# THE EFFECT OF A RISK SECURITIES EXCHANGE COMMISSION COMMENT LETTER ON CORPORATE DISCLOSURE AND FORECAST ACCURACY: AN EXPLORATORY ANALYSIS

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## Abstract

Risk disclosure is an important issue discussed by the Securities Exchange Commission (SEC) in its review process. We evaluate the effect that a risk SEC comment letter can have on US registrants' disclosure and the consequent information value generated. We examine whether disclosure changes in Item 1A and Form 10-K occur due to the SEC review and affect forecast accuracy. We manually examine risk SEC comment letters and Forms 10-K from 405 US listed companies. We employ a difference-in-difference (DID) design and a multi-level, mixed-effect generalised linear model to quantify the SEC's effect. We estimate a 9,88 per cent disclosure volume increase of Item 1A and a decrease of 2,77 per cent of the Form 10-K. Following the letter, forecast error decreases by 1 per cent but this change is not induced by the disclosure volume changes, confirming that risk disclosure may be too generic and boilerplate to provide a sufficiently strong signal for financial analysts.

**Keywords:** SEC Comment Letter, Corporate Disclosure, Form 10-K, Item 1A, Information Asymmetry, Enforcement, SEC Review, Forecast Accuracy

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## 1. INTRODUCTION

Corporate risk disclosure is key to the efficient operating of capital markets (Watson & Head, 2013). Enhancing corporate disclosure, in particular of risk factors and risk management policies, is a priority on the agenda of standard setters and regulatory agencies. In the US, the Securities Exchange Commission (SEC) mandated, through the 2005 Securities Offering Reform (SEC, 2005), that all firms

include a separate section — Item 1A (Regulation S-K, Item 503 (c)) in their annual 10-K filings to discuss "the most significant risk factors to which the issuer and its business are subjected". In support of this process and to increase the firm's compliance with Regulation S-K, the SEC reinforced its monitoring action through its Division of Corporate Finance (Sarbanes-Oxley Act [SOX], 2002, Section 408). This meant that at least once every three years, Corp Fin staff reviews all registrants' filings and, in case of material deficiencies or unclear disclosure, sends a letter to the company demanding to address the deficiencies detected. As a consequence, SEC reviews of firms' filings have significantly increased over the last decades years (Wade, 2007; Bozanic et al., 2017), leading to an extensive repertory of more than 338,000 letters as of May 2021 (Cunningham & Leidner, 2022). Among these filings comment letters about risk disclosure deficiencies in the 10-K Form and 20-Form have gained considerable prominence in the SEC review process and the accounting literature (Calderon & Gao, 2022).

A large and growing body of studies — 80 papers according to Cunningham and Leidner's (2022) review — has examined the determinants and the consequences of the SEC review process. This strand of research has documented that SEC monitoring can enhance firms' disclosure practices and improve informational transparency for investors (Bozanic et al., 2017; Johnston & Petacchi, 2017; Wang, 2016, Xu et al., 2022). The most recent studies find that the SEC review process directly affects earnings management practices (Cunningham et al., 2020) and earnings credibility (Ryans, 2021), influences stock price synchronicity (Xu et al., 2022), induces firms to change their cyber risk disclosures (Calderon & Gao, 2022), increase the likelihood of firms being sued by private plaintiffs (Hutton et al., 2022) and affects deal completion and deal price revision in mergers and acquisitions (Liu et al., 2024). Moreover, SEC enforcement indirectly affects the company's reporting practices through a peer-based spillover mechanism (Brown et al., 2018). Worthy of not, Ryans (2021) demonstrates that enhancements in earnings credibility following comment letters, as measured by changes in earnings response coefficients, are mainly caused by comment letters deemed not important. In that study, importance was based on an investor attention-based quantitative measure using EDGAR downloads. Counter to what one would expect, whereas important letters would lead to material changes such as future restatements and write-downs, the authors found that only innocuous comment letters were associated with improvements in earnings credibility, following comment letter reviews. More generally, as it regards market reaction to SEC comment letters, Cunningham and Leidner's (2022) review highlights a lack of consensus on how market participants respond to SEC review action. For instance, Wang (2016) finds that companies revise their segment disclosure, following the receipt of a comment letter, and that this change is associated with an improvement in analysts' forecast accuracy, whereas Ehinger (2020) documents that changes to firms' tax disclosure, after SEC review, are associated with a decrease in the accuracy of analysts' effective tax rate forecasts. Overall extant literature highlights a paucity of empirical evidence and a lack of clarity regarding the informational consequences of SEC comment letters related to risk reporting deficiencies. We address this gap by examining, as a primary research question, whether SEC-prompted changes to firms' risk disclosure reduce the error of financial analysts in forecasting future earnings.

To address this research question, we assume that changes in analysts' forecast accuracy, following a SEC comment letter, may occur provided the comment letter process results in substantive reporting and disclosure changes. This mechanism supposes that companies change their disclosure in response to the SEC comment letter, and analysts' accuracy changes as a result of this. Prior studies support this proposition: improvements in firm disclosure and post-SEC action have been associated with reduced information asymmetry between investors and capital markets (Bozanic et al., 2017; Wang, 2016). Following this logical path, we start by examining the effects of risk comment letters on a firm's disclosure volume; then we test whether financial analysts' accuracy changes, following the SEC action, and whether this change in disclosure volume, induced by the comment letter, has a moderating effect on analysts' forecast accuracy.

Our "treatment" sample consists of 208 companies that received a risk comment letter in the period 2012–2016. We search the EDGAR SEC database for public company filings, to identify these companies. To isolate the effects of the comment letters process from unrelated changes in disclosure volume and analysts' forecast accuracy, we use a difference-in-difference (DID) research design that compares the treated companies with a control group of 197 companies, which are selected using a propensity score matching approach. The results reveal an improvement in risk disclosure within Item 1A and a reduction in the disclosure volume of Form 10-K due to the SEC letter. Results also indicate an improvement in analyst forecast accuracy, supporting the potential information value mechanism of SEC. Changes in disclosure volume, however, do not appear to moderate the SEC's effect on analyst forecast accuracy.

This evidence contributes to the extant literature in two ways. First, we extend previous literature on the association between firms' risk disclosure practices and SEC action, by documenting a significant increase in all risk information reported in section 1A, and a concurrent significant reduction in Form 10-K. Secondly, we find that the induced changes in disclosure volume are not relevant to financial analysts, supporting the criticisms raised in the current literature about the boilerplate nature of Item 1A (Bao & Datta, 2014). In sum, this study provides preliminary evidence in support of the so-called "null argument" about the beneficial effects of SEC action, paving the way for further research on other mechanisms that could have led to forecast accuracy improvements. The study develops as follows. Section 2 provides a review of the SEC S-K regulation on Item 1A and introduces the comment letter process. Section 3 develops the information mechanism and the related hypotheses. It also describes the empirical strategy followed to test the hypotheses. Section 4 provides and discusses the empirical results, and finally, Section 5 offers a discussion of the study findings and some concluding remarks.

## 2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

### 2.1. Risk disclosure regulation

Following the corporate scandals of the late 20th and early 21st century, in 2005 the SEC enhanced corporate risk disclosure regulation requiring registrants to disclose, in Item 1A of Form 10-K, the most significant risk factors to which the "issuer and its business are subject and that make the proposed offering or transaction speculative or risky" (SEC, 2005). The SEC has also provided guidelines for reporting this information in a concise and logically organised text (Mbithi et al., 2022), specifying a non-exclusive list of examples of risk factors that could potentially adversely affect a company's business, operations, financial position, or future financial performance. Practitioners, market participants, and academics (Johnson, 2010; Investor Responsibility Research Center Institute [IRRCi], 2016; Berkman et al., 2018) have criticised Form 10-K risk disclosure as generic, redundant, and boilerplate. Consequently, in 2010, the SEC issued an ad hoc disclosure guidance on how to report specific types of risks, such as climate change risks and cybersecurity risks (SEC, 2010, 2011). In 2016, the US regulatory agency commenced the Disclosure Effectiveness Initiative (Parrino, 2021), which aimed at revising the business and financial disclosure requirements in the Item 1A section, addressing the presentation and content of risk information reported in the Form 10-K (e.g., whether risks might be quantified and the need of generic risk information).

The latest Regulation S-K Item 105, issued in 2020, requires companies to present a summary of risk factor disclosure that does not exceed two pages if the risk factor disclosure exceeds 15 pages (SEC, 2020). This summary of risk factor disclosure must be in the form of a series of concise, bulleted, or numbered statements that summarise the principal factors that make an investment in the registrant or offering speculative or risky. It must, also, discuss the "material" threats that make an investment in the registrant or offering speculative or risky, rather than the "most significant" factors as required under the former rules. Risk factors sections must be organised under relevant headings, in addition to the sub captions currently required, with any risk factors that may generally apply to an investment in securities being disclosed at the end of the risk factor section under a separate caption entitled "General Risk Factors".

### 2.2. The SEC comment letters

The SEC review of firms' periodic filings (e.g., 10-K and 10-Q Forms) is a monitoring system that aims at improving the information available to investors and uncovering possible violations of the securities laws (SEC, 2009). At least once every three years, the SEC Division of Corporation Finance examines all registrants' filings and, in case of material deficiencies or unclear disclosure, sends a letter to the company requiring addressing the deficiencies detected. There are three main types of requests made in a comment letter. The Division of Corporation Finance may ask the company: 1) to provide supplemental information to the Staff to better understand the company's disclosure; 2) to amend the documents already submitted; 3) to revise future filings providing different/additional disclosure. Normally, the registrants respond within ten days and the SEC staff may send further comment letters until all the issues raised are addressed. A further important aspect of the SEC review is the public release of all correspondence between registrants and the Division of Corporation Finance, except in particular circumstances where replies to SEC comment letters are held private and not published after the review closes. In this study, the analysis of the comment letters shows that the SEC, mainly, requires companies to revise risk factor discussion in future filings, detailing the disclosure provided in the previous annual forms or providing different risk information. Appendix A offers some examples of these SEC requests.

### 2.3. Hypotheses development

As mentioned in the Introduction, we hypothesise that companies change their disclosure patterns in response to receipt of a risk SEC comment letter. The extant literature demonstrates theoretically (Diamond & Verrecchia, 1991; Lambert et al., 2007) and finds empirically that corporate disclosure has value to financial analysts (Lang & Lundholm, 1996; Barron et al., 1999; Bozzolan et al., 2009; Glaum et al., 2013). In a similar vein, in the case of the SEC review of Forms 10-K, the improvements in disclosure might influence the information environment for these companies, affecting the information asymmetry existing between financial analysts and capital markets, as a result. To test for this mechanism, we start by examining whether companies change the volume of information reported within Item 1A and Form 10-K as a whole, after receiving the letter.

Extant empirical research has documented some beneficial informative effects derived from changes to disclosures and accounting practices following the SEC's review action. Wang (2016), analysing a sample of US listed companies that received segment comment letters, found that companies increase the number of operating and geographic segments disclosed and experienced lower forecast error (FE), after the receipt of these letters. Johnston and Petacchi (2017) observe that 17 per cent of their sample of US companies react to an SEC comment letter by issuing 10-K and 10-Q amended filings and committing to revise future filings, following the comment letter requests. They also state that the resolution of an SEC review process is associated with reduced information asymmetry. Bozanic et al. (2017) document significant improvements estimated in terms of the quality of disclosure of the Form 10-K subsequent to SEC reviews, which unlike what was investigated by Johnston and Petacchi (2017), were linked to a decrease in information asymmetry. As for risk disclosure more specifically, Brown et al. (2018) document that the SEC review process — evidenced through the regulators' comment letters — induces the monitored firm's peers to change their risk disclosures, consistent with reducing the likelihood of subsequent regulatory scrutiny.

In addition, Calderon and Gao (2022) document that firms change their cybersecurity risk disclosures one year after receiving a comment letter, by increasing the length, readability, and clarity of risk information. Nonetheless, these authors did not investigate whether receiving an SEC comment letter influences disclosure volume both within Item 1A and Form 10-K and whether such changes in disclosure have any significant effect on information asymmetry. Based on the evidence presented above, we state the following hypotheses:

*H1a: An SEC comment letter increases disclosure within Item 1A.*

*H1b: An SEC comment letter affects Form 10-K disclosure.*

After evaluating the impact of a risk SEC comment letter on disclosure volume, both in terms of Item 1A and Form 10-K as a whole, we test whether these disclosure changes moderate the effect that issuing a risk comment letter has on analyst forecast accuracy. Kravet and Muslu (2013) propose a "convergence argument" to explain the link between forecast accuracy and changes in corporate risk disclosure. More specifically, they contend that improved risk disclosure can reduce analysts' uncertainty in predicting a firm's earnings and resolving known risk factors and contingencies. In support of the convergence argument, Wang (2016) finds that companies that revise their segment disclosures, after the receipt of a comment letter, experience a decrease in analysts' forecast errors and a reduced forecast dispersion. Bozanic et al. (2017) confirm such effects, documenting that better-quality periodic information, after a comment letter, is associated with a decrease in the bid-ask spread. Also, within the risk disclosure literature, Campbell et al. (2014) provide some evidence in favour of the convergence argument documenting a negative association between corporate risk disclosure and the bid-ask spread, after controlling for investors' perceptions of risk.

Counter to the convergence argument, a "divergence argument" has been put forward by scholars. According to this argument, change in corporate risk disclosure may reveal or add unknown contingencies and risk factors, increasing analysts' uncertainty in forecasting earnings. Empirical accounting literature (Barron et al., 1999; Chen et al., 2015) confirms that forecast accuracy is adversely affected by increased forecasting complexity. The divergence argument is supported by empirical results presented by Kravet and Muslu (2013), who show — in the case of periodic filings — that an increase in risk disclosure is associated with more dispersed forecast revisions around 10-K filings. These authors also find that the industry to which the company belongs makes a significant difference in the estimated effects. Filzen (2015) exploring the relationships between the updates in risk factor statements of 10-Q quarterly forms and adverse outcomes proxied by abnormal returns and negative earnings revelations, finds a positive significant relationship, supporting the divergence argument. As for the SEC review process, Ehinger (2020) examines the impact of comment letters, related to a firm's tax disclosures, on analysts' effective tax rate (ETR) forecasts. The findings of this study document that changes to a firm's tax disclosure, following a comment letter, are associated with a decrease in analysts' forecast accuracy, raising doubts about the informativeness of the SEC review process.

However, from a theoretical standpoint, a neutral effect could also occur — i.e., the "null argument". This implies that these changes in disclosure would be neither beneficial nor detrimental to the information environment, as financial analysts would evaluate them as uninformative given their boilerplate nature. Bao and Datta (2014) examine whether different risk types, reported in Form 10-K, are informative to investors. Using the Latent Dirichlet allocation (LDA) topic model, they identify 30 risk types and test their association with investors' risk perceptions, as proxied by stock returns volatility. Twenty-two out of thirty of the different types of risk disclosure are not associated with investor's risk perceptions, whereas the remaining risk types are positively (two types of systematic risks and liquidity risk) or negatively (five types of unsystematic risks) associated with investors risk perceptions, providing evidence in support to the "null argument". That study therefore demonstrates that, overall, changes in risk disclosure would not affect information asymmetry in the majority of instances and that the type of risk communicated to the environment makes a difference in the direction of the effect on investors' risk perception. Since we cannot predict the relative strengths of these three stances, we investigate the following hypotheses:

*H2a: An increase in Item 1A disclosure volume subsequent to an SEC comment letter affects analyst forecast accuracy.*

*H2b: A change in Form 10-K disclosure volume subsequent to an SEC comment letter affects analyst forecast accuracy.*

## 3. MATERIALS AND METHODS

### 3.1. Treatment and control groups

The research hypotheses were tested using a pre-post quasi-experimental approach, specifically a difference-in-difference (DID) design (Fredriksson & Oliveira, 2019). With a DID, a treatment group — the group of listed companies that received a comment letter from the SEC — is compared to a control group (companies that were not subjected to an SEC review) over the same time period. We defined the pre-period as the 12 months prior to the filing of the 10-K subject to review and the post-period as the 12 months following it. Figure A.1 (see Appendix A) describes the SEC review process timeline and the time frame used to measure risk factor disclosure and analysts' forecast accuracy.

*Treatment group:* We use the SEC full-text search EDGAR system (Johnston & Petacchi, 2017; Wang, 2016) to identify our treatment sample. A systematic search strategy was developed based on firms receiving risk SEC comment letters, that is, letters with risk disclosure deficiencies reported in Item 1A (Appendix A). More specifically, we searched for comment letters ("Form UPLOAD"), from companies belonging to any of the industries classified using the Standard Industrial Classification, which included in the main text the words "10-K" and "risk factor". The comment letters were subsequently downloaded, and

the relevant text was manually extracted (Appendix B). The time frame of this analysis is between January 2012 and January 2016. This time period was purposely selected considering the likely anticipation effect induced by the process of revision started in 2016 by the SEC with the Disclosure Effectiveness Initiative, where the Commission staff revisited corporate risk disclosure requirements (Parrino, 2021).

*Control group:* Given the non-random nature of treatment assignment, as being regulated by SEC who in turn use a risk-based model with pre-defined criteria (SOX, 2002, Section 408; Johnston & Petacchi, 2017), and consequent likelihood of sample selection and therefore systematic differences between the two groups, a previously developed propensity score matching approach was employed. Specifically, we first estimated each firm's probability of receiving an SEC comment based on a logit regression model which estimated the determinants of receiving such comment. These determinants were identified in line with the key factors selected by Johnston and Petacchi (2017). We then identified one control firm for each of the firms selected for the treatment group, based on the highest propensity score attained, and assigned the matching analysis time frame.

## 3.2. Variables

For hypotheses *H1a* and *H1b*, in line with previous research, the dependent variable was measured in terms of total word count (Brown et al., 2018), under the assumption that increased volume would reflect increased risk disclosure. The dependent variable was considered in two formats: 1) in terms of disclosure within Item 1A, and 2) the Form 10-K word count. For the Pre-Letter 10-K Form, we downloaded the 10-K Form previous to the one subject to SEC review. For the Post-Letter period, we considered the 10-K post-SEC review (see Figure A.1). For hypotheses *H2a* and *H2b*, the dependent variable was forecast accuracy, as a proxy of information asymmetry and measured by analyst forecast error (*FE*), the closer the error was to zero the more accurate the analyst forecast. Following the approach used by Lang and Lundholm (1996) and Glaum et al. (2013), *FE* was computed as the difference between the company's actual earnings per share (*EPS*) and the analyst's typical earning forecast (*Forecast EPS*) scaled by the company share price, as follows:

$$FE_{i,t+1,j} = \frac{|EPS_{i,t+1,j} - Forecast\ EPS_{i,t+1,j}|}{P_{i,t+1,j}} * 100 \quad (1)$$

where $EPS_{i,t}$ are the realised EPS for company *i*, in year *t+1*, reported in month *j*, $Forecast\ EPS_{i,t+1,j}$ is the median EPS consensus forecast for company *i*, for year *t+1*, reported in month *j*, and $P_{i,t+1,j}$ is the stock price for company *i*, in year *t+1*, reported at the end of month *j*. *FEs* are measured as the average errors for the pre- and post-comment letter time points. For the Pre-Letter time period, we used EPS forecasts for the period from the filing date of the 10-K prior to the annual report subject to review until the filing date of the 10-K subject to SEC review. For the Post-Letter period, we considered the period from the filing date of the 10-K post-review until the date of the filing of the following annual report. This analytical approach is comparable to that used by Lang and Lundholm (1996) and Glaum et al. (2013), who estimated the average FEs given a lack of knowledge regarding the time when the information contained in Form 10-K is processed by analysts. As well as the temporal dimension (before/after the SEC comment letter) and treatment group, based on the extant literature on the determinants of corporate disclosure and analyst forecast accuracy (Brown, 2001; Duru & Reeb, 2002; Lang & Lundholm, 1996; Lehavy et al., 2011), we selected two sets of explanatory factors which may directly or indirectly influence the investigated associations.

Briefly, contextual controls included the year during which the company was subjected to the comment letter review process, the belonging industry (SIC code) and disclosure trend measured by the log of industry-average annual report word count, number of analysts following the firm, restatement and a number of risks and other comments included in the SEC letters and their word count. The other set included financial controls, namely market value and total assets (measures of company size), return on asset and financial leverage, measured as total liabilities/total assets, market-to-book ratio, earnings change and volatility, beta, sales growth, total risk measured by the variance of monthly stock returns and institutional ownership. We used the Refinitiv Eikon platform (London Stock Exchange Group, 2023) to gather relevant company data. Table C.1 (see Appendix C) provides a list of all the variables considered for analysis with respective definitions.

## 3.3. Empirical strategy

As mentioned above, for hypotheses *H1a* and *H1b* we tested the effect that receiving an SEC comment letter has on the firm's reporting practices as measured by a change in disclosure volume (*DV*, word count). To detect the treatment effect of the exposure to an SEC comment letter, we employed a DID model specified as follows:

$$DV_{i,j,t} = \beta_0 + \beta_1 Postlet_{i,j} + \beta_2 CL_{i,j,t} + \beta_3 Postlet_{i,j,t} * CL_{i,j,t} + \beta_4 Contextual\ controls_{i,j,t} + \beta_5 Financial\ controls_{i,j,t} + \varepsilon_{i,j,t} \quad (2)$$

This model compares the changes that occurred in *DV* between the company treatment and the control groups over a matching time period (*t*). The indicator (*i*) refers to the unit of measurement (company), whereas the indicator (*j*) is the SIC industry the company belongs to (multi-level effect). *CL* is the indicator variable for treatment (received a comment letter or not) which interacts with

the factor *Postlet* (time before and after receipt of the letter) — the average treatment effect is, therefore, the coefficient $\beta_3$, which captures the differential effect that an SEC comment letter had, on average, on disclosure after controlling for changes occurring within comparable companies that were not subjected to an SEC review process and a set of other contextual and financial factors that could mask that association. Based on *H1a* and *H1b*, we expect coefficient $\beta_3$ to be positive. To address *H2a* and *H2b*, we employed an empirical strategy based on an adapted DID design, in fact, a three-factor design, where the dependent variable was *FE*, as follows:

$$FE_{i,j,t} = \beta_0 + \beta_1 Postlet_{i,j} + \beta_2 CL_{i,j} + \beta_3 DV_{i,j,t} + \beta_4 Postlet_{i,j} * CL_{i,j,t} + \beta_5 Postlet_{i,j} * DV_{i,j,t} + \beta_6 CL_{i,j,t} * Postlet_{i,j,t} * DV_{i,j,t} + \beta_7 Contextual\ controls_{i,j,t} + \beta_8 Financial\ controls_{i,j,t} + \varepsilon_{i,j,t} \quad (3)$$

Equation (3) compares the change that occurred in *FE* between the two treatment groups over the same period. Comparably to Eq. (2) above, the coefficient $\beta_4$ here identifies whether any differential effect in *FE* occurred. Given our objective of determining whether such change in *FE* was moderated by a corresponding change in disclosure volume, we adjusted for *DV* and interacted with the differential effect in *FE* with $DV_{i,t}$, where $\beta_6$ captures such moderating effects. Based on the review of the relevant literature conducted above, we tested for this association without any prior expectations on effect direction, where a positive coefficient would signal that the SEC review process is associated with decreased analyst forecast accuracy (i.e., increased forecast error) about future earnings, supporting the convergence argument, and vice versa supporting the divergence argument.

### 3.4. Data

Based on the process described in subsections 3.1 and 3.2, we retrieved 966 comment letters from the EDGAR (see Table 1) for the period between January 2012 and January 2016. We identified a total of 877 first comment letters, after removing 89 second or subsequent letters. The retained comment letters were downloaded and checked for relevance. We found 506 comment letters questioning the adequacy of risk information in registration statements, IPO, and other extraordinary operations filings (e.g., Forms S-1, Form S-4), which had therefore to be removed. Next, we merged the CIK code with the company ISIN code in Eikon to gather the financial data on the identified control variables. At this stage, we excluded an additional 163 companies due to missing data on the outcomes of interest. The final treatment sample therefore consisted of 208 initial comment letters addressing deficiencies in all areas of risk reporting, including cybersecurity risk, competitive risk, disruption risk, resource and liquidity risk, information about critical estimates, market risk, and other risk issues. This sample size is comparable to Wang (2016) who analysed 186 test companies and used them to examine SEC comment letters to question segment disclosure.

As for the control sample, we considered the sample of available 2,658 US listed companies at the end of 2012, to estimate the propensity scores outlined in the above subsection 3.1. Following the application of the propensity score matching method, we identified those companies with the closest propensity score to each of the comment letter firms without replacement, obtaining a final sample of 197 matching control firms.

Table 1, Table 2, and Table 3 describe the sample of companies analysed.

**Table 1.** Analysis sample

| *Comment letters (CLs) about risk disclosure on EDGAR from 2012 to 2016 (n = 966)* | *No.* |
|---|---|
| Lees: second or subsequent CLs | 89 |
| Less: CLs referring to risk disclosure deficiencies in Form S-1, Form S-4 | 506 |
| 10-K and 8-Q first CL focusing on risk disclosure deficiencies | 371 |
| Less: companies with missing financial data | 163 |
| Treatment sample | 208 |
| Control sample | 197 |
| Total sample | 405 |

**Table 2.** Distribution of companies by industry

| *Industry* | *Risk comment letter firms* | | *No-risk comment letter firms* | |
|---|---|---|---|---|
| | *N* | *%* | *N* | *%* |
| Agriculture, mining, & construction | 19 | 9.13 | 20 | 10.15 |
| Manufacturing | 60 | 28.85 | 67 | 34.01 |
| Technology | 15 | 7.21 | 8 | 4.06 |
| Transportation & communication | 4 | 1.92 | 4 | 2.03 |
| Utilities | 5 | 2.40 | 5 | 2.54 |
| Wholesale & retail | 15 | 7.21 | 10 | 5.08 |
| Services | 21 | 10.10 | 21 | 10.66 |
| Finance, insurance & real estate | 69 | 33.17 | 62 | 31.47 |
| Total | 208 | 100.00 | 197 | 100.00 |

*Note: Industry is based on SIC codes as grouped by Wang (2016): Agricultural, mining, & construction = 0–1999; Manufacturing = 2000–3999 (excluding SIC codes counted in Technology); Technology = 3570–3579 and 7370–7379; Transportation & communications = 4000–4799 and 4800–4899, respectively; Utilities = 4900–4999; Wholesale & retail = 5000–5999; Services = 7000–8999 (excluding SIC codes counted in Technology); Finance, insurance & real estate = 6000–6999; Other = 9999.*

**Table 3.** Descriptive statistics

| ***Panel A: Treatment group, n = 205*** | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Variables*** | ***Mean*** | ***Std*** | ***p.10*** | ***Median*** | ***p.90*** | ***Min*** | ***Max*** |
| *Item 1A_Pre-letter* | 8,239 | 6,317 | 2,426 | 6,679 | 16,502 | 306 | 39,588 |
| *Item1A_Post-letter* | 9,040 | 6,226 | 2,963 | 7,477 | 17,261 | 302 | 40,113 |
| *Form 10-K_Pre-letter* | 56,345 | 45,935 | 23,090 | 46,503 | 100,311 | 4,009 | 514,936 |
| *Form 10-K_Post-letter* | 57,318 | 37,326 | 24,938 | 48,559 | 101,562 | 4,172 | 280,163 |
| *FE_Pre-letter* | 0.0181417 | 0.0619417 | 0.0008808 | 0.0062289 | 0.0296956 | 0.000048 | 0.7597765 |
| *FE_Post-letter* | 0.0103294 | 0.0181349 | 0.0005484 | 0.0038588 | 0.0287523 | 0 | 0.1419153 |
| *LN_MV* | 7.818298 | 1.831707 | 5.545334 | 7.718077 | 10.39932 | 2.36556 | 13.12384 |
| *LN_TA* | 15.12322 | 2.308191 | 12.3191 | 14.91175 | 18.22935 | 8.132119 | 21.58156 |
| *ROA* | 3.045534 | 13.85823 | -3.58 | 3.57733 | 11.89 | -121.64 | 71.69 |
| *Lev* | 36.14988 | 30.04336 | 0 | 35.075 | 73.41 | -36.33 | 315.75 |
| *EarnChange* | 125.9218 | 2,537.359 | 0.000149 | 0.0112983 | 0.8855414 | 9.86e-06 | 51,753 |
| *Earn_Volatility* | 7.606467 | 28.64893 | 0.5129522 | 2.927422 | 13.08239 | 0.0777817 | 476.0288 |
| *MB* | 1.821364 | 15.3146 | 0.62 | 1.6725 | 5.68 | -170.24 | 159.92 |
| *Analysts_following* | 12.75962 | 10.47245 | 2 | 10 | 28 | 0 | 57 |
| *Total_risk* | 0.0128052 | 0.016577 | 0.0028226 | 0.0086487 | 0.0266941 | 0 | 0.1611077 |
| *Beta* | 1.270732 | 0.731466 | 0.38 | 1.25 | 2.1198 | -1.17 | 4.0695 |
| *Inst_ownership* | 0.767868 | 0.2382865 | 0.3866 | 0.818802 | 1.0095 | 0.019123 | 1.47795 |
| *Restatements* | 0.0192308 | 0.1375005 | 0 | 0 | 0 | 0 | 1 |
| ***Panel B: Control group, n = 197*** | | | | | | | |
| ***Variables*** | ***Mean*** | ***Std*** | ***p.10*** | ***Median*** | ***p.90*** | ***Min*** | ***Max*** |
| *Item 1A_Pre-letter* | 7,787 | 5,839 | 2,450 | 6,705 | 13,926 | 1,111 | 44,059 |
| *Item 1A_Post-letter* | 8,441 | 6,309 | 3,038 | 7,227 | 14,962 | 1,306 | 49,909 |
| *Form 10-K_Pre-letter* | 64,529 | 33,233 | 35,437 | 58,037 | 99,609 | 11,656 | 265,741 |
| *Form 10-K_Post-letter* | 66,073 | 34,890 | 36,922 | 58,729 | 98,719 | 12,439 | 256,992 |
| *FE_Pre-letter* | 0.0122265 | 0.023434 | 0.000677 | 0.0040062 | 0.0326927 | 1.46e-17 | 0.2197077 |
| *FE_Post-letter* | 0.0152336 | 0.0349802 | 0.0004579 | 0.0035203 | 0.0298507 | 0 | 0.2223834 |
| *LN_MV* | 7.788726 | 1.902531 | 5.113252 | 7.92803 | 10.18144 | 2.193886 | 12.11408 |
| *LN_TA* | 15.06847 | 2.174289 | 12.45208 | 14.94597 | 17.81053 | 9.279213 | 21.37241 |
| *ROA* | 2.694607 | 17.65751 | -1.78 | 4.2 | 12.87 | -205.69 | 43.29 |
| *Lev* | 80.74157 | 865.2709 | 0 | 33.465 | 66.64 | -231.49 | 17,150 |
| *EarnChange* | 0.0589421 | 0.1824968 | 0.0011505 | 0.0146048 | 0.1108302 | 0.0000692 | 2.452497 |
| *Earn_Volatility* | 9.193856 | 42.84367 | 0.5473847 | 2.60838 | 17.62443 | 0.0804363 | 662.8238 |
| *MB* | 3.046827 | 12.55174 | 0.77 | 1.78 | 4.97 | -68.71 | 166.5 |
| *Analysts_following* | 12.00761 | 8.94185 | 2 | 9 | 25 | 0 | 43 |
| *Total_risk* | 0.0074126 | 0.0370786 | -0.021979 | 0.0059529 | 0.0305898 | -0.01626722 | 0.266447 |
| *Beta* | 1.339818 | 0.7830808 | 0.48 | 1.248475 | 2.34 | -2.1545 | 4.7738 |
| *Inst_ownership* | 0.7584034 | 0.2584976 | 0.372006 | 0.815566 | 1.015564 | 0.011793 | 1.772309 |
| *Restatements* | 0.0177665 | 0.1322696 | 0 | 0 | 0 | 0 | 1 |

*Note: Item 1A: word count of Item 1A (risk factors) of the 10-k form. 10-K: word count of Form 10-K. Forecast error (FE) pre/post-letter = The absolute value of the difference between actual annual earnings per share (EPS) minus the mean of analysts' forecasts of EPS for the reporting year prior/subsequent to the year of the comment letter (t), deflated by the mean of firm's monthly stock price in the year of the forecast, multiplied by 100. LN_MV = The natural log of the market value of equity as of the reporting year prior to EPS forecasts. ROA = Return on assets as of the reporting year prior to EPS forecasts. Lev = Total liabilities/total assets as of the year before EPS forecasts, multiplied by 100. EarnChange = The absolute value of change of earnings (before extraordinary items) one year prior to EPS forecasts, scaled by total assets. Earn_Volatility = The standard deviation of return on assets for the 5 years prior to EPS forecasts. MB = Firm's market value of equity divided by the book value of equity as of the reporting period prior to EPS forecasts. Analysts_following = Number of analysts following the firm. Total_risk = Volatility of firms' market returns, measured by the variance of monthly stock returns for the reporting period prior to EPS forecasts. Beta = Historical beta as of the reporting period prior to EPS forecasts. Inst_ownership = Institutional ownership percentage as of the reporting period prior to EPS forecasts. Restatements = Indicator variable for a restatement in the year of or year prior to EPS forecasts.*

### 3.5. Statistical analysis

Summary statistics were used to describe the sample of companies selected for analysis. Pearson's pairwise correlations were first computed between the identified variables to explore the sign and magnitude of existing linear associations. A forward stepwise approach for model specification was employed, with regression models being built progressively. Capitalising on the panel structure of the data (i.e., repeat measurement on the same units of analysis, the company) and given expected industry-level heterogeneous treatment effects, we adopted a multi-level, mixed-effect generalised linear model approach with Gaussian specification and robust standard errors to address heteroskedasticity (Hoechle, 2007). This approach allows for accounting for both fixed effects (shared across treatment groups) and random effects (varying by treatment group), which helps capture latent variability. The use of robust standard errors adjusts for potential misspecification of variance of errors differing across observations, hence enhancing the reliability of inference. Specification 1 included only the key explanatory variables of interest, the time, group, and receipt of a comment letter, as appropriate. The subsequent specifications included contextual and financial controls. Among these sets of controls, variable selection, and therefore inclusion in the final model specification, was based on significance level. Interaction terms were used to evaluate the presence of effect modification. Wald tests were used to assess between-category differences. Statistical significance was set at a $p < 0.05$ level. All analyses were performed using Stata 16 software (StataCorp, 2019).

## 4. EMPIRICAL RESULTS

Table C.2 (see Appendix C) shows the pairwise correlation coefficients between the identified variables. We find that disclosure volume both in Item 1A, as well as Form 10-K, as a whole, is positively correlated (0.458, $p < 0.001$). Both these variables are also positively and moderately correlated with forecast error and the number of analysts following the company. We find that industry has a significant differential effect on both

*H1a* and *H1b* dependent variables, indicating a significant level of industry-sector heterogeneity. Whereas a univariate moderate effect is found between treatment groups and in terms of the beta value for total form length only. As for forecast accuracy, as well as the beta value and number of analysts following the company, mostly financial controls including ROA, market-to-book value, total risk, and institutional ownership show to have significant univariate associations. Table C.3 (see Appendix C) reports the unadjusted DID effects estimated for the specified models.

### 4.1. Hypotheses H1a and H1b

Table 4 and Table 5 show the change in disclosure volume induced by an SEC comment letter calculated both in terms of word count within Item 1A and Form 10-K. A significant effect was identified for both disclosure measures, with a positive average treatment effect of 292.95 (141.61) within Item 1A, while a negative effect (mean -1,176.17, standard error 640.57) within the whole Form 10-K. This meant that, after adjusting for relevant covariates and change occurred within the control group, Item 1A increased in word count, whereas the remainder of the form would reduce in volume. Table 4 and Table 5 also show heterogeneous effects in terms of control variables: a lengthier SEC comment letter would result in a shorter Item 1A, but a longer Form 10-K as a whole, and vice versa for growth in sales.

**Table 4.** Change in disclosure volume induced by a risk SEC comment letter — Item 1A

| *Variables* | *Model 1* | *Model 2* | *Model 3* |
|---|---|---|---|
| *Postlet* | 654.15*** | 543.17*** | 408.43*** |
| | (43.87) | (69.97) | (136.14) |
| *CL* | 406.54 | 979.29 | 1,383.31** |
| | (729.43) | (1,079.65) | (628.00) |
| *Postlet#CL* | 146.55 | 187.60* | 292.95** |
| | (136.75) | (107.09) | (141.61) |
| *10-K form* | | 0.07*** | 0.07*** |
| | | (0.01) | (0.01) |
| *sales_growth* | | | 51.84*** |
| | | | (4.52) |
| *Total_commnets_words* | | | -1.01*** |
| | | | (0.32) |
| *var(id[industry])* | 11.23 | 1.84 | <0.01 |
| | (25.04) | (23.06) | (<0.01) |
| *var(_cons[industry])* | 2,293,100 | 1,104,381 | 995,251 |
| | (1,526,606) | (2,080,587) | (650,393) |
| *var(e.crd_10k)* | 35107969*** | 28842637*** | 26835339*** |
| | (10930409) | (8,940,648) | (8,436,405) |
| Constant | 7,822.88*** | 3,324.50*** | 2,963.65*** |
| | (455.13) | (1,000.76) | (433.90) |
| Observations | 810 | 810 | 810 |
| Number of groups | 8 | 8 | 8 |

*Note: Table 4 tests if Item 1A word count changes due to the SEC review process. The model results are based on a DID analysis, comparing treated companies with a matched sample of firms not subject to SEC review. In the adjusted models, we include different variables to control for the main factors that are associated with disclosure volume. Postlet is a dummy variable coded 1 if time is that of the period subsequent to the SEC review process, and 0 if time refers to the information reported in the form before the SEC review. CL is a dummy variable coded 1 for companies being subject to SEC review, 0 otherwise. All other variables are defined in Table C.1 (see Appendix C). Continuous variables are winsorized at the 1st and 99th percentile, when required, standard errors are heteroskedasticity-adjusted and are clustered for Industry. Robust standard errors in parentheses *** p < 0.01, ** p < 0.05, and * p < 0.1.*

**Table 5.** Change in disclosure volume induced by a risk SEC comment letter — Form 10-K

| *Variables* | *Model 1* | *Model 2* | *Model 3* |
|---|---|---|---|
| *Postlet* | 1,544.51** | -119.49 | 64.10 |
| | (678.55) | (823.65) | (858.47) |
| *CL* | -9,486* | -9,705** | -13,385*** |
| | (5,065) | (4,250) | (1,699) |
| *Postlet#CL* | -571.33 | -944.12* | -1,176.17* |
| | (760.46) | (556.67) | (640.57) |
| *Item 1A* | | 2.54*** | 2.68*** |
| | | (0.30) | (0.34) |
| *Sales_growth* | | | -104.29* |
| | | | (57.28) |
| *Total_commnets_words* | | | 7.39*** |
| | | | (2.33) |
| *var(id[industry])* | 260.86 | 77.25 | <0.01 |
| | (426.65) | (287.57) | (<0.01) |
| *var(_cons[industry])* | 254,734,520** | 195,738,965* | 174,191,882 |
| | (115,135,613) | (113,802,873) | (106,223,580) |
| *var(e.crd_10k)* | 1.23e+09** | 1.01e+09** | 995,497,337** |
| | (611,828,281) | (495,822,192) | (479,096,474) |
| Constant | 63,571*** | 42,903** | 42,434*** |
| | (7,089) | (6,403) | (4,663) |
| Observations | 810 | 810 | 810 |
| Number of groups | 8 | 8 | 8 |

*Note: see Table 4.*

## 4.2. Hypotheses H2a and H2b

Table 6 shows the differential change between the two company treatment groups in terms of forecast accuracy that occurred following receipt of an SEC comment letter, yet without considering the effects illustrated in Table 4 and Table 5. After adjusting for the counterfactual and relevant covariates, forecast accuracy improved following the SEC review, potentially paving the way for this regulatory intervention to play a role in improving information asymmetry between financial analysts and capital markets (convergence argument). Specifically, a decrease of 1% in the EPS-related forecast error was recorded following an SEC comment letter. A greater number of analysts following the company, a greater financial performance measured both in terms of return on asset performance and change in earnings were associated with lower forecast error.

However, when we tested whether the change in word count within Item 1A and Form 10-K played a role in improving forecast accuracy, no significant effects were identified (Table 7 and Table 8).

**Table 6.** Change in forecast error following a risk SEC comment letter

| *Variables* | *Model 1* | *Model 2* |
|---|---|---|
| *Postlet* | 0.0030 | 0.0024 |
| | (0.0026) | (0.0021) |
| *CL* | 0.0059 | 0.0058 |
| | (0.0037) | (0.0036) |
| *Postlet#CL* | -0.0108*** | -0.0105*** |
| | (0.0034) | (0.0029) |
| *ROA* | | -0.0006* |
| | | (0.0003) |
| *EarnChange* | | -0.0001*** |
| | | (0.0000) |
| *Analysts_following* | | -0.0003*** |
| | | (0.0001) |
| *var(e.fe)* | 0.0015** | 0.0014** |
| | (0.0006) | (0.0006) |
| Constant | 0.0122*** | 0.0179*** |
| | (0.0016) | (0.0029) |
| Observations | 782 | 782 |
| Number of groups | 8 | 8 |

*Note: Table 6 tests if forecast error changes due to the SEC review process. The model results are based on a DID analysis, comparing treated companies with a matched sample of firms not subject to SEC review. In the adjusted models, we include different variables to control for the main factors that are associated with disclosure volume. Postlet is a dummy variable coded 1 if time is that of the period subsequent to the SEC review process, and 0 if time refers to the information reported in the form before the SEC review. CL is a dummy variable coded 1 for companies being subject to SEC review, 0 otherwise. All other variables are defined in Table C.1 (see Appendix C). Continuous variables are winsorized at the 1st and 99th percentile, when required, standard errors are heteroskedasticity-adjusted and are clustered for Industry. Robust standard errors in parentheses *** p < 0.01, ** p < 0.05, and * p < 0.1.*

**Table 7.** Change in forecast error induced by a change in Item 1A word count

| *Variables* | *Model 1* | *Model 2* |
|---|---|---|
| *Postlet* | 0.0015326 | 0.0014788 |
| | (0.0015566) | (0.0017318) |
| *Item 1A* | -0.0000003 | 0.0000003 |
| | (0.0000006) | (0.0000006) |
| *Postlet#Item 1A* | 0.0000022 | 0.0000016 |
| | (0.0000022) | (0.0000020) |
| *CL* | 0.0058527 | 0.0041192 |
| | (0.0037631) | (0.0034382) |
| *Postlet#CL* | -0.0096128*** | -0.0098408*** |
| | (0.0027144) | (0.0026198) |
| *CL#Item 1A* | 0.0000000 | -0.0000010 |
| | (0.0000007) | (0.0000007) |
| *Postlet#CL#Item 1A* | -0.0000018 | -0.0000013 |
| | (0.0000022) | (0.0000020) |
| *ROA* | | -0.0005678* |
| | | (0.0002929) |
| *Analysts_following* | | -0.0003065*** |
| | | (0.0001166) |
| *Sales_growth* | | -0.0000719*** |
| | | (0.0000276) |
| *Risk_comments_n* | | 0.0007533*** |
| | | (0.0002079) |
| *var(_cons[indall_8])* | 0.0000026 | 0.0000005 |
| | (0.0000039) | (0.0000051) |
| *var(e.fe)* | 0.0015101** | 0.0014128** |
| | (0.0006275) | (0.0005864) |
| Constant | 0.0123519*** | 0.0184361*** |
| | (0.0015638) | (0.0029935) |
| Observations | 782 | 782 |
| Number of groups | 8 | 8 |

*Note: Table 7 tests if the changes induced in disclosure volume estimated in Table 4 and Table 5 moderate the change in forecast error estimated in Table 6. The model results are based on a DID analysis, comparing treated companies with a matched sample of firms not subject to SEC review. In the adjusted models, we include different variables to control for the main factors that are associated with disclosure volume. Postlet is a dummy variable coded 1 if time is that of the period subsequent to the SEC review process, and 0 if time refers to the information reported in the form before the SEC review. CL is a dummy variable coded 1 for companies being subject to SEC review, 0 otherwise. 1A refers to changes in disclosure volume within Item 1A. All other variables are defined in Table C.1 (see Appendix C). Continuous variables are winsorized at the 1st and 99th percentile, when required, standard errors are heteroskedasticity-adjusted and are clustered for Industry. Robust standard errors in parentheses *** p < 0.01, ** p < 0.05, and * p < 0.1.*

**Table 8.** Change in forecast error induced by a change in Form 10-K word count

| *Variables* | *Model 1* | *Model 2* |
|---|---|---|
| *Postlet* | 0.0030978 | 0.0026834 |
| | (0.0026083) | (0.0021387) |
| *10-K* | 0.0000003** | 0.0000003*** |
| | (0.0000001) | (0.0000001) |
| *Postlet#10-K* | -0.0000002*** | -0.0000003*** |
| | (0.0000001) | (0.0000001) |
| *CL* | 0.0058706 | 0.0039541 |
| | (0.0036954) | (0.0036496) |
| *Postlet#CL* | -0.0108648*** | -0.0107552*** |
| | (0.0034214) | (0.0029957) |
| *CL#10-K* | -0.0000002 | -0.0000003 |
| | (0.0000002) | (0.0000002) |
| *Postlet#CL#10-K* | 0.0000002 | 0.0000002 |
| | (0.0000002) | (0.0000002) |
| *ROA* | | -0.0005678* |
| | | (0.0002948) |
| *Analysts_following* | | -0.0002865** |
| | | (0.0001120) |
| *Sales_growth* | | -0.0000787** |
| | | (0.0000334) |
| *Risk_comments_n* | | 0.0006064*** |
| | | (0.0002198) |
| *var(_cons[indall_8])* | 0.0000025 | 0.0000004 |
| | (0.0000040) | (0.0000051) |
| *var(e.fe)* | 0.0015096** | 0.0014126** |
| | (0.0006242) | (0.0005835) |
| Constant | 0.0120744*** | 0.0182911*** |
| | (0.0015168) | (0.0029692) |
| Observations | 782 | 782 |
| Number of groups | 8 | 8 |

*Note: see Table 7; 10-K refers to changes in disclosure volume within the Form 10-K. Robust standard errors in parentheses *** p < 0.01, ** p < 0.05, and * p < 0.1.*

Including this interaction term in the model essentially confirmed the effects of financial controls discussed in Table 6 (number of financial analysts, return on asset, and change in earnings) and enabled the detection of a significant role by the number of comments relating to company risk disclosure included in a SEC letter had on forecast accuracy, that is adversely affecting it.

## 5. DISCUSSION

This paper is concerned with the effect that an SEC comment letter has on corporate risk disclosure and forecast accuracy, focusing on the risk disclosure-related deficiencies detected by the SEC Division of Corporate Finance during the review process of Form 10-K. To address this proposition, we undertook a quasi-experimental study that compared two matched groups of US companies and used data obtained from a content analysis of the SEC letters, as well as financial market and statements to establish whether a SEC intervention would affect the volume of disclosure both within Item 1A and Form 10-K as a whole. We found that an SEC comment letter has a significant positive effect on the former, whereas it pushes the total form word count downwards. This indicated that companies would react to an SEC review not only by editing Item 1A but also by revising and rearranging the entire Form 10-K because of the Commission's comments. This is an important finding as it shows the effectiveness of the Commission in regulating the risk and broader disclosure posture and mechanisms of listed companies in the US, highlighting its regulatory role. It also potentially paves the way for the possibility of it influencing information asymmetry which would be affected — in either a convergent or a divergent fashion — by a change in disclosure.

When we tested the research hypotheses (*H2a* and *H2b*), we found that forecast accuracy was indeed positively affected following an SEC review (potentially supporting the convergence argument), but also that this effect did not seem to be moderated by the change in disclosure volume induced by the comment letter mechanism. To the best of our knowledge, this is the first study that empirically tested the regulatory role of the SEC in regard to how the comment letter mechanisms affect risk disclosure volume and whether such a change in disclosure volume affects forecast accuracy. This study provides evidence in support of the null argument, that is, changes in disclosure volume within Item 1A do not significantly affect analysts' forecast accuracy, as they are too generic and essentially boilerplate, and for this reason, they do not provide a sufficiently strong signal to affect analysts' risk perception of the company.

## 6. CONCLUSION

We provide evidence about the effectiveness of the SEC review process, documenting changes to corporate risk disclosure following SEC review actions. We also find an improvement in analysts' forecast accuracy, although not associated with the risk disclosure changes.

These findings need to be interpreted in light of some limitations. To address the issue of non-random assignment of receiving a comment letter, we employed a previously developed propensity score matching method (Johnston & Petacchi, 2017), which enabled us to reduce the likelihood of sample selection in our estimation. We also adopted an empirical strategy, which accounted for the issue

of heteroskedasticity and industry-level heterogeneity and related confounding effects, that would be otherwise induced by using traditional linear regression models. Whereas this increased confidence in our results, given the several other factors potentially affecting the corporate dimensions under study, residual confounding could not be completely ruled out.

We considered a pre-post quasi-experimental design on two equally distanced points in time from the exposure (receipt of a comment letter). Whereas a prompt reaction can be reasonably expected in terms of change in disclosure by the company within the following financial year, given its vested interest in resolving the raised issues, the timing and information signal required by the financial analysts to change their ability to predict future earnings remain uncertain. This could explain why we did not detect such an effect and therefore rejected our second hypothesis. However, we acknowledge the relatively short time period considered (four years) for analysis and that we centred our empirical investigation on disclosure volume. These are key limitations, and other disclosure measures such as tone and reliability (Loughran & McDonald, 2011) should be investigated in future studies on this topic.

Another important aspect to consider is the presence of other information-relevant factors which change concurrently with disclosure volume. Indeed, whereas we found a significant effect of receiving an SEC comment letter, the mere publication of the letter could signal analysts to pay more careful attention to the company subject to the SEC review process, independently of how the company changes its disclosure patterns. As a result, a potential causal pathway related to the SEC-related action is that it might affect the firm's perceived risk by analysts. This exploratory analysis provides the basis for more advanced studies aimed at understanding the mediation and information mechanisms following an SEC review. Future research should consider investigating whether and how different types and features of risk disclosure may affect information asymmetry and replicating this study by focusing on different financial periods and integrating qualitative dimensions of disclosure that were not investigated here.

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## APPENDIX A. ILLUSTRATIONS OF RISK RELATED COMMENT LETTERS

**Illustration n. 1**
**American International Group's Comment Letter, 5 April 2012**

Form 10-K, 2011, Section 1A Risk Factors, p. 41
If we are unable to maintain the availability of our electronic data systems and safeguard the security of our data…, page 41
Corp. Fin. request: provide information to SEC staff
We note that you disclose that your systems could be subject to unauthorized access, systems failures and disruptions. Please tell us whether you have experienced attacks, unauthorized access, systems failures and disruptions in the past and, if so, whether disclosure of that fact would provide the proper context for your risk factor disclosures. Please refer to the Division of Corporation Finance's Disclosure Guidance Topic No. 2 at http://www.sec.gov/divisions/corpfin/guidance/cfguidance-topic2.htm for additional information.

**Illustration n. 2**
**Progenics Pharmaceuticals's Comment Letter, 23 September 2013**

Form 10-K, 2012, Section 1A Risk Factors, p. 11
We are dependent on Salix, Ono and other business partners…,"
Corp. Fin. request: amend the filing 10-K
We note your disclosure in this risk factor regarding the receipt of a complete response letter from the FDA in relation to Relistor. Please provide proposed disclosure to be included in an amended Form 10-K which revises your risk factor discussion to include a separate risk factor which highlights your receipt of a CRL from the FDA, discusses the FDA's concerns, and identifies the specific risks you may face with respect to your on-going partnerships with Salix and Ono as well as the continued development and potential marketing approval of Relistor, in both subcutaneous and oral form.

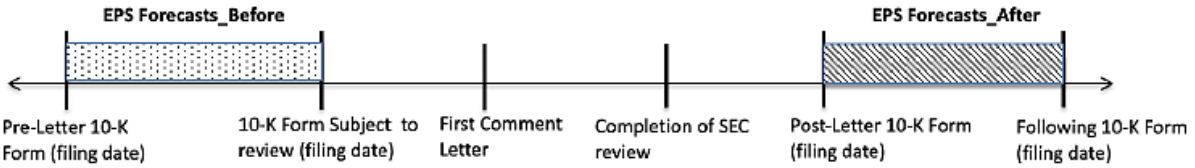
**Illustration n. 3**
**Aceto's Comment Letter, 30 January 2014**

Form 10-K, 2013, Section 1A Risk Factors, p. 14.
Our distribution operations of APIs concentrate on generic products and therefore are subject to the risks of the generic pharmaceutical industry, page 7
Corp. Fin. request: provide additional disclosure in future filings
We note your disclosure that your margins can also be "materially adversely affected by the risks inherent to the generic industry." In future filings, please expand your risk factor disclosure to specify those risks "inherent to the generic industry."

**Illustration n. 4**
**Armstrong World Industries's Comment Letter, 30 April 2014**

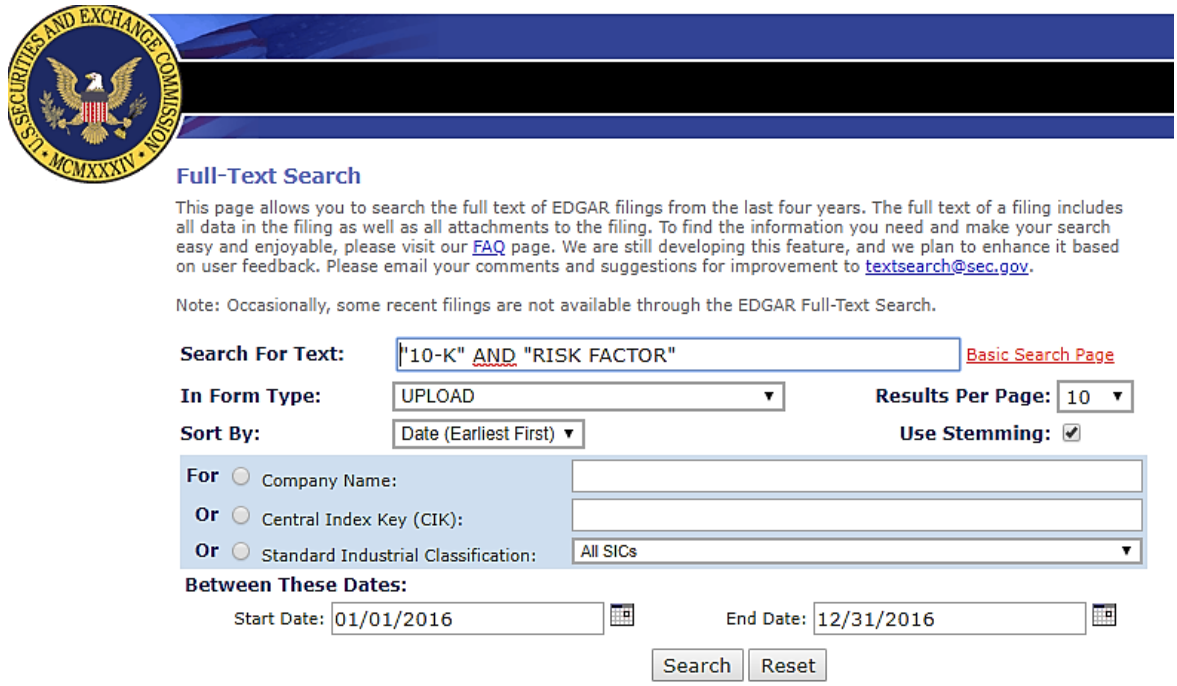
Form 10-K, 2013, Section 1A Risk Factors, p. 11.
Corporate Fin. request: provide different disclosure in future filing
In future filings, please avoid generic risk factors that appear to discuss risks that could apply to any company and ensure that your risk factors elaborate on the material risk currently impacting your business. In particular, we note the risk factor entitled "Key Customers."

**Figure A.1.** Timeline for the measurement of risk factors disclosure and analysts forecast errors




*Note: Figure A.1 illustrates the timeline of an SEC comment letter and the time frame used to evaluate differences in risk disclosure and analysts' forecast accuracy (EPS forecast error).*

## APPENDIX B. EDGAR SYSTEM INTERFACE




## APPENDIX C. VARIABLES DESCRIPTION AND ADDITIONAL ANALYSIS

**Table C.1.** List of variables and sources

| *Variables* | *Description* | *Source of data* |
|---|---|---|
| *CL* | Comment letter is equal to 1 if a company is subject to the comment letter review and 0 otherwise. | EDGAR System |
| *FE* | Forecast error is equal to the absolute value of the difference between actual annual earnings per share (EPS) minus the mean of analysts' forecasts of EPS for the reporting year prior/subsequent to the year of the comment letter (*t*), deflated by the mean of firm's monthly stock price in the year of the forecast, multiplied by 100. These values are not adjusted for missing values. | IBES |
| *Postlet* | Postletter equal to 1 if corporate risk disclosure refers to the 10-K subsequent to the SEC review process and 0 if corporate risk disclosure refers to the information reported in the 10k-prior to the SEC review. | EDGAR System |
| *10-K form length* | Volume/length of an annual report, measured by the number of words contained within Form 10-K. | EDGAR System |
| *Item 1A* | Risk factors disclosure, measured by the number of words contained in Item 1A (risk factors) of the Form 10-K prior/subsequent to the 10-K subject to the SEC review in year *t*. | Textual analysis |
| *LN_MV* | Size, measured as a natural log of the market value of equity of the reporting year prior to EPS forecasts. | Datastream |
| *LN_TA* | Size, measured as a natural log of the total assets of the reporting year prior to EPS forecasts. | Datastream |
| *ROA* | Profitability, measured as return on assets of the reporting year prior to EPS forecasts. | Datastream |
| *Lev* | Leverage, measured as total debts/total assets of the reporting year prior to EPS forecasts, multiplied by 100. | Datastream |
| *EarnChange* | Earning change, measured as the absolute value of change of earnings (before extraordinary items) of the reporting year prior to EPS forecasts, scaled by total assets. | Datastream |
| *Earn_Volatility* | Earning volatility, measured as the standard deviation of return on assets for the 5 years of the reporting year prior to EPS forecasts. | Datastream |
| *MB* | Market-to-book ratio, measured as the firm's market value of equity divided by the book value of equity of the reporting year prior to EPS forecasts. | Datastream |
| *Industry* | Industry classification, measured by SIC code. | Datastream |
| *Year* | Year is equal to the year during which the company is subject to the comment letters review process. | Datastream |
| *Total_risk* | Total risk, measured by the variance of monthly stock returns of the reporting year prior to EPS forecasts. | Datastream |
| *Analysts_following* | Analyst following, measured as the number of analysts following the firm of the reporting year prior to EPS forecasts. | Datastream |
| *Beta* | Beta, measured by the historical beta of the reporting period prior to EPS forecasts. | Datastream |
| *Inst_ownership* | Institutional ownership, measured by the institutional ownership percentage of the reporting period prior to EPS forecasts. | Datastream |
| *Restatements* | Restatements are equal to 1 if the company had a restatement in the year prior to EPS forecasts and 0 otherwise. | Datastream |
| *Total_comments_words (CL complexity)* | Total comment letters words, measured as the total number of words in the initial SEC comment letters. | Textual analysis |

**Table C.2.** Pairwise correlations

| *Variables* | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* | *(7)* | *(8)* | *(9)* | *(10)* | *(11)* | *(12)* | *(13)* | *(14)* | *(15)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***(1)*** *Item 1A* | 1.000 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| ***(2)*** *10K Form_lenght* | 0.458* | 1.000 | | | | | | | | | | | | | |
| | (0.000) | | | | | | | | | | | | | | |
| ***(3)*** *FE* | 0.118* | 0.101* | 1.000 | | | | | | | | | | | | |
| | (0.001) | (0.005) | | | | | | | | | | | | | |
| ***(4)*** *Postlet* | 0.059 | 0.016 | -0.035 | 1.000 | | | | | | | | | | | |
| | (0.093) | (0.643) | (0.326) | | | | | | | | | | | | |
| ***(5)*** *CL* | 0.043 | -0.110* | 0.006 | 0.000 | 1.000 | | | | | | | | | | |
| | (0.226) | (0.002) | (0.859) | (1.000) | | | | | | | | | | | |
| ***(6)*** *Debtasset* | -0.004 | 0.026 | -0.005 | -0.030 | -0.037 | 1.000 | | | | | | | | | |
| | (0.900) | (0.459) | (0.897) | (0.395) | (0.294) | | | | | | | | | | |
| ***(7)*** *EarnChange* | -0.014 | -0.014 | -0.012 | 0.035 | 0.035 | -0.002 | 1.000 | | | | | | | | |
| | (0.689) | (0.683) | (0.737) | (0.319) | (0.325) | (0.954) | | | | | | | | | |
| ***(8)*** *ROA* | -0.125* | -0.059 | -0.235* | -0.031 | 0.011 | -0.001 | 0.001 | 1.000 | | | | | | | |
| | (0.000) | (0.093) | (0.000) | (0.382) | (0.752) | (0.975) | (0.977) | | | | | | | | |
| ***(9)*** *MB* | -0.023 | -0.049 | -0.084* | 0.011 | -0.044 | -0.011 | -0.001 | -0.119* | 1.000 | | | | | | |
| | (0.506) | (0.163) | (0.019) | (0.753) | (0.215) | (0.744) | (0.973) | (0.001) | | | | | | | |
| ***(10)*** *Indall_8* | 0.210* | 0.257* | 0.047 | 0.000 | 0.035 | -0.028 | 0.040 | -0.001 | -0.013 | 1.000 | | | | | |
| | (0.000) | (0.000) | (0.187) | (1.000) | (0.326) | (0.430) | (0.258) | (0.969) | (0.721) | | | | | | |
| ***(11)*** *Total_risk* | 0.051 | -0.040 | 0.143* | 0.033 | 0.094* | -0.111* | -0.004 | -0.171* | -0.040 | -0.149* | 1.000 | | | | |
| | (0.148) | (0.254) | (0.000) | (0.342) | (0.007) | (0.001) | (0.905) | (0.000) | (0.252) | (0.000) | | | | | |
| ***(12)*** *Analysts_following* | 0.088* | 0.215* | -0.096* | 0.046 | 0.039 | -0.008 | 0.039 | 0.099* | 0.000 | -0.121* | -0.034 | 1.000 | | | |
| | (0.012) | (0.000) | (0.007) | (0.194) | (0.273) | (0.826) | (0.270) | (0.005) | (0.996) | (0.001) | (0.334) | | | | |
| ***(13)*** *Beta* | 0.023 | 0.195* | 0.082* | 0.009 | -0.046 | 0.129* | -0.005 | 0.008 | 0.003 | -0.067 | 0.084* | 0.110* | 1.000 | | |
| | (0.511) | (0.000) | (0.022) | (0.791) | (0.195) | (0.000) | (0.879) | (0.828) | (0.928) | (0.056) | (0.017) | (0.002) | | | |
| ***(14)*** *Institutional~p* | -0.052 | -0.016 | -0.094* | 0.062 | 0.019 | 0.038 | 0.013 | 0.246* | -0.007 | -0.090* | -0.006 | 0.164* | 0.187* | 1.000 | |
| | (0.136) | (0.650) | (0.009) | (0.077) | (0.588) | (0.277) | (0.711) | (0.000) | (0.839) | (0.011) | (0.870) | (0.000) | (0.000) | | |
| ***(15)*** *Restatements* | 0.000 | 0.049 | 0.009 | 0.082* | 0.005 | -0.001 | -0.005 | 0.000 | -0.009 | 0.011 | -0.025 | 0.135* | 0.095* | 0.031 | 1.000 |
| | (0.996) | (0.161) | (0.810) | (0.019) | (0.877) | (0.970) | (0.890) | (0.992) | (0.797) | (0.761) | (0.480) | (0.000) | (0.007) | (0.385) | |

*Note: *** p < 0.01, ** p < 0.05, * p < 0.1.*

**Table C.3.** Unadjusted difference-in-differences analysis

| | ***Risk comment letter firms*** | | | | ***No-risk comment letter firms*** | | | | ***Difference-in-difference*** | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ***Pre-letter (1)*** | ***Post-letter (2)*** | ***Difference (3 = 2 - 1)*** | | ***Pre-letter (1)*** | ***Post-letter (2)*** | ***Difference (3 = 2 - 1)*** | | ***(3–6)*** | |
| | ***(N = 208)*** | ***(N = 208)*** | ***(N = 208)*** | | ***(N = 197)*** | ***(N = 197)*** | ***(N = 197)*** | | ***Treat vs control sample*** | |
| | *Mean* | *Mean* | *Diff.* | *P-value* | *Mean* | *Mean* | *Diff.* | *P-value* | *Mean* | *P-value* |
| *Item 1A* | 8.240 | 9.041 | 801 | <0.001*** | 7.787 | 8.441 | 654 | <0.001*** | 147 | 0.8660 |
| *10-K Form* | 56.346 | 57.319 | 973 | 0.451 | 64.529 | 66.073 | 1.544 | 0.273 | -571 | 0.915 |
| *FE* | 1.814 | 1.033 | -0.781 | 0.072* | 1.160 | 1.446 | 0.286 | 0.259 | -1.10 | 0.054* |
| ***Control variables*** | | | | | | | | | | |
| *LN_MV* | 7.785 | 7.852 | 0.067 | 0.108 | 7.720 | 7.857 | 0.138 | 0.001*** | -0.071 | 0.789 |
| *ROA* | 3.575 | 2.516 | -1.059 | 0.186 | 3.136 | 2.253 | -0.883 | 0.521 | -0.176 | 0.937 |
| *Loss* | 0.832 | 0.798 | -0.034 | 0.224 | 0.178 | 0.132 | -0.046 | 0.072* | 0.012 | |
| *Lev* | 34.668 | 36.623 | 1.955 | 0.057* | 34.046 | 34.594 | 0.548 | 0.550 | 1.407 | 0.699 |
| *EarnChange* | 0.575 | 0.474 | -0.101 | 0.279 | 0.070 | 0.048 | -0.022 | 0.097* | -0.079 | 0.664 |
| *Earn_Volatility* | 6.019 | 5.612 | -0.408 | 0.252 | 6.968 | 5.940 | -1.029 | 0.0986* | 0.621 | 0.654 |
| *MB* | 2.535 | 2.557 | 0.022 | 0.929 | 2.574 | 2.700 | 0.126 | 0.7016 | -0.104 | 0.766 |
| *LnNum_Ana* | 1.556 | 1.833 | 0.277 | 0.023** | 1.854 | 1.897 | 0.043 | 0.2350 | 0.235 | 0.444 |
| *Total_risk* | 0.014 | 0.012 | -0.002 | 0.084* | 0.003 | 0.011 | 0.008 | 0.008*** | -0.010 | 0.023** |
| *Beta* | 1.262 | 1.280 | 0.018 | 0.492 | 1.335 | 1.345 | 0.010 | 0.6930 | 0.008 | 0.93 |
| *Inst_ownership* | 0.746 | 0.790 | 0.044 | 0.000*** | 0.750 | 0.767 | 0.017 | 0.07* | 0.026 | 0.49 |
| *Restatements* | 0.005 | 0.034 | 0.029 | 0.034** | 0.01 | 0.03 | 0.02 | 0.258 | 0.01 | |

*Note: Item 1A = 1A item word count; 10-K = 10-K word count. Forecast error (FE) = The absolute value of the difference between actual annual earnings per share (EPS) minus the mean of analysts' forecasts of EPS for the reporting year prior/subsequent to the year of the comment letter (t), deflated by the mean of firm's monthly stock price in the year of the forecast, multiplied by 100. LN_MV = The natural log of the market value of equity as of the reporting year prior to EPS forecasts. ROA = Return on assets as of the reporting year prior to EPS forecasts. Loss = Indicator variable if earnings before extraordinary items are negative in the reporting period prior to EPS forecasts. Lev = Total liabilities/total assets as of the year before EPS forecasts, multiplied by 100. EarnChange = The absolute value of change of earnings (before extraordinary items) one year prior to EPS forecasts, scaled by total assets. Earn_Volatility = The standard deviation of return on assets for the 5 years prior to EPS forecasts. MB = Firm's market value of equity divided by the book value of equity as of the reporting period prior to EPS forecasts. LnNum_Ana = Natural log of the number of analysts following the firm as of the reporting period prior to EPS forecasts. Total_risk = Volatility of firms' market returns, measured by the variance of monthly stock returns for the reporting period prior to EPS forecasts. Beta = Historical beta as of the reporting period prior to EPS forecasts. Inst_ownership = Institutional ownership percentage as of the reporting period prior to EPS forecasts. Restatements = Indicator variable for a restatement in the year of or year prior to EPS forecasts. CL_Complexity = Total number of words in the initial SEC comment letters. EPS forecasts refer to the reporting year (t–1) prior to the initial comment letter (t). All control variables are measured in the accounting period (t–2) prior to the EPS forecasts.*