Preliminary and Incomplete

Please do not quote or circulate

What information can Critical Audit Matters provide?

Roberto Gonzales

The University of Texas at Arlington

Abstract:

This paper investigates the information that Critical Audit Matters (CAMs) may contain. Relying on the motive for the standard, this paper argues that CAMs should, on average, reveal bad news (e.g., about the firm's financial reporting process). To test this conjecture, I examine the investment activity of short sellers because prior literature suggests that they can identify firms with bad news potential before other market participants and that short interest is positively associated with audit risk. I find that companies that received CAMs in their 2019 audit opinion are more heavily shorted in the period before the CAM disclosure than firms that do not. These results are driven by firms that receive revenue- and contingency-related CAMs. Firms with tax-related CAMs exhibit lower short interest than other firms, even those without CAMs. Although previous studies fail to find a significant market reaction to the CAMs disclosure, the results in this paper indicate that varying CAM subjects contain information about potential future bad news.

Comments:

Recent discussions on this paper suggest the story may be stated as an information exchange between short sellers and auditors. For example, one suggestion is to ask whether auditors learn from short sellers or vice versa. Other comments suggest additional control variables for the primary regression and alternative windows (e.g., eight and four quarters) for short interest. Although the updates have not made it into this draft, the author is currently working on implementing these and other suggestions and looks forward to additional feedback on these and other matters.

1. INTRODUCTION

The primary purpose of financial statements is to provide investors with information that faithfully represents a company's economic reality. Auditors are tasked with providing reasonable assurance that such information is faithfully represented in all material respects. While some numbers are easier to confirm, like the amount of cash and cash equivalents, other measures require significant judgment, such as the valuation of intangible assets, and other accounts may be more vulnerable to manipulation, such as revenues. Following the 2008 financial crisis, investors demanded more informative auditor disclosures (PCAOB 2011). Specifically, investors wanted to know the areas auditors found most problematic during the audit, i.e., matters related to heightened audit risk (PCAOB 2011, p.186,196; Burke et al. 2022). This led to the most significant change to the audit opinion since the 1940s – Auditing Standard (AS) 3101 (KPMG 2020). AS 3101, which includes the CAMs disclosure requirement, went into effect for large accelerated filers with a fiscal year ending on or after June 30, 2019 (PCAOB 2017). Although the purpose of CAMs was to provide more information to investors, the literature failed to find a market reaction to their publication (Burke et al. 2022). In this paper, I examine what information CAMs can provide.

CAMs should disclose matters associated with heightened audit risk (PCAOB 2011). Audit risk indicates that there is a possibility that the auditor fails to detect a material misstatement when one is present. Issues that cause auditors to increase audit risk would be considered bad news because they indicate possibly unresolved hurdles that increase the likelihood that the financial statements are unreliable. To examine how much of this bad news may be incorporated in CAM disclosures, one need only look for a group of investors motivated to invest in firms expected to disclose such news: short sellers. Short sellers profit from decreases in stock price by borrowing and selling shares at their current price and using the proceeds to repurchase the shares at some

future period (when they expect a lower stock price). Consequently, they profit from firms revealing bad news to the market, such as restatements or poor performance (Desai et al. 2002; Desai et al. 2006; Efendi and Swanson 2009). These short sellers are sophisticated investors with resources, for example, the collateral required to borrow shares (NASD 1998). Short positions are dangerous, as any increase in stock price creates a loss to short sellers, which theoretically has no limit (Dechow et al. 2001). As a result, short sellers must enter these positions carefully. The sophistication of these investors is evident in numerous studies that report that short sellers can identify firms with overpriced shares (Dechow et al. 2001) and accounting irregularities (Desai et al. 2006; Efendi and Swanson 2009) not apparent to other shareholders, and they appear to possess this information at least one year before it is brought to light.

Short sellers may position themselves in firms with elevated levels of audit risk in the period before the CAM disclosure because audit risk is sticky. Interviews with auditors and archival evidence suggest that a large portion of audit risk remains consistent over time (De Villiers et al. 2014; Munsif et al. 2011). This may explain why current literature on CAMs finds no evidence of increased audit fees, a proxy for audit risk, after adopting the CAMs standard (Burke et al. 2022; Drake et al. 2021). Auditors are not changing their assessment of audit risk; instead, they are now finally required to disclose the issues that drive it. Short interest is positively associated with audit risk (Cassell et al. 2011). If the information in CAMs aligns with investors' demands (i.e., informative disclosures on audit risk – bad news), then firms that eventually reveal CAMs may be targeted by short sellers before the CAMs are made public. However, it is possible that some auditors issue CAMs as disclaimers for legal protection (Brasel et al. 2016). In that case, there may be a misalignment between the firms' actual audit risk and the disclosure, so there would

be no association between those CAMs and short interest. Therefore, whether CAMs can have information about the firm is an empirical question.

I use a sample of 1,542 firms required to adopt AS 3101 in the 2019 audit opinion and examine how short sellers position themselves in the ten quarters before CAMs are issued. I find that, on average, firms that eventually receive CAMs are more heavily shorted than firms that do not. The results suggest that audit disclosures may contain information aligned with investor demands.

To better understand CAMs, I examine those issued in specific subject areas. Findings in recent studies (Burke et al. 2022; Gonzales 2021; Li et al. 2022; Bédard et al. 2019) allow me to make predictions about CAM subject areas that may be more heavily shorted than others. For example, unexpected revenue CAMs have been shown to exhibit an adverse market reaction (Burke et al. 2022), from which short sellers may profit if they short the stock before the CAM is disclosed. In addition, firms receiving revenue CAMs display more opportunistic discretionary revenue (Gonzales 2021) and lower financial reporting quality (Li et al. 2022); low financial reporting quality is also associated with short interest (Desai et al. 2006). I find that firms receiving revenue CAMs are the most heavily shorted firms in the sample. These results indicate that firms receiving revenue CAMs may be characterized as the firms with the greater potential for bad news, perhaps as a result of heightened audit risk, which is consistent with the purpose of CAMs.

Similar to revenues, intangible-related CAMs may also contain more information on audit risk. European studies on expanded auditor reports find that intangible-related disclosures (e.g., goodwill) exhibit higher audit fees (Bédard et al. 2019), possible indications of both audit risk and short interest (Cassell et al. 2011). Inconsistent with my prediction, I find insignificant results that firms receiving intangible CAMs are associated with heightened levels of short interest. Since

short sellers focus on the bad news that the market has not already incorporated into the stock price, it may be that the market is already aware that these firms have intangible assets associated with more audit risk.

Regarding CAMs of other topics, two noteworthy results are reported. First, I find that firms with contingency CAMs are the second most heavily shorted firms (revenue CAMs being the first). Contingencies are potential future liabilities that may result from an event that occurred in the past. If short sellers believe that a firm may have underestimated a potential liability (bad news), then they may profit when a more severe outcome is revealed to the market (from declines in stock price). Second, the results indicate that tax-related CAMs are less heavily shorted than other companies, including those without CAMs. One possible explanation for this result is that short sellers do not target these firms because the market already has information on issues that may predict bad news. For example, suppose matters related to tax contingencies dominate a company's bad news potential. These matters may already be disclosed to market participants because of the robust disclosure requirements of FIN No. 48 (codified as ASC 740). The rule was adopted in December 2006 and requires comprehensive information about the reserve for uncertain tax benefits (Blouin et al. 2010). As a result, these CAMs may still possess unfavorable information about audit risk, but the information is already known to the market.

I also examine the change in short interest in the months before and after the CAMs disclosure and find that revenue CAMs continue to exhibit higher levels of short interest compared to other firms at least six months following the CAMs disclosure. The anomaly may suggest that even after CAMs are disclosed, market participants fail to adequately price bad news revealed by auditors into stock prices. In addition, I find that in the month that firms report contingency CAMs they exhibit a downward trend in short interest. This may suggest that the information in CAMs

closed the informational gap between what short sellers and market participants knew about contingencies. Therefore, these firms are no longer an attractive investment to short sellers as they no longer possess an information advantage. Finally, the trend reveals that firms receiving tax-related CAMs continue to exhibit the lowest levels of short interest in the months after the CAM is revealed.

This paper contributes to the literature in the following ways. First, several studies on the expanded audit report show that, on average, the expanded auditor disclosures do not elicit a significant market reaction (Gutierrez et al. 2018; Bédard et al. 2019; Burke et al. 2022). These results are interpreted as CAMs not being informative to market participants. My results suggest that news in CAMs about audit risk likely varies based on the CAM subject area (e.g., revenue, tax). Second, the paper contributes to the value relevance literature. While the literature on firm fundamentals indicates that different financial statement elements possess varying degrees of value relevance to stakeholders (Lev and Thiagarajan 1993; Abarbanell and Bushee 1997; Barth et al. 1998; Barth et al. 2022), this paper shows that bad news potential associated with specific financial statement elements varies, which may have an impact on its value relevance for stakeholders. Third, this paper also contributes to the literature on short sellers. Prior literature finds a positive association between short interest and audit fees (Cassell et al. 2011). We find the association also exists for another measure of audit risk (CAMs), but that association may only be present when investors are not fully aware of the audit risk.

The remainder of this paper is outlined as follows. Section 2 discusses the background and hypotheses development. Section 3 outlines the research design. The results are reported in Section 4. Section 5 discusses future work and section 6 concludes this article.

2. BACKGROUND AND HYPOTHESIS DEVELOPMENT

2.1. Critical audit matters

PCAOB Auditing Standard (AS) 3101 made significant changes to the audit reports included in 10-K filings, one of which requires auditors to communicate Critical Audit Matters – CAMs (PCAOB 2017). The standard defines "[a] critical audit matter as any matter arising from the audit of the financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates to accounts or disclosures that are material to the financial statements and (2) involved especially *challenging*, *subjective*, or *complex* auditor *judgment*." The standard gives auditors significant discretion regarding how they report a CAM to meet its objective of avoiding boilerplate narratives and provide more informative auditor disclosures (PCAOB 2011).[1]

Burke et al. (2022) were among the first to examine whether CAMs are informative. They utilize a difference-in-differences design around the first year of the CAMs' introduction and conclude that, on average, CAMs are not informative, as implied by an insignificant market reaction. The results are consistent with the findings on European Key Audit Matters – KAMs (Gutierrez et al. 2018; Bédard et al. 2019).[2] Overall, the evidence suggests that expanded auditor reports do not provide incremental information to the market. Research on the expansion of the audit report, both in the U.S and in Europe, generally agrees that the expansion was motivated by investors' demand for more informative auditor disclosures (Gutierrez et al. 2018; Bédard et al. 2019; Drake et al. 2021; Burke et al. 2022; Klevak et al. 2020). However, these studies do not

[1] Klevak et al. (2020) and Burke et al. (2022) document a variation in CAMs disclosures, such as length of disclosure and type of audit procedures mentioned.
[2] The Financial Reporting Council (FRC) issued International Standard on Auditing (ISA) 700 on June 2013, in the United Kingdom. The Standard included a requirement of Key Audit Matters (KAMs), which is similar to U.S. CAMs. See Gutierrez et al. (2018) for more details.

consider the type of "news" that the CAM would deliver, i.e., what information content CAMs can provide.

CAMs should provide *bad news*. The urgency to adopt the standard was motivated following the financial crisis of 2008, which prompted investor demand for more information "from auditors than the assurance that the traditional pass/fail report provides (p. 10)"; investors want to know "what keeps the auditor up at night (p. 186, 196)" (PCAOB 2011). In general, the enhanced auditor disclosure *should* provide investors with information on audit risk, which considers issues within a firm's financial reporting process or other related matters. Information in CAMs ought to be about what elements of the financial statements may include reporting mistakes and, therefore, may be regarded as *bad news* immediately when the CAM is released (i.e., the CAMs are likely to shed light on the existence of greater downside risk than the market already anticipates).

Nevertheless, it is possible that auditors issue *some* CAMs as disclaimers for legal protection. AS 3101 requires that auditors explicitly state, in the audit opinion, when no CAMs are identified. An auditor may be motivated to issue a CAM when one is not warranted to avoid legal liability, for example, if a future restatement occurs (Brasel et al. 2016). The issuance of such CAMs could result in a misalignment between the audit risk in a company's financial reporting process and the reason for the audit disclosure.

Short sellers may capture how much bad news may be incorporated in CAMs. Short sellers are highly skilled, sophisticated investors capable of predicting decreases in company stock prices. These investors are likely aware of bad news that the rest of the market cannot anticipate. They are usually professionals who collect private information and have the resources to take short positions. See Appendix B for institutional background on short sellers. Numerous studies suggest

that short sellers can identify firms with financial issues, such as accounting irregularities and overpriced shares, not apparent to other market participants (Desai et al. 2006; Efendi and Swanson 2009). Desai et al. (2006) and Efendi and Swanson (2009) show that short sellers accumulate their positions *more than one year* before a restatement and subsequently unwind their positions following a decline in share price. Dechow et al. (2001) report that short sellers position themselves in firms with low financial ratios, such as cash-to-price, and then unwind their positions after these ratios revert to normal levels. More interesting, short sellers do not short all firms with low financial ratios; they avoid securities of firms that are not likely to experience a price decline. For example, short sellers avoided shares of Cisco Systems, which performed consistently well, even though it was within the lowest fundamental-to-price category. Finally, audit research finds a positive association between short interest and audit risk (Cassell et al. 2011). Therefore, one way to assess whether CAMs could have information content is to explore the association between firms that will eventually receive CAMs and their pre-CAM short interest.

If auditors provide meaningful disclosures about dangers within the firm, short interest would be positively associated with firms that eventually receive CAMs. That is because short sellers can anticipate an adverse market reaction following either the CAMs disclosure or other bad news related to an issue disclosed in CAMs. Consider goodwill impairment as an example. Under SFAS 142 (codified into ASC 350), the valuation of goodwill relies on assumptions about future management actions, which directly impact estimations of future cash flows. Filip et al. (2015) report that auditors rely on plans developed by managers to assess whether goodwill is impaired. They find that managers manipulate cash flows for a group of suspect firms to postpone the recognition of goodwill impairment. This manipulation of cash flows has a detrimental impact on future firm performance. Although management estimates may not violate GAAP requirements,

they may not pass the auditor "smell test." As a result, the auditor issues a CAM related to goodwill.[3]

In the goodwill scenario above, short sellers may benefit from shorting firms with goodwill CAMs for three possible outcomes. First, they may profit from a decline in the stock price if the market perceives goodwill CAMs as bad news. Second, if the market does not react to the CAM, but the company later reveals goodwill impairment, the stock price will decrease (Li et al. 2011), and short sellers will profit. Third, even if the market does not react negatively and goodwill is not impaired, the manipulation of cash flows will hurt future firm performance (Filip et al. 2015), resulting in a decrease in stock price. In summary, this explanation suggests the market need not necessarily react to CAM disclosures to benefit short sellers. If issues in CAMs eventually manifest themselves as bad news, then short sellers may still profit from them.

However, as mentioned above, auditors may issue CAMs for legal protection, and the CAMs would not contain information about vulnerabilities within the firm. Therefore, no association between CAMs and short interest may be present. Furthermore, it is possible that market participants already price adverse information contained in CAMs because they obtained the data from other sources. Due to the conflicting theoretical predictions, it is an empirical question of whether an association exists between CAMs and short interests, so the first hypothesis is stated in null form.

Hypothesis 1: *Short interest in a firm's stock is not associated with the firm's eventual CAM disclosure*.

[3] For example, auditors are required to perform analytical procedures during the planning phase to assess whether changes in account balances are reasonable. Auditors may find that decreases in discretionary expenses (e.g., R&D), which contribute to increases in operating cash flows, may be suspect but do not violate GAAP.

Since Burke et al. (2022) did not find a market reaction to the overall disclosure of CAMs, they categorized the different CAMs into seven subject areas and developed a prediction model to examine how the market reacts when an unexpected CAM is issued. They find a negative market reaction to the disclosure of unexpected CAMs. Most importantly, the authors report that the results are driven by unexpected CAMs related to revenues. Their findings highlight the importance of examining these seven subject areas more closely to explore possible variation in attributes of firms that receive CAMs of varying subjects.

Other studies focus on CAMs in specific subject areas and their association with firms' reporting decisions. Gonzales (2021) finds that firm-issued revenue-related CAMs are associated with heightened levels of positive discretionary revenue immediately following the adoption of ASC 606 – *Revenue from Contracts with Customers*. Similarly, Li et al. (2022) report that compared to firms receiving CAMs in other subject areas, firms receiving revenue CAMs exhibit lower accruals quality. Finally, Drake et al. (2021) find that managers of firms issued tax-related CAMs are less likely to use tax expenses to meet analysts' after-tax forecast consensus.

The combined evidence that different topics have different consequences is consistent with different firm fundamentals possessing varying degrees of value relevance for stakeholders (Lev and Thiagarajan 1993; Abarbanell and Bushee 1997; Barth et al. 1998; Barth et al. 2022). Because CAMs are generally related to specific firm fundamentals, such as revenue and tax, they may possess varying degrees of value relevance to investors and other stakeholders. In addition, they may be associated with varying degrees of potential bad news, which would impact a short seller's position. Overall, it is unlikely that all CAMs will be shorted to an equal extent. For example, the adverse market reaction to unexpected revenue CAMs (Burke et al. 2022) and the association between revenue CAMs and lower financial reporting quality (Gonzales 2021; Li et al. 2022) make

these firms candidates for heightened levels of short-interest before the CAMs' public disclosure. As a result, I predict firms receiving Revenue CAMs will be more heavily shorted than other firms.

Hypothesis 2a: *Short interest in firms that receive revenue CAMs will, on average, be higher compared to other firms.*

As stated previously, goodwill was noted as a possible CAM of interest for short sellers because of three scenarios associated with decreases in stock price. A European study examining the effects of Justifications of Assessments (JOAs, the French version of CAMs) finds that firms that received JOAs related to intangible assets (such as goodwill) are the only group that exhibits an increase in audit fees (Bédard et al. 2019). Cassell et al. (2011) find a positive association between audit fees (a proxy for audit risk) and short interest. As a result, I predict that firms with intangible-related CAMs also exhibit higher levels of short interest compared to other firms.

Hypothesis 2b: *Short interest in firms that receive intangible CAMs will, on average, be higher compared to other firms.*

As I cannot make ex-ante predictions about the other subject areas, the final hypothesis is written in null form.

Hypothesis 2c: *Firms that receive M&A, Tax, PPE, Contingencies, and Credit Losses CAMs will, on average, not exhibit varying degrees of short interest compared to other firms.*

3. RESEARCH DESIGN

3.1. Empirical specifications

To test the first hypothesis, I create an indicator variable equal to one if the firm receives a CAM and zero otherwise. I regress short interest on the indicator variable as follows.

$$Q\_SI_{it} = \alpha + \beta_1 CAMs\_Any_{it} + \sum_k \beta_k Controls_{it} + \varepsilon_{it} \quad (1)$$

Q_SI is the short interest for firm *i* in quarter *t* taken at the end of each quarter. The variable is computed by dividing the number of shorted shares by the total shares outstanding at the end of the quarter (Brendel and Ryans 2021). *CAM_Any* is an indicator variable equal to one if the firm receives a CAM and zero otherwise. If short sellers, on average, have higher positions in firms that eventually report CAMs, the coefficient on β_1 will be positive and significant.

The control variables include firm size (log of assets), growth (market to book), performance (return on assets), dividend yield, leverage, loss, and receivable inventory intensity. Prior literature suggests that shares of firms with high levels of institutional ownership are easier to borrow, thus reducing short sellers' transaction costs. I control for institutional ownership and predict the coefficient to be positive and significant (Dechow et al. 2001; Kot 2007). I control for discretionary accruals using the modified Jones model (Dechow et al. 1995) and predict a positive coefficient because low earnings quality may indicate questionable financial reporting that leads to a restatement (Desai et al. 2006). I control for pricing multiples previously shown to be associated with short interest. Dechow et al. (2001) report that short sellers target firms with low cash-to-price multiples because they may indicate the firm is overpriced. In addition, I used industry- and year-fixed effects to control for unobservable industry and year characteristics.[4] All continuous control variables are winsorized at the 1st and 99th percentiles.

To test hypotheses 2a, 2b, and 2c, I follow the CAM subject areas presented in Burke et al. (2022) and categorize CAMs into seven major subject areas. Subject areas include Intangible Assets, Revenue, M&A, PPE, Taxes, Credit Losses, and Contingencies. The subjects are

[4] The results are unaffected when using quarterly fixed affects.

composed of granular topics organized by Audit Analytics (See variable definitions for the topics used to categorize the subject areas). I regress short interest on firms receiving CAMs in each subject area.

$$Q\_SI_{it} = \alpha + \lambda_x CAMs\_SA_{it} + \sum_k \lambda_k Controls_{it} + \varepsilon_{it} \quad (2)$$

In the equation above, *CAMs_SA* represents each of the CAM subject areas and is an indicator variable equal to one if the firm receives a CAM in that subject area in its 2019 audit report and zero otherwise. Hypothesis 2a predicts that the coefficient on CAMs_SA should be positive and significant when CAMs_Revenue equals one, as defined in appendix A. Hypothesis 2b indicates that the coefficient on CAMs_SA should be positive and significant when CAMs_Intangibles equals one. Hypothesis 2c does not predict the coefficient's sign in the other subject areas. I use the same control variables as in equation one.

3.2. *Sample*

The analysis is conducted with a sample of 1,542 firms required to adopt CAMs in the 2019 audit opinion. The CAMs requirement became effective for large accelerated filers (LAFs) with fiscal years ending on or after June 30, 2019, and for other publicly traded companies with fiscal years ending on or after December 15, 2020 (PCAOB 2017). The SEC defines a LAF if "[t]he issuer has a public float of $700 million or more, as of the last business day of the issuer's most recently completed second fiscal quarter [with no revenue threshold] (SEC 2020)." I compute public float by multiplying the common shares outstanding by the stock price at the end of the second quarter, using Compustat quarterly data. I keep firms with public floats equal to or greater than $700 million. I use the FactSet Ownership file to compute institutional ownership and the Compustat Short Interest File to compute short interest. Total company shares outstanding are

downloaded from the Center for Research in Security Prices (CRSP). Compustat data is used to calculate control variables as outlined in Appendix A. I identified 3,011 LAFs before any exclusions, of which 2,276 are issued CAMs in 2019. Of these 3,011 firms, 966 are removed for missing institutional holdings data from FactSet, and 503 are removed because of missing Compustat data.

I retroactively assign the 2019 CAM subject areas to firms starting in the 3rd firm quarter of 2017 and ending in the 4th firm quarter of the 2019 fiscal year. The 3rd quarter of 2017 is selected as a starting point for three reasons. First, it helps alleviate firm attrition as the sample size is reduced the further back CAMs are assigned. Second, taking the short interest at the end of the quarter helps capture variation in short interest during the year. Finally, the PCAOB officially adopted the CAMs regulation on June 1, 2017, although it did not become effective until June 30, 2019 (Zhang and Pany 2021). Examining short interest following the adoption of the standard may capture short positions motivated by an expectation that firms will reveal CAMs in subsequent periods.

Table 1 describes the selection process and sample distribution. Panel A reports the sample selection process. Panel B, Column two, tabulates the number of firms that received at least one CAM in each industry (Fama and French 1997). Notably, a single firm may receive a CAM in multiple areas. For example, Microsoft's 2019 audit report includes a Revenue and a Tax CAM (totaling two CAMs). I, therefore, report the total number of CAMs issued to all firms within the industry in column three. The industry with the highest number of CAMs is the business services sector. This industry includes companies like Meta, Microsoft, Go Daddy, and other tech companies. It may be no surprise these firms are issued the highest number of CAMs because the tech industry involves highly complex financial reporting practices (Carmichael 1998). Panel C

reports the distribution of CAMs by subject areas in the original sample of 1,542 firms. The distribution is similar to Burke et al. (2022). They report that Intangible CAMs comprise most of the sample, followed by Revenue CAMs. Contingencies and Credit losses exhibit the lowest count. Panel D details the retroactive assignment of 2019 CAMs to previous quarters, making up the total sample of 15,048 firm quarter observations.

Table 2 reports the sample descriptive statistics. Panel A reports that 89.7% of firms in the sample receive at least one CAM in any subject area. The average number of CAMs received is 1.5, with a median value of 1, suggesting that most LAFs did not receive more than one CAM. Our sample consists of LAFs, characterized as large firms. Firm size has been previously shown to be positively correlated with institutional ownership (Duggal and Millar 1999). Therefore, institutional ownership in the sample is larger than that of other studies. Louis et al. (2022) report that a mean (median) of 66.5% (72.8%) of firm shares are owned by institutional investors. We report a mean (median) of 75.3% (82.6%), which appears reasonable given our sample is constructed of the largest firms in the population. Panel B reports the pairwise correlation with asterisks denoting statistical significance. Overall, the correlations are consistent with prior literature. For example, discretionary accruals and institutional ownership positively correlate with short interest (Dechow et al. 2001; Desai et al. 2006). After each regression, I examine the variance inflation factor to test for multicollinearity and find no indications that it should be a concern in my tests.

4. RESULTS

4.1. Hypothesis 1: Short interest and CAMs

Table 3 reports the test results of the first hypothesis with quarterly short interest as the dependent variable. Column (1) reports the coefficients and t-statistics of the control variables,

verifying they retain the same sign after including the test variables of interest. Columns (2) and (3) include the coefficients on the test variables. In column (2), the coefficient of 0.009 on *CAM Any* is positive and significant (t-statistic of 4.90, p<.01), suggesting that firms that receive CAMs of any subject area are, on average, more heavily shorted, by 0.9 percentage points, than firms without any CAMs. Economically, an increase in short interest of 0.9 percentage points from the mean suggests the firms lie within the top 75th percentile of the sample distribution. The results indicate that short sellers perceive firms that eventually receive CAMs as possessing higher levels of bad news potential. As an additional test, I replace the indicator variable with a count of the number of CAMs the firm receives. In column 3, the coefficient of 0.002 on the number of CAMs is also positive and statistically significant (t-statistics of 2.96, p<.01) at all conventional levels. The results indicate that firms receiving one additional CAM exhibit an increase in short interest of 0.2 percentage points. The average short interest in the sample is 4.3%, suggesting an increase in short interest of (.2/4.3) 4.6% from the mean for each additional CAM. These results theoretically align with Klevak et al. (2020), who report that firms with more CAMs exhibit a more negative market reaction; short sellers profit from declines in market prices.

Regarding the control variables, column (1) reports the results without the test variables of interest; note that the coefficients are consistent throughout each test. As expected, discretionary accruals, institutional ownership, and loss coefficients are positive and significant. These results suggest that short sellers' positions are motivated by firms with lower financial reporting quality (Desai et al. 2006), higher levels of institutional ownership (Dechow et al. 2001; Kot 2007), and expected to report losses. The negative coefficient on size (log of assets) and dividend yield suggests that short sellers are less likely to short, larger, more financially stable firms. Higher dividend yields have been previously shown to be positively associated with firm performance

(Farrukh et al. 2017). Simerly and Li (2000) suggest that the association of financial leverage on company performance varies. The association is positive when the company resides in a stable business environment and negative when it operates in a dynamic environment "where there is no widely agreed upon basis of managerial action (Simerly and Li, 2000, p. 32)." The positive and marginally significant coefficient on leverage suggests that short sellers expect higher-levered LAFs to exhibit lower future performance, perhaps because they reside in more dynamic industries. The negative coefficient on cash to price ratio suggests that short sellers take fewer short positions when cash flows are a better a representation of stock price. The coefficient on receivable-inventory-intensity (RII) is positive and significant, suggesting that short sellers expect that firms with higher levels of receivables and inventory as a fraction of total assets will underperform in the future. A high RII ratio could signify that the firm is having difficulty collecting its receivables, selling its inventory, or both.

Finally, the adjusted R-square is consistent with the average explanatory power of prior short-interest models (Dechow et al. 2001; Desai et al. 2006; Kot 2007). Kot (2007) reports an R-squared between 0.08-0.14.

4.2. Hypotheses 2a-2c: CAMs by topic

Table 4 reports the results of the second hypothesis. For readability, I only report the coefficients on subject areas that are statistically significant. The results suggest that short interest varies by CAM subject area. The tests fail to reject the null that short interest in firms with CAMs subject areas differs from zero for firms that received CAMs related to Intangibles (H2b), M&A, PPE, and Credit Losses, with reported t-statistics of 0.072, 0.377, -.317, and 1.456, respectively.

Credit losses are only marginally significant ($p<0.10$) when all categories are included in the fourth column.

In contrast, Revenue (CAM_Revenue = 0.008, $p<0.01$) and Contingency (CAM_Contengencies = 0.005, $p<0.01$) CAMs are most heavily shorted. The results are consistent with the prediction in hypothesis 2a. The results suggest that, on average, firms that received Revenue Cams exhibit higher levels of short interest of 0.8 percentage points, with contingencies exhibiting the second highest level of 0.5 percentage points. Contingencies are potential liabilities that may result from an event that occurred in the past. If short sellers believe that a firm may have underestimated its potential liability (bad news), then they may profit when a more severe outcome is revealed to the market (from declines in stock price). Column (2) reports that firms receiving Tax related CAMs are less heavily shorted (CAM_Taxes=-0.004, $p<0.05$) compared to other firms, even those without CAMs. One possible explanation for this result is that short sellers do not target these firms because the market already has information on issues that may predict bad news. For example, suppose matters related to tax contingencies dominate a company's bad news potential. These matters may already be disclosed to market participants because of the robust disclosure requirements of FIN No. 48, which requires comprehensive information about the reserve for uncertain tax benefits (Blouin et al. 2010). As a result, these CAMs may still possess adverse information, but the information is already known and priced by the market.

Column 4 reports the results of including CAMs of all subject areas. The result can be interpreted as the association between a firm receiving a CAM in each subject area and short interest after controlling for the fact that firms may receive CAMs in other subject areas. For example, it was previously noted that Microsoft received both a Revenue and Tax CAM. The coefficients on CAM_Revenue and CAM_Contingencies remain positive and statistically

significant (p<.01) even after controlling for other subject areas. The coefficient on CAM_Taxes remains negative and significant (p<.05).

Overall, the results suggest that, on average, short interest is higher for firms that eventually receive CAMs. The findings also indicate that not all CAMs are shorted equally and that short sellers primarily targeted firms with Revenue and Contingency-related CAMs in the years before the CAMs were issued. In addition, Tax related CAMs are less heavily shorted compared to other subject areas, including firms without any CAMs.

The results on firms that were issued revenue CAMs are especially interesting because prior studies have highlighted these. Firms with Revenue CAMs are associated with lower financial reporting quality than those given CAMs in other subject areas (Li et al. 2022). Gonzales (2021) reports that managers of firms that eventually received Revenue CAMs use more opportunistic revenue discretion immediately following the adoption of the new revenue standard in 2018 (ASC 606). Burke et al. (2022) find that market reaction to unexpected CAMs is driven by firms that receive unexpected Revenue related CAMs. Overall, the results suggest that firms with Revenue CAMs possess intriguing qualities that future work must explore.

4.3. Additional analyses

4.3.1 The trend in monthly short interest

So far, I have only explored a firm's short interest before CAMs are issued. In the spirit of Desai et al. (2006), this section examines the change in monthly short interest before and after the CAM is disclosed. I obtain the average monthly short interest 18 months before and six months after the CAM disclosure for the original sample of 1,542 firms. Figure 1 outlines the monthly short interest for each previously defined CAM subject area. The x-axis represents the month

before and after the CAM issue date; month zero is the month CAMs are disclosed. The y-axis represents the average monthly short interest.

The difference in average short interest between the No CAM and CAM Any groups decreases about five months before CAMs are disclosed. Then in the month following the release of CAMs, the difference appears again, with firms receiving CAMs being more heavily shorted than the No CAM group. The graph also shows that firms that eventually receive Revenue CAMs are among the most heavily shorted during the entire examination window. The trend is consistent with H3; firms that eventually receive Revenue CAMs are more heavily shorted in the period leading up to the CAM disclosure. Contingency CAMs are the second most heavily shorted CAMs at least before month -6, after which they exhibit a downward trend. This category also shows a steep decrease in short interest in the disclosure month, suggesting that the information in CAMs closed the informational gap between what short sellers and market participants knew about contingencies. Therefore, these firms are no longer an attractive investment to short sellers as they no longer possess an information advantage.

Table 5 reports the monthly change in short interest and the distribution of firms receiving credit losses and PPE-related CAMs. Panel A of Table 5 reports the average change in short interest starting one month before the CAM release date. In the three-month window (-1, +1), Revenue, M&A, Contingencies, and Credit Losses exhibit a negative change in short interest. Intangibles, PPE, and Taxes experience an increase in short interest. *Rank* orders CAM subject areas from the largest to the smallest absolute change in short interest for each specified window. In window (-1, +1), Contingencies exhibit the most considerable change, followed by PPE and M&A; Credit Losses exhibit the smallest change. Within the four-month window (-1, +2), the sign for firms with Credit Losses changes from negative to positive and displays the most considerable

change in short interest. In the following two windows, Credit Losses continue to show rapid increases in short interest. PPE CAMs peak at the (-1, +3) window and then exhibit a decrease in short interest.

The upward trend in short interest in the months following the CAM disclosure may result from the Covid-19-induced stock crash. Most of the firms in the sample are large-accelerated filers with a 12/31 year-end and are required to file a 10-K 60 days (2 months) after year-end (Dong et al. 2022). Therefore, most firms in our sample, except those with extensions, should have reported between January and February 2020. The following section explores CAMs as a potential signal to investors about which companies underperformed during the pandemic-related stock crash.

5. FUTURE WORK

So far, the results suggest that firms with CAMs of different subject areas exhibit various levels of short interest. Figure 1 plots the monthly trend in average short interest of firms by CAM subject areas. Figure 1 shows that two months following the CAM disclosure, firms that issued credit losses CAMs exhibited a significant increase in short interest. I predict the increase is related to the Covid-19-induced stock market crash. I examine the sample and note that 87% of the sample has a 12/31 year-end. This is important because all firms in the sample are large-accelerated filers required to file a 10-K 60 days (2 months) after year-end (Dong et al. 2022). Indeed, 80% of the sample files its earnings report between January and February 2020.

In preliminary work (not tabulated), I examine the abnormal returns during the 2020 Covid-19 stock crash for firms receiving CAMs of varying subject areas. I do not restrict the sample to the criteria outlined in Panel A of Table 1. I use existing studies on the Covid-19 market crash and

select the window between February 24 and March 18 as the market crash window.[5] After controlling for other factors that may explain firm performance during the market crash, I find a significant negative coefficient on abnormal returns only for firms receiving credit losses CAMs. Firms in the banking industry drive these results. Of the 202 firms that received credit losses CAMs, 157 are in the banking industry. There are 189 firms in the banking industry, and only 32 did not receive credit losses CAMs.

In future work, I will explore whether firm performance during the stock market crash differs for banks that received CAMs from those that did not. Finding a significant difference in performance may indicate that CAMs are meaningful. For example, suppose that banks that received credit losses CAMs performed poorly compared to firms that did not receive these CAMs. Relatedly, motivation for the CAMs requirements has its roots in the 2008 financial crisis. Investors were frustrated with the lack of transparency of financial institutions (e.g., banks) in the period leading up to the market crash (PCAOB 2011). Although different reasons caused the 2008 and 2020 market crashes, perhaps the information in credit losses CAMs could forewarn investors about problems within the banking institutions that could have helped them anticipate their performance during the 2020 stock crash.

Finally, interesting questions are raised by the results for revenue-, contingency-, and tax-related CAMs documented in this study. For example, why are firms with revenue CAMs more heavily shorted than other firms, and why does this continue after the CAMs are disclosed? In addition, why are firms receiving tax-related CAMs on average the least heavily shorted firms? Is it because most of the potential for bad news is priced by the market as a result of disclosure

[5] Albuquerque et al. (2020) indicate February 24th as the starting point of the Covid induced stock market crash and March 18th being the date when President Trump signed the second Coronavirus Emergency Aid Package, starting the U.S. monetary response to the global pandemic. Refer to Figure 1 of Albuquerque et al. (2020).

requirements of FIN No. 48? If so, were these firms among the most heavily shorted before the detailed disclosures were required? These additional questions provide future research avenues to expand this paper and may motivate additional research projects.

6. SUMMARY AND CONCLUSION

In 2019, Auditing Standard 3101, which included the CAMs requirement, became effective for large-accelerated filers. The purpose of the auditing standard was to enhance auditor disclosures and provide more information to investors about areas in the audit that involved especially challenging, subjective, or complex auditor judgment (PCAOB 2017), i.e., information on audit risk. This paper argues that CAMs likely contain bad news related to potentially unresolved hurdles (i.e., audit risk) auditors faced during the audit.

I rely on the findings of prior literature reporting that short sellers are among the market's most sophisticated investors, capable of identifying firms with adverse news potential to assess whether CAMs may contain bad news. I find that firms that eventually receive CAMs are, on average, more heavily shorted than firms that do not. The results suggest that, on average, audit disclosures may contain information aligned with investor demands. In addition, I rely on the findings of current CAMs literature to predict which CAMs subject areas may be associated with higher levels of short interest (bad news potential). I find that firms receiving revenue CAMs are among the most heavily shorted firms in the sample. These results indicate that firms receiving revenue CAMs may be characterized as the firms with the worst news potential. The results also reveal that firms receiving tax-related CAMs are less heavily shorted than other companies, including those without CAMs. One possible explanation for this result is that short sellers do not target these firms because the market already has information on issues that may predict bad news. For example, due to the tax disclosure requirements of FIN No. 48.

The results contribute to the literature in the following ways. First, several studies on the expanded audit reports (e.g., in the U.S. and Europe) suggest that they are not informative to market participants because they do not elicit a significant market reaction (Gutierrez et al. 2018; Bédard et al. 2019; Burke et al. 2022). My results suggest that news in CAMs about audit risk likely varies based on the CAM subject area (e.g., revenue, tax). The results are consistent with the literature on firm fundamentals which indicates that different financial statement elements possess varying degrees of value relevance to stakeholders (Lev and Thiagarajan 1993; Abarbanell and Bushee 1997; Barth et al. 1998; Barth et al. 2022). Whether market participants interpret CAMs appropriately is an empirical question for future work.

In addition, the results of differing short interests in CAM in distinct subject areas raise interesting questions about firms that receive these auditor disclosures. For example, why are firms with revenue CAMs more heavily shorted than other firms, and why does this continue after the CAMs are disclosed? In addition, why are firms receiving tax-related CAMs on average the least heavily shorted firms?

References:

Abarbanell, J. S., and B. J. Bushee. 1997. Fundamental analysis, future earnings, and stock prices. *Journal of accounting research* 35 (1):1-24.

Barth, M. E., W. H. Beaver, and W. R. Landsman. 1998. Relative valuation roles of equity book value and net income as a function of financial health. *Journal of Accounting and Economics* 25 (1):1-34.

Barth, M. E., K. Li, and C. McClure. 2022. Evolution in value relevance of accounting information.

Bédard, J., N. Gonthier-Besacier, and A. Schatt. 2019. Consequences of expanded audit reports: Evidence from the justifications of assessments in France. *Auditing: A Journal of Practice & Theory* 38 (3):23-45.

Black, B., H. Desai, K. Litvak, W. Yoo, and J. J. Yu. 2022. The SEC's Short-Sale Experiment: Evidence on Causal Channels and on the Importance of Specification Choice in Randomized and Natural Experiments: SSRN Working Paper 3657196.

Blouin, J. L., C. A. Gleason, L. F. Mills, and S. A. Sikes. 2010. Pre-empting disclosure? Firms' decisions prior to FIN No. 48. *The Accounting review* 85 (3):791-815.

Brasel, K., M. M. Doxey, J. H. Grenier, and A. Reffett. 2016. Risk disclosure preceding negative outcomes: The effects of reporting critical audit matters on judgments of auditor liability. *The Accounting review* 91 (5):1345-1362.

Brendel, J., and J. Ryans. 2021. Responding to activist short sellers: Allegations, firm responses, and outcomes. *Journal of accounting research* 59 (2):487-528.

Burke, J., R. Hoitash, U. Hoitash, and S. X. Xiao. 2022. The disclosure and consequences of U.S. critical audit matters. *The Accounting review*.

Carmichael, D. R. 1998. Software revenue recognition under SOP 97-2. *The CPA Journal* 68 (7):44.

Cassell, C. A., M. S. Drake, and S. J. Rasmussen. 2011. Short interest as a signal of audit risk. *Contemporary accounting research* 28 (4):1278-1297.

De Villiers, C., D. Hay, and Z. J. Zhang. 2014. Audit fee stickiness. *Managerial Auditing Journal*.

Dechow, P. M., A. P. Hutton, L. Meulbroek, and R. G. Sloan. 2001. Short-sellers, fundamental analysis, and stock returns. *Journal of financial economics* 61 (1):77-106.

Dechow, P. M., R. G. Sloan, and A. P. Sweeney. 1995. Detecting earnings management. *Accounting review*:193-225.

Desai, H., S. Krishnamurthy, and K. Venkataraman. 2006. Do short sellers target firms with poor earnings quality? Evidence from earnings restatements. *Review of accounting studies* 11 (1):71-90.

Desai, H., K. Ramesh, S. R. Thiagarajan, and B. V. Balachandran. 2002. An investigation of the informational role of short interest in the Nasdaq market. *The Journal of Finance* 57 (5):2263-2287.

Diamond, D. W., and R. E. Verrecchia. 1987. Constraints on short-selling and asset price adjustment to private information. *Journal of financial economics* 18 (2):277-311.

Dong, B., J. Nash, and L. Xu. 2022. Indirect effects of regulatory change: Evidence from the acceleration of the 10-K filing deadline. *Advances in accounting* 56:100582.

Drake, K. D., N. C. Goldman, S. J. Lusch, and J. J. Schmidt. 2021. Do companies manage earnings less after a critical audit matter disclosure? Evidence from tax accounts. *SSRN*.

Duggal, R., and J. A. Millar. 1999. Institutional ownership and firm performance: The case of bidder returns. *Journal of Corporate Finance* 5 (2):103-117.

Efendi, J., and E. P. Swanson. 2009. Short seller trading in companies with a severe accounting irregularity. *Available at SSRN 1465156*.
Fama, E. F., and K. R. French. 1997. Industry costs of equity. *Journal of financial economics* 43 (2):153-193.
Farrukh, K., S. Irshad, M. Shams Khakwani, S. Ishaque, and N. Y. Ansari. 2017. Impact of dividend policy on shareholders wealth and firm performance in Pakistan. *Cogent Business & Management* 4 (1):1408208.
Filip, A., T. Jeanjean, and L. Paugam. 2015. Using real activities to avoid goodwill impairment losses: Evidence and effect on future performance. *Journal of Business Finance & Accounting* 42 (3-4):515-554.
Gonzales, R. 2021. Critical Audit Matters and the New Revenue Standard, Accounting Department, University of Texas at Arlington.
Gutierrez, E., M. Minutti-Meza, K. W. Tatum, and M. Vulcheva. 2018. Consequences of adopting an expanded auditor's report in the United Kingdom. *Review of accounting studies* 23 (4):1543-1587.
Kot, H. W. 2007. What determines the level of short-selling activity? *Financial management*:123-141.
KPMG. 2021. *Critical Audit Matters - What you need to know about the new Auditor Reporting Model*. KPMG 2020 [cited March 19, 2021 2021]. Available from https://audit.kpmg.us/topics/critical-audit-matters.html.
Lev, B., and S. R. Thiagarajan. 1993. Fundamental Information Analysis. *Journal of accounting research* 31 (2):190-215.
Li, Y., B. Luo, Z. Singer, and J. Zhang. 2022. Is Critical Audit Matter an Indicator of Poor Accruals Quality? In *2022 AAA Annual Meeting* San Diego, California
Li, Z., P. K. Shroff, R. Venkataraman, and I. X. Zhang. 2011. Causes and consequences of goodwill impairment losses. *Review of accounting studies* 16 (4):745-778.
Louis, H., P. Truong, Z. Xu, and Y. Yang. 2022. Differences of Opinion and Corporate Investment Efficiency. Working Paper, Smeal College of Business Penn State, Unpublished.
Munsif, V., K. Raghunandan, D. V. Rama, and M. Singhvi. 2011. Audit fees after remediation of internal control weaknesses. *Accounting Horizons* 25 (1):87-105.
NASD. 1998. NASD Notice to Members 98-102, edited by F. I. R. Authority. finra.org: Financial Industry Regulatory Authority.
PCAOB. 2011. *ROUNDTABLE ON THE AUDITOR'S REPORTING MODEL*. September 15,2011.
PCAOB, P. C. A. O. B. 2021. *The Auditor's Report on an Audit of Financial Statements when the Auditor Expresses an Unqualified Opinion and Related Amendments to PCAOB Standards.* 2017 [cited March 19, 2021 2021]. Available from https://pcaobus.org/Rulemaking/Docket034/2017-001-auditorsreport-final-rule.pdf.
Reed, A. V. 2013. Short Selling. *Annual review of financial economics* 5 (1):245-258.
SEC. 2022. *Accelerated Filer and Large Accelerated Filer Definitions* 2020 [cited 6/29/2022 2022]. Available from https://www.sec.gov/corpfin/secg-accelerated-filer-and-large-accelerated-filer-definitions.
Simerly, R. L., and M. Li. 2000. Environmental dynamism, capital structure and performance: a theoretical integration and an empirical test. *Strategic management journal* 21 (1):31-49.
Zhang, J., and K. Pany. 2021. A Summary of Early Critical Audit Matter Reporting. *CPA Journal*.

APPENDICES

Appendix A – Variable Definitions

Variable	Definition
CAMs Subject Areas:	
CAM_Any	Existence of CAMs. Indicator variable that equals one if the auditor's report for the current year's 10-K filings includes a CAM; and zero otherwise.
Num_CAMS	The total number of CAMs received by a single company in the 2019 audit report.
CAM_Intangibles	The CAM mentions intangible assets. An indicator variable that equals one if the CAM mentions Audit Analytics Topic Key 26, 30, 27, or 14; and zero otherwise.
CAM_Revenue	The CAM mentions revenue-related topics. An indicator variable that equals one if the CAM mentions Audit Analytics Topic Key 61, 63, 54, or 78; and zero otherwise.
CAM_M&A	The CAM mentions mergers and acquisitions. An indicator variable that equals one if the CAM mentions Audit Analytics Topic Key 6, 76, or 9; and zero otherwise.
CAM_PPE	The CAM mentions long-term assets. An indicator variable that equals one if the CAM mentions Audit Analytics Topic Key 57, 79, 91, 88, or 16; and zero otherwise.
CAM_Taxes	The CAM mentions taxes. An indicator variable that equals one if the CAM mentions Audit Analytics Topic Key 35, 34, or 33; and zero otherwise.
CAM_Credit_losses	The CAM mentions credit losses. An indicator variable that equals one if the CAM mentions Audit Analytics Topic Key 71 or 2; and zero otherwise.
CAM_Contingencies	The CAM mentions contingent liabilities. An indicator variable that equals one if the CAM mentions Audit Analytics Topic Key 10 or 50; and zero otherwise.
Short interest:	
Short_Interest	Quarterly short interest. The total number of shares shorted at the end of the quarter divided by the total number of shares outstanding. Monthly short interest data is obtained from Compustat Short Interest File and total company shares from CRSP monthly.
Control variables:	
Institutional ownership	Institutional ownership. The number of shares held by institutional investors divided by the total number of shares outstanding. Institutional

	holdings are downloaded from FactSet Ownership dataset 13F. Total shares are downloaded from CRSP.
Market to Book	Market to book ratio. The market value of equity divided by the book value of equity, using Compustat fundamentals.
Returns on Assets	Return on assets. Net income divided by total assets, using Compustat fundamentals.
Cash to price	Cash to price ratio. Cash flows from operations divided by market value of equity, using Compustat fundamentals.
Log of market value	The natural log of the firm's market value of equity, using Compustat fundamentals.
Dividend yield	Annual dividends per share divided by stock price per share, using Compustat fundamentals.
Leverage	Total long-term debt divided by total assets, using Compustat fundamentals.
Log of assets	The natural logarithm of total assets
Receivable/inventory intensity	The sum of total receivables and total inventory divided by total assets, using Compustat fundamentals
Loss	A dichotomous variable equal to one if net income from Compustat is less than zero and coded zero otherwise.
Discretionary Accruals	A firm's discretionary accruals calculated using the modified Jones Model (Dechow et al. 1995).

Appendix B – Short Selling Institutional Details

When investors have expectations about a public company's future performance, they can either take long or short positions on the company's stock. There are three primary differences between long and short positions. First, in a long position, investors purchase shares of a corporation expecting to profit from price increases, whereas a short seller profits from price declines. Second, investors having long positions "own" the securities they purchase. In contrast, short sellers must borrow a stock to complete their transaction. Third, long buyers have unlimited upside potential but limited downside risk. If an investor purchases $100 of Amazon, she may benefit from a limitless increase in price but can only lose $100, assuming the price falls to zero. The opposite is true for short sellers, as will be illustrated below. A short seller's maximum gain in the previous example would be $100 if the price drops to zero, while the loss is theoretically unlimited, as any stock price above 100 would be a loss.

While a long position is established by buying the stock, a short position requires borrowing the stock for a pre-specified time and buying the stock at the end of the position to return it to the original owners. To illustrate, I provide a hypothetical example of a short sale. A short seller predicts that the price of Studio Inc will decline in the future. To *establish her position,* the short seller calls the brokerage house and informs the broker that she wants to short one share of Studio Inc. To execute her request, the broker will borrow one share of Studio Inc from one of its clients' portfolios or ask another brokerage house. Once the share is obtained, the broker will sell the borrowed stock on the market for $100 and deposit the proceeds in an escrow account as collateral. Suppose the price of the stock declines to $70. The short seller may contact the broker and *close her position* by using the funds ($100) from the initial sale to buy back the stock at $70. The difference between the initial sale ($100) and the repurchase price of the stock ($70) is profit

($30) to the short seller. In practice, borrowing and services fees must be paid to the brokerage house. Two important things to note in this example are as follows. First, the maximum profit, before fees, the short seller can make is $100, assuming the price drops to zero. Second, if the price of the stock increases before the position is closed, say to $500, then the short seller would lose $400 ($100-$500) plus any fees associated with the transaction. Thus, implying that the loss to the short seller is theoretically unlimited.

In addition to the unlimited downside potential, short selling has substantial transaction costs and added risks. The United States has adopted rules that make short selling costly, partly due to a belief that short selling can lead to a downward spiral in stock prices. Regulation T, Sections 220.12(a) and (c)(1) of the Federal Reserve requires that short sellers deposit 50% of the shorted shares' market value as additional collateral to cover their positions (NASD 1998). If a short seller shorts a $100 stock, total collateral of $150 is required. Short sellers also risk being "squeezed." This occurs when the owner of the share that was originally borrowed wants to sell that share. Short sellers unable to find another lender must purchase the share in the open market, usually at a loss to the short seller. Although short sellers can mitigate the risk by paying additional fees to borrow shares on a specified term basis, short sellers do not usually engage in this practice.[6]

The costs and risks associated with short selling allow only investors with superior knowledge and resources to self-select into these arrangements. Short sellers will only trade if the expected profit from a firm's price decline is sufficient to cover the costs and risks associated with holding their position (Diamond and Verrecchia 1987).

[6] For a more detailed review of short selling institutional details please see Dechow et al. (2001), Reed (2013), and Black et al. (2022).

Table 1 – Sample selection and distribution

Panel A: Sample selection process

	No. Firms	W/CAMs	W/No CAMs
2019 Large accelerated filers identified in Compustat	3,011	2,276	735
Observations missing institutional holdings data from FactSet	(966)	(546)	(420)
Observations missing Compustat data	(503)	(376)	(127)
Total sample	**1,542**	**1,354**	**188**

Panel B: Number of firms that issue CAMs and total CAMs issued by industry

Industry	No. firms with any CAM	No. of total CAMs issued
Business Services	190	313
Pharmaceutical Products	103	175
Trading	92	130
Utilities	71	128
Electronic Equipment	65	100
Insurance	55	84
Petroleum and Natural Gas	55	89
Transportation	52	77
Machinery	43	72
Other	41	67
Telecommunications	41	75
Chemicals	40	57
Medical Equipment	40	72
Wholesale	37	59
Measuring and Control Equipment	31	50
Construction Materials	29	35
Automobiles and Trucks	26	40
Computers	25	45
Healthcare	22	42
Restaurants Hotel Motel	21	41
Food Products	20	29
Banking	19	33
Consumer Goods	19	30
Entertainment	17	27
Precious Metals	17	29
Retail	17	24

Steel works	17	33
Electrical Equipment	15	23
Real Estate	14	20
Business Supplies	13	18
Aircrafts	12	23
Construction	12	19
Nonmetallic Mining	12	24
Apparel	10	22
Printing and Publishing	8	17
Shipping Containers	8	12
Rubber and Plastic Products	7	13
Candy and Soda	6	11
Miscellaneous	6	13
Recreational Products	6	9
Alcoholic Beverages	5	11
Personal Services	5	8
Shipbuilding, Railroad eq	4	6
Defense	3	6
Coal	2	3
Fabricated Products	1	1
Grand Total	**1,354**	**2,215**

Panel C: Number of firms in the 2019 final sample (1,354) with CAMs in each area[7]

Subject areas	**No. Firms**
CAM_Intangibles	411
CAM_Revenue	384
CAM_MnA	280
CAM_Taxes	258
CAM_PPE	163
CAM_Contingencies	151
CAM_Credit_losses	54

[7] Note that a single firm may receive more than one cam in each area.

Panel D: Retroactive assignment of CAMs from 2019 to previous quarters

Firm Quarter	No. Firms	W/CAMs	W/No CAMs
2017Q3	1,459	1,331	130
2017Q4	1,479	1,344	137
2018Q1	1,481	1,348	137
2018Q2	1,481	1,350	138
2018Q3	1,492	1,352	140
2018Q4	1,506	1,353	145
2019Q1	1,524	1,353	164
2019Q2	1,542	1,354	188
2019Q3	1,542	1,354	188
2019Q4	1,542	1,354	188
Grand Total	**15,048**	**13,493**	**1,555**

Table 2 – Descriptive statistics

Panel A reports the deceptive statistics, and Panel B reports the pairwise correlations with asterisks representing p-values as follows: *** *p<0.01*, ** *p<0.05*, * *p<0.1*. Variables are defined in Appendix A.

Panel A: Q3 2017 – Q4 2019

	N	mean	sd	p25	p50	p75
Short_Interest	15,048	0.043	0.065	0.014	0.026	0.052
CAM_Any	15,048	0.897	0.304	1	1	1
Num_CAMS	15,048	1.469	0.899	1	1	2
CAM_Intangibles	15,048	0.271	0.444	0	0	1
CAM_Revenue	15,048	0.254	0.435	0	0	1
CAM_MnA	15,048	0.186	0.389	0	0	0
CAM_PPE	15,048	0.111	0.314	0	0	0
CAM_Taxes	15,048	0.170	0.376	0	0	0
CAM_Credit_losses	15,048	0.036	0.185	0	0	0
CAM_Contingencies	15,048	0.100	0.300	0	0	0
Discretionary_accruals	15,048	0.064	0.088	0.015	0.035	0.075
Log_of_Assets	15,048	8.428	1.710	7.258	8.261	9.522
Receivable_Inventory_Intensity	15,048	0.189	0.164	0.065	0.150	0.264
Loss	15,048	0.206	0.405	0.000	0.000	0.000
Market_to_book	15,048	4.072	8.138	1.456	2.594	4.787
Cash_to_price	15,048	0.099	0.129	0.042	0.076	0.134
Dividend_yield	15,048	9.093	26.270	0.000	0.659	5.122
Leverage	15,048	0.270	0.203	0.111	0.257	0.383
Return_on_assets	15,048	0.027	0.117	0.008	0.039	0.078
Institutional_ownership	15,048	0.753	0.220	0.657	0.826	0.919

Panel B: Pairwise correlations

ID	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Short interest											
(2) Discretionary accruals	0.11*										
(3) Log of assets	-0.18*	-0.23*									
(4) Receivable inventory intensity	0.04*	0.02*	-0.06*								
(5) Loss	0.21*	0.24*	-0.26*	-0.15*							
(6) Market to book	0.06*	0.07*	-0.12*	0.00	0.06*						
(7) Cash to price	-0.10*	-0.08*	0.32*	-0.03*	-0.13*	-0.16*					
(8) Dividend yield	-0.10*	-0.07*	0.50*	-0.09*	-0.08*	-0.04*	0.18*				
(9) Leverage	-0.01	0.00	0.13*	-0.13*	0.01*	-0.08*	0.13*	0.03*			
(10) Return on assets	-0.18*	-0.24*	0.22*	0.14*	-0.66*	0.00	0.19*	0.05*	-0.01*		
(11) Institutional ownership	0.10*	-0.05*	-0.02*	0.10*	-0.03*	0.04*	-0.04*	-0.15*	0.01*	0.06*	
(12) Number of CAMs	0.00	-0.06*	0.25*	0.00	-0.01	0.01	0.02*	0.15*	0.03*	0.03*	0.13*

Table 3- Short Interest and Firms that will eventually report a CAM (H1)

This table reports the results of hypothesis 1 using the following OLS regression: $Q\_SI_{it} = \alpha + \beta_x CAMs\_Any_{it} + \sum_k \beta_k Controls_{it} + \varepsilon_{it}$. *Q_SI* is the short interest for firm *i* in quarter *t* taken at the end of each quarter. The variable is computed by dividing the number of shorted shares by the total shares outstanding at the end of the quarter. Column (1) reports the results using only the control variables. In column (2), the variable of interest is *CAM_any*, defined as an indicator variable equal to one if the firm receives a CAM in any subject area and zero otherwise. In column (3), *Num_CAMs* is the variable of interest, defined as the total number of CAMs the firm received in its 2019 audit opinion. Asterisks denote the p-values as follows: *** p<0.01, ** p<0.05, * p<0.1; t-statistics are in parentheses. Control variable definitions are in Appendix A.

	(1)	(2)	(3)
CAM_Any		0.009***	
		(4.903)	
Num_CAMS			0.002***
			(2.955)
Discretionary_accruals	0.028***	0.029***	0.028***
	(4.447)	(4.653)	(4.526)
Log_of_Assets	-0.004***	-0.004***	-0.004***
	(-9.195)	(-9.741)	(-9.593)
Receivable_Inventory_Intensity	0.026***	0.026***	0.026***
	(6.458)	(6.500)	(6.393)
Loss	0.019***	0.019***	0.018***
	(10.775)	(10.838)	(10.583)
Market_to_book	0.000**	0.000**	0.000**
	(2.256)	(2.034)	(2.224)
Cash_to_price	-0.012***	-0.010**	-0.012***
	(-2.696)	(-2.277)	(-2.601)
Dividend_yield	-0.000**	-0.000*	-0.000**
	(-2.125)	(-1.795)	(-2.289)
Leverage	0.005*	0.005*	0.005*
	(1.886)	(1.717)	(1.806)
Return_on_assets	-0.043***	-0.043***	-0.043***
	(-6.989)	(-7.109)	(-7.129)
Institutional_ownership	0.031***	0.028***	0.030***
	(12.657)	(11.223)	(12.223)
Constant	0.030***	0.026***	0.029***
	(5.868)	(4.958)	(5.359)
Observations	15,048	15,048	15,048
Adjusted R-squared	0.103	0.104	0.103
Year F.E.	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes

Table 4- CAMs in Different Subject Areas (H2a and 2b)

This table reports the results of testing the second hypothesis using the following OLS regression: $Q\_SI_{it} = \alpha + \beta_x CAMs\_SA_{it} + \sum_k \beta_k Controls_{it} + \varepsilon_{it}$. *Q_SI* is the short interest for firm *i* in quarter *t* taken at the end of each quarter. The variable is computed by dividing the number of shorted shares by the total shares outstanding at the end of the quarter. *CAM_SA* is an indicator variable equal to one if the firm receives a CAM in each of the seven subject areas, as defined in Burke et al. (2022). For readability, only those subject areas that are statistically significant are tabulated below. Column (1) reports the results for firms with Revenue CAMs; column (2) reports results for firms with Tax-related CAMs; column (3) reports the results of firms with Contingencies CAMs. Column (4) reports the results when including all seven subject areas into a single regression. Asterisks denote the p-values as follows:*** p<0.01, ** p<0.05, * p<0.1; t-statistics are in parentheses. See Appendix A for details on the construction of subject area categories and definitions of control variables.

	(1)	(2)	(3)	(4)
CAM_Intangibles				0.001
				(0.789)
CAM_Revenue	0.008***			0.008***
	(6.100)			(6.364)
CAM_MnA				0.000
				(0.302)
CAM_PPE				0.000
				(0.051)
CAM_Taxes		-0.004***		-0.004**
		(-3.091)		(-2.468)
CAM_Credit_losses				0.006*
				(1.876)
CAM_Contingencies			0.005***	0.006***
			(3.074)	(3.466)
Discretionary_accruals	0.027***	0.028***	0.028***	0.028***
	(4.365)	(4.543)	(4.430)	(4.503)
Log_of_Assets	-0.004***	-0.003***	-0.004***	-0.004***
	(-9.221)	(-8.562)	(-9.313)	(-8.887)
Receivable_Inventory_Intensity	0.026***	0.026***	0.025***	0.023***
	(6.465)	(6.437)	(6.225)	(5.478)
Loss	0.018***	0.019***	0.019***	0.018***
	(10.415)	(10.814)	(10.787)	(10.502)
Market_to_book	0.000**	0.000**	0.000**	0.000**
	(2.046)	(2.334)	(2.232)	(2.139)
Cash_to_price	-0.011**	-0.012***	-0.012***	-0.011**
	(-2.425)	(-2.704)	(-2.627)	(-2.416)
Dividend_yield	-0.000**	-0.000**	-0.000**	-0.000**
	(-2.365)	(-2.013)	(-2.276)	(-2.483)
Leverage	0.006**	0.006**	0.005*	0.006**
	(2.249)	(2.013)	(1.862)	(2.221)
Return_on_assets	-0.043***	-0.041***	-0.043***	-0.042***
	(-7.077)	(-6.794)	(-7.130)	(-6.902)
Institutional_ownership	0.030***	0.031***	0.031***	0.030***
	(12.374)	(12.705)	(12.615)	(12.131)

	(1)	(2)	(3)	(4)
Constant	0.030***	0.029***	0.031***	0.030***
	(5.742)	(5.559)	(5.956)	(5.683)
Observations	15,048	15,048	15,048	15,048
Adjusted R-squared	0.105	0.103	0.103	0.106
Year F.E.	Yes	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes	Yes

Table 5 – Short Interest Analysis (See figure 1)

Panel A: Average change in short interest starting one month before the CAM release date

The table below represents the change in short interest starting the month before the CAM issue date, as shown in figure 1. The change is computed as: $SI_{m+x} - SI_{m-1}$, where *S.I.* represents the monthly short interest, *m* indicates the month, *x* represents the number of months immediately following the CAM announcement month, zero. See Figure 1 for an illustration. Rank indicates the order from the largest to the smallest absolute change in short interest for that window. For example, between months -1 to +1, contingencies experienced the largest absolute change in short interest.

Change in S.I.	**Intangibles**	**Revenue**	**M&A**	**PPE**	**Taxes**	**Contingencies**	**Credit Losses**
Month -1 to +1	0.00020	-0.00167	-0.00212	0.00298	0.00057	-0.00343	-0.00037
Rank	7	4	3	2	5	1	6
Month -1 to +2	0.00190	-0.00083	-0.00272	0.00759	0.00187	-0.00324	0.00888
Rank	5	7	4	2	6	3	1
Month -1 to +3	0.00343	0.00144	-0.00205	0.00732	0.00234	-0.00326	0.00964
Rank	3	7	6	2	5	4	1
Month -1 to +4	0.00325	0.00205	-0.00188	0.00608	0.00258	-0.00300	0.01089
Rank	3	6	7	2	5	4	1

Panel B: Credit Losses CAM distribution

Industry	Firms with at least one CL CAM	Total number of CAMs issued to firms with CL CAMs	Average number of CAMs per firm
Banking	12	21	1.8
Trading	10	19	1.9
Healthcare	8	16	2.0
Business Services	7	11	1.6
Entertainment	2	2	1.0
Real Estate	2	3	1.5
Automobiles and Trucks	1	3	3.0
Chemicals	1	2	2.0
Construction Materials	1	1	1.0
Consumer Goods	1	2	2.0
Electronic Equipment	1	2	2.0
Insurance	1	3	3.0
Machinery	1	2	2.0
Personal Services	1	3	3.0
Restaurants Hotel Motel	1	3	3.0
Telecommunications	1	2	2.0
Transportation	1	3	3.0
Utilities	1	3	3.0
Wholesale	1	2	2.0
Grand Total	**54**	**103**	

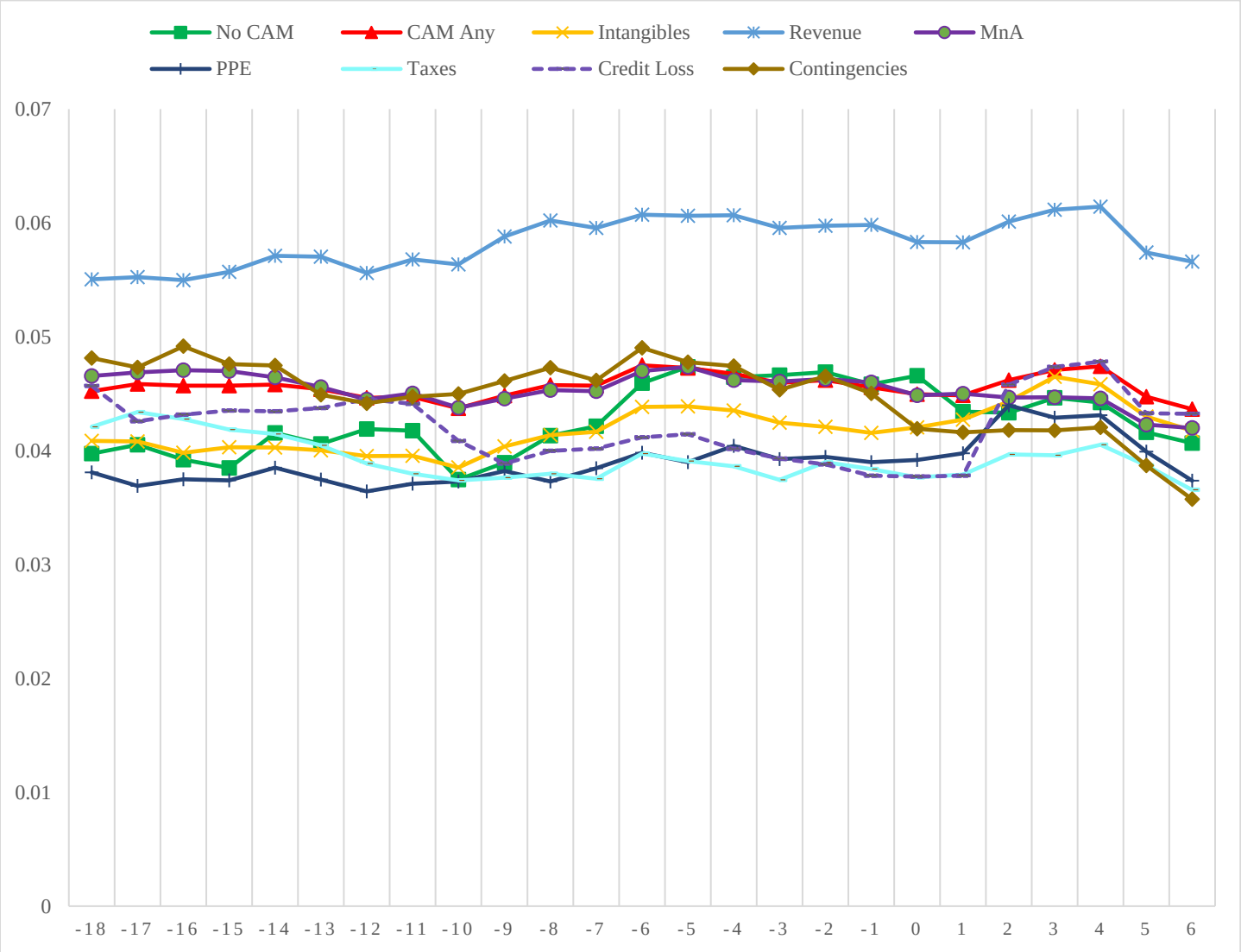
Panel C: PPE CAM distribution

Industry	Firms with at least one PPE CAM	Total number of CAMs issued to firms with PPE CAMs	Average number of CAMs per firm
Petroleum and Natural Gas	36	64	1.8
Transportation	18	31	1.7
Other	14	24	1.7
Precious Metals	12	21	1.8
Utilities	12	28	2.3
Trading	8	13	1.6
Business Services	7	12	1.7
Restaurants Hotel Motel	7	17	2.4
Nonmetallic Mining	6	15	2.5
Steel works	5	11	2.2
Telecommunications	5	9	1.8
Wholesale	4	8	2.0
Machinery	3	9	3.0
Retail	3	5	1.7
Aircrafts	2	5	2.5
Apparel	2	6	3.0
Construction	2	4	2.0
Construction Materials	2	2	1.0
Entertainment	2	3	1.5
Measuring and Control Equipment	2	4	2.0
Medical Equipment	2	3	1.5
Automobiles and Trucks	1	3	3.0
Business Supplies	1	1	1.0
Chemicals	1	2	2.0
Electronic Equipment	1	3	3.0
Food Products	1	2	2.0
Healthcare	1	2	2.0
Insurance	1	3	3.0
Pharmaceutical Products	1	1	1.0
Real Estate	1	1	1.0
Grand Total	**163**	**312**	

FIGURES

Figure 1- Short interest 18 months before and 6 months following the CAM issue date.

The figure below illustrates the monthly short interest of firms that received a CAM in subject areas outlined in Appendix A. Subject areas are derived from Audit Analytics granular Topics, as defined in Burke et al. (2022). The x-axis represents the month before and after the CAM issue date. Month zero is the month that the CAM is disclosed. The y-axis represents the average monthly short interest. Short interest is calculated by dividing the number of shorted shares by the total shares outstanding of firm *i* in month *t*.



Tabulated data

Time	NO CAM	CAM Any	Revenue	Contingencies	Credit losses	Tax	Intangibles	PPE	MnA
-18	0.045	0.054	0.064	0.055	0.042	0.054	0.046	0.046	0.054
-17	0.045	0.054	0.063	0.056	0.046	0.054	0.046	0.043	0.055
-16	0.048	0.057	0.065	0.059	0.048	0.057	0.050	0.048	0.058
-15	0.047	0.056	0.064	0.059	0.048	0.055	0.049	0.046	0.057
-14	0.048	0.059	0.067	0.063	0.051	0.055	0.052	0.044	0.058
-13	0.048	0.059	0.068	0.062	0.047	0.054	0.053	0.046	0.056
-12	0.046	0.055	0.065	0.055	0.046	0.048	0.050	0.045	0.053
-11	0.045	0.056	0.066	0.056	0.046	0.048	0.051	0.045	0.054
-10	0.047	0.057	0.067	0.060	0.045	0.049	0.051	0.047	0.056
-9	0.045	0.055	0.064	0.056	0.044	0.047	0.050	0.044	0.054
-8	0.045	0.054	0.063	0.055	0.046	0.046	0.050	0.043	0.054
-7	0.045	0.053	0.059	0.054	0.045	0.047	0.046	0.045	0.054
-6	0.049	0.053	0.060	0.054	0.048	0.047	0.045	0.047	0.055
-5	0.047	0.054	0.060	0.057	0.047	0.049	0.046	0.046	0.056
-4	0.050	0.057	0.062	0.063	0.053	0.052	0.049	0.051	0.061
-3	0.049	0.057	0.061	0.062	0.051	0.053	0.048	0.049	0.062
-2	0.051	0.060	0.063	0.064	0.056	0.056	0.049	0.051	0.064
-1	0.051	0.060	0.066	0.063	0.055	0.056	0.049	0.048	0.066
0	0.052	0.059	0.067	0.065	0.059	0.054	0.049	0.043	0.070
1	0.052	0.061	0.076	0.064	0.060	0.052	0.051	0.041	0.076
2	0.048	0.058	0.073	0.061	0.056	0.052	0.048	0.040	0.073
3	0.046	0.058	0.068	0.062	0.054	0.051	0.049	0.042	0.070
4	0.043	0.056	0.063	0.060	0.053	0.050	0.049	0.041	0.069
5	0.039	0.055	0.059	0.061	0.052	0.050	0.050	0.039	0.067
6	0.033	0.049	0.048	0.055	0.050	0.045	0.045	0.037	0.059