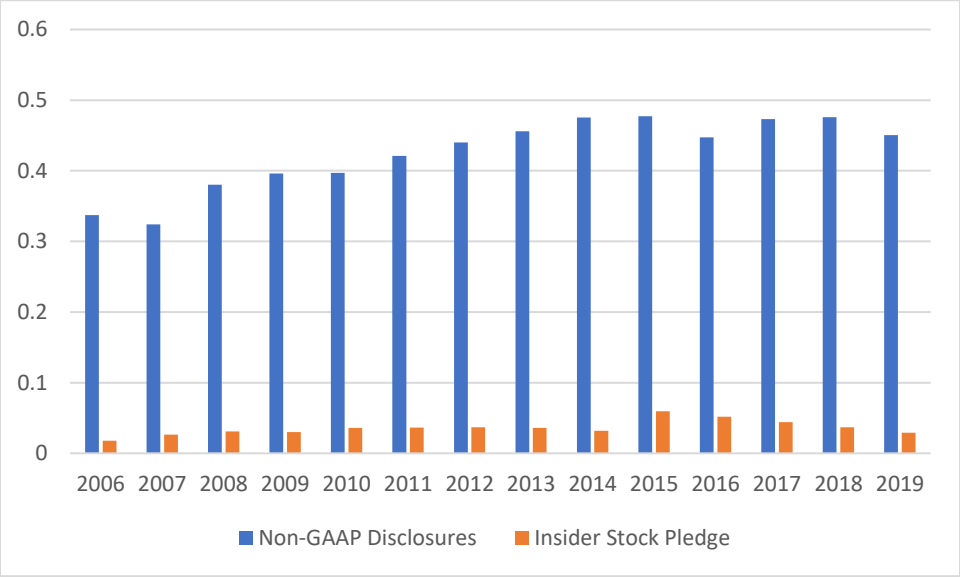

Fig. 1 Frequency of non-GAAP disclosures and Insider Stock Pledge

TABLES

Table 1 Descriptive statistics

Variable of interest	N	Mean	SD	p50	Min	Max
NG	25647	0.44	0.496	0	0	1
STOCKPLEDGE	25647	0.039	0.194	0	0	1
SP_RATIO	1005	0.376	0.299	0.291	0	1
INSTHOLD	25647	0.628	0.311	0.721	0.001	1
RET	25647	0.122	0.514	0.063	-0.851	2.214
STDROA	25647	0.068	0.086	0.038	0.001	0.603
LEVERAGE	25647	0.200	0.185	0.172	0	0.807
SIZE	25647	6.811	2.016	6.723	2.493	12.462
BIGNAUDIT	25647	0.857	0.35	1	0	1
GUIDANCE	25647	0.699	0.459	1	0	1
BTM	25647	0.619	0.613	0.46	0.032	5.331
ROA	25647	0.006	0.159	0.039	-0.995	0.306
ABSAC	25647	0.276	0.522	0.12	0.002	7.815
EPSNG	11295	1.875	2.368	1.36	-3.8	12.07
EPSGAAPOP	25646	1.297	2.337	0.8	-5.46	12.66
TOTALEXCL	11295	0.633	1.347	0.27	-2.59	8.25
BELOWLINE	25647	-0.009	0.151	0	-1.16	0.53
SPECIALEXCL	25646	0.215	0.773	0.02	-2.05	4.45
MGR_EXCRECUR	11295	0.292	0.941	0.100	-7.040	9.070

This table provides descriptive statistics of our main variables. All continuous variables are winsorized at the 1 percent and 99 percent levels. All variables are as defined in Appendix A

Table 2 Correlations

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	NG	1																
2	STOCKPLEDGE	**0.053**	1															
3	PledgePerc~t	**0.031**	**0.777**	1														
4	RET	**0.015**	**0.0013**	0.0024	1													
5	INSTHOLD	**0.446**	**0.033**	**0.02**	**0.058**	1												
6	GUIDANCE	**0.387**	**0.047**	**0.025**	**0.037**	**0.519**	1											
7	BIGNAUDIT	**0.172**	**0.02**	**0.014**	**0.018**	**0.335**	**0.245**	1										
8	BTM	**-0.13**	**-0.025**	-0.0122	**-0.325**	**-0.25**	**-0.142**	**-0.15**	1									
9	LEVERAGE	**0.097**	**0.048**	**0.042**	**-0.043**	**0.077**	**0.063**	**0.103**	**0.018**	1								
10	SIZE	**0.224**	**0.05**	**0.023**	**0.022**	**0.289**	**0.243**	**0.428**	**-0.122**	**0.36**	1							
11	GROWTH	**-0.022**	**-0.014**	-0.0043	**0.089**	**0.023**	**-0.031**	**-0.012**	**-0.132**	**-0.0026**	**-0.023**	1						
12	ROA	**0.077**	**0.028**	0.0121	**0.182**	**0.156**	**0.171**	**0.093**	**-0.144**	**-0.03**	**0.304**	**0.031**	1					
13	STDROA	**-0.079**	**-0.042**	**-0.028**	**-0.025**	**-0.158**	**-0.143**	**-0.123**	**0.05**	**-0.117**	**-0.355**	**0.082**	**-0.524**	1				
14	ABSAC	**-0.052**	-0.0105	-0.0111	**0.055**	**-0.044**	**-0.049**	**-0.067**	**-0.028**	**-0.014**	**-0.068**	**0.131**	0.0064	**0.085**	1			
15	TOTALEXCL	**0.331**	0.0094	0.0084	**-0.065**	**0.184**	**0.149**	**0.083**	-0.0107	**0.116**	**0.15**	**-0.031**	**-0.139**	**0.028**	**-0.023**	1		
16	SPECIALEXCL	**0.154**	0.0086	0.0044	**-0.131**	**0.108**	**0.091**	**0.072**	**0.082**	**0.148**	**0.123**	**-0.059**	**-0.23**	**0.044**	**-0.013**	**0.599**	1	
17	BELOWLINE	0.004	-0.0063	0.0013	**-0.016**	-0.0075	-0.0041	**-0.016**	0.0053	0.0009	**-0.047**	**0.025**	-0.0094	**0.016**	**-0.023**	**0.018**	0.0024	1

Table 2 presents Pearson correlations. Correlations in **bold** are statistically significant (two-tailed) at p<0.05. All continuous variables are winsorized at the 1 percent and 99 percent levels.

Table 3 The effect of insider stock pledge on the likelihood of Non-GAAP reporting

Dependent Variable:	Pr(NG=1)		
	(1)	(2)	(3)
STOCKPLEDGE $_{t-1}$	0.326***	0.215***	
	(4.76)	(3.1)	
SP_RATIO $_{t-1}$			0.272**
			(2.14)
RET $_{t-1}$		-0.027	-0.028
		(-1.27)	(-1.30)
INSTHOLD $_{t-1}$		1.640***	1.638***
		(24.48)	(24.46)
GUIDANCE $_{t-1}$		0.574***	0.576***
		(15.76)	(15.8)
BIGNAUDIT $_{t-1}$		-0.026	-0.027
		(-0.46)	(-0.47)
BTM $_{t-1}$		0.009	0.007
		(0.14)	(0.11)
LEVERAGE $_{t-1}$		0.453***	0.453***
		(4.24)	(4.24)
SIZE $_{t-1}$		0.077***	0.078***
		(6.17)	(6.23)
GROWTH $_{t-1}$		0.015	0.014
		(0.54)	(0.49)
ROA $_{t-1}$		0.076	0.078
		(0.71)	(0.73)
STDROA $_{t-1}$		0.532***	0.530***
		(2.68)	(2.67)
ABSAC $_{t-1}$		-0.022	-0.021
		(-1.04)	(-1.02)
Industry fixed effect	YES	YES	YES
Year fixed effect	YES	YES	YES
Observations	25646	25646	25646
Marginal effect		0.064	0.007
Pseudo R^2	0.047	0.229	0.228

This table presents the probit regression that estimates the propensity to disclose non-GAAP earnings of pledging firms. The variable STOCKPLEDGE in column (1) and (2) equals 1 for firms with insider stock pledge and 0 otherwise. The variable SP_RATIO in column (3) is the firm's precentage of shares pledged in a given fiscal year. Z-statistics based on standard errors clustered by firm are shown in parentheses. See Appendix A for variable descriptions. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively. Marginal effects for variable of interest in column (2) and (3) are calculated.

Table 4 The aggressiveness of Non-GAAP reporting

Dependent Variable:	*Pr(PROFIT =1)*
STOCKPLEDGE $_{t-1}$	-0.185*
	(-1.66)
RET $_{t-1}$	-0.093*
	(-1.69)
INSTHOLD $_{t-1}$	0.379***
	(2.94)
GUIDANCE $_{t-1}$	0.240***
	(3.11)
BIGNAUDIT $_{t-1}$	0.088
	(0.87)
BTM $_{t-1}$	0.235**
	(2.12)
LEVERAGE $_{t-1}$	0.330**
	(2.13)
SIZE $_{t-1}$	-0.168***
	(-7.47)
GROWTH $_{t-1}$	0.278***
	(4.64)
ROA $_{t-1}$	-1.242***
	(-6.90)
STDROA $_{t-1}$	0.364
	(1.10)
ABSAC $_{t-1}$	0.014
	(0.28)
Industry fixed effect	YES
Year fixed effect	YES
Observations	10776
Marginal effect	-0.019
Pseudo R^2	0.125

This table presents the probit regressions that estimate manager's propensity to convert a GAAP loss to Non-GAAP profit following insider stock pledge. Z-statistics based on standard errors clustered by firm are shown in parentheses. See Appendix A for variable descriptions. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively. Marginal effects for variable of interest is calculated.

Table 5 The magnitude of non-GAAP exclusions

Dependent Variable:	*TOTALEXCL*	*MGR_EXCRECUR*	*TOTALEXCL*	*MGR_EXCRECUR*
	(1)	(2)	(3)	(4)
STOCKPLEDGE $_{t-1}$	-0.112*	-0.0589*	-0.114*	-0.0636*
	(-1.77)	(-1.71)	(-1.81)	(-1.87)
BELOWLINE $_{t-1}$		-0.0729		-0.0667
		(-1.12)		(-1.00)
SPECIALEXCL $_{t-1}$		0.0169		0.0369**
		(1.06)		(2.22)
LAG_PF $_{t-1}$			0.0348	0.0611***
			(1.03)	(3.12)
NEG_FE $_{t-1}$			0.209***	0.158***
			(7.37)	(8.47)
GAAPOP_LOSS $_{t-1}$			0.0262	0.163***
			(0.53)	(4.55)
Controls	YES	YES	YES	YES
Industry fixed effect	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES
Observations	11295	11295	11010	11010
Adjusted R2	0.0822	0.0847	0.0879	0.0638

This table presents ordinary least square (OLS) results of the association between insider stock pledge and non-GAAP exclusions. In Column (1), we follow Abdel-Meguid et al. (2021) model specification. We also follow Brown et al. 2011 model specification to add LAG_PF, NEG_FE and GAAPOP_LOSS in our magnitude test as a robustness check in Column (2). LAG_PF equals one if the firm reports non-GAAP earnings in the previous fiscal year and zero otherwise, NEG_FE is one if GAAP EPS from operation is less than mean analyst earnings forecast and zero otherwise, and GAAPOP_LOSS is one if GAAP EPS from operation is a loss, and zero otherwise. Following prior studies (e.g., Doyle et al. 2003; Brown et al. 2012a), we restrict our sample to firm-years in which managers disclose a non-GAAP number, to ensure that our results are not affected by managers' decision to provide non-GAAP EPS. Z-statistics based on standard errors clustered by firm are shown in parentheses. See Appendix A for variable descriptions. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 6: Insider stock pledge and Value Relevance of exclusions

	(1)	(2)
Dependent Variable:	*PRICE*	*PRICE*
BV	0.525***	0.496***
	(3.16)	(3.05)
EPSNG	7.850***	8.255***
	(12.11)	(12.63)
TOTALEXCL	0.100	
	(0.34)	
STOCKPLEDGE	-4.302*	-4.231*
	(-1.75)	(-1.73)
BV_SP	0.381*	0.399*
	(1.69)	(1.73)
EPSNG_SP	-1.471	-1.593
	(-1.25)	(-1.25)
TOTALEXCL_SP	1.555*	
	(1.77)	
MGR_EXCRECUR		-1.422***
		(-3.04)
MGR_EXCRECUR_SP		2.229**
		(2.01)
BELOWLINE		14.26***
		(8.02)
SPECIALEXCL		1.419***
		(3.80)
BELOWLINE_SP		-1.747
		(-0.42)
SPECIALEXCL_SP		0.897
		(0.60)
Controls	YES	YES
Industry fixed effect	YES	YES
Year fixed effect	YES	YES
Observations	11295	11295
Adj R2	0.706	0.706
MGR_EXCRECUR+MGR_EXCRECUR_SP		0.57
p-value(sum=0)		0.45

This table examines the association of value relevance of non-GAAP earnings for firms with insider stock pledge. STOCKPLEDGE lags 1 fiscal year. All other variables are in time t. Z-statistics based on standard errors clustered by firm are shown in parentheses. See Appendix A for variable descriptions. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 7 Robustness tests: PSM and Entropy balancing

Panel A: Difference in Firm Characteristics before and after matching

	Unmatched			Matched		
	STOCKPLEDGE=1	*STOCKPLEDGE*=0	Significantly Different?	*STOCKPLEDGE*=1	*STOCKPLEDGE*=0	Significantly Different?
RET	0.119	0.127	No	0.125	0.125	No
INSTHOLD	0.680	0.615	***	0.670	0.674	No
GUIDANCE	0.805	0.676	***	0.786	0.760	No
BIGNAUDIT	0.901	0.862	***	0.894	0.891	No
BTM	0.653	0.662	No	0.636	0.636	No
LEVERAGE	0.236	0.188	***	0.232	0.229	No
SIZE	7.300	6.721	***	7.207	7.174	No
GROWTH	0.093	0.137	***	0.105	0.119	No
ROA	0.032	0.011	***	0.031	0.032	No
STDROA	0.069	0.050	***	0.050	0.053	No
ABSAC	0.243	0.291	***	0.294	0.301	No

Panel B: Difference in Firm Characteristics after Entropy Balancing Approach

	Pledging		Non-Pledging		Balance statistics	
Variable	Mean	Variance	Mean	Variance	Std Mean Diff	Variance Ratio
RET	0.1252	0.2152	0.1252	0.2152	0.000	1.000
INSTHOLD	0.6757	0.05158	0.6756	0.05158	0.000	1.000
GUIDANCE	0.7947	0.1633	0.7945	0.1633	0.000	1.000
BIGNAUDIT	0.8942	0.09472	0.8941	0.09473	0.000	1.000
BTM	0.6477	0.07747	0.6476	0.07746	0.000	1.000
LEVERAGE	0.2447	0.03451	0.2446	0.0345	0.000	1.000
SIZE	7.282	3.458	7.281	3.458	0.001	1.000
GROWTH	0.08879	0.07212	0.08879	0.07213	0.000	1.000
ROA	0.02739	0.01494	0.02739	0.01494	0.000	1.000
STDROA	0.05148	0.003997	0.05147	0.003997	0.000	1.000
ABSAC	0.2444	0.151	0.2445	0.1518	0.000	0.995

Panel C: Non-GAAP reporting and insider stock pledging

Dependent Variable:	*NG*	
	PSM	Entropy balancing
	(1)	(2)
STOCKPLEDGE $_{t-1}$	0.143*	0.178**
	(1.67)	(2.45)
RET $_{t-1}$	-0.127	-0.0806
	(-1.63)	(-1.44)
INSTHOLD $_{t-1}$	1.467***	1.169***
	(8.04)	(7.28)
GUIDANCE $_{t-1}$	0.606***	0.478***
	(5.39)	(5.73)
BIGNAUDIT $_{t-1}$	-0.00750	0.0655
	(-0.05)	(0.58)
BTM $_{t-1}$	-0.0520	0.0393
	(-0.30)	(0.28)
LEVERAGE $_{t-1}$	0.437	0.532**
	(1.56)	(2.33)
SIZE $_{t-1}$	0.103***	0.108***
	(3.49)	(4.39)
GROWTH $_{t-1}$	-0.0628	-0.0705

	(-0.54)	(-0.84)
ROA $_{t-1}$	-0.192	-0.340
	(-0.52)	(-1.12)
STDROA $_{t-1}$	0.0441	0.787*
	(0.06)	(1.80)
ABSAC $_{t-1}$	-0.00445	0.0199
	(-0.07)	(0.42)
Industry fixed effect	YES	YES
Year fixed effect	YES	YES
Observations	1970	25646
Pseudo R^2	0.222	0.164

This table reports the robustness of our main results by implementing propensity score matching and entropy-balancing, respectively. Z-statistics based on standard errors clustered by firm are shown in parentheses. See Appendix A for variable descriptions. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively. Panel A presents comparation of the mean values for variables in the STOCKPLEDGE=1 and STOCKPLEDGE=0 samples before and after employing propensity score matching (PSM). Panel B shows firm characteristics after Entropy balancing approach. Panel C presents the regression results after matching by propensity score and Entropy balancing, respectively.

Table 8: Staggered DID analyses

Dependent Variable:	*NG*		
	(1)	(2)	(3)
	Staggered DID	Dynamic Effects	5-Year Window
InsiderSP_POST	0.535***		0.461***
	(3.75)		(2.93)
Before T-4		-0.389	
		(-1.59)	
T-3		0.394	
		(1.29)	
T-2		0.156	
		(0.55)	
T		0.0561	
		(0.22)	
T 1		0.607**	
		(2.32)	
T 2		0.569**	
		(2.13)	
T 3		0.462*	
		(1.67)	
After T 4		0.800***	
		(3.41)	
Controls	YES	YES	YES
Firm fixed effect	YES	YES	YES
Year fixed effect	YES	YES	YES
Observations	12469	12469	11560
pseudo R^2	0.051	0.053	0.048

This table presents the effect of insider stock pledge on firm's non-GAAP reporting using staggered DID analysis. The dependent variable is one year ahead non-GAAP reporting indicator. *InsiderSP_POST* is a DID estimator that is coded as an indicator variable that equals to 1 on or after the year that firms initially have insider stock pledge, and otherwise. Column (1) is based on sample of observations from all years. Column (2) presents analysis of parallel trend assumption and Column (3) are based on the sample of observations from 5 years before to 5 years after initial stock pledge. Z-statistics based on standard errors clustered by firm are shown in parentheses. See Appendix A for variable descriptions. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 9 Cross-sectional Test: Conditional on Firm Risk-taking

Dependent Variable:	*NG*							
	(1) LowHHI	(2) HighHHI	(3) LowR&D	(4) HighR&D	(5) LowCAPEX	(6) HighCAPEX	(7) LowSegment	(8) HighSegment
STOCKPLEDGE t-1	0.108	0.363***	0.264**	0.458***	0.179*	0.205**	0.232***	0.167
	(1.27)	(3.27)	(2.46)	(2.78)	(1.93)	(2.17)	(2.67)	(1.55)
RET t-1	-0.0369	-0.0320	0.00318	-0.0977**	0.00356	-0.0988***	-0.0470	-0.0125
	(-1.02)	(-1.15)	(0.10)	(-2.30)	(0.13)	(-2.79)	(-1.51)	(-0.40)
INSTHOLD t-1	1.754***	1.593***	1.479***	1.859***	1.333***	1.948***	1.957***	1.257***
	(17.55)	(15.77)	(13.83)	(13.14)	(13.63)	(19.15)	(22.06)	(12.88)
GUIDANCE t-1	0.570***	0.544***	0.430***	0.924***	0.486***	0.669***	0.581***	0.516***
	(9.91)	(11.57)	(8.15)	(11.37)	(11.02)	(11.70)	(11.53)	(10.19)
BIGNAUDIT t-1	-0.0358	-0.0575	-0.0911	-0.227	-0.0225	0.0757	-0.0665	0.0479
	(-0.28)	(-0.90)	(-1.28)	(-1.22)	(-0.37)	(0.51)	(-0.77)	(0.69)
BTM t-1	-0.0239	-0.111	-0.0217	0.138	-0.0881	-0.0554	-0.0628	-0.0488
	(-0.23)	(-1.40)	(-0.24)	(0.98)	(-1.18)	(-0.53)	(-0.73)	(-0.58)
LEVERAGE t-1	0.574***	0.185	0.509***	0.174	0.399***	0.267*	0.366**	0.397***
	(3.72)	(1.26)	(3.06)	(0.85)	(2.83)	(1.79)	(2.57)	(2.65)
SIZE t-1	0.0847***	0.109***	0.0974***	0.0496**	0.145***	0.0984***	0.0744***	0.115***
	(4.14)	(3.92)	(3.82)	(1.97)	(5.48)	(5.14)	(4.81)	(5.18)
GROWTH t-1	0.0658	0.0191	-0.00572	-0.0779	0.0444	0.0397	0.0650	0.0203
	(0.97)	(0.66)	(-0.14)	(-1.62)	(1.46)	(0.68)	(1.29)	(0.62)
ROA t-1	-0.764***	0.0423	0.213	0.352*	-0.00219	-0.516**	-0.482***	0.201
	(-2.97)	(0.35)	(1.49)	(1.69)	(-0.02)	(-2.23)	(-2.86)	(1.42)
STDROA t-1	1.363***	0.228	0.605**	0.354	0.395*	1.163***	0.902***	0.360
	(3.15)	(1.04)	(2.22)	(0.92)	(1.79)	(3.01)	(3.00)	(1.40)
ABSAC t-1	-0.0550	0.0148	-0.0381	0.0262	0.00687	-0.109***	-0.0336	-0.0272
	(-1.51)	(0.59)	(-1.37)	(0.46)	(0.29)	(-3.05)	(-0.96)	(-1.04)
Firm fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Observations	12823	12764	9642	7494	12960	12684	14720	10890
Pseudo R^2	0.221	0.245	0.196	0.246	0.212	0.230	0.240	0.230

This table present results from regressions of non-GAAP reporting on insider stock pledge, conditional on the level of firm risk-taking. A firm-year is classified as LowHHI, LowR&D, LowCAPEX and LowSegment if they are below median within each industry-year group. Z-statistics based on standard errors clustered by firm are shown in parentheses. See Appendix A for variable descriptions. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 11: Margin Call Pressure

RETURN=	-15%	-12%	-18%

Dependent Variable:	*NG*	*NG*	*NG*
SP_PRESSURE $_{t-1}$	0.444*	0.449**	0.411*
	(1.87)	(2.12)	(1.69)
RET $_{t-1}$	-0.0351*	-0.0348*	-0.0352*
	(-1.69)	(-1.68)	(-1.70)
INSTHOLD $_{t-1}$	1.603***	1.603***	1.602***
	(24.78)	(24.78)	(24.76)
GUIDANCE $_{t-1}$	0.571***	0.571***	0.572***
	(16.46)	(16.46)	(16.47)
BIGNAUDIT $_{t-1}$	-0.0102	-0.0103	-0.00991
	(-0.19)	(-0.19)	(-0.18)
BTM $_{t-1}$	-0.00718	-0.00697	-0.00688
	(-0.12)	(-0.11)	(-0.11)
LEVERAGE $_{t-1}$	0.452***	0.451***	0.451***
	(4.38)	(4.38)	(4.37)
SIZE $_{t-1}$	0.0730***	0.0730***	0.0729***
	(5.97)	(5.98)	(5.97)
GROWTH $_{t-1}$	0.0167	0.0168	0.0167
	(0.64)	(0.64)	(0.64)
ROA $_{t-1}$	0.102	0.101	0.102
	(0.99)	(0.98)	(0.99)
STDROA $_{t-1}$	0.540***	0.540***	0.539***
	(2.93)	(2.93)	(2.93)
ABSAC $_{t-1}$	-0.0196	-0.0196	-0.0196
	(-1.02)	(-1.01)	(-1.01)
Industry fixed effect	YES	YES	YES
Year fixed effect	YES	YES	YES
Observations	27532	27532	27532
Pseudo R2	0.2246	0.2246	0.2246

Panel A presents results from regressions of non-GAAP reporting on margin call pressure (*SP_PRESSURE*) that is measured by the share pledge ratio conditioned on previous fiscal year stock return. For the robustness check, diverse benchmarks of threshold (e.g., -12% and -18%) are applied to define prior returns. Panel B presents results from regressions of non-GAAP reporting on insider stock pledge, conditional on whether firms continue to increase (cash) dividends. Z-statistics based on standard errors clustered by firm are shown in parentheses. See Appendix A for variable descriptions. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Panel B: Cross-sectional Test Conditioning on Whether Firms Increase Dividends

Dependent Variable:	*NG*	*NG*
	Increase Div==0	Increase Div==1
STOCKPLEDGE $_{t-1}$	0.252***	0.103
	(3.28)	(0.95)
RET $_{t-1}$	-0.00790	-0.0504
	(-0.31)	(-1.22)
INSTHOLD $_{t-1}$	1.709***	1.544***
	(21.55)	(20.58)
GUIDANCE $_{t-1}$	0.600***	0.525***

	(13.60)	(11.49)
BIGNAUDIT $_{t-1}$	-0.0569	0.0702
	(-0.88)	(1.01)
BTM $_{t-1}$	0.0903	-0.174**
	(1.25)	(-2.25)
LEVERAGE $_{t-1}$	0.482***	0.401***
	(3.88)	(3.20)
SIZE $_{t-1}$	0.0915***	0.0454***
	(6.40)	(3.26)
GROWTH $_{t-1}$	-0.0690**	0.0907**
	(-1.99)	(2.34)
ROA $_{t-1}$	0.0468	0.163
	(0.36)	(1.15)
STDROA $_{t-1}$	0.804***	0.0837
	(3.34)	(0.36)
ABSAC $_{t-1}$	-0.0481*	0.0214
	(-1.91)	(0.69)
Diff in Coefficient	*p=0.030*	
Industry fixed effect	YES	YES
Year fixed effect	YES	YES
Observations	18510	7136
Pseudo R2	0.2261	0.2256

Table 11 presents mechanism tests of our hypothesis 1. Panel A presents results from regressions of non-GAAP reporting on margin call pressure (*SP_PRESSURE*) that is measured by the share pledge ratio conditioned on previous fiscal year stock return. For the robustness check, diverse benchmarks of threshold (e.g., -12% and -18%) are applied to define prior returns. Panel B presents results from regressions of non-GAAP reporting on insider stock pledge, conditional on whether firms continue to increase (cash) dividends. Z-statistics based on standard errors clustered by firm are shown in parentheses. See Appendix A for variable descriptions. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.