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Mehring, Oliver | Müller, Jens | Sievers, Sönke |
Sofilkanitsch, Christian

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Does learning about low GAAP reporting quality change investors' perceptions of aggressive non-GAAP reporting choices?

Oliver Mehring[#] Jens Mueller[##] Soenke Sievers[###] Christian Sofilkanitsch[####]

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Abstract

Material financial restatements reveal GAAP-based misreporting and thus are a strong signal of low GAAP reporting quality. We explore these reporting shocks and investigate whether heightened investor scrutiny of GAAP reporting quality after material restatements has a spillover effect on investors' perceptions of aggressive non-GAAP reporting choices. We find that investors reward aggressive non-GAAP reporting choices before material restatements (i.e., ERC premium) but penalize the same reporting choices after material restatements (i.e., ERC discount). Furthermore, we document that short- and long-term market reactions to material restatements are more negative for firms that aggressively reported non-GAAP earnings before the announcement of material restatements. We provide evidence that heightened investor scrutiny of GAAP reporting quality affects investors' perceptions of aggressive non-GAAP reporting choices. Finally, our findings are consistent with the idea that aggressive non-GAAP reporting choices misled investors before material restatement announcements.

JEL Classification: G1, K4, M4
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[#] Paderborn University, Department of Taxation, Accounting & Finance, Warburger Straße 100, 33098 Paderborn, Germany. E-mail: oliver.mehring@uni-paderborn.de.
[##] Paderborn University, Department of Taxation, Accounting & Finance, Warburger Straße 100, 33098 Paderborn, Germany. E-mail: jens.mueller@uni-paderborn.de.
[###] Paderborn University, Department of Taxation, Accounting & Finance, Warburger Straße 100, 33098 Paderborn, Germany. E-mail: soenke.sievers@uni-paderborn.de.
[####] (Corresponding author) Paderborn University, Department of Taxation, Accounting & Finance, Warburger Straße 100, 33098 Paderborn, Germany. E-mail: christian.sofilkanitsch@uni-paderborn.de.

An earlier version of this paper circulated under the title "Non-GAAP reporting and investor attention: Are investors misled by exclusions of recurring expenses from non-GAAP earnings before restatement announcements?".

1. Introduction

Non-GAAP reporting is a controversial topic and has recently been debated by regulatory bodies (SEC, 2018; Stein, 2016; White, 2016), standard setters (Golden, 2017; Kabureck, 2017), and practitioners (PWC, 2019). These parties express the concern that aggressively inflated non-GAAP earnings might mislead investors. In contrast, empirical studies largely provide evidence that non-GAAP reporting has improved following Regulation G (Reg G) in 2003 (Black et al., 2012; Black et al., 2017a; Heflin and Hsu, 2008; Kolev et al., 2008; Whipple, 2015), suggesting a discrepancy between current regulatory concerns and academia (Black et al., 2018).

A more nuanced view, however, reveals mixed evidence of mispricing for both the pre- and post-Reg G periods (Bhattacharya et al., 2003; Black et al., 2012; Chen, 2010; Christensen et al., 2014; Doyle et al., 2013; Doyle et al., 2003; Gu and Chen, 2004; Hsu et al., 2021; Landsman et al., 2007; Leung and Veenman, 2018; Lopez et al., 2019; Lougee and Marquardt, 2004; Whipple, 2015). In particular, the exclusion of recurring expenses (e.g., stock-based compensation) is critically debated in the financial press (McKenna, 2019) [1] and subject to future research suggestions (Black et al., 2018). Moreover, mixed existing findings might be attributable to the application of different research design choices leaving room for improvement (Abarbanell and Lehavy, 2007; Berger, 2005; Beyer et al., 2010; Black et al., 2018; Easton, 2003; Lambert, 2003).[2]

[1] Warren Buffett highlights that "it has become common for managers to tell their owners to ignore certain expense items that are all too real" and believes that "analysts are guilty of propagating misleading numbers that can deceive investors" (Buffet 2015, p. 16). However, at Berkshire Hathaway, he has also been found to exclude "all too real" expenses (McKenna, 2019), suggesting a "do as I say, not as I do" attitude.

[2] Prior non-GAAP research assumes that investors learn over time (Curtis et al., 2014; Doyle et al., 2003; Whipple, 2015). Thus, subsequent share price movements are interpreted as a reversal of ex ante mispricing. Easton (2003) discusses findings by Doyle et al. (2003) and notes that "[i]t is difficult to believe that so much learning about mispricing takes place after a two-year lag" (p. 182). Instead, managers could be more likely to aggressively inflate non-GAAP earnings today because they anticipate future downturns based on private information (Easton, 2003).

One of the yet unresolved concerns is that empirically detecting mispricing is difficult, as investors might continue to believe in high non-GAAP reporting quality and, thus, might never reverse potential mispricing of inappropriate non-GAAP adjustments (Lambert, 2003). To resolve this issue, Lambert (2003) suggests implementing an informational shock by which investors learn the truth and correct former mispricing. To address this suggestion, ideally, one would focus on events that reveal low non-GAAP reporting quality and investigate the immediate market reactions to these events. However, because only four non-GAAP-related Accounting and Auditing Enforcement Releases (AAERs) have been released since 2002 (Donelson et al., 2020), empirical analysis using strong signals of low non-GAAP reporting quality is cumbersome.

To overcome the quantitative limitations of non-GAAP-related shocks, we apply GAAP-related shocks instead. In this respect, our research questions are: (i) Do investors perceive aggressive non-GAAP reporting choices differently after learning about low GAAP reporting quality? and (ii) Are investors misled by aggressive non-GAAP reporting choices before learning about poor GAAP reporting quality? We exploit material restatements as GAAP-related shocks, as these reliably capture a substantial increase in investor scrutiny (Chen et al., 2014b; Hennes et al., 2008; Wilson, 2008) and are a strong signal of low GAAP reporting quality (Christensen et al., 2016; Dechow et al., 2010; Pomeroy and Thornton, 2008).[3] We identify aggressive non-GAAP reporting choices in line with prior literature by focusing on the exclusion of recurring expenses (often referred to as "other expense" and "non-special item" exclusions). These adjustments have been largely found to be of low quality (Barth et al., 2012; Bhattacharya et al., 2003; Kolev et al., 2008) and are described as "especially indicative of aggressive pro forma reporting" (Black and Christensen,

[3] The SEC characterizes restatements as the "most visible indicator of improper accounting – and source of new investigations" (Schroeder, 2001).

2009) and potentially misleading (Black et al., 2012). Although one could assume that investors fully account for the low exclusion quality of these adjustments, recall that the empirical evidence is mixed (Black et al., 2012; Brown et al., 2012; Doyle et al., 2013). Since recurring expense exclusions represent a sizeable amount of non-GAAP adjustments (Black et al., 2014; Whipple, 2015), gaining a better understanding of whether changes in perceived GAAP reporting quality affect investors' treatment of recurring expense exclusions is of interest to regulatory bodies, researchers, and practitioners.[4]

As financial restatements have been found to correct only GAAP information (Kyung et al., 2019) and thus do not directly reveal any incremental information about non-GAAP reporting quality, one could expect that investors will not change their perceptions of aggressive non-GAAP reporting choices after material restatements.[5] Alternatively, as non-GAAP earnings derive from GAAP earnings and represent quantitative and decision-relevant financial information by the same firm (Bhattacharya et al., 2003; Bradshaw et al., 2018), one could assume that investors will revise their overall beliefs about financial reporting quality (including non-GAAP reporting quality) and perceive recurring expense exclusions differently after material restatements.[6]

Turning to our findings, we evidence a change in investors' treatment of recurring expense exclusions after material restatements. Specifically, we document an ERC premium for aggressive

[4] Black et al. (2018) state that investors might have simply "bought in" (p. 284) to the claim that inappropriate non-GAAP adjustments are justifiable, suggesting that investors' perceptions of financial reporting quality is a potential determinant of how they regard recurring expense exclusions.

[5] Kyung et al. (2019) state that "[w]hile the required 8-K reconciliations of non-GAAP to GAAP earnings could arguably be subject to restatement in these instances, we were unable to identify a single instance of this occurring" (p. 179).

[6] If investors revise downward their beliefs about non-GAAP reporting quality, ex post investors will likely discount aggressive non-GAAP reporting more. In contrast, if investors believe that heightened SEC scrutiny after material restatements will deter managerial opportunisms in both GAAP and non-GAAP disclosures, ex post investors might discount aggressive non-GAAP reporting less. Overall, it is unclear whether and how material restatements will affect investors' perceptions of aggressive non-GAAP reporting choices.

non-GAAP reporting choices before material restatements, suggesting that investors perceive the exclusion of recurring expenses as informative before material restatements. After material restatements, however, we find an ERC discount for aggressive non-GAAP reporting choices, suggesting that investors perceive the exclusion of recurring expenses as less justifiable. The documented change from reward to penalty (from ERC premium to ERC discount) of recurring expense exclusions yields two essential insights. First, our findings suggest that investors revise downward their perceptions of recurring expense exclusions after material restatements, suggesting a spillover effect from perceived GAAP to non-GAAP reporting quality. Second, investor scrutiny seems to be a vital determinant of how investors perceive aggressive non-GAAP reporting choices.

Having established that investors revise downward their beliefs about non-GAAP reporting quality after material restatements, we investigate the potential mispricing of recurring expense exclusions before material restatements. We condition short- and long-term market reactions to the restatement announcement on ex ante non-GAAP reporting and ask whether the ERC premium for aggressive non-GAAP reporting choices in the pre-restatement period (as evidence in our first analysis) indicates mispricing. We show that short- and long-term market reactions to the restatement announcement are more negative for firms with aggressive pre-restatement non-GAAP reporting relative to non-aggressive firms. Specifically, aggressive firms experience cumulative abnormal returns (CAR) of –10.9 percent, and non-aggressive firms experience a CAR of – 3.8 percent. This finding suggests that investors formed overoptimistic expectations in the pre-restatement period because of aggressively inflated non-GAAP earnings. Investors' expectations, however, eroded after they learned about low financial reporting quality through a material restatement. In other words, investors were likely misled by aggressive non-GAAP

reporting choices before the announcement of material restatements. Moreover, we find an ERC decline for firms that aggressively reported non-GAAP earnings before material restatements but not for non-aggressive counterfactuals. This ERC revision might suggest that investors overestimated the financial reporting quality of firms that frequently excluded recurring expenses before material restatements.[7] Carefully note that our findings hold in the pre- and post-Reg G periods, meaning that Reg G has not resolved this issue.

To rule out alternative explanations, we perform a battery of robustness tests that corroborate the view that our findings are attributable to i) the exclusion of recurring expenses and ii) the revelation of poor GAAP reporting quality. For example, as a placebo measure for aggressiveness, we employ appropriate non-GAAP adjustments (i.e., special items) and document that the findings, as expected, do not hold. In the same vein, we employ events that do not primarily reveal low GAAP reporting quality (e.g., security class action lawsuits) and show that the findings do not hold. Moreover, we consider whether investors change their treatment of recurring expense exclusions because of changes in exclusion quality after material restatements. As we do not evidence changes in the quality of recurring expense exclusions, our findings are robust to this alternative explanation. We also acknowledge that prior research has applied street earnings from I/B/E/S as a proxy for pro forma earnings (Bradshaw and Sloan, 2002; Brown and Sivakumar, 2003; Doyle et al., 2013; Doyle et al., 2003; Heflin and Hsu, 2008; Kolev et al., 2008) or actual pro forma earnings (Bentley et al., 2018; Bhattacharya et al., 2019; Marques, 2006) to investigate firms' non-GAAP reporting choices. Our findings remain qualitatively similar for both procedures,

[7] In detail, multivariate analyses indicate that CARs are more negative by five percentage points for aggressive than for non-aggressive firms. Furthermore, although non-aggressive firms experience no ERC decline, aggressive firms experience an ERC decline of 43.93 percent. The ERC decline is long-lived for aggressive firms. Overall, market reactions are statistically and economically more negative for firms with aggressive pre-restatement non-GAAP reporting relative to non-aggressive counterfactuals.

consistent with the notion that "most I/B/E/S-provided non-GAAP EPS metrics agree with managers' non-GAAP disclosures" (Bentley et al. 2018, p. 1043).

We turn to our contribution and document a spillover effect from the revelation of poor GAAP reporting quality to investors' perceptions of aggressive non-GAAP reporting choices by showing that investors reward recurring expense exclusions before a material restatement but penalize the same reporting choices thereafter. Additionally, the change in investors' responsiveness to aggressive non-GAAP reporting choices (from ERC premium to ERC discount) suggests that firm-specific scrutiny of financial reporting quality is a determinant of how investors perceive aggressive non-GAAP reporting choices.[8] As material restatements are assumed to attract investor attention (Cao et al., 2012), our findings closely relate to analytical work by Hirshleifer and Teoh (2003), who propose that investor attention is a determinant of how investors price inappropriate non-GAAP adjustments.[9]

Second, contributing to regulatory debates (SEC, 2018; Stein, 2016; White, 2016), our findings hold for both the pre- and post-Reg G periods, suggesting that mispricing of non-GAAP earnings is not yet fully resolved.[10] Significantly, we contribute to mixed findings of non-GAAP reporting regarding mispricing (Bhattacharya et al., 2003; Black et al., 2012; Chen, 2010; Doyle et al., 2013; Doyle et al., 2003; Gu and Chen, 2004; Lopez et al., 2019; Lougee and Marquardt, 2004; Whipple, 2015) and address future research suggestions (Black et al., 2018; Lambert, 2003; McVay, 2006).[11]

[8] To the best of our knowledge, prior research thus far has not evidenced an ERC premium to recurring expense exclusions (Black et al., 2014; Black et al., 2012; Brown et al., 2012; Doyle et al., 2013; Doyle et al., 2003).

[9] On a broader scale, our research aligns with the view that investor attention affects the pricing of earnings announcements (Chiu et al., 2020; Drake et al., 2016; Hirshleifer et al., 2009; Kempf et al., 2016; Nekrasov et al., 2021).

[10] Black et al. (2018) state that "[f]uture research can help to reconcile the difference between academic research, which indicates that non-GAAP reporting quality has improved over time and is now primarily used for informative reasons, to the increased regulatory concern about non-GAAP reporting."

[11] Black et al. (2018) raise the question, "[i]f recurring exclusions really are a signal of aggressive and opportunistic reporting, how do managers continue to benefit from making these same adjustments year after year while explicitly

In particular, the exploitation of material restatements as shocks to investors' perceptions of financial reporting quality allows us to investigate investors' detection of mispricing. The immediate market reaction to material restatements enables us to rule out several alternative explanations proposed in prior literature that rely on long-horizon association studies (Doyle et al., 2003; Whipple, 2015), which are critically discussed (Easton, 2003).

Third, we extend restatement-related findings that have not considered ex ante non-GAAP reporting to be a moderator of short- and long-term market reactions to restatements (Agrawal and Chadha, 2005; Chen et al., 2014b; Gordon et al., 2013; Hennes et al., 2008; Palmrose et al., 2004; Wilson, 2008). Our findings suggest that recurring expense exclusions have been misleading before material restatements, and investors overestimated the financial reporting quality of firms with aggressive ex ante non-GAAP reporting in the pre-restatement period. Thus, well-known findings from the literature, such as by Chen et al. (2014b), who document a long-lived ERC decline after material restatements, must be re-considered given that we show that the long-lived ERC decline after material restatement is non-existent when firms reported non-GAAP earnings non-aggressively before material restatements. Hence, future restatement research could consider ex ante non-GAAP reporting as a determinant of market consequences.

By choosing identification over generalization, our restatement-related findings do not contrast prior non-GAAP literature that yields contrary findings based on non-restatement samples (Black et al., 2012; Black and Christensen, 2018; Whipple, 2015; Zhang and Zheng, 2011). Importantly,

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disclosing them to investors?" (p. 284). Importantly, if firms' non-GAAP reporting is never exposed to informational shocks, investors might continue to believe in "false" information for an indefinite period, suggesting that it is unclear when, if ever, mispricing will be revealed and reversed. Given our findings, one might assume that investors were misled before material restatements because they overestimated the quality of recurring expense exclusions. Our focus on the pre-restatement period addresses McVay (2006), who suggests investigating non-GAAP reporting choices in a setting in which executives might be incentivized to exclude expenses from core earnings. The pre-restatement period is a period high information asymmetry (Griffin, 2003).

our findings do not suggest that firms with recurring expense exclusions per se are overpriced. Instead, we show that firms with the pressure, incentive, and opportunity to provide incorrect GAAP information (i.e., material restatements) (Sievers and Sofilkanitsch, 2019) can mislead investors by providing aggressively inflated non-GAAP earnings in the quarters leading up to the material restatement. Considering that approximately 78 percent of non-GAAP reporters exclude recurring items (Black et al., 2014; Whipple, 2015), it might be worrisome if only a fraction of all recurring expense exclusions were mispriced.[12] Eventually, our findings shed light on the understanding of whether and how changes in perceived financial reporting quality affect investors' perceptions of recurring expense exclusions.

The remainder of this paper is organized as follows. Section 2 introduces the prior literature on non-GAAP reporting and restatements. Section 3 outlines our hypotheses, and Section 4 illustrates our research design choices and the models applied. Sample descriptions are presented in Section 5. Section 6 presents the empirical results, including robustness checks, and Section 7 concludes the paper.

[12] Non-GAAP earnings are, on average, 33 percent higher than GAAP earnings (Fahey, 2016).

2. Prior literature

2.1 Non-GAAP reporting

Non-GAAP reporting allows managers to exclude expenses and gains otherwise required to be included under GAAP (Cohen et al., 2007). While managers claim that non-GAAP adjustments reduce noise from one-time effects, critics highlight that managers might distract investors from actual firm performance by aggressively inflating non-GAAP earnings (PWC, 2019; SEC, 2018).[13] In line with this concern, the SEC has intensified the focus on non-GAAP reporting in recent years (Rapoport, 2016), suggesting that some non-GAAP adjustments are viewed as less appropriate (Stein, 2016; White, 2016). In contrast, the established view in academia indicates that non-GAAP reporting is largely informative after Reg G (Black et al., 2018).[14] A more nuanced view on non-GAAP literature, however, provides a fragmented picture of mispricing before and after Reg G.[15] Moreover, considering that a sizeable amount of non-GAAP reporters exclude recurring expenses described as "especially indicative of aggressive pro forma reporting" (Black and Christensen, 2009) might support the SEC's concerns.[16]

[13] Remarkably, in 2015, GAAP earnings declined by –12.7 percent for S&P 500 firms, whereas non-GAAP earnings grew by 0.4 percent (Lahart, 2016), meaning that performance and, thus, investors' expectations about future cash flows might vary considerably between GAAP and non-GAAP figures. Consistent with this observation, Bernstein (2019) asks: "[w]hat do words like "earnings" and "profitable" even mean in the era of the non-GAAP arms race?"

[14] Black et al. (2018) suggest that future research could reconcile findings from academia (e.g., evidence of informative non-GAAP disclosure) to regulatory concerns about potentially misleading non-GAAP earnings.

[15] Prior literature finds that the exclusion quality has improved following Reg G (Black et al., 2017a; Heflin and Hsu, 2008; Kolev et al., 2008; Whipple, 2015) and the SEC's release of Compliance and Disclosure Interpretations (C&DIs) in 2010 (Bond et al., 2017). Whipple (2015) states that "excluding other items in the current reporting environment is largely informative," and Doyle et al. (2013) show that investors are less responsive to aggressively reported non-GAAP earnings in cases in which forecasts are met or beat. In contrast, Lopez et al. (2019) state that "at least some investors are misled by the use of non-GAAP expense exclusions," and Christensen et al. (2014) provide evidence that short-sellers target firms with exclusions of recurring expenses, suggesting that these firms are perceived as mispriced and having low financial reporting quality. Furthermore, Hsu et al. (2021) document a "positive relation between the frequency of managers' non-GAAP reporting and crash risk," suggesting that non-GAAP earnings can be harmful to investors' wealth.

[16] Two widely accepted views in non-GAAP research are established: (1) non-GAAP disclosure is informative after the introduction of Reg G (Black and Christensen, 2018; Zhang and Zheng, 2011) and (2) the exclusion of recurring items (i.e., other items) is potentially misleading (Barth et al., 2012; Bhattacharya et al., 2003; Black et al., 2012;

2.2 Inappropriate non-GAAP adjustments

Prior literature addresses inappropriate non-GAAP adjustments, namely, the exclusion of recurring expenses, and largely concludes that these are of low quality (Barth et al., 2012; Bhattacharya et al., 2003; Kolev et al., 2008) and used to meet or beat analyst forecasts (Black and Christensen, 2009; Doyle et al., 2013). Although one could expect that investors price exclusions according to their quality, thus avoiding mispricing, empirical research yields ambiguous findings of whether investors fully unravel the low exclusion quality of recurring expense exclusion (Black et al., 2012; Brown et al., 2012; Doyle et al., 2013).[17] Turning to theoretical work, Hirshleifer and Teoh (2003) propose that investors are misled by inappropriate non-GAAP adjustments because of limited investor attention, suggesting that investors misprice aggressive non-GAAP reporting choices. Furthermore, Hirshleifer and Teoh (2003) propose that managers are more likely to make inappropriate non-GAAP adjustments if investors perceive financial reporting quality to be high. The latter proposition indirectly suggests that investors' pricing of recurring expense exclusions is affected by investors' perceived financial reporting quality. For example, suppose investors believe in high non-GAAP reporting quality. In that case, investors might decrease their effort in detecting the actual quality of non-GAAP adjustments and, thus, fail to detect less justifiable (potentially misleading) yet salient non-GAAP reporting choices.[18] Moreover, if investors continue to believe

Doyle et al., 2013; Kolev et al., 2008). Interestingly, while approximately 78 percent of non-GAAP reporters exclude recurring items (Black et al., 2014; Whipple, 2015), findings of whether investors price these adjustments correctly are ambiguous (Black et al., 2012; Brown et al., 2012; Doyle et al., 2013; Whipple, 2015), suggesting that recurring expense exclusions might require further investigation (Black et al., 2018).

[17] Black et al. (2012) find that investors do not discount recurring item exclusions before and after Reg G. In contrast, Doyle et al. (2013) show that investors are less responsive to non-GAAP earnings when recurring expenses are excluded and analyst forecasts are met or beat, suggesting that investors at least partially see through the quality of non-GAAP adjustments. Finally, Brown et al. (2012) state that "while investors appear to discount the recurring exclusions contained in early pro forma announcements at the report date, this discount is far from complete" (p. 349).

[18] Reconciliations from GAAP to non-GAAP earnings have been mandatory since 2003 (SEC, 2002), 97 percent of S&P 500 firms released non-GAAP earnings as of 2017 (Usvyatsky and Coleman, 2018), and non-GAAP reporting has been subject to only four AAERs since 2002 (Donelson et al., 2020). These observations suggest high transparency, acceptance, and credibility of non-GAAP reporting and might be perceived by investors as evidence of high non-

in high non-GAAP reporting quality, they could fail to detect past mispricing unless they eventually learn about low non-GAAP reporting quality. This concern aligns with Lambert (2003), who highlights that "mispricing could last for an indefinite period before inattentive investors correct their previous errors" (p. 397), meaning that it is "difficult to empirically detect the magnitude of any mispricing that exists" (p. 397). For that reason, Lambert (2003) advises that future research investigate "the process by which the valuation errors made by inattentive investors get corrected (whether it is by eventually learning the truth or by having the error driven out by the attentive investors)" (p. 399).[19] Thus far, non-GAAP literature has not considered a firm-specific learning event by which i) investors might update their beliefs about recurring expense exclusion and, thus, ii) reverse potential mispricing attributable to aggressive non-GAAP reporting choices. Furthermore, non-GAAP research has not investigated whether firm-specific shocks to perceived financial reporting quality affect investors' treatment of recurring expense exclusions.

2.3 Financial restatements

Financial restatements reveal prior GAAP-based misreporting, are "a shock to the operating environment of the firm" (Richardson 2005, p. 341), and a signal of low GAAP-based reporting quality (Pomeroy and Thornton, 2008). Given this informational shock, investors increase their scrutiny of financial reporting quality (Chen et al., 2014b) and re-estimate expected future cash flows and information risk, leading to decreased firm value (Palmrose et al., 2004). Firms that

GAAP reporting quality.

[19] Easton (2003) discusses findings by Doyle et al. (2003) and notes that "[i]t is difficult to believe that so much learning about mis-pricing takes place after a two-year lag" (p. 182). Ultimately, Easton (2003) concludes that the correlation between aggressive non-GAAP reporting choices and future negative abnormal returns found by Doyle et al. (2003) can alternatively suggest that "firms with more exclusions have lower expected returns than firms with less exclusions." In other words, managers might be more likely to aggressively report non-GAAP earnings if they foresee a bleak future regarding true profitability than managers who expect a bright future.

announce material restatements experience CAR of –14 percent (Hennes et al., 2008) and a long-lived ERC decline of several years (Chen et al., 2014b). Overall, prior literature attributes restatement-related market reactions primarily to past GAAP misreporting.[20] Thus far, restatement research has not considered pre-restatement non-GAAP reporting choices to be a moderator of market reactions to restatements, nor was a restatement considered a potential channel through which investors revise their beliefs about recurring expense exclusions.

3. Hypothesis development

3.1 Cross-sectional tests: Reporting shock and investor responsiveness

Turning to the first question of whether investors update their beliefs about non-GAAP reporting quality after GAAP-related shocks, we compare investors' responsiveness to the exclusion of recurring expenses before and after material restatements. Considering that investor attention is a determinant of pricing inappropriate non-GAAP adjustments (Hirshleifer and Teoh, 2003), one might assume that investors change their treatment of aggressive non-GAAP reporting choices after material restatements.[21]

After material restatements, one might expect that investors revise downward the overall perceived quality of financial reporting (including the credibility of non-GAAP information) and view recurring expense exclusions with deeper skepticism (Chen et al., 2014b). Consequently, investors might perceive the exclusion of recurring expenses as less justifiable in the post-restatement period and discount aggressive non-GAAP reporting choices more after material restatements.[22]

[20] While restatements could trigger an ex post correction of non-GAAP reconciliations given the corrections to GAAP numbers, such a direct link has not been observed (Kyung et al., 2019), suggesting that restatements do not directly reveal any incremental information about non-GAAP reporting quality.

[21] Because restatements are "trust-destroying" events (Almer et al., 2008; Chen et al., 2014a; Elliott et al., 2012), investors could become more attentive and devote more effort and time to detecting potentially misleading non-GAAP reporting choices after financial restatements.

[22] As prior literature largely evidences an ERC discount to recurring expense exclusions (Black et al., 2014; Doyle et

Alternatively, investors might believe that heightened SEC and auditor scrutiny in the post-restatement period might curtail managerial opportunism in both GAAP and non-GAAP reporting ex post. Therefore, investors might assume improved non-GAAP disclosure and discount aggressive non-GAAP reporting choices less after material restatements.[23] Given plausible arguments for each prediction, we posit that material restatements affect investors' responsiveness to aggressive non-GAAP reporting choices (all hypotheses are stated in the alternative form).

H1. *Investors discount aggressive non-GAAP reporting choices in the post-restatement period differently than they do in the pre-restatement period.*

3.2 Conditioning market reactions to restatements on pre-restatement exclusion patterns

Turning to our second set of analyses, according to Chakravarthy et al. (2014), imperfectly informed agents revise their beliefs using Bayes' rule whenever new information reveals decision-relevant information (Cyert and DeGroot, 1974; Feldman, 1987; Harsanyi, 1967; Kihlstrom and Mirman, 1975) and "information events trigger greater belief revisions when prior disclosures are of lower precision" (Veenman 2011, p. 314). Assuming that investors revise downward their perceived financial reporting quality after material restatements (Chen et al., 2014b), and ex ante aggressively inflated non-GAAP earnings might be regarded as imprecise following material restatements, we predict a greater (H2) and longer-lived ERC decline (H3) for

al., 2013; Doyle et al., 2003), we expect to find an ERC discount for aggressive non-GAAP reporting choices in both the pre- and post-restatement period, but potentially with different magnitudes in each period.

[23] Potential outcomes and explanations are many folded. For example, ex post investors might believe that firms will shift their managerial opportunism (i.e., aggressive reporting choices) from GAAP to non-GAAP disclosure because the SEC and auditor scrutiny are more likely to affect GAAP reporting than non-GAAP disclosure. This suggests that investors view the exclusion of recurring expenses as more aggressive ex post, meaning larger ERC declines to aggressive non-GAAP reporting choices after material restatements. Furthermore, investors might view non-GAAP earnings as a better alternative to GAAP numbers ex post, suggesting a smaller ERC discount ex post. Additionally, material restatements might not affect investors' beliefs about non-GAAP reporting quality, suggesting that investors do not change the treatment of aggressive non-GAAP reporting choices.

firms with aggressive ex ante non-GAAP reporting relative to firms with non-aggressive ex ante non-GAAP reporting, as follows.

H2. *The decline in perceived financial reporting quality is more pronounced for firms with ex ante aggressive non-GAAP reporting relative to non-aggressive firms.*

H3. *The decline in perceived financial reporting quality is longer lived for firms with ex ante aggressive non-GAAP reporting relative to non-aggressive firms.*

To capture the detection of potential mispricing of ex ante aggressive non-GAAP reporting choices, we condition short-term market reactions to restatements (CAR) on ex ante non-GAAP reporting choices. Analytical research by Hirshleifer and Teoh (2003) suggests that investors are misled by inappropriate non-GAAP adjustments and "the larger are excess pro forma earnings, […] the more negative is the average subsequent abnormal return" (p. 357). Assuming that investors fail to fully discount aggressive non-GAAP reporting choices before material restatements (Hirshleifer and Teoh, 2003) but reverse mispricing once they learn about poor financial reporting quality, we expect to find more negative short-term market reactions to the restatement announcement for firms with aggressive ex ante non-GAAP reporting relative to non-aggressive counterfactuals.

H4. *Short-term market reactions to material restatement announcements are more negative for firms with aggressive ex ante non-GAAP reporting than for firms with non-aggressive ex ante non-GAAP reporting.*

4. Research design

In the first analysis, we are primarily interested in whether GAAP-related shocks affect investors' perceptions of aggressive non-GAAP reporting choices. In the second set of analyses, we condition short- and long-term market reactions to material restatements on firms' ex ante non-GAAP reporting.

4.1 Identification of aggressive non-GAAP reporting choices

In line with prior literature, we focus on the exclusion of recurring expenses to identify aggressive non-GAAP reporting choices (Bhattacharya et al., 2019; Black and Christensen, 2009; Black et al., 2017a; Doyle et al., 2013).[24] The variable *EXCLUDE* indicates an aggressive non-GAAP reporting choice and equals one if non-GAAP earnings exceed operating GAAP earnings per share, suggesting that recurring expenses are excluded.

4.2 Identification of groups with aggressive pre-restatement non-GAAP reporting

In addition to identifying aggressive non-GAAP reporting choices, we also form groups of firms with aggressive, mixed and non-aggressive pre-restatement non-GAAP reporting based on firms' ex ante non-GAAP reporting. Because non-GAAP reporting is "part of a multi-period disclosure policy" (Black et al., 2018, p. 7), we count the frequency of recurring expense exclusions (*EXCLUDE*) per firm in the five quarters leading up to the material restatement and divide this number by the total quarters observed.[25] A higher frequency of recurring expense exclusions indicates higher aggressiveness of non-GAAP reporting.[26] Based on the exclusion rate quartiles,

[24] We highlight that, in the non-GAAP reporting literature, recurring expense exclusions are often labeled "other" and "non-special item" adjustments (Bradshaw et al., 2018; Doyle et al., 2013; Heflin and Hsu, 2008; Kolev et al., 2008; Leung and Veenman, 2018).
[25] Applying five quarters allows us to extend the findings from Chen et al. (2014b), who investigate the ERC change after the restatement announcement and use a pre-period of five and a post-period of 12 quarters.
[26] For example, if a firm excludes recurring expenses in four out of five pre-restatement quarters, the average exclusion rate is 0.8.

we assign firms to the non-aggressive (1st quartile of the exclusion rate), mixed (2nd and 3rd quartiles), or aggressive (4th quartile) group. Once a firm is assigned to one of the three groups (aggressive, mixed, non-aggressive), it remains in the same group throughout the pre- and post-periods, regardless of the ex post changes in non-GAAP reporting behavior.

4.3 Identification of events that reveal low GAAP reporting quality

Most restatements arise from rather technical and unintentional misreporting and, thus, are not well suited as events that reveal severe GAAP reporting failure or that substantially increase investor scrutiny (Chen et al., 2014b; Hennes et al., 2008).[27] In contrast, material restatements are likely attributable to past intentional misreporting (Amel-Zadeh and Zhang, 2015; Baber et al., 2015; Brown et al., 2015; Demerjian et al., 2013; Lin et al., 2013), heighten investor scrutiny (Chen et al., 2014b; Hennes et al., 2008), and signal poor financial reporting quality (Pomeroy and Thornton, 2008).[28]

4.4 Investor treatment of aggressive non-GAAP reporting choices in the pre- and post-restatement period

In our first analysis, we investigate investors' responses to aggressive non-GAAP reporting choices (*UE X EXCLUDE*) for both the pre- and post-restatement periods by applying an ERC model (Chakravarthy et al., 2014; Chen et al., 2014b; Hennes et al., 2008; Hirschey et al., 2015; Wilson,

[27] To identify non-GAAP-related shocks, one could apply non-GAAP-related SEC comment letters as signals of low non-GAAP reporting quality. However, because comment letters do not identify a severe misuse of financial reporting and are less likely to attract investor attention relative to financial restatements, using material restatements is suitable for our research questions.

[28] Prior restatement literature labels material restatements as "irregularities" (Hennes et al., 2008) or "serious restatements" (Chakravarthy et al., 2014) and immaterial restatements as "errors" (Hennes et al., 2008) or "other restatements" (Chen et al., 2014b). Moreover, addressing the pre-restatement period, we note that GAAP misreporting (Donelson et al., 2013; Elayan et al., 2008) and aggressive non-GAAP reporting choices share a similar set of incentives in terms of misreporting (Black et al., 2017b; Doyle et al., 2013; Isidro and Marques, 2015), suggesting that aggressive non-GAAP reporting choices before material restatements might be more likely intended to mislead investors than those in a non-restatement setting. For example, managers desire to distract investors from poor actual performance and meet and beat analyst forecasts.

2008). In the ERC model, we regress investors' reactions (*UR*) on unexpected earnings (*UE*). *UR* is the cumulative abnormal return in the three-day window (–1; +1) around the earnings announcement date for each firm *i* in each quarter *t*. *UE* is calculated by subtracting the expected earnings per share from the actual earnings per share and then scaling by price at the end of the fiscal quarter. We assume that unexpected returns (*UR*) are positively correlated with *UE*, meaning that investors respond negatively to negative earnings surprises and positively to positive earnings surprises. Following Wilson (2008), we include seven control variables (*MTB*, *BETA*, *SIZE*, *LOSS*, *Q4*, *PREDICT*, *PERSIST*) and their interactions with *UE* to control for the impact of other factors on the ERC.[29]

$$UR_{i,t} = \alpha + \beta_1 UE_{i,t} + \beta_2 EXCLUDE_i + \beta_3 UE_{i,t} \times EXCLUDE_i + \beta_4 NONLINEAR_{i,t} + \sum_{k=5}^{11} \beta_k CNTRLS_{i,t} + \sum_{k=12}^{18} \beta_k \left[UE_{i,t} \times CNTRLS_{i,t} \right] + \varepsilon_{i,t}, \quad (1)$$

where: $CNTRLS_{i,t} = \left\{ MTB_{i,t}, BETA_{i,t}, SIZE_{i,t}, LOSS\_NONGAAP_{i,t}, Q4_{i,t}, PREDICT_{i,t}, PERSIST_{i,t} \right\}.$

The coefficient on *UE* (the ERC) represents the investor's responsiveness to non-aggressive non-GAAP earnings (i.e., responsiveness to non-GAAP earnings when recurring expenses are NOT excluded). *UE X EXCLUDE* is our variable of interest and captures the ERC change for aggressive non-GAAP reporting choices (i.e., investors' ERC adjustments attributable to aggressive non-GAAP reporting choices). We run the regression separately for the pre- and post-restatement period and ask whether the coefficient on *UE X EXCLUDE* differs between these periods. Consistent with H1, we expect that investors discount aggressive non-GAAP reporting choices differently after material restatements.

[29] For predicted signs on the coefficients of the control variables, we follow the arguments outlined by Wilson (2008, p. 526-527).

4.5 Aggressive vs. *non-aggressive firms and perceived financial reporting quality (magnitude)*

In our next analyses, we partition our restatement sample into three groups (aggressive, mixed, and non-aggressive) based on their pre-restatement recurring expense exclusion frequency and investigate whether market reactions to material restatements differ between these groups. To capture the change in the perceived financial reporting quality between the pre- and post-restatement period, we use an ERC model as applied by prior restatement literature (Chakravarthy et al., 2014; Chen et al., 2014b; Hennes et al., 2008; Hirschey et al., 2015; Wilson, 2008).

$$UR_{i,t} = \alpha_1 + \alpha_2 POST_{i,t} + \beta_1 UE_{i,t} + \beta_2 \left[UE_{i,t} \times POST_{i,t} \right] + \beta_3 NONLINEAR_{i,t} + \sum_{k=4}^{10} \beta_k CNTRLS_{i,t} + \sum_{k=11}^{17} \beta_k \left[UE_{i,t} \times CNTRLS_{i,t} \right] + \varepsilon_{i,t}. \quad (2)$$

The coefficient on *UE* constitutes the ERC in the pre-period. *UE X POST* is our variable of interest and captures the change in the ERC between the pre- and post-restatement period. We run this regression separately for aggressive, mixed, and non-aggressive firms. Consistent with H2, we assume that downward ERC revisions are more pronounced for firms with aggressive ex ante non-GAAP reporting than for non-aggressive firms.

4.6 Aggressive vs. *non-aggressive firms and perceived financial reporting quality (duration)*

To provide insights into the duration of the ERC decline, we disaggregate the post-period into 12 post-quarters. We apply the same model used by Chen et al. (2014b) (i.e., identical pre- and post-period durations) and capture the difference between the pre-period ERC and the post-quarter ERC with $UE\ X\ QTR_t$ for each quarter t ∈ (1-12). We run this regression separately for non-aggressive, mixed, and aggressive firms. Consistent with H3, we predict a longer-lasting ERC decline for aggressive firms than for non-aggressive firms.

$$UR_{i,t} = \alpha_1 + \sum_{t=1}^{12} a_{2,t} QTR_{i,t} + \beta_1 UE_{i,t} + \sum_{t=1}^{12} \beta_{2,t} \left[UE_{i,t} \times QTR_{i,t} \right] + \beta_3 NONLINEAR_{i,t} + \sum_{k=4}^{10} \beta_k CNTRLS_{i,t} + \sum_{k=11}^{17} \beta_k \left[UE_{i,t} \times CNTRLS_{i,t} \right] + \varepsilon_{i,t}. \quad (3)$$

4.7 Market reactions around the restatement announcement date

To capture investors' immediate market value revisions, we adapt a CAR model used in the financial restatement-related literature (Gordon et al., 2013; Palmrose et al., 2004).

$$\begin{aligned} CAR_i = \alpha \ & + \beta_1 MIXED\_GROUP_i + \beta_2 AGGRESSIVE\_GROUP_i + \\ & \beta_3 PROMPTER\_COMPANY_i + \beta_4 PROMPTER\_AUDITOR_i + \beta_5 PROMPTER\_OTHER_i + \\ & \beta_6 REVENUE_i + \beta_7 IMPACT_i + \beta_8 PERVASINESS_i + \beta_9 DURATION_i + \\ & \beta_{10} IMPACT\_SIZE_i + \beta_{11} IMPACT\_LEVERAGE_i + \beta_{12} RETURN120_i + \\ & \beta_{13} PRESS\_RELEASE_i + \beta_{14} POST\_SOX_i + \varepsilon_i. \end{aligned} \quad (4)$$

CAR is the cumulative abnormal return in the seven-day window (–3; +3) around the restatement announcement date, and *AGGRESSIVE_GROUP* is our variable of interest and equals one if the firm aggressively reported non-GAAP earnings before the restatement announcement. The base group *(NON_AGGRESSIVE_GROUP*) represents firms with non-aggressive ex ante non-GAAP reporting. *PROMPTER_COMPANY*, *PROMPTER_AUDITOR*, and *PROMPTER_OTHER* refer to the party to which the restatement is attributed. Palmrose et al. (2004) find larger market value declines when restatements are prompted by the company or the auditor. *PROMPTER_SEC* is the base group, as restatements initiated by the SEC have been associated with the least adverse market reactions (Palmrose et al., 2004). *REVENUE* identifies firms involved in the manipulation of revenues. Agrawal and Chadha (2005) report larger decreases in market value if the restatements are revenue related. *IMPACT* controls for the magnitude of the restated amount, *PERVASINESS* controls for the number of accounts affected by the restatement, and *DURATION* reflects the number of years that was restated. Furthermore, we control for firm characteristics (size, leverage, and return) using *IMPACT_SIZE*, *IMPACT_LEVERAGE*, and *RETURN120* (past returns over 120

days). *PRESS_RELEASE* and *POST_SOX* account for more negative market reactions with a more prominent disclosure (Myers et al., 2013) and less negative market reactions to restatements announced after the SOX Act (Hirschey et al., 2010). A detailed description of all variables is provided in the Appendix. Consistent with H4, we predict that the coefficient of *AGGRESSIVE_GROUP* is significantly negative, assuming that market reactions are more negative for firms with aggressive ex ante non-GAAP reporting than for those with non-aggressive ex ante non-GAAP reporting.

5. Sample and descriptive statistics

5.1 Sample selection

We retrieve restatement data from the U.S. Government Accountability Office (GAO) and the Audit Analytics (AA) database. To ensure that we identify a substantial increase in investor scrutiny regarding GAAP reporting quality, we exclude restatements that relate to technical errors and focus only on material restatements (Dechow et al., 2010; Karpoff et al., 2017). Furthermore, to limit the concern that subsequent restatements introduce noise into the post-period of preceded restatements, we retain only firms with one restatement announcement. To increase the comparability between the pre- and post-restatement period, we require at least two firm-quarter observations for these periods, meaning that our sample includes at least four quarterly observations for each firm. Our final sample comprises 264 material restatement firms and yields 3,471 firm-quarter observations across five pre- and 12 post-restatement quarters.[30] Table 1 shows the sample selection process. [31]

[30] Choosing five pre- and 12 post-restatement quarters allows us to reliably reconcile and extend restatement-related findings obtained by Chen et al. (2014b). Applying a balanced panel with 5 pre- and 5 post-periods yields qualitatively similar results. Our sample size is in line with well-established studies in this field (Chakravarthy et al., 2014; Chen et al., 2014b; Gordon et al., 2013; Stanley and Todd DeZoort, 2007).

[31] We note that the AA database does not provide the prompter of the restatement, and the GAO database does not

----------Please insert Table 1 approximately here----------

Based on the ex ante frequency of recurring expense exclusions, we decompose the final sample into three groups (non-aggressive, mixed, and aggressive). These groups comprise 54 non-aggressive (755 firm-quarter observations), 140 mixed (1,812 firm-quarter observations), and 70 aggressive firms (904 firm-quarter observations). The aggressive and non-aggressive groups reflect the upper and lower quartiles of the pre-restatement recurring expense exclusion frequency. Specifically, the non-aggressive group reflects firms that did not exclude any recurring expenses before material restatements (Table 2). By contrast, the aggressive group represents firms that excluded recurring expenses in 91.4 percent of all firm-quarter observations before the restatement announcement. The mixed group had an average exclusion rate of 42.6 percent before the restatement.

----------Please insert Table 2 approximately here----------

5.2 Descriptive statistics

Tables 3 and 4 provide the summary statistics and univariate tests for the variables applied in the ERC (Table 3) and CAR analyses (Table 4).[32] Focusing on the pre-restatement period, we document that aggressive and non-aggressive firms are not significantly different on many control variables (*UR*, *UE*, *NONLINEAR*, *MTB*, *SIZE*, *LOSS_NONGAAP*, *Q4*, *OVER*, *PRICE*). Significant differences exist by construction in the frequency of recurring expense exclusions (*EXCLUDE*) and the amount of recurring expense exclusions (*RECURRING_EXP*), indicating that aggressive firms exclude recurring expenses more often and with a higher magnitude than non-aggressive firms. Notably, aggressive firms turn approximately every second GAAP loss into a non-GAAP

provide the restatement amount and period restated. Because these data are necessary for the CAR analysis (H4), we manually collected these data using EDGAR filings and whistleblowing data from Dyck et al. (2010).

[32] A full description of all variables is provided in the Appendix at the end of this manuscript.

profit (*LOSS_GAAP:* 0.423 vs. *LOSS_NONGAAP:* 0.212), whereas non-aggressive firms report non-GAAP losses similar to GAAP losses (*LOSS_GAAP:* 0.177 vs. *LOSS_NONGAAP:* 0.181). This conversion of GAAP losses to GAAP profits supports the concern that some managers might exploit non-GAAP reporting to distract investors from poor GAAP performance, as proposed by Ciccone (2002).[33] In Panel A of Table 4, we see that the average short-term market reaction (*CAR*) for the entire sample is –6.6 percent, suggesting that our sample as constructed includes rather attention-grabbing material restatements. In Panel B of Table 4, we reveal that firms with aggressive ex ante reporting experience significantly more adverse short-term market reactions than firms with non-aggressive ex ante non-GAAP reporting (*CAR*: –10.9 percent for aggressive vs. –3.8 percent for non-aggressive firms, p-value: 0.029).

----------Please insert Table 3 approximately here----------

----------Please insert Table 4 approximately here----------

6. Multivariate tests

In our first multivariate test, we investigate whether material restatements affect investors' treatment of aggressive non-GAAP reporting choices (H1). Subsequently, in the second set of analyses, we condition market reactions to the restatement announcement on ex ante non-GAAP reporting (H2-H4). The investigated market reactions comprise perceived financial reporting quality (H2 and H3) and market value (H4).

6.1 H1: Responsiveness to aggressive non-GAAP reporting choices

Using model 1, we find that investors reward aggressive non-GAAP choices in the pre-period (*UE X EXCLUDE*: 4.358, p-value: 0.000) but penalize the same reporting choices in the

[33] However, the findings by Leung and Veenman (2018) support the view that GAAP loss converters are informative in terms of future cash flows.

post-period (*UE X EXCLUDE*: –0.441, p-value: 0.011). The change from ERC premium to ERC discount suggests that investors perceive recurring expense exclusions as less informative after learning about poor GAAP reporting quality. This interpretation is consistent with the view that investors revise downward their beliefs about non-GAAP reporting quality after material restatements, indicating a spillover effect from perceived GAAP to non-GAAP reporting quality. Furthermore, this finding supports the notion that investor scrutiny is a determinant of how investors perceive aggressive non-GAAP reporting choices. Since material restatements are also assumed to attract investor attention (Cao et al., 2012), our findings may suggest that investor attention moderates investors' pricing of inappropriate non-GAAP adjustments. The latter interpretation closely relates to the analytical work by Hirshleifer and Teoh (2003), who propose that attention is a determinant of pricing inappropriate non-GAAP adjustments. Furthermore, the documented change in investors' treatment of recurring expense exclusions extends findings Black et al. (2012), who evidence no change in investors' responsiveness to recurring expense exclusions after the SOX Act.

Turning to the pre-period, the ERC premium for aggressive non-GAAP reporting choices (*UE X EXCLUDE*: 4.358) suggests that investors perceive recurring expense exclusions as informative before material restatements. While the ERC premium might indeed indicate superior informativeness of these non-GAAP disclosures, it could alternatively suggest that investors fail to unravel inappropriate non-GAAP adjustments and, thus, misprice aggressively reported non-GAAP earnings (Hirshleifer and Teoh, 2003). Regarding economic significance, the ERC premium indicates that investors are approximately 151 percent more responsive to aggressively reported non-GAAP earnings relative to non-aggressive earnings (*UE X EXCLUDE*/*UE*: 4.358/2.811). Referring to the post-restatement period, we find an ERC discount for aggressive

non-GAAP reporting choices (*UE X EXCLUDE*: –0.441, p-value: 0.011), suggesting that investors perceive these adjustments as inappropriate. The documented ERC discount translates to a penalty of 11.5 percent for aggressive non-GAAP reporting choices (*UE X EXCLUDE*/*UE*: –0.441/3.836). This result aligns with Doyle et al. (2013), who show an ERC discount of 14 percent in a non-restatement setting and interpret that investors at least partially see through aggressive non-GAAP disclosures.

We highlight that the ERC premium in the pre-restatement period contrasts prior empirical research that largely evidences an ERC discount in non-restatement settings (Black et al., 2014; Doyle et al., 2013; Doyle et al., 2003). Regarding potential deviations to the prior literature, we note that other studies investigate investors' responsiveness to aggressive non-GAAP reporting choices in non-restatement samples (Black et al., 2014; Black et al., 2012; Doyle et al., 2013; Doyle et al., 2003) and around the SOX Act (Black et al., 2012). Our findings shed light on the question of whether changes in perceived GAAP reporting quality affect investors' treatment of recurring expense exclusions, that is, non-GAAP reporting quality. Given that recurring expense exclusions are common non-GAAP adjustments (Black et al., 2014; Whipple, 2015), controversially discussed (McKenna, 2019) and suggested to be addressed in future research (Black et al., 2018), our contribution might be of interest to many parties, including equity investors and regulators.

----------Please insert Table 5 approximately here----------

6.2 H2: Revision of perceived financial reporting quality (magnitude)

Using model 2 (Table 6), we find that firms with non-aggressive ex ante non-GAAP reporting do not experience any significant ERC decline after material restatements (*UE X POST:* –0.063, p-value: 0.905), suggesting that investors do not change their beliefs about financial reporting

quality for non-aggressive firms after material restatements. In contrast, firms with aggressive pre-restatement non-GAAP reporting undergo an ERC decline of 43.93 percent (*UE X POST:* – 2.586, p-value: 0.000 and *UE*: 5.886, p-value: 0.000), suggesting that investors might have overestimated financial reporting quality for aggressive firms in the pre-restatement period.[34] Comparing the ERC changes between aggressive and non-aggressive firms supports H2, in which we predict a more pronounced ERC decline for aggressive firms (*UE X POST*: more negative by –2.649 for aggressive firms, p-value: 0.001).

Furthermore, we observe that the pre-restatement ERC for aggressive firms is approximately 65 percent higher than that for non-aggressive counterfactuals (*UE:* 5.886 vs. 3.568). The higher pre-restatement ERC suggests that investors perceive aggressive firms as more informative in terms of financial information than non-aggressive firms. After the restatement, however, the ERC difference between aggressive and non-aggressive firms is statistically insignificant (*UE + UE X POST*: 3.300 vs. 3.568, p-value: 0.730), indicating no difference in the perceived financial reporting quality between firms with aggressive and non-aggressive ex ante non-GAAP reporting after material restatements.[35] The higher pre-restatement ERC for aggressive firms relative to non-aggressive firms (*UE:* 5.886 vs. 3.568) might have incentivized managers to exclude recurring expenses in the first place. This explanation aligns with the theoretical work by Hirshleifer and Teoh (2003), who propose that "greater informativeness of earnings […] encourages firms" (p. 360) to make inappropriate non-GAAP adjustments. Specifically, higher investor responsiveness

[34] The ERC-related findings for the mixed group suggest that investors' revisions are more pronounced for the mixed group than for the non-aggressive group (no decline vs. 14.19 percent decline in the ERC) and less pronounced for the mixed group than for the aggressive group (14.19 percent vs. 43.93 percent decline in ERC). Given our research questions, we focus on the aggressive and non-aggressive groups.

[35] The cumulative test is *UE + UE X POST,* untabulated and available on request.

to earnings might suggest to the manager i) higher expected benefits and ii) lower expected costs from aggressively inflated non-GAAP earnings for managers.[36]

----------Please insert Table 6 approximately here----------

6.3 H3: Revision of perceived financial reporting quality (duration)

In Table 7, we disaggregate the post-period into 12 post-quarters (*UE X QTR)* and investigate whether the ERC decline is longer lived for aggressive firms relative to non-aggressive counterfactuals. We find that firms with aggressive pre-restatement non-GAAP reporting experience a long-lived decline in the ERC, with all 12 post-quarters having significantly lower ERCs in the post-period (*UE + UE X QTR)* than in the pre-restatement period (*UE*). For non-aggressive counterfactuals, we do not find an ERC decline for any of the 12 post-quarters. These findings suggest that investors' revisions of perceived financial reporting quality is long-lived for aggressive firms. Figure 1 illustrates the compound ERC for the entire observation period.

----------Please insert Table 7 approximately here----------

Contributing to the restatement literature, we extend the findings by Chen et al. (2014), who report a long-lasting ERC decline after material restatements but do not condition market reactions on ex ante non-GAAP disclosure. Moreover, the higher pre-restatement ERC for aggressive firms relative to non-aggressive counterfactuals supports the analytical research that proposes that

[36] For example, if investors have strong perceptions about financial reporting quality, they could be more likely to "buy into" the claim that recurring expense exclusions are informative, whereas in fact they are not. If this interpretation is appropriate, the ex post frequency of aggressive non-GAAP reporting choices should decline for aggressive firms, similar to the ERC decline. We note that the frequency of aggressive non-GAAP reporting choices declines from 91.4 to 49.5 percent for aggressive firms (*EXCLUDE**100 in Table 3), and the ERC declines from 5.886 (*UE* in Table 6) to 3.300 (*UE + UE X POST* in Table 6) for aggressive firms.

managers are more likely to make inappropriate non-GAAP adjustments if investors perceive financial reporting quality as high (Hirshleifer and Teoh, 2003). Finally, the ERC decline for aggressive firms supports the view that investors might have overestimated the financial reporting quality of firms with frequent recurring expense exclusions in the pre-restatement period.

----------Please insert Figure 1 approximately here----------

6.4 H4: Short-term market reaction to material restatement announcements

Table 8 shows four regressions that refer to the determinants of short-term market reactions to the restatement. In the first version of the regression (column 1), we do not control for ex ante non-GAAP reporting and show that market reactions are more negative when restatements are initiated by the auditor (*PROMPTER_AUDITOR*: –0.072, p-value: 0.094) or the company (*PROMPTER_COMPANY*: –0.046, p-value: 0.033) relative to the SEC (base group). Furthermore, market reactions are more adverse when restatements are revenue related (*REVENUE*: –0.065, p-value: 0.013). These findings are consistent with the prior literature (Palmrose et al., 2004). In column 2, we add our indicator variable of interest, *AGGRESSIVE_GROUP*, and find that firms with aggressive ex ante non-GAAP reporting experience CARs that are 5.5 percent more negative than those of non-aggressive firms (*AGGRESSIVE_GROUP:* –0.055*,* p-value: 0.034). To rule out alternative explanations, we further control for the disclosure type in column 3 (*PRESS_RELEASE*) and the post-SOX effect in column 4 (*POST_SOX*). Consistent with the prior literature (Hirschey et al., 2010; Myers et al., 2013), CARs are more negative for restatements disclosed in a press release (column 3, *PRESS_RELEASE*: –0.045, p-value: 0.069) and less negative after the SOX Act became effective (column 4, *POST_SOX*: 0.051, p-value: 0.033). Importantly, after adding *PRESS_RELEASE* and *POST_SOX,* firms that aggressively reported non-GAAP earnings before material restatements continue to have more negative CARs than

non-aggressive firms (*AGGRESSIVE_GROUP* in column 3: –0.050, p-value: 0.045 and in column 4: –0.046, p-value: 0.058).

Addressing the interpretations of our findings, Hirshleifer and Teoh (2003) propose the following:

> "*[i]f some investors have limited attention in their evaluation of pro forma earnings announcements, then the larger are excess pro forma earnings, […] the more negative is the average subsequent abnormal return.*" (p. 357)

Following Hirshleifer and Teoh (2003), more negative market reactions for firms with aggressive pre-restatement non-GAAP reporting could be viewed as evidence of mispricing in the pre-restatement period, suggesting to regulatory bodies that investors might fail to unravel inappropriate non-GAAP adjustments because of limited investor attention.

Our results extend the restatement literature by showing that aggressive ex ante non-GAAP reporting has an adverse effect on market reactions to material restatements (Agrawal and Chadha, 2005; Chen et al., 2014b; Files et al., 2009; Gordon et al., 2013; Hennes et al., 2008; Hirschey et al., 2010; Myers et al., 2013; Palmrose et al., 2004). Moreover, exploiting material restatements as informational shocks supports our capture of investors' detections of mispricing (Lambert, 2003) and enriches the mixed findings of the non-GAAP literature (Black et al., 2012; Brown et al., 2012; Doyle et al., 2013).

6.5 Alternative explanations

Addressing alternative explanations, one might argue that the documented change in investors' treatment of recurring expense exclusions is not primarily driven by the heightened investor scrutiny of GAAP reporting but, instead, is attributable to changes in the quality of recurring expense exclusions. For example, recurring expense exclusion quality could deteriorate after material restatements, suggesting a higher ERC discount to aggressive non-GAAP reporting

choices after material restatements. Following prior literature (Frankel et al., 2011; Kolev et al., 2008), we investigate the exclusion quality of recurring expenses for the pre- and post-restatement period and find no changes after material restatements.[37] Thus, we can alleviate concerns that our findings are driven by changes in exclusion quality of recurring expenses.[38]

Moreover, considering that partitioning the restatement sample based on ex ante recurring expense exclusions might pool firms with specific business models into the aggressive group, our findings might be driven by the business model rather than investors' overpricing of aggressively inflated non-GAAP earnings. Addressing this possibility, we highlight that the frequency of aggressive non-GAAP reporting choices declines from 91.4 percent to 49.5 percent for aggressive firms (*EXCLDUE**100 in Table 3), meaning that it is unlikely that the business model has changed drastically from the pre- to the post-period. Furthermore, the reason a particular business model triggers more adverse market reactions to material restatements is economically questionable.[39]

Arguably, our findings could be driven by investor sophistication (Allee et al., 2007). For example, aggressive firms could face less-sophisticated investors in the pre-period, which could more likely misprice aggressive non-GAAP reporting choices.[40] As we find that institutional ownership is

[37] We investigate the quality in a supportive (untabulated) test and lose 10 percent of our full sample size. This loss of observations is attributable to data requirements (e.g., this test requires the next four quarterly GAAP earnings announcements, which are not available in cases of M&A activity).

[38] Since we evidence low exclusion quality for the pre- and the post-restatement periods, our findings suggest that investors reward low exclusion quality in the pre-period (ERC premium) and at least partially unravel low exclusion quality in the post-period (ERC discount). Although one might be surprised about the magnitude of the documented ERCs (e.g., 5.886 in Table 6, column 3), we note that prior restatement-related literature that uses the same ERC models as we do finds similar magnitudes (Chakravarthy et al., 2014; Chen et al., 2014b; Wilson, 2008). For example, Chakravarthy et al. (2014) find an ERC of 5.756, and Wilson (2008) documents an ERC of 7.32 for restatement firms. Further, our ERC magnitudes also align with the non-GAAP literature. In detail, the overall height of our ERCs (e.g., coefficients on *UE* and *UE X EXLUDE*) is similar to Black et al. (2012) (e.g., coefficients on FE_{PF} and FE_{PF} *X RECUR*), who investigate potential changes in investor responsiveness to aggressive non-GAAP reporting choices after the SOX Act.

[39] Being aware of the possibility that companies from the technology industry might be overrepresented in the aggressive group, we apply a difference-in-difference design that controls for industry fixed effects. As expected, our findings hold. This test is untabulated and available on request.

[40] Moreover, facing less-sophisticated investors could incentivize managers to exclude recurring expenses in the first place (e.g., higher expected benefits from aggressive non-GAAP reporting choices). This test is untabulated and available on request.

higher for aggressive firms in the pre-period than for non-aggressive counterfactual firms (0.545 vs. 0.475), the alternate explanation does not hold.[41]

Furthermore, one might argue that excluding recurring expenses frequently before material restatements is informative and not aggressive (e.g., as these firms have a persistent treatment of recurring expenses).[42] Suppose that frequent excluders (formerly aggressive) are the informative firms, and less-frequent excluders (formerly non-aggressive) are the less informative firms. In this case, our findings suggest that firms with more informative non-GAAP reporting experience more negative market reactions because investors find the restatement to be a bigger negative surprise given high ex ante perceptions. We note that this alternative interpretation is closely related to our main interpretation because investors ex ante indeed perceive aggressive firms as more informative than non-aggressive firms (Table 6, *UE:* 5.886 vs. 3.568). Nevertheless, since investors reward recurring expense exclusions in the pre-period but penalize these adjustments in the post-restatement period, our findings rather support the view that the market reaction is indicative of prior mispricing.[43]

[41] By construction, all determinants of aggressive non-GAAP reporting choices could correlate with market reactions to material restatements, suggesting a variety of alternative explanations. For example, one might argue that ex ante stock-based compensation leads to both i) aggressive non-GAAP reporting (Black et al., 2014) and ii) more negative market reactions to material restatements. However, because non-GAAP earnings are incorporated in share prices (Bradshaw et al., 2018; Bradshaw and Sloan, 2002; Brown and Sivakumar, 2003; Doyle et al., 2003), and aggressive non-GAAP reporting choices are rewarded before material restatements, we find it difficult to consider economically plausible arguments against our interpretation.

[42] Addressing alternative labels and partitions, we acknowledge that frequent excluders might represent the most informative group (instead as the most aggressive) because reporting choices are consistent and might repair the short-comings of GAAP, suggesting high information content of earnings.

[43] The mixed group could represent informative reporters because these firms inconsistently exclude recurring expenses given that "properties of the particular item might change across time" (Black et al. 2020, p. 10). Black et al. (2020) find that firms changing their year-to-year treatment of non-GAAP adjustments "generally enhance the information in earnings about firms' ongoing performance." Alternatively, the mixed group could represent aggressive firms because they might opportunistically vary in their treatment of non-GAAP reporting choices (i.e., no consistency). Exclusion patterns and investors' perceptions of non-GAAP adjustments would go beyond the scope of this paper and could be addressed in future research.

Eventually, as restatements are the most vivid signal of low audit quality (Christensen et al., 2016), our findings might be attributed to changes in perceived audit quality. Given that restatements are a signal of both low financial reporting and low audit quality (Gaynor et al., 2016) and, in both cases, investors learn about poor GAAP reporting quality, our primary interpretation remains unchanged.

----------Please insert Table 8 approximately here----------

6.6 Robustness checks

Considering further alternative interpretations of our findings, we conduct a battery of robustness tests, including placebo tests.[44] Our findings, as expected, do not hold for SCALs or AAERs because SCALs are, on average, not a signal of severe reporting failure, and AAERs generally take place after financial restatements (Karpoff et al., 2017).[45] Our findings also do not hold for less material restatements, as these do not trigger severe concerns about financial reporting quality (Chen et al., 2014b; Hennes et al., 2008). Moreover, when we shift event dates 12 quarters back and forth to create pseudo pre- and post-restatement periods, the findings do not hold, suggesting that the actual increase in investor scrutiny of GAAP reporting drives our findings. Furthermore, the pseudo-period test mitigates concerns that our findings are mechanically occurring because one might argue that investors become less responsive to earnings when firms frequently exclude recurring expenses. Additionally, we measure aggressiveness using appropriate non-GAAP adjustments (i.e., special items) and document that the findings, as expected, do not hold.

[44] All untabulated results are available on request.

[45] We acknowledge contributions by Karpoff et al. (2017), who outline differences among financial restatements, AAERs, and security class action lawsuits (SCALs). AAERs are usually announced after financial restatements (Karpoff et al., 2017), meaning that reactions to AAERs are likely muted by the anticipation of low financial reporting quality. SCALs are often preceded by sharp share price declines, meaning that investor attention is likely heightened before the release of SCALs, and SCALs are not a signal of low GAAP reporting quality. Finally, Ronen and Yaari (2008) suggest that restatements forego class action lawsuits. Further explanations are discussed in the supplemental material, which is available on request.

We highlight that our findings hold in the pre- and post-Reg G periods. Furthermore, when we define aggressiveness based on the exclusion amount rather than the frequency of recurring expense exclusions, our findings hold, as expected. Our findings hold when we apply a balanced panel (i.e., five pre- and five post-quarters) and when we partition our sample into aggressive and non-aggressive firms using the median instead of the upper and lower quartiles. Furthermore, we note that our findings also hold when we replace I/B/E/S actual data with actual pro forma data from Bentley et al. (2018) where available, suggesting that data selection choices do not drive our findings.[46] Last, our findings also hold when we apply a difference-in-difference design.

Based on our robustness tests, material restatements and recurring expense exclusions are crucial for our findings, fostering the view that investors change their pricing of inappropriate non-GAAP adjustments after they learn about poor GAAP reporting quality. All robustness tests are available on request.[47]

[46] We apply street earnings in our main tables because i) we desire to make our findings comparable to Doyle et al. (2003) and Doyle et al. (2013) and ii) our observation timeframe reaches back to 1995 (Bentley et al., 2018). Furthermore, because analyst data is reflected in share prices (Bentley et al., 2018) and managers can influence analysts' exclusions without even explicitly reporting non-GAAP earnings (Berger, 2005), applying street earnings is reasonable. Using street earnings likely underestimates managerial aggressiveness (Bentley et al., 2018), and using dummy variables for aggressive non-GAAP reporting choices likely reduces misclassification attributable to small deviations between street and pro forma earnings. Because both metrics have their advantages and disadvantages when investigating the effect of managerial non-GAAP reporting choices on share prices (Bentley et al., 2018; Berger, 2005; Beyer et al., 2010; Black et al., 2018), we run our analyses for both metrics.

[47] In addition to our analysis, one could investigate whether aggressive firms are more overvalued relative to non-aggressive counterfactuals. However, as overvaluation reflects the relation between price and value, interpretation is difficult because both metrics (prices and values) might be biased upwards for aggressive firms, suggesting that the expected overvaluation of investors (prices) is offset by biased values, which are built on analyst forecasts. In other words, because non-GAAP earnings "are the first pieces of information that a share analyst has to talk to traders about, they drive valuations and share prices" (Economist, 2002). Moreover, Buffett (2015) notes that "Wall Street analysts often play their part in this charade, too, parroting the phony, compensation-ignoring 'earnings' figures fed them by managements."

7. Conclusion

Addressing a yet unresolved limitation of prior non-GAAP research, we highlight that it is unclear through which event investors revise their beliefs about non-GAAP reporting quality and i) might change their perceptions about aggressive non-GAAP reporting choices and ii) potentially reverse prior mispricing of aggressively inflated non-GAAP earnings.

To overcome the quantitative limitation of direct non-GAAP shocks, we apply GAAP-related shocks in the form of material restatements instead. We find that once investors learn about poor GAAP reporting quality, they respond differently to aggressive non-GAAP reporting choices (i.e., the exclusion of recurring expenses). Specifically, investors reward the exclusion of recurring expenses before material restatements but penalize the same reporting choices in the post-restatement period. This finding strongly suggests that investors update their beliefs about non-GAAP reporting quality after material restatements and regard the exclusion of recurring expense as less informative ex post. Furthermore, this finding provides evidence that scrutiny is a determinant of how investors process aggressive non-GAAP reporting choices.

Next, we condition market reactions to material restatements on pre-restatement non-GAAP reporting. We find that short- and long-term market reactions are more negative for firms that aggressively reported non-GAAP earnings before material restatements relative to non-aggressive firms, suggesting that investors were misled by aggressively reported non-GAAP earnings before material restatements. Short-term market reactions to material restatements (CAR) are on average five percentage points more negative for firms with aggressive ex-ante non-GAAP reporting relative to non-aggressive counterfactuals. Moreover, we document a long-lived ERC decline for firms with aggressive pre-restatement non-GAAP reporting and no decline for non-aggressive firms, suggesting that investors overestimated the quality of aggressive firms.

In sum, our findings provide evidence that firm-specific changes in perceived financial reporting quality affect investors' responses to aggressive non-GAAP reporting choices and that aggressive non-GAAP reporting choices misled investors before material restatements. Since our findings hold for the pre- and post-Reg G periods, we note to regulatory bodies that mispricing likely has not yet been resolved. To investors, we propose being vigilant when pricing aggressively reported non-GAAP earnings because our findings suggest that recurring expense exclusions might still be opportunistically exploited.

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Tables

Table 1 Sample Selection

U.S. Government Accountability Office (GAO) Database		Number of Restatement Announcements
Accounting restatement cases in the period 1997–2006 (GAO)		2,705
Less: Restatement cases by firms not covered in Compustat	90	2,615
Less: Restatement cases by firms not covered in CRSP & I/B/E/S	267	2,348
Less: Restatements cases with missing data throughout either the pre-restatement period (quarters –4 to 0) or the post-restatement period (quarters 1 to 12)[a]	0	2,348
Less: Restatements by firms that restated multiple times	995	1,353
Less: Other restatements (not material)[b]	1,062	291
Total GAO Restatement Sample (Number of Firms)		**291**
Audit Analytics (AA) Database		
Accounting restatement cases in the period 1995–2015 (AA)		16,086
Less: Restatement cases by firms not covered in Compustat	2,729	13,357
Less: Restatement cases by firms not covered in CRSP and I/B/E/S	6,510	6,847
Less: Restatements cases with missing data throughout either the pre-restatement period (quarters –4 to 0) or the post-restatement period (quarters 1 to 12)[a]	103	6,744
Less: Restatements by firms that restated multiple times	4,594	2,150
Less: Other restatements (not material)[b]	1,796	354
Total Audit Analytics Restatement Sample (Number of Firms)		**354**
Pooled Sample (GAO & AA Database)		
Combined Databases (GAO & AA)		
Accounting restatement cases in the period 1995–2015 (GAO+AA)	**291 +354**	645
Less: Overlaps: Restatements firms that are redundant in the pooled sample (GAO + AA) with the exact restatement date	100	554
Less: Overlaps: Restatements firms that are redundant in the pooled sample (GAO + AA) with the restatement dates that fall apart by not more than 90-days[a]	16	539
Less: Restatements cases with missing variables	117	422
Less: Restatements with negative common equity	6	416
Less: Restatements without at least two observations in each period (pre- and post-restatement period)	152	264
Final GAO and AA Restatement Sample (Number of Firms)		**264**

This table reports our selection process in which we combine restatement data from GAO and AA. Most importantly, we reduce our sample through the exclusion of less severe restatements and restatements with subsequent restatements. Relying on analyst forecast and market reaction, we lose a substantial number of observations.

[a] In some cases, the AA and GAO database include only one material restatement case per firm but provide different restatement dates (e.g., AA: 1st Sep. 2000, GAO: 8th Sep. 2000). In such cases, we take the earlier date as the initial attention grabbing signal as long as both dates do not fall apart by more than 90 days. In other cases, in which both dates fall apart by more than 90 days (e.g., AA: 1st Sep. 2000, GAO: 8th Dec. 2002) we exclude both observations as we cannot identify these firms reliably as one-time restatement firms.

[b] To identify material restatements, we apply the classification by Hennes et al. (2008) for GAO restatement data. We note that Hennes et al. (2008) do not provide their classification (irregularities vs. errors) for AA restatements. To overcome this issue, we follow prior literature and identify restatements as material when they are related to fraud, SEC investigations or AAERs (Armstrong et al., 2013; Chen et al., 2014b). While one might consider to include all Big R restatements (i.e., 8-K with item 4.02), we note that these might impede the identification of material shocks as on average item 4.02 are less severe than material restatements. With our applied identification process, we likely capture restatements that are the result of intentional misreporting (Amel-Zadeh and Zhang, 2015; Baber et al., 2015; Brown et al., 2015; Demerjian et al., 2013; Lin et al., 2013), meaning that investors will likely respond to this shock of poor GAAP reporting quality and revise their beliefs about firms` GAAP financial credibility.

Table 2 Sub-Groups Based on Ex-Ante Non-GAAP Reporting

Ex-ante Mean of *EXCLUDE*

Group	Min	Max	Mean	# Quarter Obs.	# Firm
Non-Aggressive Group	0.000	0.00[a]	0.000	755	54
Mixed Group	0.200	0.75	0.426	1,812	140
Aggressive Group	0.800	1	0.914	904	70
Total	0.000	1	0.480	3,471	264

Variable Definitions:
Non-Aggressive Group = 1 ex-ante mean of *EXCLUDE* for the firm is < 25th percentile, 0 otherwise
Mixed Group = 1 if ex-ante mean of *EXCLUDE* for the firm is >= 25th & < 75th percentile, 0 otherwise.
Aggressive Group = 1 ex-ante mean of *EXCLUDE* for the firm is >= 75th percentile, 0 otherwise.
Since we observe non-GAAP reporting choices over five pre-restatement quarters, quartile cut-off values do not take values in between zero (firms do not exclude recurring expenses in the pre-period; 0/5) and 0.2 (firms exclude recurring expenses once in the pre-period; 1/5).
The mean of ex-ante non-GAAP reporting aggressiveness (ex-ante mean of *EXCLUDE*) is calculated by counting the frequency of pre-restatement quarters in which a firm excludes recurring expenses in the five quarter preceding the restatement announcement and dividing the number by the number of observations. For example, if a firm excludes recurring expenses in 5 out of 5 quarters, the ex-ante mean non-GAAP reporting aggressiveness is 1 (5/5). By contrast if a firm excludes recurring expenses in 2 out of 4 quarters, the ex-ante mean non-GAAP reporting aggressiveness is 0.5 (2/4). We note that not all companies have full data (at least 2 pre-restatements quarter observations per firm). Based on the ex-ante mean non-GAAP reporting aggressiveness we identify whether firms have aggressive, mixed, and non-aggressive ex-ante non-GAAP reporting. It is important that a firm is indicated with the same indicator variable throughout all quarters, as otherwise a pre- and post-period comparison would not be possible. The disclosure after the restatement is of none relevance for firm classification, as only the pre-disclosure assigns each firm to the corresponding reporting group. We condense the 2nd and 3rd quartile to the subsample labeled as "Mixed Group." We focus on the first (Non-Aggressive Group) and fourth quartile (Aggressive Group).
[a] Subsample minimum and maximum values may take the value of 1/5, 2/5,3/5, 4/5, 1/4, 2/4, 3/4, 1/3, 2/3, 3/3, 1/2 (2/4), 0 and 1 as we observe in how many quarters out of five pre-restatement quarters recurring expenses were excluded. Therefore, in some cases cut off values will seem to lack continuity (e.g. cut-off values between the non-aggressive and the mixed group, which are 0.0 and 0.2).

Table 3 Firm-Quarter Observations

Descriptive Statistics on Pre- and Post-Restatement Firm-Quarter Observations for the ERC-Regression

	Aggressive Group 70 firms		**Non-Aggressive Group** 54 firms		**Mean Test**	
	Mean	Std.	Mean	Std.	Dif.	p-Value
Pre-Period (5quarters)	n = 326 quarter-firm obs.		n = 226 quarter-firm obs.			
UR	-0.004	0.111	-0.001	0.074	-0.003	0.716
UE	-0.001	0.011	0.000	0.007	-0.001	0.271
NONLINEAR	0.000	0.001	0.000	0.000	0.000	0.180
MTB	3.926	3.846	3.618	3.167	0.308	0.321
BETA	1.353	0.683	1.135	0.507	0.218	0.000†††
SIZE	7.177	1.620	7.097	1.875	0.081	0.590
LOSS_NONGAAP	0.212	0.409	0.177	0.383	0.035	0.315
LOSS_GAAP	0.423	0.495	0.181	0.386	0.242	0.000†††
Q4	0.242	0.429	0.221	0.416	0.021	0.566
PREDICT	0.026	0.117	0.009	0.033	0.017	0.033††
PERSIST	0.195	0.424	0.130	0.366	0.065	0.064†
EXCLUDE	0.914	0.281	0.000	0.000	0.914	0.000†††
RECURRING_EXP	0.035	0.084	-0.003	0.011	0.037	0.000†††
Post-Period (12 quarters)	n = 578 quarter-firm obs.		n = 529 quarter-firm obs.			
UR	-0.008	0.103	0.002	0.091	-0.010	0.073†
*UE****	-0.006	0.028	-0.001	0.015	-0.005	0.000†††
*NONLINEAR****	-0.001	0.003	0.000	0.002	-0.001	0.000†††
*MTB****	2.734	3.049	3.252	2.972	-0.518	0.004†††
*BETA**	1.264	0.643	1.176	0.528	0.088	0.014††
*SIZE**/##	6.930	1.917	7.390	1.857	-0.459	0.000†††
*LOSS_NONGAAP****	0.315	0.465	0.151	0.359	0.164	0.000†††
LOSS GAAP	0.457	0.499	0.174	0.379	0.283	0.000†††
Q4	0.232	0.422	0.221	0.415	0.011	0.672
PREDICT#	0.033	0.114	0.005	0.024	0.028	0.000†††
PERSIST	0.181	0.413	0.149	0.414	0.032	0.200
*EXCLUDE***/###	0.495	0.500	0.185	0.389	0.310	0.000†††
*RECURRING_EXP***/##	0.015	0.066	0.001	0.027	0.013	0.000†††

$^{\dagger\dagger\dagger/\dagger\dagger/\dagger}$ Significantly different between aggressive and non-aggressive firms at the 0.01/0.05/0.10 level (two-sided).
***/**/* Aggressive Group: Significantly different between the pre- and post-restatement period at the 0.01/0.05/0.10 level (two-sided)
###/##/# Non-Aggressive Group: Significantly different between the pre- and post-restatement period at the 0.01/0.05/0.10 level (two-sided)
Table 3 reports the descriptive statistics on the variables used in the regression analyses for all restatements included in the sample, separately for the pre- and post-restatement period. All variables are defined in Table 9.

Table 4 Firm Observations

Descriptive Statistics on Firm Observations for the CAR-Regression

Panel A: All Firms (264 firms)

	Mean	Median	Std.	Minimum	Maximum
CAR	-0.066	-0.030	0.159	-0.722	0.283
DURATION	2.453	2.025	2.141	0.247	12.422
IMPACT	-0.020	-0.005	0.054	-0.331	0.112
IMPACT_SIZE	-0.124	-0.033	0.310	-1.917	0.430
IMPACT_LEVERAGE	-0.008	-0.002	0.019	-0.112	0.040
RET_120	-0.086	-0.097	0.366	-0.860	1.726
PROMPTER_COMPANY	0.636	1.000	0.482	0.000	1.000
PROMPTER_SEC	0.186	0.000	0.390	0.000	1.000
PROMPTER_AUDITOR	0.076	0.000	0.265	0.000	1.000
PROMPTER_OTHER	0.144	0.000	0.352	0.000	1.000
REVENUE	0.356	0.000	0.480	0.000	1.000
PERVASIVENESS	2.083	2.000	1.603	1.000	10.000
PRESS_RELEASE	0.242	0.000	0.429	0.000	1.000
POST_SOX	0.686	1.000	0.465	0.000	1.000

Table 4, Panel A reports descriptive statistics on the variables used in the cumulative abnormal returns *(CAR*) regression for returns around the restatement announcement day. All variables are described in Appendix in detail.

Panel B: Aggressive (70 Firms) vs. Non-Aggressive Group (54 Firms)

	Aggressive Group 70 firms		**Non-Aggressive Group** 54 firms		**Mean Test**	
	Mean	Std.	Mean	Std.	Dif.	p-Value
CAR	-0.109	0.208	-0.038	0.122	-0.070	0.029††
DURATION	2.406	1.862	2.531	2.355	-0.125	0.742
IMPACT	-0.031	0.068	-0.008	0.031	-0.024	0.019††
IMPACT SIZE	-0.194	0.394	-0.055	0.171	-0.139	0.017††
IMPACT LEVERAGE	-0.012	0.023	-0.003	0.009	-0.009	0.007†††
RET 120	-0.085	0.555	0.000	0.267	-0.085	0.302
PROMPTER COMPANY	0.643	0.483	0.611	0.492	0.032	0.719
PROMPTER SEC	0.171	0.380	0.204	0.407	-0.032	0.650
PROMPTER AUDITOR	0.086	0.282	0.111	0.317	-0.025	0.639
PROMPTER OTHER	0.114	0.320	0.130	0.339	-0.015	0.797
REVENUE	0.471	0.503	0.241	0.432	0.231	0.008†††
PERVASIVENESS	2.114	1.450	1.907	1.404	0.207	0.426
PRESS RELEASE	0.329	0.473	0.222	0.420	0.106	0.195
POST SOX	0.543	0.502	0.741	0.442	-0.198	0.024††

†††/††/† Significantly different between aggressive and non-aggressive firms at the 0.01/0.05/0.10 level (two-sided).
In Table 4, Panel B, the aggressive group indicates firms with aggressive ex-ante non-GAAP reporting and the non-aggressive group indicates firms with non-aggressive ex-ante non-GAAP reporting. All variables are described in Appendix in detail.

Table 5 ERC-Discount by Period for Aggressive Reporting Choices

	Pre-Period (1)		Post-Period (2)			(2) – (1)	
Variable	Coeff.	p-value	Coeff.	p-value	Sign	Coeff.	p-value
UE	2.811	0.000***	3.836	0.000***			
UE X EXCLUDE	**4.358**	**0.000*** **	**-0.441**	**0.011** **	H1: (+/–)	-4.799	0.000###
EXCLUDE	-0.008	0.065*	-0.014	0.000***			
NONLINEAR	-33.081	0.000***	-8.067	0.002***			
MTB	0.005	0.092*	0.002	0.279			
BETA	-0.002	0.404	-0.001	0.518			
SIZE	0.000	0.890	0.003	0.098*			
LOSS	0.010	0.113	-0.007	0.132			
Q4	-0.002	0.687	0.001	0.738			
PREDICT	0.002	0.346	-0.003	0.236			
PERSIST	-0.008	0.000***	0.000	0.903			
UE X MTB	-1.860	0.000***	-0.254	0.008***			
UE X BETA	1.525	0.000***	0.016	0.827			
UE X SIZE	0.156	0.736	0.061	0.677			
UE X LOSS	-0.753	0.407	-2.684	0.000***			
UE X Q4	0.863	0.175	-0.373	0.194			
UE X PREDICT	-0.586	0.024**	-0.019	0.656			
UE X PERSIST	0.407	0.272	-0.094	0.108			
CONSTANT	0.017	0.139	-0.014	0.245			
Quarter-fixed effects	Yes		Yes				
Industry-fixed effects	Yes		Yes				
Adj. R^2	0.18		0.09				
N	1,117		2,228				
Firms	264		264				

Reported p-values are two-sided , * $p<0.1$; ** $p<0.05$; *** $p<0.01$

# p<0.1; ## p<0.05; ### p<0.01; we use seemingly unrelated estimation (SUEST) to test coefficients between the pre-period (1) and the post-period (3).

This table reports the change in the ERC when recurring expenses are excluded in the pre- (1) and the post-restatement period (2). The coefficient on *UE* is the ERC (investors' responsiveness) when the earnings are not exposed to recurring expense exclusions. The coefficient on *UE X EXCLUDE* captures the change in the ERC when recurring expenses are excluded from quarterly earnings. The remaining control variables are described in Appendix. We focus on the difference between firms with ex-ante aggressive and ex-ante non-aggressive non-GAAP reporting. Addressing the ERC-design (H1 – H4), we exclude the observations with studentized residuals greater than 2.5 in absolute value, as performed by Chen et al. (2014). Further, for ease of interpretation, we follow Chen et al. (2014) and standardize each control variable (e.g., *MTB*, *BETA*, etc.) by subtracting its sample mean and then scale the difference by its standard deviation (e.g., the coefficient on *UE* can be interpreted as the ERC for a firm with average firm characteristics). We do not standardize the indicator variables (e.g., *Q4*, *LOSS*, etc.). The reported p-values are based on standard errors adjusted for firm-level clustering as performed by Chen et al. (2014). The original samples are reduced through the exclusion of observations with studentized residuals greater than 2.5 in absolute value.

Table 6 ERC-Regression: Magnitude (Dependent Variable: *UR*)

	Non-Aggressive Group (1)		Mixed Group (2)		Aggressive Group (3)			(3) – (1)	
Variable	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Sign	Coeff.	p-value
UE	3.568	0.000***	4.637	0.000***	5.886	0.000***		+2.318	0.021##
UE X POST	0.063	0.905	**-0.663**	**0.089***	**-2.586**	**0.000*****	H2: (–)	-2.649	0.001###
NONLINEAR	2.667	0.681	-17.125	0.000***	-16.418	0.000***			
MTB	0.002	0.516	0.002	0.255	0.006	0.027**			
BETA	-0.000	0.961	0.000	0.883	-0.009	0.006***			
SIZE	0.000	0.975	0.002	0.287	0.006	0.207			
LOSS	-0.001	0.919	0.003	0.554	-0.005	0.554			
Q4	0.006	0.301	-0.003	0.533	-0.006	0.393			
PREDICT	0.005	0.424	-0.002	0.580	-0.004	0.181			
PERSIST	-0.001	0.751	-0.001	0.535	-0.007	0.027**			
UE X MTB	0.025	0.701	-0.540	0.002***	-0.240	0.019**			
UE X BETA	0.135	0.690	0.153	0.190	0.289	0.141			
UE X SIZE	0.543	0.094*	-0.177	0.364	-0.407	0.173			
UE X LOSS	-3.150	0.004***	-2.242	0.000***	-1.928	0.002***			
UE X Q4	0.575	0.157	-1.349	0.003***	0.330	0.495			
UE X PREDICT	0.005	0.978	0.005	0.947	-0.190	0.017**			
UE X PERSIST	0.042	0.782	0.012	0.895	-0.158	0.229			
POST	0.004	0.452	0.002	0.631	-0.017	0.016**			
CONSTANT	-0.002	0.720	0.000	0.919	0.016	0.019**			
Industry-fixed	Yes		Yes		Yes				
Adj. R^2	0.05		0.10		0.12				
N	731		1,751		879				
Firms	54		140		70				
Mean AGGRESSIVE	0		0.426		0.914				

Reported p-values are two-sided, * p<0.1; ** p<0.05; *** p<0.01

# p<0.1; ## p<0.05; ### p<0.01; we use seemingly unrelated estimation (SUEST) to test coefficients between non-aggressive (1) and aggressive firms (3).

This table reports the change in the ERC when recurring expenses are excluded in the pre- (1) and the post-restatement period (2). The coefficient on *UE* is the ERC (investors' responsiveness) when the earnings are not exposed to recurring expense exclusions. The coefficient on *UE X EXCLUDE* captures the change in the ERC when recurring expenses are excluded from quarterly earnings. The remaining control variables are described in Appendix. We focus on the difference between firms with ex-ante aggressive and ex-ante non-aggressive non-GAAP reporting. Addressing the ERC-design (H1 – H4), we exclude the observations with studentized residuals greater than 2.5 in absolute value, as performed by Chen et al. (2014). Further, for ease of interpretation, we follow Chen et al. (2014) and standardize each control variable (e.g., *MTB*, *BETA*, etc.) by subtracting its sample mean and then scale the difference by its standard deviation (e.g., the coefficient on *UE* can be interpreted as the ERC for a firm with average firm characteristics). We do not standardize the indicator variables (e.g., *Q4*, *LOSS*, etc.). The reported p-values are based on standard errors adjusted for firm-level clustering as performed by Chen et al. (2014). The original samples are reduced through the exclusion of observations with studentized residuals greater than 2.5 in absolute value.

Table 7 ERC-Regression: Duration (Dependent Variable: *UR*)

	Non-Aggressive Group (1)		Mixed Group (2)		Aggressive Group (3)			(1) – (3)	
Variable	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Sign	Coeff.	p-value
UE	3.017	0.000***	5.068	0.000***	6.697	0.000***			
UE X QTR1	0.567	0.264	**-1.672**	**0.004*** **	**-3.661**	**0.000*** **	H3: (–)	-4.228	0.000###
UE X QTR2	0.020	0.490	-0.541	0.155	**-1.862**	**0.002*** **	H3: (–)	-1.882	0.028##
UE X QTR3	-0.543	0.187	-0.577	0.148	**-1.561**	**0.008*** **	H3: (–)	-1.018	0.113
UE X QTR4	0.361	0.416	-0.590	0.159	**-1.317**	**0.074***	H3: (–)	-1.678	0.182
UE X QTR5	0.388	0.335	**-0.784**	**0.067***	**-2.089**	**0.003*** **	H3: (–)	-2.477	0.014##
UE X QTR6	-1.366	0.183	**-1.740**	**0.002*** **	**-3.735**	**0.004*** **	H3: (–)	-2.369	0.112
UE X QTR7	**2.125**	**0.012*** **	-0.020	0.483	**-2.988**	**0.002*** **	H3: (–)	-5.113	0.000###
UE X QTR8	-0.148	0.423	**-1.358**	**0.006*** **	**-1.398**	**0.041** **	H3: (–)	-1.250	0.119
UE X QTR9	**2.081**	**0.077***	-0.413	0.200	**-3.223**	**0.001*** **	H3: (–)	-5.304	0.001##
UE X QTR10	0.549	0.429	**-1.300**	**0.010** **	**-4.043**	**0.000*** **	H3: (–)	-4.592	0.062#
UE X QTR11	1.271	0.105	0.524	0.255	**-3.572**	**0.000*** **	H3: (–)	-4.843	0.000###
UE X QTR12	0.520	0.390	**-1.792**	**0.000*** **	**-3.079**	**0.006*** **	H3: (–)	-3.599	0.045##
NONLINEAR	-2.310	0.687	-19.443	0.000***	-24.369	0.000***			
MTB	0.001	0.605	0.002	0.309	0.007	0.018**			
BETA	0.002	0.572	0.000	0.843	-0.009	0.003***			
SIZE	-0.000	0.928	0.001	0.548	0.005	0.227			
LOSS	-0.005	0.482	0.001	0.912	-0.005	0.535			
Q4	0.006	0.286	-0.001	0.732	-0.004	0.529			
PREDICT	0.008	0.158	-0.002	0.523	-0.004	0.212			
PERSIST	-0.001	0.689	-0.001	0.518	-0.006	0.055*			
UE X MTB	0.021	0.846	-0.324	0.074*	-0.303	0.000***			
UE X BETA	-0.158	0.701	0.092	0.465	0.608	0.003***			
UE X SIZE	0.157	0.704	-0.175	0.422	0.056	0.874			
UE X LOSS	-2.547	0.013**	-2.269	0.000***	-1.559	0.043**			
UE X Q4	-0.020	0.962	-1.425	0.000***	-0.160	0.785			
UE X PREDICT	-0.277	0.321	0.031	0.602	-0.239	0.011**			
UE X PERSIST	0.131	0.486	0.007	0.955	-0.051	0.733			
CONSTANT	-0.003	0.649	-0.001	0.841	0.015	0.020**			
Quarter-fixed	Yes		Yes		Yes				
Industry-fixed	Yes		Yes		Yes				
Adj. R^2	0.08		0.11		0.15				
N	728		1,748		875				
Firms	54		140		70				
Mean AGGRESSIVE	0		0.426		0.914				

Following Chen et al. (2014) we report p-values one-sided for the coefficients on *UE X QTR*$_t$ and two-sided otherwise.
For directional test variables according to our hypothesis H3 we report p-values one-sided. H3 is stated in alternative form.
* p<0.1; ** p<0.05; *** p<0.01; ERC-decline within the group (1) to (3), difference the pre- and post-restatement period.
# p<0.1; ## p<0.05; ### p<0.01; for each quarter, we use seemingly unrelated estimation (SUEST) to test coefficients between non-aggressive (1) and aggressive firms (3).
This Table reports the ERC change duration through the coefficient on *UE X QTR* for firms with non-aggressive (1), mixed (2), and aggressive (3) ex-ante non-GAAP reporting. The coefficient on *UE* constitutes the pre-period ERC. We regress unexpected returns (*UR*) on unexpected earnings (*UE*). Remaining control variables are described in Appendix. The original sub-samples are reduced through the exclusion of observations with studentized residuals greater than 2.5 in absolute value.

Table 8 CAR-Regression: Market Reaction (Dependent Variable: *CAR*)

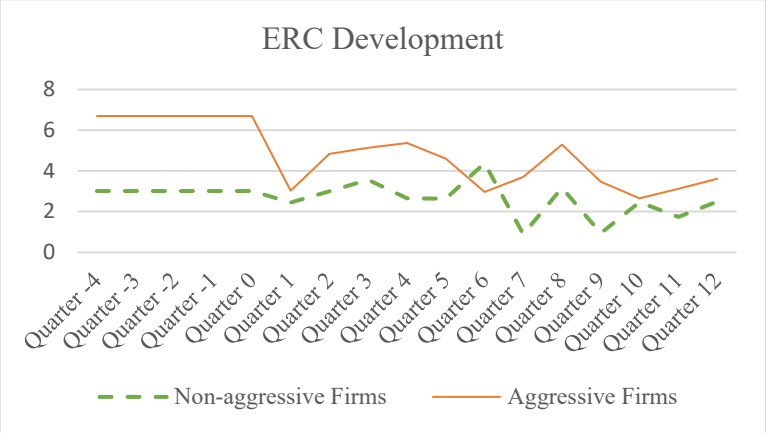
	Palmrose et al. (2004) **(1)**			**Extention I** **(2)**			**Extention II** **(3)**			**Extention III** **(4)**	
Variable	Coeff.	p-value	Sign	Coeff.	p-value	Sign	Coeff.	p-value	Sign	Coeff.	p-value
PROMPTER_COMPANY	-0.046	0.033**		-0.048	0.024**		-0.039	0.066*		-0.043	0.049**
PROMPTER_AUDITOR	-0.072	0.094*		-0.074	0.082*		-0.066	0.112		-0.067	0.097*
PROMPTER_OTHER	-0.026	0.425		-0.030	0.364		-0.016	0.629		-0.020	0.550
REVENUE	-0.065	0.013**		-0.062	0.016**		-0.054	0.034**		-0.048	0.061*
IMPACT	0.300	0.649		0.436	0.527		0.336	0.629		0.640	0.379
PERVASIVENESS	0.006	0.314		0.006	0.314		0.006	0.264		0.005	0.402
DURATION	0.004	0.288		0.003	0.354		0.004	0.242		0.002	0.648
IMPACT_SIZE	-0.118	0.336		-0.140	0.272		-0.127	0.321		-0.168	0.207
IMPACT_LEVERAGE	2.311	0.063*		2.138	0.081*		2.211	0.063*		1.979	0.088*
RET_120	-0.019	0.582		-0.020	0.573		-0.023	0.512		-0.029	0.408
MIXED_GROUP				-0.010	0.624		-0.012	0.551		-0.014	0.485
AGGRESSIVE_GROUP			H4: (–)	**-0.055**	**0.034****	H4: (–)	**-0.050**	**0.045****	H4: (–)	**-0.046**	**0.058***
PRESS_RELEASE							-0.045	0.069*		-0.037	0.125
POST_SOX										0.051	0.033**
CONSTANT	-0.023	0.529		-0.001	0.980		-0.006	0.883		-0.028	0.503
Industry-fixed effects	Yes			Yes			Yes			Yes	
Adj. R^2	0.08			0.09			0.10			0.11	
N	264			264			264			264	
Firms	264			264			264			264	

Following Myers et al. (2013) we report p-values two-sided when no directional prediction is made, and one-sided for directional test variables according to our hypothesis H4 that is stated in alternative form.
* p<0.1; ** p<0.05; *** *p*<0.01
This Table reports the potential determinants for the cumulative abnormal returns around the restatement announcement day without (1) and with pre-restatement ex-ante non-GAAP reporting aggressiveness. *AGGRESSIVE_GROUP* indicates firms with aggressive ex-ante non-GAAP reporting. Variables are defined as follows:
CAR = Cumulative abnormal returns in the three-day window [-3;3] around the restatement announcement date
Prompter:
PROMPTER_COMPANY = The restatement was prompted by the company;
PROMPTER_AUDITOR = The restatement was prompted by the auditor;
PROMPTER_OTHER = The restatement was prompted by another party than the SEC, company or auditor or was not known;
PROMPTER_SEC = The restatement was prompted by the SEC (base group);
Accounts:
REVENUE = The restatement affected revenue;
Further controls:
IMPACT = Total restated income (loss) less originally reported income (loss) accumulated over the restatement period scaled by the book value of total assets reported at quarter end prior to restatement announcement;
PERVASIVENESS = The number of accounts affected.
DURATION = Number of days between the beginning and end of misreporting scaled by 360.
IMPACT_SIZE = Natural log of book value of total assets reported at year end prior to the restatement announcement, times *Change in net income/assets*;
IMPACT_LEVERAGE = Book value of long-term debt divided by book value of total assets, reported at year end prior to the restatement announcement, times Change in net income/assets;
RET_120 = Buy and hold returns over 120 days prior to the restatement announcement;
Non-GAAP disclosure:
NON_AGGRESSIVE_GROUP= Firms with non-GAAP reporting that belong to the first quartile of ex-ante mean of *EXCLUDE (54 firms, base group)*;
MIXED_GROUP = Firms with non-GAAP reporting that belong to the second and third quartile of ex-ante mean of *EXCLUDE (75+65 firms)*;
AGGRESSIVE_GROUP = Firms with non-GAAP reporting that belong to the forth quartile of ex-ante mean of *EXCLUDE (70 firms)*;
Additional controls (not applied by Palmrose et al. (2004)):
PRESS_RELEASE = The restatement was published through a press release;
POST_SOX = The restatement was published after the SOX-Act became effective.
All variables are described in Appendix in detail.

Figures

Figure 1 ERC Development

ERC development across 5 pre and 12 post-restatement quarters



The quarter 0 is the last quarter before the restatement announcement. This figure illustrates the ERC based on aggregation of the pre-ERC (*UE*) and post-quarter changes (*UE X QTR*) for aggressive and non-aggressive firms. Values derive from Table 7. The solid line reflects the aggressive firms. The dashed line shows non-aggressive firms. We note that quarter -4 to quarter 0 reflect the pre-restatement period, which is captured by the coefficient on *UE*.

Appendix

Variable	Definition	Data Sources
Variables Used for Categorization into Subgroups		
Ex-ante Mean of *EXCLUDE*	The mean of ex-ante non-GAAP reporting aggressiveness (ex-ante mean of *EXCLUDE*) is calculated by counting the frequency of pre-restatement quarters in which a firm excludes recurring expenses in the five quarter preceding the restatement announcement and dividing the number by the number of observations. For example, if a firm excludes recurring expenses in 5 out of 5 quarters, the ex-ante mean non-GAAP reporting aggressiveness is 1 (5/5). By contrast if a firm excludes recurring expenses in 2 out of 4 quarters, the ex-ante mean non-GAAP reporting aggressiveness is 0.5 (2/4). We note that not all companies have full data (at least 2 pre-restatements quarter observations per firm). Based on the ex-ante mean non-GAAP reporting aggressiveness we identify whether firms have aggressive, mixed, and non-aggressive ex-ante non-GAAP reporting. It is important to note that a firm is tagged with the same indicator variable throughout all quarters, as otherwise, a pre- and post-period comparison would not be possible. The disclosure after the restatement is of none relevance for firm classification, as only the pre-disclosure assigns each firm to the corresponding reporting group**.**	See below
Dependent Variables		
UR	Cumulative abnormal returns in the three-day window [-1;1] around the earnings announcement date, where the abnormal return is calculated as the firm's return less the CRSP value-weighted market return. Calculated as: **ret** – **vwretd**	CRSP, Compustat
CAR	Cumulative abnormal returns in the three-day window [-3;3] around the restatement announcement date, where the abnormal return is calculated as the firm's return less the estimated return, using the market model and the value-weighted CRSP index, where the estimation window is [-200, -20]. Unexpected returns are calculated as: **ret** – predicted_return	CRSP
Control Variables		
UE	Unexpected quarterly earnings at the earnings announcement date, scaled by price at the end of the fiscal quarter, with expected earnings proxied by the median of analysts' forecasts issued within 90 days prior to the earnings announcement date. Earnings surprise is based on non-GAAP earnings. Calculated as: (**actual** – **median value)** / (**prccq** /**ajexq**)	I/B/E/S, Compustat
NONLINEAR	Calculated as: *UE**Absolute(*UE*)	I/B/E/S, Compustat
POST	*POST* is 1 if the firm quarter observation belongs to the post-restatement-period (12 quarter subsequent to the restatement), and 0 if the firm quarter observation belongs to the pre-restatement-period (5 quarters leading up to the restatement announcement).	Compustat, GAO, AA
QTR_i	QTR_i is a binary variable that takes the value 1 if the firm quarter observation belongs to a post-restatement quarter i = 1 to 12. QTR_i is zero if the firm quarter observation belongs to any of the five quarters leading up to the restatement announcement.	
EXCLUDE	1 if recurring expenses are excluded; non-GAAP exceed operating GAAP EPS. 1 if **actual** > (**opepsq** / **ajexq**)	I/B/E/S, Compustat
AGGRESSIVE_GROUP *MIXED_GROUP* *NON_AGGRESSIVE_GROUP*	Each firm belongs to the 1st (non-aggressive), 2nd and 3rd (mixed) or 4th (aggressive) quartile of **ex-ante non-GAAP reporting aggressiveness** (mean *EXCLUDE* in the pre-period).	I/B/E/S, Compustat
RECURRING_EXP	Recurring expense exclusions are calculated as: (**actual** – **opepsq**)***cshprq**) / **atq** Recurring expense exclusions are multiplied by shares outstanding and scaled by total assets as performed by Bentley et al. (2018).	I/B/E/S, Compustat

MTB	Market-to-book ratio is calculated as: **(cshoq*prccq)/ceqq**	Compustat
BETA	Market-model beta estimated over 250 days ending two days prior to the earnings announcement date (we require a minimum of 120 days).	CRSP
SIZE	Natural log of market value of equity is calculated as: log(**cshoq*prccq**) **cshoq (Compustat)** = Common Shares Outstanding **prccq (Compustat)** = Price Close - Quarter	Compustat
LOSS_NONGAAP	1 if reported non-GAAP earnings per share are negative, otherwise 0. 1 if **actual** < 0 **actual** (I/B/ES) = Actual Value, from the Detail Actuals File	I/B/E/S
LOSS_GAAP	1 if reported GAAP earnings per share are negative 1 if **epsfxq** / **ajexq**< 0 & if **pdf** = "D" 1 if **epspxq** / **ajexq** < 0 & if **pdf** = "P"	I/B/E/S
Q4	Indicator variable, equal to 1 if the earnings announcement is for the fourth quarter of the fiscal year;	Compustat
PREDICT	The variance of the absolute values of unexpected earnings over the two-year period prior to the earnings announcement, where unexpected earnings are based on a seasonal random walk.	Compustat
PERSIST	Autoregressive coefficient from Foster's (1977) model estimated over the two-year period prior to the earnings announcement.	Compustat
RETURN120	Buy and hold returns over 120 days prior to the restatement announcement [– 120; – 1].	CRSP
PROMPTER AUDITOR	1 if the restatement was prompted by the auditor (GAO).	GAO, hand-collection, Dyck et al. (2010)
PROMPTER COMPANY	1 if the restatement was prompted by the company (GAO).	GAO, hand-collection, Dyck et al. (2010)
PROMPTER SEC	1 if the restatement was prompted by the SEC (GAO).	GAO, hand-collection, Dyck et al. (2010)
PROMPTER_OTHER	1 if the restatement was not prompted by the auditor, the SEC, the company, or when the prompter is unknown.	GAO, hand-collection, Dyck et al. (2010)
REVENUE	The restatement affected revenue. For AA restatements 1 if **res_acc_res_fkey_list** = 6 (|Revenue recognition issues|) For GAO restatements 1 if **RevRecognition** = 1	GAO, AA
IMPACT	Total restated income (loss) less originally reported income (loss) accumulated over the restatement period scaled by the book value of total assets reported at quarter end prior to restatement announcement. Calculated as: **Cumulative Change in Net Income/atq**	AA, hand-collection, Compustat
IMPACT_SIZE	Natural log of book value of total assets reported at year end prior to the restatement announcement, times Change in net income/assets. Calculated as: ltq/atq**IMPACT*	AA, hand-collection, Compustat
IMPACT_LEVERAGE	Book value of long-term debt divided by the book value of total assets reported at year end prior to the restatement announcement, times Change in net income/assets. Calculated as: log(atq)* *IMPACT*	AA, hand-collection, Compustat
DURATION	The number of days restated scaled by 360.	AA, hand-collection
PERVASIVENESS	The number of accounts affected.	AA, GAO, hand-collection
PRESS_RELEASE	1 if the restatement was published through a press release, otherwise 0.	AA, hand-collection
POST_SOX	1 if the restatement was published after the SOX-Act became effective, otherwise 0.	Compustat, AA, GAO

TRR 266 Accounting for Transparency

Contact:
Prof. Dr. Caren Sureth-Sloane
Paderborn University
Faculty of Business Administration and Economics
Department of Taxation, Accounting and Finance
Warburger Str. 100, 33098 Paderborn, Germany

trr266@mail.upb.de
www.accounting-for-transparency.de