

Hoarding Non-Proprietary Bad News through Confidential Treatments?

An Analysis of Market Reactions to Redaction Amendments

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August 2019

Abstract: The SEC frequently requires firms to submit amended filings to release the information that was initially redacted by the firms on the ground of protecting against competitive harm. We examine the firm's and its rivals' market reactions surrounding the amendment filing day. We find that, contrary to causing competitive harm, the firm's negative stock price reactions around the amendment filing days are explained by the revelation of previously redacted non-proprietary bad news. The revelation does benefit a subset of rival firms with high product similarity and in the high R&D intensity industry, which however does not result in competitive harm to the firm. We also find that the market reactions to redaction amendments are associated with SEC review staff's experience and corporate affiliations.

Keywords: Confidential Treatment; Information Redaction; Bad News; Agency Problem; Proprietary Cost; Investor Protection; SEC Reviewer staff

JEL Classification: M41, M48, H83

* Corresponding author. We appreciate and acknowledge helpful comments on the versions of this paper from Xia Cheng, Haifeng You, Mark DeFond, Katie S. Moon, Jim Naughton (Hawaii Accounting Research Conference discussant), Rachel Geoffroy (FARS discussant), Hoyoun Kyung (AAA discussant), workshop participants at City University of Hong Kong, the University of Hong Kong, Singapore Management University and conference participants at 2019 Hawaii Accounting Research Conference, 2019 FARS Midyear Meeting, 2019 AAA Annual Meeting. We also appreciate the financial support from ECS grant of Hong Kong SAR Government (Project No: 27502718). All errors are our own.

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1. Introduction

Disclosure theory suggests that protecting proprietary information is an important reason why firms choose not to disclose fully (Verrecchia 1983). Without such motive, managers may choose to disclose fully because traders would otherwise rationally “assume the worst” and discount the firm’s share price to a great extent (i.e., “complete unravelling” suggested by Milgrom 1981; Milgrom and Roberts 1986).¹ Prior studies provide evidence of firms’ information redaction from their public filings and support firms’ motive to protect proprietary information (Verrecchia and Weber 2006; Boone, Floros, and Johnson 2016; Glaeser 2018; Heinle, Samuels, and Taylor 2018).

Our main contribution is to identify management’s incentive to opportunistically use protecting proprietary information as an excuse for hiding non-proprietary bad news from capital market investors. Following the literature, “proprietary information” refers to information that may cause competitive harm in the product market space once publicly released (i.e., rivals do not know such information beforehand). “Bad news” refers to information that would cause negative stock market reaction once it is publicly released to capital market investors, which can be non-proprietary (i.e., rivals already know such information).

Consider the case that two firms A and B compete for a sales contract of \$1 million and that firm A wins it. Both firms already know the outcome, so this information is non-proprietary. However, the stock market investors are unaware of it. If the contract amount is lower than the market has expected, firm A may not wish to disclose this information publicly. Thus, the management may use protecting proprietary information as an excuse for redacting such (non-proprietary) bad news (i.e., agency problem).² In general,

¹ Dye (1985) and Jung and Kwon (1988) argue that the uncertainty about whether the managers possess any new information can be another reason that prevents complete unravelling.

² From the theoretical standpoint, we identify the possibility that protecting proprietary information creates the noise that prevents the market from discounting the stock prices.

because rivals compete directly with the firm in the product market space, they enjoy a richer information set about the firm than capital market investors do, who typically hold more diversified investment portfolios and have limited resources to acquire rich information about a specific firm.

Our empirical work focuses on firms' confidential treatment requests (CTRs). A CTR is a firm's request for redacting information from its public filings (for a certain period of time) on the ground of its proprietary nature and immateriality to capital market investors' decision making. When a firm does not wish to disclose such information publicly, it redacts such information from the filing while simultaneously submitting a CTR. If the Security Exchange Commission (SEC) rejects such request, it typically gives the firm the chance to file amendments that contain the previously redacted information.³ Thus, the SEC CTR review balances the tradeoff between investors' access to material information and the firm's desire to protect against potential harm from the product market. On the other hand, the managers may behave opportunistically when applying for redaction to hide bad news. Thus, we study the firm's real motive behind redaction requests, as well as the potential role of SEC review staff in this process to guard against such behaviors.⁴

Our study has important policy implications as the SEC has recently made changes to its rules designed to simplify disclosure requirements, known as FAST Act Modernization and Simplification of Regulation S-K. One of the most important changes is the SEC's new approach to confidential treatment, which allows firms to redact confidential information from filings without the need to submit formal CTRs (became effective on April 2, 2019) if they believe the information redacted is not material and would likely cause competitive harm to the firm if publicly disclosed. If firms tend to use the confidential treatment system opportunistically, this tendency may be greater after the new rule, because it becomes much easier to redact information without providing detailed support in advance.

³ The review procedures are set out in Rule 406 under the Securities Act of 1933 and Rule 24b-2 of the Securities Exchange Act of 1934.

⁴ The SEC protect the investors by ensuring two means: 1) the redaction is immaterial, so that the withholding won't hurt investors; 2) the redaction is limited to the proprietary information (under the product market scope), so that the firms will not abuse it.

Empirically, we examine stock market reactions to firms' amended filings that releases the information that was previously redacted. We construct a sample of 4,036 CTRs from 2008 to 2015 from the SEC's Electronic Data Gathering, Analysis, and Retrieval (EDGAR) database. For each CTR, we hand-collect the following information: firm name; the application information (e.g., filing forms); the type of redacted information from exhibits; the name of the SEC reviewer; the SEC's decision; and amendment filing date (*if any*). To explore the role of SEC review staff, we also hand-collect their demographic information, education background, and work experience from various sources, including new employment and departure announcements from the SEC website, LinkedIn, Martindale, and Google Search.

Evidence suggests that almost all of the CTRs concern the information in 10-K, 10-Q, or 8-K filings. Each CTR typically contains redactions from multiple exhibits. The most frequently redacted exhibits are related to sales or purchase (60% of the CTRs) and license fees or royalty income (37%), consistent with managers' incentives to redact such information either because it is proprietary, or for fear of poor operating data causing disappointments in the capital market. In contrast, only about 8% are related to research and development (R&D). On average, around 13% of the CTRs in our sample require amendment to varying extent.

Our empirical analyses focus on stock price reactions of the firm and its rivals around the amendment filing day. We find that, on average, the firm's stock prices react negatively around the amendment filing day. On the other hand, rivals' stock prices on average do not react significantly around amendment filing. These two pieces of evidence are more consistent with the agency problem explanation as the amendments, on average, reveal non-proprietary bad news. If the motive of CTR is to protect proprietary information, which, by definition, harms the firm's competitive position and benefits its rivals, we should have observed that rivals' stock prices react positively to amendments.⁵

Results from cross-sectional analyses also support the agency problem explanation. We document that the firm's negative stock price reactions are more pronounced when the firm's information environment is

⁵ In contrast, we find insignificant price reaction to the events of CTR approvals, suggesting that the market expects a typical CTR to be approved by the SEC.

more opaque. This evidence is consistent with the agency problem explanation as the opaque information environment reflects the managers' desire and capability to hide bad news.

Also consistent with the agency problem explanation, we find that the negative stock price reactions to amendment filing are more pronounced when (long-term) institutional ownership is low. Investor monitoring plays an important role in determining the degree to which managers hoard bad news. For instance, prior work suggests that institutional investors tend to discourage the particular agency problem of withholding bad news (Ali, Li and Zhang 2018; An and Zhang 2013; and Callen and Fang 2013).

In contrast, we find that rivals' stock price reactions do not vary with the proxies for the firm's information environment nor the level of firm's (long-term) institutional ownership. These results are consistent with the notion that rivals in general know more about the news embedded in the redaction compared with capital market investors. It is therefore not surprising that common proxies for capital market information symmetry do not capture cross-sectional variation in the proprietary information in the product market space.

While we document the agency problem explanation as the first-order effect, it is unlikely that information redaction is motivated entirely by hiding non-proprietary bad news. Empirically, we are able to detect significant cross-sectional variations in the rivals' market reactions using product market competition-related proxies (even though the rivals' stock price reactions are insignificant on average). Specifically, the rivals' market reactions to CTR amendment are relatively more positive when the industry tends to be R&D intensive and when the rivals have high product similarity with the firm. These results are consistent with the prediction that rivals benefit more when there is a greater potential of leaking proprietary information (e.g., higher industry R&D intensity) or the rivals have similar products with the firm (i.e., higher product similarity). In other words, our results indicate that redacted information benefits only a particular subset of rivals that compete/coordinate more closely with the firm.⁶

⁶ We expect this to be the case because rivals should always better off by knowing more.

Interestingly, we do not find the firm's negative market reactions to vary with industry R&D intensity nor product similarity. Thus, the disclosed information does not necessarily cause more harm when rivals are more likely to benefit from it. This evidence further questions the assertion that redaction is to protect firm against "competitive harm". In addition, given the joint results that rivals' market reactions vary with industry R&D intensity and product similarity but the firm's market reactions do not, we can infer that rivals' benefits do not necessarily come at the expense of the firm. For instance, knowing the new information through public disclosures, rivals might benefit from coordinating with the firm in the product market as opposing to competing against it.

Next, we examine the monitoring role of SEC review staff to guard against firms' opportunistic behaviors. Specifically, we empirically test whether market reactions vary with SEC reviewers' experience to gain further insights on the CTR process and managers' incentive. We focus on two elements of reviewers' experience, namely, experience with reviewing CTRs (i.e., CTR review experience) and prior work experience in the corporate world (i.e., corporate affiliations).

Greater CTR review experience likely leads reviewers to develop greater expertise in their understanding of the nature of redacted information in relation with capital market investors. This expertise is more important when there is greater potential for the firm to hide bad news (i.e., information is more opaque and investors are more short-term focused). Consistent with the agency problem explanation, we find that the firm's negative market reactions associated with poor information and low institutional investor ownership are more pronounced when the reviewer has more prior CTR review experience.

Corporate affiliated reviewers, on the other hand, may be more sympathetic towards the firm's claim to protect against competitive harm because they have worked in the corporate world and thus may be more sensitive to the potential informational harm in the product market (Gormley 1979). If corporate affiliated reviewers are more lenient in CTR amendment decisions, the information released through amendment should on average contain *less* amount of proprietary information. Consistent with this tendency, we find that the rivals' positive market reactions associated with high industry R&D intensity and high product similarity are less pronounced when the reviewer is corporate affiliated.

Our primary contribution is providing empirical evidence of firms' intention to hide bad news through CTR redaction from their SEC filings. The concurrent work by Thompson, Urcan, and Yoon (2018) examines whether the redacted information in CTRs conveys good news or bad news in a small sample of 149 *approved* CTRs from 28 firms. They conclude that on average there is no news in redacted information. Our study, on the other hand, focuses on the CTR amendments using a much larger sample and demonstrates that the originally redacted information that later receives amendment requests after the SEC review contains material non-proprietary bad news.

We also contribute to the literature by expanding our understanding of how the SEC reviewer characteristics affect corporate disclosures (deHaan, Kedia, Koh, and Rajgopal 2015; Hayes 2015). Our paper identifies staff prior work experiences as an important factor in regulating accounting disclosures and documents that these experiences affect the SEC's competing objectives of ensuring investors' access to material information while protecting firms from competitive harm.

Lastly, our study has policy implications. Our evidence suggests that SEC monitoring is an important mechanism that guards against managers' incentive to play the disclosure game and hide non-proprietary bad news from capital market investors. While the SEC staff has stated that it intends to continue reviewing filings for compliance with the new rules (i.e., redactions should be limited to information that is not material and that would likely cause competitive harm if publicly disclosed), it remains to be seen how much scrutiny the staff will apply in practice. Results in our paper provides support for the potential benefits of such scrutiny.

The remainder of this paper is organized as follows. Section 2 discusses the background of CTR review process. Section 3 develops our hypotheses. Section 4 reviews our sample and provides summary statistics. Section 5 provides empirical findings. Section 6 concludes the paper.

2. Background Information

Firms wishing not to disclose mandated information that would likely cause competitive harm to the firm if publicly disclosed may choose to submit a Confidential Treatment Request (CTR) to the SEC. Panel A of Figure 1 illustrates the timeline of this process. When a firm files a CTR, which includes explanation and supporting legal or factual information for the redaction, the request is sent to the SEC, which either approves it (by publicly issuing a Confidential Treatment Order) or rejects it but demands amendments (by sending a private comment letter to the firm) within 28 days upon receiving the request. If a comment letter is issued, the firm has 21 days to respond to the letter either by amending its initial CTR (i.e., submit an amendment) or providing additional supporting information to defend its initial request (which may go through several rounds). Upon finding such amendment satisfactory, the SEC approves the amended filing by publicly issuing a Confidential Treatment Order (CTO). Outright disapproval (without the chance to amend) or disapproval of amended filings are extremely rare.⁷

As depicted in Panel B of Figure 1, the SEC evaluates CTRs on the basis of whether the redacted information is material (“materiality”) and whether the disclosure would cause competitive harm. Materiality represents the primary objective of security regulations to protect investor’s access to firm information. As the first step of the review decision, if the redacted information is deemed to be material to investors, the CTR will be rejected. Given that the information has been deemed immaterial, the SEC reviewer next decides if the disclosure of a firm’s proprietary information can be detrimental to the interests of current shareholders. If the reviewer does not believe revealing such information causes competitive harm, the CTR will also be rejected.⁸

⁷ There are only nine (one) such cases in our initial (final) sample of 11,057 (4,036) observations.

⁸ The Freedom of Information Act (FOIA) allows regulators to grant confidential treatment of information contained in filings required under the Securities Act and the Exchange Act if the information belongs to one of the exemptions granted under FOIA. There are a number of requirements that must be met for a firm to granted confidential treatment. Information redacted should not be publicly available elsewhere, such as in press releases, news articles, or disclosures (or intention to disclose) from another party to the agreement. Information required and/or material cannot be granted even if it is confidential. This includes the identity of a 10% customer, the dollar amount of firm backlog orders, interest expenses and other similar items in a material credit agreement, the duration and effect of all patents, trademarks, licenses, franchises and concessions held, all disclosures required in the Management’s Discussion and Analysis of Financial Condition and Results of Operations section, which relates, for instance, to loan arrangements and installment payment obligations on debt, and any disclosures about related party transactions (SEC [2001]).

The government agency responsible for reviewing CTRs is the Division of Corporation Finance (DCF) of the SEC. Within this division, the Disclosure Operations Office consists of 11 Assistant Director (AD) offices, each of which specializes in certain industries (detailed in Panel D of Table 2).

The regulation of CTR review is somewhat ambiguous as the regulator cannot specify all possible scenarios, which leaves room for managerial opportunism. As revealed in the audit report of the Office of Inspector General (SEC Report No. 479 [2010]), the assessment of a firm's argument is subjective, including whether the information 1) is material to investors and 2) causes competitive harm. While the assessment should be based on both qualitative and quantitative factors, one area that is open to interpretation is how the DCF perceives materiality, which depends on how the DCF interprets the term "investors" as different investors often have different objectives. Determining a cut-off point for whether a piece of information is material or not is also ambiguous. Furthermore, while it is the firm's responsibility to demonstrate that the disclosed information would lead to competitive harm, either commercially or financially, many firms do so by only providing vague evidence. Thus, there is much room for interpretation and individual judgement that determines the CTR review outcome.

3. Hypothesis Development

3.1 Market Reaction to Amendments

We develop testable hypotheses based on the two potential motives behind redactions, the agency problem explanation and the proprietary information explanation. Note that 1) investors do not observe the private communications between the SEC and the firm prior to the amendment filing and 2) investors observe the firm files an amendment publicly that reveals the previously redacted information (as demanded by the SEC). Our tests thus focus on market reactions around the amendment filing day.

The first explanation is the agency problem. Prior studies argue that managers have incentives to hide bad news (e.g., due to career concerns, Kothari, Shu and Wysocki (2009); Ali, Li and Zhang (2018)). Thus, while the firm claims that it redacts information to avoid competitive harm, the real motivate may be hiding

non-proprietary bad news. Consider the example that a sales contract of \$1 million is redacted from a 10-Q filing. This information is non-proprietary because its rivals already know it (as they fail to win the contract), and thus public disclosure will not cause any competitive harm in the product market space. However, the managers may not wish to disclose the \$1 million contract price because the amount is below market expectation (i.e., hiding bad news under agency problem). In this case, when the firm files an amendment that releases such information, the firm's stock prices should react negatively. However, rivals' stock prices should not react to amendments, because the rivals' stock prices have already reflected the fact that they fail to win the contract.⁹

The second explanation is managers' concern for disclosing proprietary information, which could aid rivals and hurt the firm's competitiveness (Jovanovic, 1982; Verrecchia, 1983). This concern is consistent with maintained motivation for the firm to file a CTR. Following the above example, the rivals may not know such sales contract (i.e., it is indeed proprietary). As such, when the sales contract of \$1 million is disclosed, its rivals can take advantage of this information to price their own products. Under this explanation, we predict that rivals should benefit from the disclosed information (i.e., knowing this piece of new information is always better than not knowing) and that rivals' stock prices react positively to amendments.¹⁰

Note that although disclosing proprietary information provides the rivals the opportunity to benefit, such benefits do not necessarily come at the expense of the firm. For instance, upon observing the firm's \$1 million contract price, its rivals may choose to engage in price collusion by adjusting the prices of their own contracts upward to be consistent with the firm's price, as opposed to price the contract below \$1 million to compete. In this case, the benefits accrued to rivals come at the expense of consumers as opposed

⁹ The market knows this information because it observe the absence of publicly filing of winning such material contracts (e.g., 8-K filing).

¹⁰ Note that, under the proprietary information explanation, the redacted information on average should be news-neutral and cause no market reaction of the redacting firm (i.e., the redacted information, ex ante, could be either good news or bad news to capital market investors as investors might have expected \$1.1 million or \$0.9 million).

to the firm. Thus, even if the firm discloses proprietary information, such disclosures may not cause harm to the firm. As a result, it is not clear if the firm's stock prices will react negatively.

Overall, we make the following predictions under the agency problem explanation and the proprietary information explanation regarding the firm's and the rivals' stock price reactions to CTR amendments:

	<i>Agency Problem</i>	<i>Proprietary Information</i>
<i>Firm's Price Reaction</i>	- (H1a)	- / None (H1b)
<i>Rivals' Price Reaction</i>	<i>None</i>	+ (H1c)

3.2 Cross-Sectional Variation in Market Reactions

To further discriminate the agency problem and proprietary information explanations, we take closer examinations of the cross-sectional variation in the market reactions to CTR amendments. Under the agency problem explanation, the redaction reflects the managers' desire to hide non-proprietary bad news. Therefore, firms managed by such managers should tend to have more opaque information environment. Additionally, these managers' tendency to hide bad news should also manifest in other aspects of disclosures (e.g., voluntary earnings forecasts, see Beyer, Cohen, Lys and Walther (2010) for a comprehensive review of literature). As a result, the stock prices may tend to reflect the optimistically biased expectation provided by the managers. Thus, when the previously redacted information is released, the firm's negative stock price adjustments should be more pronounced:

H2a: The firm's negative market reaction to CTR amendment is more pronounced when the firm's information environment is more opaque.

Under the agency problem explanation, we also expect that investor monitoring plays an important role in determining the degree to which managers hoard bad news. In particular, hoarding bad news should be less successful when there are more institutional investors, who have longer investment horizon (i.e., "you can't lie forever"). For instance, Ali et al. (2018) show that managers withhold bad news because of career concern, but such behavior is attenuated by higher institutional ownership. An and Zhang (2013) and Callen and Fang (2013) show that higher (long-term) institutional ownership is associated with lower

future stock price crash risk, consistent with (long-term) institutional investors discouraging managers hoarding bad news (which causes higher crash risk). Earlier studies such as Ajinkya, Bhojraj, and Sengupta (2005) also provide evidence that higher institutional ownership is associated with more frequent, precise and less optimistically biased voluntary earnings forecasts. Thus, the agency problem explanation predicts that the redacted information is more likely to be bad news when the firm has low institutional ownership, causing larger negative market reactions:

H2b: The firm's negative market reaction to CTR amendment is more pronounced when the firm has low institutional ownership.

Next, we consider the predictable cross-sectional variation in the rivals' positive market reactions under the proprietary information explanation. The maintained assumption under this explanation is that managers act in the best interest of shareholders and hide proprietary information to avoid competitive harm. As discussed above, competitive harm is driven by 1) that rivals react to the disclosed information to their own benefits and 2) that rivals' benefits come at the expense of the firm. We expect the rivals to benefit more when there is a greater potential of leaking proprietary information (e.g., higher industry R&D intensity, Ellis, Fee and Thomas (2012); Boone, Floros and Johnson (2016)) or the rivals have similar products with the firm (i.e., higher product similarity, Raith (2003)):

H3a: The rivals' positive market reactions to CTR amendment are more pronounced when the industry tends to be R&D intensive.

H3b: The rivals' positive market reaction to CTR amendment are more pronounced when the rivals have high product similarity with the firm.

If rivals' benefits come at the expense of the firm (i.e., causing competitive "harm"), we expect the following:

H4a: The firm's negative market reaction to CTR amendment is more pronounced when the industry tends to be R&D intensive.

H4b: The firm's negative market reaction to CTR amendment is more pronounced when the rivals have high product similarity with the firm.

3.3 Additional Analysis: Effects of Reviewer Experience

We focus on two elements of reviewers' experience, namely, experience with reviewing CTRs (i.e., CTR review experience) and prior work experience in the corporate world (i.e., corporate affiliations). Greater CTR review experience likely leads reviewers to develop greater expertise in their ability to assess materiality to protect investors. This ability is more important when there is greater potential for the firm to hide bad news (i.e., information is more opaque and investors are more short-term focused). Under the idea of efficient internal resources allocation, it is also possible that more experienced reviewers are assigned by the SEC to handle those more difficult CTRs (e.g., those from firms with opaque information environment), which gives the same expectation. Thus, under the agency problem explanation, we expect that the firm's negative market reactions associated with both poor information environment and low institutional investor base are more pronounced when the reviewer is more experienced with reviewing CTRs:

H5a: The firm's negative market reactions associated with poor information and low institutional ownership are more pronounced when the reviewer has more CTR review experience.

Corporate affiliated reviewers, on the other hand, may be more sympathetic towards the firm's claim to protect against competitive harm because they have worked in the corporate world and thus may be more sensitive to the potential informational harm in the product market. For instance, Gormley (1979) shows that FCC commissioners' prior industry experience increases the likelihood that they will cast votes favorable to the regulated industry. If corporate affiliated reviewers have this tendency, they should be more lenient in CTR amendment decisions. In other words, the information released through amendment should on average contain smaller amount of proprietary information. We expect corporate affiliated reviewer's leniency to be more pronounced when the expected potential competitive harm is higher. Thus,

the rivals' positive market reactions associated with high industry R&D intensity and high product similarity should be less pronounced as the reviewer is corporate affiliated:¹¹

H5b: The rivals' positive market reactions associated with high industry R&D intensity and high product similarity are less pronounced when the reviewer is corporate-affiliated.

4. Sample

4.1 Sample Selection

To construct our sample of CTRs, we identify all CTOs released by the SEC from May 1, 2008 to December 31, 2015 from the SEC EDGAR database. Recall that a CTO informs the market that the SEC approves the firm's CTR or approves the amended filings (as demanded by the SEC).¹² In case of the SEC's approval of CTR, this approval becomes known to the market on the CTO issuance day. In case of the SEC's requested amendment, it becomes known to the market when the firm files the amendment that reveals (part of) the previously redacted information, which occurs before the CTO issuance day.

Our initial sample consists of 11,507 CTOs. From this sample, we use Regular Expression in PERL to extract the details from each decision, including firm identity, filing and grant dates, form type (e.g., 10-K, 10-Q, and 8-K), exhibit information, and the name of the SEC reviewer. We also manually collect the amendment filing dates for CTRs that are requested to amend by the SEC. We then remove 2,309 CTOs that are extensions of previous approved request.¹³ Because financial firms have different disclosure requirements, we also remove 693 CTOs related to financial firms.

¹¹ This prediction is also consistent with SEC's efficient internal resources allocation, which would suggest that the SEC assigns those CTRs with higher expected competitive harm to corporate affiliated reviewers to protect against proprietary information leaking.

¹² There is only one case in our final sample that the SEC disapproves the firm's CTR without giving the opportunity to amend.

¹³ Extensions concern information that was successfully redacted previously, which are likely to be associated with different market expectation in terms of the likelihood of CTR approval and less likely to be related to current managers' incentives regarding information disclosure.

For each CTO document, we obtain the firm's financial information from COMPUSTAT.¹⁴ To examine the effects of reviewers, we obtain their information from the following sources: 1) SEC announcements of new employees and departures; 2) LinkedIn; 3) Martindale; 4) Google Search; and 5) the U.S. Government Publishing Office. From these sources, we manually collect the gender, age, educational background, and work experience of each reviewer. To ensure data accuracy, we crosscheck the reviewer characteristics across the different sources. We then delete any observations for which any of the above reviewers' demographic information is missing. After requiring stock return data from CRSP, our final sample has 4,036 CTR observations from 1,288 unique firms.

Panel A of Table 1 presents our sample selection procedure and the distribution of CTRs across years. The number of CTRs is relatively stable, except 2008, the first year in our sample for which the CTOs only became available to the public beginning in May 2008. Panel B shows CTR frequency over time by review outcomes (i.e., Amend = 1 or 0).¹⁵ On average, 13.55% of the CTRs in our sample receive an amendment. The amendment rate ranges from 10 to 20%, with the exception of 2008 (4.58%), suggesting that a significant number of applications are amended.¹⁶ This range also indicates a large time-series variation in CTR amendment rates, likely due to variation in political conditions and SEC resources.

4.2 CTR Descriptive Statistics

In Table 2 Panel A, we provide a breakdown of the CTRs by SEC-mandated filing form type. Most CTRs (i.e., over 80%) concern annual and quarterly financial statements, with approximately 55% for 10-Qs and 27% for 10-Ks. Other types of filing forms are relatively infrequent. The distribution of the form types is quite stable over time.

¹⁴ We use the most recent fiscal year before the CTR filing date, requiring the end of the fiscal year to be no more than two years before the CTR filing date.

¹⁵ Amend = 0 includes those CTRs of which the SEC approves without demanding amendments. Amend = 1 comprises of those CTRs of which the SEC initially rejects but giving the opportunity to amend (and the one case that the SEC disapproves without giving the opportunity to amend).

¹⁶ Our main findings are robust if we remove the year 2008 from the sample.

In Table 2 Panel B, we provide statistics on CTR review length, number of exhibits involving redacted information per CTR, and the number of years the redacted information is requested to be concealed (i.e., redaction duration). The data indicates a significant decrease in review length over time, from 18 weeks in 2008 to only 9.5 weeks in 2015. The number of exhibits involving redacted information per CTR remains fairly stable over the years, averaging about 1.7 exhibits. The average requested redaction duration is also stable over the years, at about 5.5 years.

We also summarize the type of exhibits from which the information is redacted.¹⁷ Following Boone, Floros and Johnson (2016), we categorize exhibits into the following seven categories: agreements related to 1) selling to or purchasing from third parties (*Sale/Purchase*); license or royalty (*License/Royalty*); 2) research and development, patent, copyright, trademark, and consulting (*Research/Consulting*); 3) joint ventures, strategic alliances, collaborations, co-marketing, and advertising (*Collaboration*); 4) borrowing, lending, factoring, and leasing (*Credit/Lease*); 5) employees (*Employment*); 6) stockholders, such as changes in control rights and stock purchases (*Stockholder*); and 7) the settlement of lawsuits, arbitration, and termination of contracts (*Settlement*).¹⁸

Table 2 Panel C shows that the most frequent exhibits are related to *Purchase/Sale*. In particular, 58% of CTRs cover at least one *Purchase/Sale*-related redaction, while 37% cover at least one *License/Royalty*-related redaction. These statistics are consistent with managers' incentives to redact such information either because it is proprietary or for fear of poor operating data causing disappointments in the capital market. In contrast, only 8% cover at least one *Research/Consulting*-related redaction.

In Table 2 Panel D, we show the amendment rates and CTR review time across AD Offices, which correspond to broad industry sectors. We document significant variations in the number of CTRs, amendment rates, and review time across industry sectors. Healthcare and Insurance (AD Office 1) receives

¹⁷ To categorize the type of redacted information, we first merge exhibits in CTO with the firm observations obtained from the SEC EDGAR master file. We then download exhibits based on filing name, exhibit name, and filing date. Next, we apply a PERL algorithm to categorize each downloaded exhibit into different types of contracts based on title and content.

¹⁸ Note that a given exhibit can fall under more than one category.

the largest number of CTRs, and the other sectors are far behind it. Amendment rates vary across sectors, with Natural Resources (AD office 4) having the highest value, followed by Beverages, Apparel, and Mining (AD office 9) and Electronics and Machinery (AD Office 10). Review time also varies across sectors, from 8.75 weeks for Office 1 (Healthcare and Insurance) to 15.08 weeks for Office 3 (Information Technologies and Services).

In Table 2 Panel E, we present the summary statistics for reviewer characteristics across AD offices.¹⁹ Overall, there is a total of 33 reviewers with complete demographic information in our sample. Not surprisingly, AD Office 1 uses most of these reviewers (=29) due to the large volume of CTRs handled by this office. In contrast, AD Office 8 only uses five reviewers throughout our entire sample period. On average, female reviewers are close to 50%, and over 10% of the reviewers have an MBA degree. Average reviewer age is about 48. Reviewer gender, the possession of an MBA degree, and age are quite similar across industry sectors.

We designate CTR as being reviewed by an experienced reviewer (*Experience* =1) if the person meets both of the following: 1) the CTR comes from the AD Office for which she has reviewed the most since 2008 (the first year in our sample) and 2) the CTR comes from the two-digit SIC industry for which she has reviewed the most compared to other reviewers. Experienced reviewers may be more apt at assessing materiality, resulting in an inclination to protect investors. In our sample, about one-third of CTRs are reviewed by experienced reviewers. The CTRs processed by AD Office 5 (Transportation and Leisure) are most likely handled by experienced reviewers.

We also designate a reviewer as corporate-affiliated (*Corporate* = 1) if her work experience (number of years) with non-government sectors is in the top quartile of the sample distribution (i.e., more than 6 years). Due to their corporate experience, these corporate-affiliated reviewers may be more sympathetic to CTR applicants. In our sample, it appears that CTRs processed by AD Office 8 (Real Estate and Commodities) are most likely handled by corporate-affiliated reviewers.

¹⁹ Consistent with other summary statistics and regressions, the unit of observations in this panel is CTR.

4.3 Review Outcome Statistics

Table 3 provides the results of OLS regressions that associate the CTR outcome (i.e., $Amend = 1$ or 0) with observable characteristics. Note that $Amend = 1$ represents reviewers' rejection of CTR with the chance of amendments. We find that firms with large market capitalization (*Size*) are associated with lower amendment rates. Firms with positive change in ROA compared to prior year (*Ch_ROA*) and issuing significant debt or equity during the fiscal year prior to CTR (*Issuer*) are associated with higher amendment rates. While we predict market reactions to vary with firm's information environment (*Poor Information*), institutional ownership, and product similarity with rivals, and industry average R&D intensity, these variables are not directly associated with amendment rates.²⁰ We provide detailed variable definitions in Appendix A.

Consistent with the materiality consideration, CTRs that request more contracts to be redacted (*Num. Contracts*) or the redacted information is requested to be concealed for longer period of time (*Redact Duration*) are associated with higher amendment rates. Experienced reviewers (*Experience*) are associated with higher amendment rates, while corporate-affiliated reviewers (*Corporate*) are associated with lower amendment rates. These associations are consistent with the expectation that reviewers with more prior CTR review experience are more apt at identifying unwarranted requests, while reviewers with prior corporate affiliations are more lenient to firms on the ground of protecting proprietary information.²¹

5. Market Reaction Analyses

5.1 Univariate Evidence

²⁰ Specifically, we define *Poor Information* as the first principal component of the following four dimensions: 1) abnormal accruals, 2) using a Big-Four auditor, 3) occurrence of frauds in prior two years, and 4) high bid-ask spreads during the year. *Product Similarity* is defined as the text-based product similarity score (Hoberg and Phillips, 2016) in the year when the CTO is filed.

²¹ Note that these are descriptive evidence and cannot be interpreted as causal evidence as we do not observe the counterfactuals (i.e., what happens if the same CTR is reviewed by a different reviewer).

Figure 2 presents the firm's and rivals' cumulative abnormal stock returns (CAR) around the review outcome day for CTRs, including the amendment filing date for CTRs which are rejected by SEC for amendments and the CTO issuance day for approved CTRs. Abnormal returns are obtained from the market model, where the beta is estimated using the [-200, -60] estimation window prior to the event day (Chen, Harford and Li, 2007; Qiu and Wang, 2018).²² Because the majority of the CTRs are approved, it is not surprising that the market reactions to CTR approvals are muted. In contrast, for CTRs that require amendment, the market is surprised and the firm's stock prices react negatively on average. This evidence is consistent with the agency problem explanation or the proprietary information explanation (H1a and H1b).

On the other hand, Panel B shows little price reactions for the firm's rivals, which is inconsistent with the proprietary information explanation (H1c). Note that observing rivals' positive price reactions is a necessary condition for the validity of proprietary information explanation for the firm's negative price reaction. Thus, the negative price reaction for the firm observed in Panel A is more likely explained by the agency problem.

Panel A of Table 4 tabulates the firm's CARs around the CTR amendment day (i.e., day 0). For CTR amendments, the average five-day CAR prior to amendment day is almost zero ($t = 0.421$). The three-day CAR during the event window [0, +2] is -0.582% ($t = -1.852$). The market continues to adjust negatively during the five-day window [+3, +7] after the event window = -0.591% ($t = -1.951$). The CARs for approved CTRs are statistically insignificant.

Panel B shows, for the amendment events, the average three-day CARs during the event window [0, +2] for portfolios sorted by firm characteristics (i.e., H2a; H2b; H4a; H4b). We find significant differences in average CAR for High-Low portfolios sorted on *Poor Information* and *Institutional Ownership*. Consistent with H2a, firms with poorer information environment experience more negative CAR compared with firms with better information environment (difference = -1.519%, $t = -2.618$). Consistent with H2b,

²² We require a minimum of 60 days in the estimation window.

firms with lower institutional ownership experience more negative CAR compared with firms with higher institutional ownership (difference = -1.017%, $t = -2.440$). Inconsistent with the claim of competitive harm (H4a; H4b), we do not find significant negative differences between High-Low portfolios sorted on *Industry R&D* and *Product Similarity*.

Panel C of Table 4 tabulates the rivals' CAR around the CTR amendment day (i.e., day 0). We find insignificant CAR for the five-day window prior to amendment day, the three-day CAR during the event window [0, +2], and the five-day window [+3, +7] after the event window. Thus, on average, rivals do not appear to benefit from the information revelation through amendments.

Panel D shows rivals' average three-day CAR during the event window [0, +2] for portfolios sorted by firm characteristics (i.e., H3a; H3b). We find significant differences in average CAR for High-Low portfolios sorted on *Industry R&D* and *Product Similarity*. Consistent with H3a, rivals in higher R&D intensity industry experience more positive CAR compared with rivals in lower R&D intensity industry (difference = 0.528%, $t = 1.964$). Consistent with H3b, rivals with higher product similarity experience more positive CAR compared with rivals with lower product similarity (difference = 0.582%, $t = 2.441$). Consistent with the agency problem explanation, we do not find significant negative differences for the rivals' CAR between High-Low portfolios sorted on *Poor Information* and *Institutional Ownership*.

5.2 Effect of Information Environment and its Interaction with Reviewer Experience

We run regressions to further test the effects of information environment (H2a), as well as its interactions with reviewer experience (H5a). Specifically, we regress three-day market reactions (CAR [0, +2]) on observable firm characteristics that capture information environment (*Poor Information*). If firms attempt to hide bad news through CTRs due to agency problem (H2a), we expect that the firm's CAR to be negatively associated with *Poor Information*. Additionally, rivals' stock price reactions should not be associated with *Poor Information*.

Table 5 columns (1) and (2) present the regression results when we regress the firm's three-day CAR on variable *Poor Information* as well as control variables. In column (1), we control for year- and industry-

fixed effects. In column (2), we further control for firm characteristics (*Size*, *Issuer*, *Ch_ROA*), CTR characteristics ($\log(\text{Num. Contracts})$ and $\log(\text{Redaction Duration})$), contract types (*Sale/Purchase*, *License/Research/Collaboration*, *Credit/Lease*, *Settlement*), and form types (*10-K*, *10-Q*, etc.). We choose not to tabulate the estimated coefficients and p-values for these additional control variables because none of them are statistically significant (i.e., p-value > 0.10). Adding these additional control variables only slightly reduces the statistical significance of *Poor Information*.

Consistent with H2a, we find significant negative association between the three-day CAR and *Poor Information* in columns (1) and (2), indicating that negative market reactions are more pronounced when the firm's information environment is more opaque. Consistent with the firm's own agency problem (i.e., investors are surprised by the bad news), results in columns (7) and (8) show that rivals' average three-day CAR is insignificantly associated with *Poor Information*.

Regarding the effects of reviewer experience (H5a), columns (3) and (4) show significant coefficients for the interaction term *Poor Information* \times *Experience*. In other words, the negative market reactions associated with opaque information environment is more pronounced when the reviewer is more experienced. This result is consistent with the ideas that more experienced reviewer is better at detecting bad news in disguise and/or that the SEC assigns CTRs that involve more material information to more experienced reviewers.

Results in columns (9) and (10) show insignificant coefficients for *Poor Information* \times *Experience* in the rivals' stock price reactions, which are expected under the agency problem explanation because the reviewer's experience is more helpful in protecting investors and has less to do with protecting proprietary information. We also interact reviewers' corporate affiliations (*Corporate*) with *Poor Information*, and none of the coefficients are significant, which indicates reviewer's corporate affiliation has little impact on mitigating potential agency problem of hiding bad news.

In untabulated analyses, we find similar results when we re-define *Poor Information* to indicate firms with bad financial reporting quality, i.e., a binary indicator variable that equals one if the firm's abnormal

accruals are greater than the yearly median or if it uses non-Big-Four auditor. Moreover, results are robust to using the yearly bid-ask spread as alternative proxy for *Poor Information* (Leuz and Verrecchia, 2000).

5.3 Effect of Investor Monitoring and its Interaction with Reviewer Experience

We also regress the firm's three-day market reactions (CAR [0, +2]) on low level of institutional ownership (*Low Ownership*) that capture the lesser extent of investor monitoring. *Low Ownership* is a binary indicator variable that equals one if the institutional ownership is below the sample median and zero otherwise, and institutional ownership is the proportion of outstanding shares owned by institutional owners in the year when the firm submits the CTR. It is expected that firms with low institutional ownership have stronger incentives of and/or are more capable of hoarding bad news. Thus, under the agency problem explanation, the market should be more negatively surprised by the bad news revealed by CTR amendments when the firm has lower institutional ownership (H2b).

Table 6 columns (1) and (2) present the results when we regress the three-day CAR on variable *Low Ownership* as well as control variables. In column (1), we control for year- and industry-fixed effects. In column (2), we further include control variables at the firm-, CTR-, and contract-level. Again, we do not tabulate the estimated coefficients and p-values for them because none of them are statistically significant (i.e., p-value > 0.10). Adding these additional control variables somewhat reduces the statistical significance of *Low Ownership*.

Consistent with H2b, we find significant negative association between the three-day CAR and *Low Ownership* in columns (1) and (2), indicating that negative market reactions are more pronounced when the firm has lower institutional ownership, which supports the agency problem explanation. Results in columns (7) and (8) show that rivals' average three-day CAR is insignificantly associated with *Low Ownership*, indicating that the firm's negative market reactions reflect the firm's own agency problem.,

Regarding the effects of reviewer experience (H5a), columns (3) and (4) show significant coefficients for the interaction term *Low Ownership* \times *Experience*. In other words, the negative market reactions associated with low institutional ownership is more pronounced when the reviewer is more experienced.

This result is consistent with the ideas that more experienced reviewer is better at detecting bad news in disguise and that the SEC assigns CTRs that involve more material information to more experienced reviewers.

Results in columns (9) and (10) show insignificant coefficients for *Low Ownership* \times *Experience* in the rivals' stock price reactions, which are expected under the agency problem explanation because the reviewer's experience is more helpful in protecting investors and has less to do with protecting proprietary information.

In untabulated analyses, we find similar results when we use *Short Horizon* in lieu of *Low Ownership* to proxy for lower investor monitoring intensity, where *Short Horizon* is defined as a binary indicator variable which equals one if the proportion of shares owned by long-horizon investors (i.e., dedicated and quasi-index investors, Bushee 1998) is below the sample median. Our findings are also robust using a measure that considers both the ownership and board structure. Specifically, we use the first principal component of the following three governance related variables, *Short Horizon*; a binary variable indicating that the CEO is chairman, and the proportion of independent directors on board, as alternative proxy for investor monitoring intensity and find similar inferences.

5.4 Effect of Industry R&D Intensity and its Interaction with Reviewer's Corporate-Affiliation

Table 7 reports the regression results for testing hypotheses H3a, H4a, and H5b. Under the proprietary information explanation, we expect the rivals' CAR to be positively associated with industry R&D intensity (H3a). Additionally, the firm's stock price reactions should be negatively associated with industry R&D intensity (H4a).

Table 7 columns (1) to (6) present the regression results when we regress the firm's three-day CAR on variable *High R&D*, which is a binary indicator variable equal to one if *Industry R&D* is in the top quartile of the sample distribution and zero otherwise, as well as similar control variables at the firm-, CTR-, and

contract-level. Columns (7) to (12) present the regression results when the dependent variables are rivals' three-day CAR.

Consistent with H3a, we find significant positive association between rivals' three-day CAR and *High R&D* in columns (7) and (8), indicating that rivals' positive market reactions are more pronounced when the industry has more proprietary information. Inconsistent with H4a, results in columns (1) and (2) do not show significant negative coefficients for *High R&D* (i.e., competitive harm to the firm). Thus, the results indicate that only a subset of the rivals in the high R&D intensity industries tend to benefit when redacted information is released publicly. However, rivals' benefits do not seem to come at the expense of the firm.

Regarding the effects of corporate affiliated reviewer (H5b), columns (11) and (12) show significant negative coefficients for the interaction term *High R&D × Corporate*. In other words, the positive market reactions associated with industry R&D intensity are less pronounced when the reviewer is corporate affiliated. This result is consistent with the ideas that corporate-affiliated reviewer is more lenient towards the firm's claim to protect proprietary information (i.e., amendments contain less amount of proprietary information).

Results in columns (5) and (6) show insignificant coefficients for *High R&D × Corporate* in the firm's stock price reactions, which are expected to be positive under the claim of competitive harm because amendments contain less amount of proprietary information.

5.4 Effect of Product Similarity and its Interaction with Reviewer's Corporate-Affiliation

Similar to Table 7, Table 8 reports the regression results for testing hypotheses H3b, H4b, and H5b when we focus on *Product Similarity*. Under the proprietary information explanation, we expect the rivals' CAR to be positively associated with *Product Similarity* (H3b). Additionally, the firm's stock price reactions should be negatively associated with *Product Similarity* (H4b). Columns (1) to (6) of Table 8 present the regression of the firm's three-day CAR, while Columns (7) to (12) present the regression results when the dependent variables are rivals' three-day CAR.

Consistent with H3b, we find significant positive association between rivals' three-day CAR and *Product Similarity* in columns (7) and (8), indicating that rivals' positive market reactions are more pronounced when rivals have similar products with the firm. Inconsistent with H4b, results in columns (1) and (2) do not show significant negative association between *Product Similarity* and the firm's stock price reactions (i.e., competitive harm to the firm). Thus, we obtain the same inferences that a subset of the rivals benefit from the redacted information, which does not seem to come at the expense of the firm.

Regarding the effects of corporate affiliated reviewer (H5b), columns (11) and (12) show significant negative coefficients for the interaction term *Product Similarity* \times *Corporate*. In other words, the positive market reactions associated with product similarity are less pronounced when the reviewer is corporate affiliated. Again, this result is consistent with the idea that corporate-affiliated reviewer is more lenient towards the firm's claim to protect proprietary information, which leads to a smaller amount of proprietary information in amendments. On the other hand, results in columns (5) and (6) show insignificant coefficients for *Product Similarity* \times *Corporate* in the firm's stock price reactions, which are expected to be positive under the claim of competitive harm as amendments contain less amount of proprietary information.

6. Conclusion

We examine whether the firm takes advantage of the confidential treatment regulation to withhold non-proprietary bad news from the capital market. Consistent with the agency problem explanation, we find that, on average, the firm's stock prices react negatively around the amendment filing day. Inconsistent with the claim that redaction helps mitigate the competitive harm, we do not find that information that released from amendments significantly benefits the rivals on average. Further, cross sectional evidence indicates that the firm's negative stock price reactions are more pronounced when the firm's information environment is more opaque, consistent with the agency problem explanation that the redaction reflects the managers' desire to hide bad news. Also, consistent with the agency problem explanation, we find that investor monitoring plays an important role in determining the degree to which managers hoard bad news. We document that only a subset of rivals could have benefited from the redacted information, but their

benefits do not seem to come at the expense of the firm. Documented effects from the SEC's review staff on market reactions are also consistent with the agency problem explanation.

While our analyses focus on rejected CTRs that requires amendments, our inferences should be applicable to approved CTRs. Our evidence suggests that SEC monitoring is an important mechanism that guards against managers' incentive to play the disclosure game and hide non-proprietary bad news from capital market investors. It remains to be seen how much scrutiny the SEC will apply in practice with the new rules, and results in our paper provides support for the potential benefits of such scrutiny.

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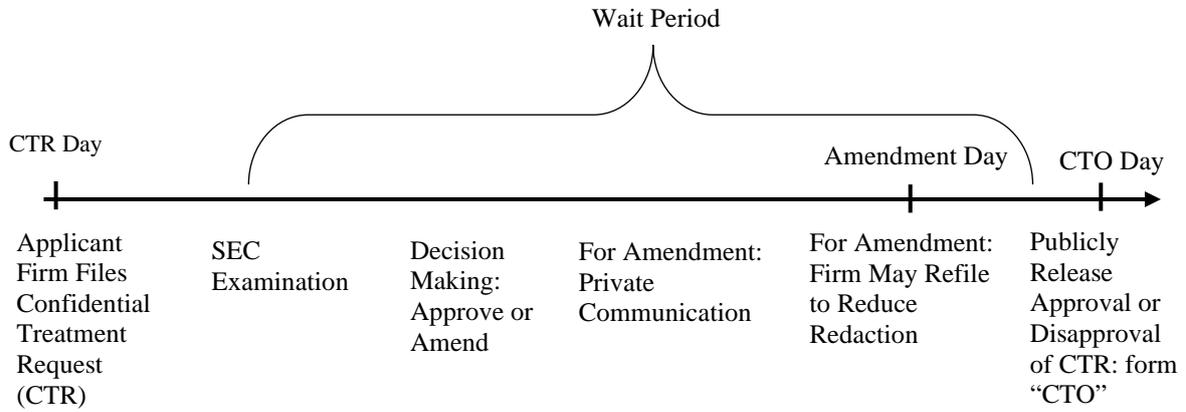
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Figure 1. The SEC's CTO Decision

Panel A depicts the SEC's review process of the firm's confidential treatment requests (CTR). This figure shows that the SEC's formal decision released through Confidential Treatment Order (CTO) occurs after private communication between SEC and the firm, which may involve the firm submitting additional information to the SEC.



Panel B's flowchart depicts the SEC's review process of CTRs and illustrates how review experience may affect CTR review outcomes.

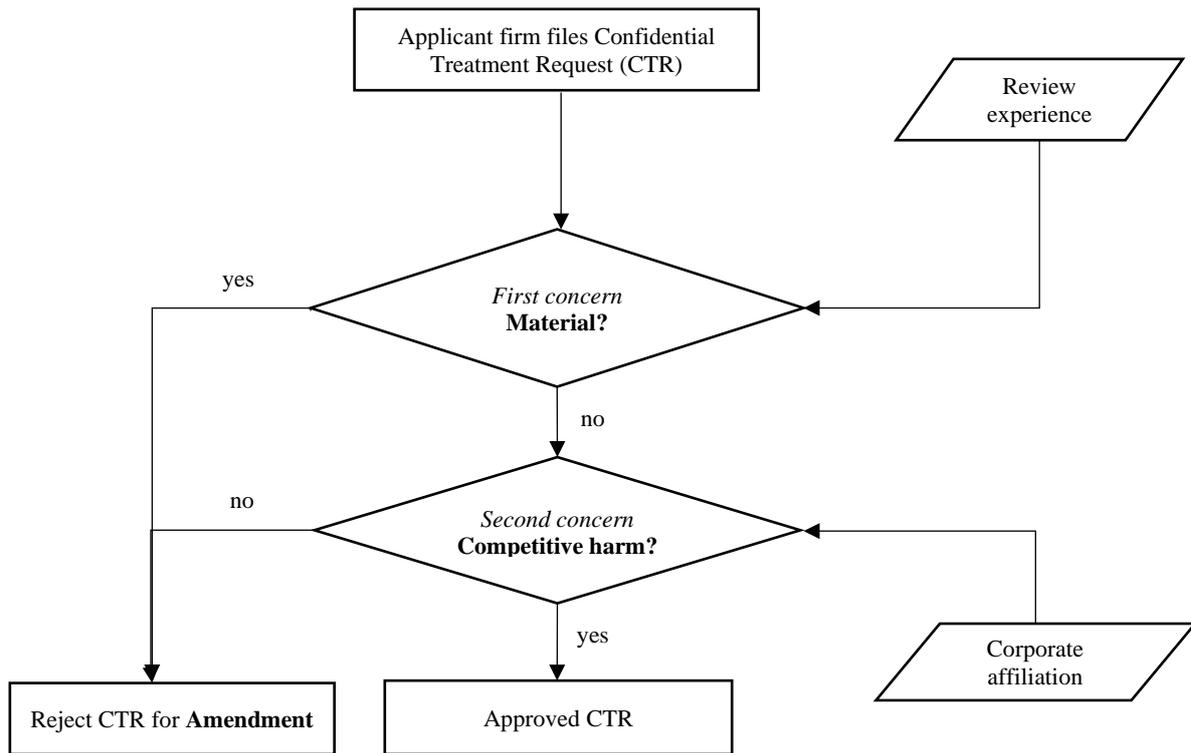
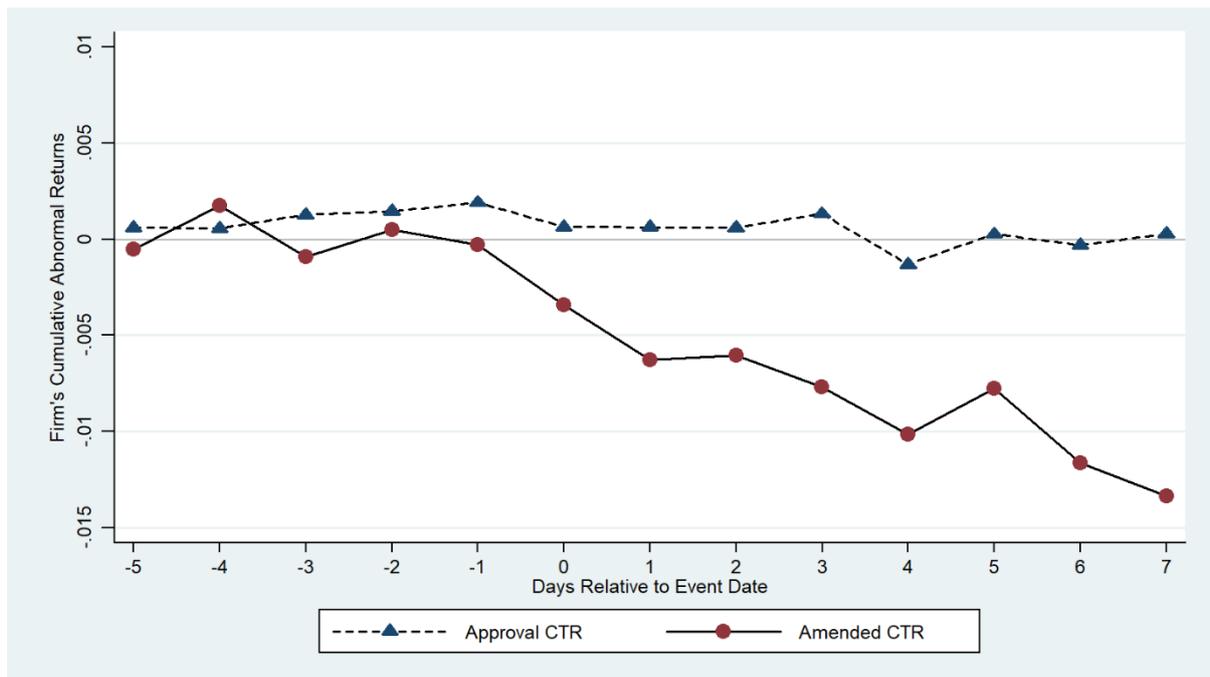


Figure 2 Cumulative Stock Returns for Firms and Rivals Around Event dates

This figure plots the cumulative abnormal stock returns from day -5 to day +7, where day 0 refers to the event date. The dash line represents the returns for CTRs that approved by the SEC (Approved CTR) and the solid line represents the returns for CTRs that are rejected by the SEC for amendment (Amended CTR). The event date for *Amended CTR* is the amendment filing date, and the event date for *Approved CTR* is the Confidential Treatment Order (CTO) issuance date. Panel A displays the results of the market reactions to CTR firms, and Panel B displays the results of the market reactions to rival firms.

Panel A: Firm's Market Reaction



Panel B: Rivals' Market Reaction

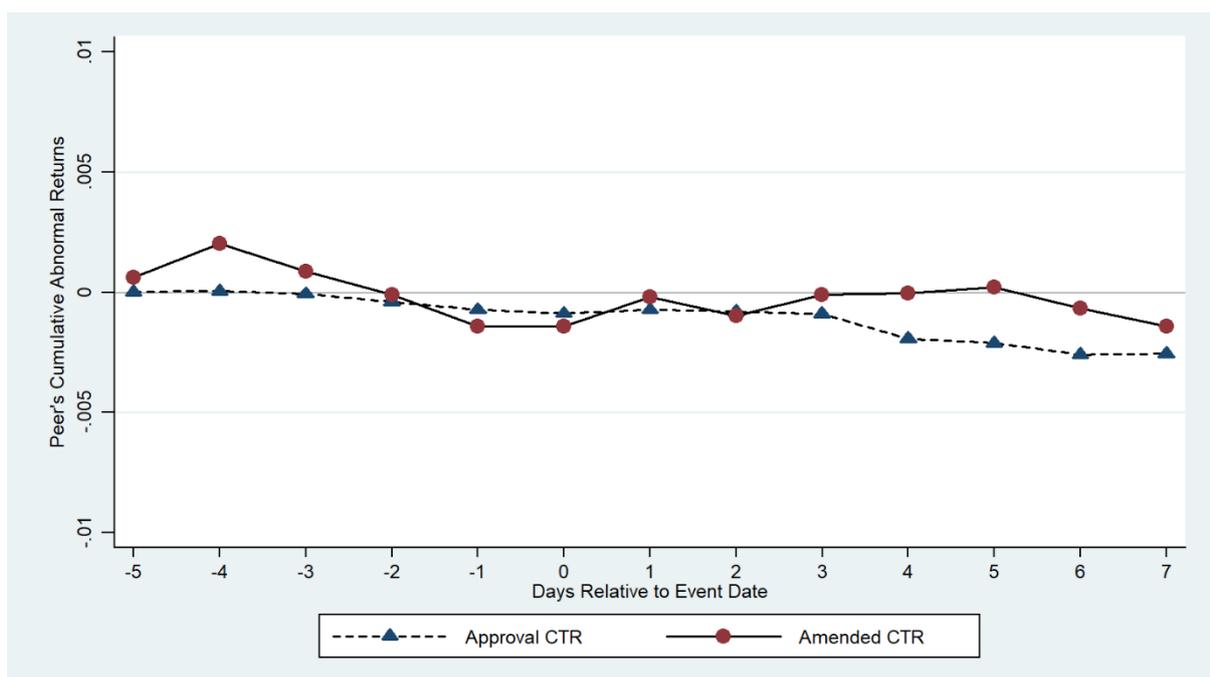


Table 1. Sample Selection

This table shows the sample selection process, the distribution of Confidential Treatment Orders (CTOs), and the number of unique applicant firms (in parentheses) across years.

	2008	2009	2010	2011	2012	2013	2014	2015	Total
Panel A: Sample Selection									
All CTO 2008-2015	1095 (718)	1494 (926)	1592 (916)	1429 (850)	1488 (870)	1329 (829)	1343 (870)	1287 (815)	11057 (3084)
(-) Application for extension of prior granted CTR	919 (669)	1208 (856)	1234 (864)	1106 (790)	1130 (798)	1062 (760)	1082 (795)	1007 (725)	8748 (3004)
(-) Financial firms	867 (626)	1126 (790)	1128 (786)	1028 (730)	1014 (716)	962 (689)	993 (733)	937 (669)	8055 (2743)
(-) Invalid financial (Compustat) information	598 (417)	810 (548)	825 (551)	752 (499)	704 (465)	666 (440)	659 (458)	643 (445)	5657 (1690)
(-) Invalid reviewer information	350 (260)	542 (400)	651 (458)	639 (444)	616 (409)	523 (421)	654 (457)	639 (445)	4714 (1531)
(-) Invalid stock return (CRSP) information	306 (227)	476 (347)	552 (393)	533 (367)	539 (360)	533 (361)	538 (374)	559 (390)	4036 (1288)
Panel B: Sample for Market Reaction Test									
Amend = 0	292 (220)	428 (319)	462 (341)	425 (311)	457 (318)	450 (311)	467 (335)	508 (361)	3489 (1189)
Amend = 1	14 (11)	48 (43)	90 (82)	108 (90)	82 (74)	83 (76)	71 (66)	51 (47)	547 (401)
% of Amendment	4.58	10.08	16.30	20.26	15.21	15.57	13.20	9.12	13.55

Table 2. Descriptive Statistics of Confidential Treatment Request (CTR) Review Duration/Outcomes

This table presents the various descriptive statistics for our sample. Panel A shows the distribution of the sample for different filing form types that associate with CTR, across years. Panel B shows the distribution of CTR review characteristics (review duration and outcomes) across years. Panel C shows the proportion of CTRs associated with a certain type of exhibit, as indicated on the top of the table. Panel D shows the distribution of CTR review characteristics across the SEC's AD offices. Panel E shows the distribution of reviewer characteristics across the SEC's AD offices. The definitions of the variables are available in Appendix A.

Panel A: Form Types

Year	10-K	10-Q	8-K	Registration	13D	Others
2008	28.10%	54.25%	16.01%	0.65%	0.98%	0.00%
2009	29.20%	53.99%	15.34%	0.63%	0.21%	0.63%
2010	27.54%	53.26%	18.66%	0.18%	0.00%	0.36%
2011	23.26%	56.85%	18.39%	0.75%	0.00%	0.75%
2012	23.56%	56.22%	19.29%	0.37%	0.37%	0.19%
2013	26.64%	54.78%	18.20%	0.19%	0.19%	0.00%
2014	27.51%	56.51%	15.61%	0.19%	0.19%	0.00%
2015	27.19%	55.46%	16.28%	0.18%	0.89%	0.00%
Total	26.51%	55.23%	17.32%	0.37%	0.32%	0.25%

Panel B: SEC Review Duration/Outcome across Years

Year	Mean Review Weeks	Num. Exhibits	Redact Duration
2008	18.000	1.696	5.477
2009	12.151	1.752	5.653
2010	10.393	1.699	5.303
2011	11.263	1.619	5.321
2012	9.824	1.673	5.438
2013	9.886	1.677	5.750
2014	9.320	1.703	5.541
2015	9.485	1.717	5.436
Total	10.880	1.691	5.487

Panel C: Type of Exhibit

Year	Sale /Purchase	License /Royalty	Research /Consulting	Collaboration	Credit /Lease	Employment	Stockholder	Settlement
2008	58.79%	34.94%	9.00%	7.32%	6.90%	8.58%	6.49%	3.97%
2009	57.87%	35.96%	7.35%	10.50%	9.84%	7.61%	4.99%	2.36%
2010	56.20%	36.01%	7.20%	8.85%	14.17%	6.26%	6.97%	1.65%
2011	54.91%	36.21%	7.10%	7.93%	13.25%	4.14%	7.93%	3.55%
2012	52.64%	43.60%	6.70%	10.46%	10.22%	5.99%	9.52%	3.29%
2013	65.22%	34.21%	6.52%	8.01%	9.27%	2.86%	6.06%	2.06%
2014	61.00%	37.19%	8.62%	6.24%	8.84%	2.38%	6.92%	1.81%
2015	59.73%	38.27%	9.62%	13.53%	8.88%	3.81%	5.39%	2.11%
Total	58.33%	37.19%	7.73%	9.24%	10.33%	4.93%	6.80%	2.51%

Panel D: SEC Review Duration/Outcomes across AD Offices

AD Office	AD Office Title	Applications	Amend	Mean Review Weeks	Num. Exhibits	Redact Duration
1	Healthcare and Insurance	1052	7.79%	8.752	1.581	6.266
2	Consumer Products	393	11.20%	8.830	1.453	4.865
3	Information Technologies and Services	401	16.21%	15.077	1.988	3.773
4	Natural Resources	98	21.43%	12.122	1.582	6.051
5	Transportation and Leisure	426	12.68%	12.261	2.070	6.359
6	Manufacturing and Construction	277	7.94%	10.375	1.542	5.538
8	Real Estate and Commodities	31	3.23%	14.258	1.258	3.710
9	Beverages, Apparel, and Mining	332	20.18%	9.274	1.669	5.229
10	Electronics and Machinery	608	19.41%	12.368	1.590	4.985
11	Telecommunications	418	17.46%	11.634	1.844	5.768
All		4036	13.55%	10.880	1.691	5.487

Panel E: Reviewer Characteristics across AD Offices

AD Office	Reviewers	Experience	Corporate	Female	Age	MBA
1	29	0.379	0.207	0.552	47.621	0.138
2	17	0.400	0.353	0.471	47.412	0.118
3	14	0.414	0.357	0.500	47.429	0.143
4	6	0.333	0.167	0.500	47.167	0.167
5	20	0.550	0.300	0.550	47.650	0.050
6	10	0.400	0.300	0.600	45.600	0.100
8	5	0.300	0.400	0.400	48.800	0.000
9	21	0.333	0.286	0.524	47.238	0.190
10	21	0.429	0.238	0.476	46.333	0.095
11	11	0.364	0.273	0.364	46.273	0.273
Total	33	0.393	0.212	0.515	48.152	0.121

Table 3. Amendment Rate and Application/Reviewer Characteristics

This table presents the results of OLS regressions that associate review outcome ($Amend = 1$ or 0) with firm/reviewer characteristics. The dependent variable is *Amend*, which is binary variable that equals one if the CTR is requested for amendment. All columns control for year and two-digit SIC industry fixed effects. The definitions of the variables are available in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the AD office-Reviewer level and displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

	Amend		
	(1)	(2)	(3)
Size	-0.010** (0.005)		-0.011** (0.005)
M/B	-0.000 (0.001)		-0.000 (0.001)
Ch_ROA	0.041** (0.018)		0.038** (0.018)
Issuer	0.031** (0.014)		0.031** (0.014)
Poor Information	-0.002 (0.006)		-0.002 (0.006)
Institutional Ownership	0.003 (0.018)		0.005 (0.018)
Product Similarity	0.055 (0.066)		-0.005 (0.062)
Industry R&D	0.004 (0.010)		0.005 (0.010)
Log(Num. Exhibits)	0.039*** (0.013)		0.039*** (0.013)
Log(Redact Duration)	0.023*** (0.007)		0.023*** (0.007)
Experience		0.058*** (0.020)	0.057*** (0.021)
Corporate		-0.038* (0.020)	-0.039** (0.019)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	4036	4036	4036
R-squared	0.065	0.060	0.071

Table 4. Market Reaction to Amendment versus Approval

This table presents the market reactions of CTRs around the event date. The event date for amended CTRs (*Amend* = 1) is the amendment filing date, and it is the CTO issuance date for approved CTRs (*Amend* = 0). Panel A displays the results of the average cumulative abnormal returns (CAR) for the firm during the windows of [-5, -1], [0, +2], and [+3, +7], where day 0 refers to the event date. Panel B displays average CAR [0, +2] for amendment firms sorted on *Poor Information*, *Institutional Ownership*, *Industry R&D*, and *Product Similarity*. Panel C displays the results of the average CAR for the rivals during the windows of [-5, -1], [0, +2], and [+3, +7]. Panel D displays average CAR [0, +2] for rivals sorted on *Poor Information*, *Institutional Ownership*, *Industry R&D*, and *Product Similarity*. The definitions of the variables are available in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. t-statistics are displayed in parentheses. Standard errors are clustered at the AD office-Reviewer. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Panel A: Firm's Market Reactions

	Amend (=1)		Amend (=0)	
	Mean	t-statistics	Mean	t-statistics
	(1)	(2)	(3)	(4)
(1) CAR[-5, -1], %	0.130	(0.421)	0.034	(0.268)
(2) CAR[0, +2], %	-0.582*	(-1.825)	-0.145	(-1.436)
(3) CAR[+3, +7], %	-0.591*	(-1.951)	-0.107	(-0.857)
Num. of CTR	547		3,489	

Panel B: Cross-Sectional Variation in Firm's Market Reaction (Amend =1)

	CAR [0, +2], %			
	Poor Information	Institutional Ownership	Industry R&D	Product Similarity
	(1)	(2)	(3)	(4)
Low	0.586	-0.690	0.353	-0.169
Medium	0.373	-0.001	-0.182	-0.022
High	-1.047	0.691	-0.133	0.201
High - Low	-1.519**	1.017**	-0.205	0.291
t-statistics	(-2.618)	(2.440)	(-0.409)	(0.637)

Panel C: Rivals' Market Reactions

	Amend (=1)		Amend (=0)	
	Mean	t-statistics	Mean	t-statistics
	(1)	(2)	(3)	(4)
(1) CAR[-5, -1], %	-0.142	(0.591)	0.073	(-0.600)
(2) CAR[0, +2], %	0.045	(0.357)	-0.008	(-0.096)
(3) CAR[+3, +7], %	-0.044	(-0.137)	-0.175	(-1.180)
Num. of CTR	427		2,847	

Panel D: Cross-Sectional Variation in Rivals' Market Reaction (Amend =1)

	Avg. Rivals CAR [0, +2], %			
	Poor Information	Institutional Ownership	Industry R&D	Product Similarity
	(1)	(2)	(3)	(4)
Low	0.085	-0.149	-0.080	-0.455
Medium	0.127	-0.084	-0.257	0.047
High	-0.229	0.232	0.355	0.390
High - Low	-0.336	0.347	0.528*	0.582**
t-statistics	(-1.187)	(0.923)	(1.964)	(2.441)

Table 5. Information Quality and Market Reactions

This table presents OLS regression results relating firm information quality and reviewer characteristics to market reactions to CTRs around the amendment filing date. The dependent variable is $CAR[0, +2]$ in columns (1) to (6), and $Avg. Rivals CAR [0, +2]$ in columns (7) to (12). $CAR[0, +2]$ is the cumulative abnormal returns of the applicant firm from day 0 to day +2, where day 0 refers to the refiling date. $Avg. Rivals CAR [0, +2]$ is the average $CAR [0, +2]$ of all of the applicant firm's industry rivals, where day 0 refers to the refiling date. All columns control for year and two-digit SIC industry fixed effects. Columns (2), (5), (6), (8), (11) and (12) further control for firm characteristics (*Size, Issuer, Ch_ROA*), CTR characteristics ($\log(Num. Exhibits)$, $\log(Redact Duration)$), exhibit types (*Sale Contract, IP Contract, Credit Contract, Settlement Contract*), and form types (*Periodic Report, Current Report*). The definitions of the variables are available in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the AD office-Reviewer level and displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

	CAR [0, +2]						Avg. Rivals CAR [0, +2]					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Poor Information (H2a)	-0.007*** (0.002)	-0.005** (0.003)	-0.004 (0.003)	-0.002 (0.003)	-0.008*** (0.003)	-0.006* (0.003)	-0.000 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Experience			-0.004 (0.007)	-0.004 (0.007)					0.001 (0.003)	0.001 (0.003)		
Poor Information*Experience (H5a)			-0.008** (0.003)	-0.007** (0.004)					-0.002 (0.003)	-0.003 (0.003)		
Corporate					0.000 (0.008)	-0.000 (0.008)					0.002 (0.004)	0.002 (0.004)
Poor Information*Corporate					0.003 (0.005)	0.003 (0.005)					0.001 (0.002)	0.001 (0.002)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm, CTR, Exhibit and Form Controls	No	Yes	No	Yes	No	Yes	No	No	No	Yes	No	Yes
Observations	547	547	547	547	547	547	427	427	427	427	427	427
R-squared	0.117	0.136	0.123	0.142	0.117	0.137	0.139	0.166	0.142	0.169	0.140	0.167

Table 6. Institutional Ownership and Market Reactions

This table presents results relating institutional ownership and reviewer characteristics to market reactions to CTRs around the amendment filing date. The dependent variable is $CAR[0, +2]$ in columns (1) to (6), and $Avg. Rivals CAR [0, +2]$ in columns (7) to (12). $CAR[0, +2]$ is the cumulative abnormal returns of the applicant firm from day 0 to day +2, where day 0 refers to the refiling date. $Avg. Rivals CAR [0, +2]$, is the average $CAR [0, +2]$ of all of the applicant firm's industry rivals, where day 0 refers to the refiling date. All columns control for year and two-digit SIC industry fixed effects. Columns (2), (5), (6), (8), (11) and (12) further control for firm characteristics (*Size*, *Issuer*, *Ch_ROA*), CTR characteristics ($\log(Num. Exhibits)$, $\log(Redact Duration)$), exhibit types (*Sale Contract*, *IP Contract*, *Credit Contract*, *Settlement Contract*), and form types (*Periodic Report*, *Current Report*). The definitions of the variables are available in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the AD office-Reviewer level and displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

	CAR [0, +2]						Avg. Rivals CAR [0, +2]					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Low Ownership (H2b)	-0.014*** (0.005)	-0.010* (0.006)	-0.007 (0.006)	-0.003 (0.007)	-0.013** (0.005)	-0.010* (0.006)	-0.004 (0.003)	-0.007 (0.004)	-0.001 (0.003)	-0.002 (0.004)	-0.005 (0.003)	-0.007* (0.003)
Experience			0.004 (0.008)	0.004 (0.008)					0.007 (0.005)	0.008 (0.005)		
Low Ownership*Experience (H5a)			-0.018** (0.009)	-0.018** (0.008)					-0.009 (0.006)	-0.011 (0.007)		
Corporate					0.003 (0.011)	0.000 (0.011)					0.002 (0.008)	0.002 (0.008)
Low Ownership*Corporate					-0.002 (0.012)	0.001 (0.012)					0.001 (0.009)	-0.000 (0.010)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm, CTR, Exhibit, and Form Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	547	547	547	547	547	547	427	427	427	427	427	427
R-squared	0.109	0.133	0.115	0.139	0.109	0.133	0.163	0.195	0.171	0.204	0.164	0.195

Table 7. Industry R&D and Market Reactions

This table presents results relating R&D intensity and reviewer characteristics to market reactions to CTRs around the amendment filing date. The dependent variable is $CAR[0, +2]$ in columns (1) to (6), and $Avg. Rivals CAR [0, +2]$ in columns (7) to (12). $CAR[0, +2]$ is the cumulative abnormal returns of the applicant firm from day 0 to day +2, where day 0 refers to the refiling date. $Avg. Rivals CAR [0, +2]$, is the average $CAR [0, +2]$ of all of the applicant firm's industry rivals, where day 0 refers to the refiling date. All columns control for year and two-digit SIC industry fixed effects. Columns (2), (5), (6), (8), (11) and (12) further control for firm characteristics ($Size$, $Issuer$, Ch_ROA), CTR characteristics ($log(Num. Exhibits)$, $log(Redact Duration)$), exhibit types ($Sale Contract$, $IP Contract$, $Credit Contract$, $Settlement Contract$), and form types ($Periodic Report$, $Current Report$). The definitions of the variables are available in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the AD office-Reviewer level and displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

	CAR [0, +2]						Avg. Rivals CAR [0, +2]					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
High R&D (H3a; H4a)	-0.002 (0.007)	-0.002 (0.008)	-0.001 (0.011)	-0.003 (0.012)	-0.001 (0.007)	0.001 (0.008)	0.006** (0.003)	0.006* (0.003)	0.008* (0.005)	0.007 (0.005)	0.008** (0.003)	0.008** (0.004)
Experience			-0.004 (0.009)	-0.005 (0.009)					0.002 (0.003)	0.002 (0.003)		
High R&D*Experience			-0.004 (0.012)	0.001 (0.013)					-0.002 (0.006)	-0.002 (0.006)		
Corporate					0.004 (0.009)	0.006 (0.009)					0.006 (0.004)	0.005 (0.004)
High R&D*Corporate (H5b)					-0.009 (0.014)	-0.017 (0.014)					-0.010* (0.005)	-0.010* (0.006)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes						
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes						
Firm, CTR, Exhibit, and Form Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	547	547	547	547	547	547	427	427	427	427	427	427
R-squared	0.098	0.129	0.099	0.130	0.099	0.131	0.142	0.168	0.143	0.169	0.147	0.173

Table 8. Product Similarity and Market Reactions

This table presents results relating product similarity and reviewer characteristics to market reactions to CTRs around the amendment filing date. The dependent variable is $CAR[0, +2]$ in columns (1) to (6), and $Avg. Rivals CAR [0, +2]$ in columns (7) to (12). $CAR[0, +2]$ is the cumulative abnormal returns of the applicant firm from day 0 to day +2, where day 0 refers to the refiling date. $Avg. Rivals CAR [0, +2]$ is the average $CAR [0, +2]$ of all of the applicant firm's industry rivals, where day 0 refers to the refiling date. All columns control for year and two-digit SIC industry fixed effects. Columns (2), (5), (6), (8), (11) and (12) further control for firm characteristics (*Size, Issuer, Ch_ROA*), CTR characteristics ($\log(Num. Exhibits)$, $\log(Redact Duration)$), exhibit types (*Sale Contract, IP Contract, Credit Contract, Settlement Contract*), and form types (*Periodic Report, Current Report*). The definitions of the variables are available in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the AD office-Reviewer level and displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

	CAR [0, +2]						Avg. Rivals CAR [0, +2]					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Product Similarity (H3b; H4b)	0.040 (0.042)	0.028 (0.041)	0.035 (0.052)	0.012 (0.049)	0.048 (0.046)	0.041 (0.044)	0.036*** (0.012)	0.032** (0.014)	0.042*** (0.014)	0.039** (0.016)	0.042*** (0.015)	0.039** (0.016)
Experience			-0.008 (0.009)	-0.010 (0.009)					0.002 (0.004)	0.002 (0.004)		
Product Similarity*Experience			0.025 (0.047)	0.049 (0.047)					-0.015 (0.022)	-0.017 (0.024)		
Corporate					0.005 (0.011)	0.007 (0.011)					0.006 (0.005)	0.006 (0.004)
Product Similarity*Corporate (H5b)					-0.047 (0.072)	-0.075 (0.064)					-0.036* (0.020)	-0.039** (0.019)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm, CTR, Exhibit, and Form Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	547	547	547	547	547	547	427	427	427	427	427	427
R-squared	0.100	0.130	0.102	0.132	0.101	0.132	0.146	0.171	0.147	0.172	0.150	0.175

Appendix A Variable Definition

Variable	Definition
CAR[0, +2]	The three-day cumulative abnormal returns from day t to day t+2. Abnormal returns are estimated based on the market model using days [-200, -60] before the event day (e.g., Chen, Harford and Li, 2007; Qui and Wang, 2018). We require a minimum of 60 days in the estimation window. The event date is set to the amendment filing date for CTRs that are requested by the SEC for amendment or are disapproved without chance to amend, and the CTO issuance date for CTRs that are approved by the SEC.
Avg. Rivals CAR [0, +2]	The average CAR [0, +2] of industry rivals around the refiling date. We define industry rivals as rivals which operate in the same Text-based Network Industry (Hoberg and Phillips 2016) as the applicant firm, and have the pairwise similarity with the applicant firm being greater than the sample median. The event date is set to the amendment filing date for CTRs that are requested by the SEC for amendment or are disapproved without chance to amend, and the CTO issuance date for CTRs that are approved by the SEC.
Experience	A binary variable that equals one if the CTR meets the following two criteria: 1) the CTR comes from the AD office for which she has reviewed the most since 2008 (the first year in our sample), and 2) the CTR is assigned to the person who reviews the most for the two-digit SIC industry since 2008.
Corporate	A binary variable that equals one if the reviewer's work experience (number of years) with non-government sectors is in the top quartile of the sample distribution (i.e., more than 6 years).
AbAccrual	The performance-matched discretionary accruals (Kothari, Leone and Wasley, 2005) in the year prior to the CTR date. The discretionary accruals are estimated based on the Modified Jones model. The model is estimated for each two-digit SIC industry and each year, requiring a minimum of 20 observations. Abnormal accrual is defined as the absolute value of the residual.
Big 4	A binary variable that equals 1 if the firm was audited by Big 4 audit firms in the year prior to the CTR date.
Restate	A binary variable that equals 1 if the firm issued a restatement in the two years prior to the CTR date.
Bid-Ask	The median value of bid-ask spread during the year prior to the CTR date, where bid-ask spread is defined as the absolute spread divided by the average of bid and ask.
Poor Information	The first principle component of <i>AbAccrual</i> , <i>Big 4</i> , <i>Restate</i> and <i>Bid-Ask</i> . The loadings on these variables are 0.41, -0.65, 0.01 and 0.65, respectively.
Institutional Ownership	The proportion of outstanding shares owned by institutional owners in the year prior to the CTR date.
Low Ownership	A binary variable that equals one if the <i>institutional ownership</i> is below the sample median.
Industry R&D	The average value of R&D/Assets of all firms in the sample text-based network industry in the year when the CTO is filed (Hoberg and Phillips, 2016), where R&D/Sale is the ratio of R&D expenditure to total sales. Missing firm R&D is replaced with zero when computing industry average.
High R&D	A binary variable that equals one if <i>Industry R&D</i> is in the top quartile of the sample distribution.
Product Similarity	The text-based product similarity score in the year when the CTO is filed (Hoberg and Phillips, 2016).

Size	The natural logarithm of market capitalization in the year prior to the CTR date.
M/B	The ratio of market value of equity to the book value of equity in the year prior to the CTR date.
Issuer	A binary variable that equals 1 if either the change of equity or long-term debt scaled by total assets is larger than 0.05 in the year prior to the CTR date.
Ch_ROA	The change of the ratio of earnings before extraordinary items to total assets in the year prior to the CTR date.
Num. Exhibits	The number of exhibits applied in the CTR.
Redact Duration	The number of years that the redacted information is requested to be concealed from the public.
Review Weeks	The number of weeks from the CTR date to the CTO filing date.
Sale/Purchase	A binary variable that equals one if the CTR is related to sales or purchase contract.
License/Research/ Collaboration	A binary variable that equals one if the CTR is related to license, loyalty, and rivals contract.
Credit/Lease	A binary variable that equals one if the CTR is related to equity issuance, lease or debt contract.
Settlement	A binary variable that equals one if the CTR is related to settlement of lawsuits, arbitration, and termination of contracts.
Periodic Report	A binary variable that equals one if the original exhibit with redacted information is filed through 10-K or 10-Q reports.
Current Report	A binary variable that equals one if the original exhibit with redacted information is filed through 8-K reports.
