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The role of external regulators in mergers and acquisitions: evidence from SEC comment letters

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Abstract

This study examines the role of the Securities and Exchange Commission (SEC) in mergers and acquisitions (M&As) involving publicly traded target firms. We find that deals receiving comment letters have an increased likelihood of deal completion and deal price revision, consistent with the SEC review process reducing information asymmetry, albeit at the cost of delaying the M&A process. Further analyses suggest that the SEC review process generates new value-relevant information via firms' disclosure amendments in response to comment letters. We address endogeneity concerns using multiple approaches. Our findings that the SEC review process reduces information asymmetry in M&As provide new insight into the real economic consequences of disclosure regulation.

Keywords SEC · Comment letters · M&A · Information asymmetry · Deal completion · Offer price revision · Deal duration

JEL codes M41 · G34 · K22

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1 Introduction

Information transparency is crucial to the efficiency and fairness of mergers and acquisitions (M&As). However, existing literature demonstrates severe information asymmetry in the M&A process (e.g., Hansen 1987; DeAngelo 1990). For example, bidder managers and target managers may withhold negative information in order to obtain more favorable deal outcomes. Target managers, because of agency conflicts, may withhold positive information to lower the purchase price in exchange for obtaining private benefits from the acquirer (Hartzell et al. 2004; Moeller 2005). Further, given the complex nature of M&A disclosure requirements, managers may unintentionally omit relevant information from their M&A filings due to a lack of expertise. Previous studies show that bidder and target firms attempt to alleviate information asymmetry using various internal mechanisms, such as methods of payment, third party certifications, conference calls, and shared auditors.[1] However, information asymmetry remains severe in M&As because market forces alone often cannot fully resolve this problem (Coffee Jr 1984).

In this paper, we investigate the role of an external force, the Securities and Exchange Commission (SEC), in reducing information asymmetry in M&As. Prior research suggests that the SEC plays a critical role in the capital markets via regulations and enforcement (e.g., Bonsall et al. 2021; Blackburne et al. 2021). In the M&A setting, the SEC requires firms to comply with disclosure requirements to ensure that investors have sufficient information to properly evaluate the transaction.[2] If the SEC determines that an M&A filing does not fully comply with disclosure requirements, the reviewer will issue a comment letter to the filing firm, and the firm must address these issues before completing the deal (SEC 2019). We therefore examine how the SEC review process affects M&A deal outcomes.

We use the Thomson One Banker SDC database to construct our sample of M&A transactions announced from 2005 to 2017 involving domestic publicly traded target firms, and we identify deals receiving SEC comment letters using Audit Analytics.[3] Our final sample contains 2527 deals after imposing standard filters. We document that the SEC issues comment letters for approximately 31% of the transactions in our sample. A comment letter contains 18.3 comments and is resolved in 27.5 days, on average. We manually categorize all of the comments and find that comments related to the fairness opinion and valuation, transaction background, and reasons and recommendations for the transaction occur the most frequently in our sample.

We first examine the effect of SEC comment letters on deal completion. Target shareholder disagreement is a common reason that deals fail, because transaction completion often requires shareholder cooperation. Existing literature documents

[1] See, for example, Officer (2004), Kimbrough and Louis (2011), and Dhaliwal et al. (2016).

[2] We summarize the specific disclosure requirements, which vary across different types of deals, in Fig. 1. We also describe the detailed disclosure requirements in Section 2.

[3] We manually review each comment letter to ensure that the content is indeed merger-related, and we fix various issues with the Audit Analytics dataset. For example, Form S-4 acceleration requests filed by bidder firms are often mistakenly classified as comment letters.

that reduced information asymmetry in M&As can alleviate shareholder disagreement and help convince shareholders to support a transaction because they perceive the deal to be fair (DeAngelo 1986, 1990). Given that information transparency facilitates deal completion, there are two possibilities regarding the relation between SEC comment letter receipt and deal completion. On one hand, if the SEC fully reviews all deals with disclosure deficiencies and uses the comment letter process to correct all disclosure issues, then all deals should have similar ex post disclosure quality and therefore similar deal completion likelihoods. On the other hand, if the SEC does not fully review all deals, perhaps due to resource constraints (e.g., Blackburne 2014; Ege et al. 2020), then some deals with disclosure deficiencies that should have been fully reviewed will not receive comment letters. In this case, deals receiving SEC comment letters could have a *higher* completion likelihood relative to deals not receiving comment letters. Therefore, the directional effect of SEC comment letters on deal completion is unclear ex ante.

We find that receipt of an SEC comment letter is associated with a 4% increase in the likelihood of deal completion. The effect of comment letter receipt on deal completion is concentrated among comment letters that result in filing amendments, which suggests that SEC comment letters generate new information via firms amending their merger filings in response to SEC comments. Further, consistent with comment letters helping to reduce investor disagreement, the effect of comment letters on deal completion is greater when shareholder approval is required than when no shareholder approval is required. These results suggest that the SEC review process facilitates M&A transaction completion by alleviating shareholder disagreement.

As discussed above, the observed positive relation between SEC comment letters and deal completion suggests that the SEC does not fully review all deals with disclosure deficiencies. To investigate this conjecture, we construct an ex ante measure of disclosure quality for sample deals based on target and bidder firms' history of restatements and SEC comment letters. We observe that many low disclosure quality deals do not receive a comment letter, and the effect of comment letters on deal completion becomes stronger when we compare comment letter deals with non–comment letter deals with low disclosure quality. In contrast, the effect disappears when we compare comment letter deals with non–comment letter deals with high disclosure quality. Therefore, SEC comment letters increase disclosure quality to the level of disclosure quality for high quality non–comment letter deals and above the level of disclosure quality for low quality non–comment letter deals.

Next, we examine whether SEC comment letters affect deal offer prices. SEC review could impact M&A offer prices if the review process provides new information to shareholders via amendment filings. Because existing literature documents that managers may withhold both positive and negative information during the M&A process, comment letters could increase the likelihood of both positive and negative price revisions from the initial price to the final price.[4] We find that

[4] See, for example, Hartzell et al. (2004), Officer (2004), Moeller (2005), Kimbrough and Louis (2011), and Dhaliwal et al. (2016).

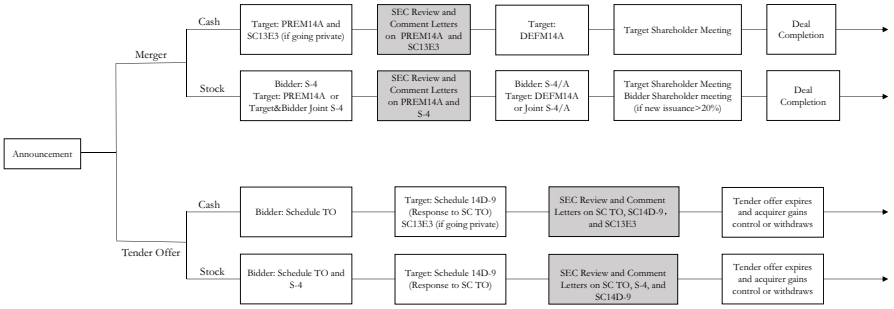

Fig. 1 The Timeline of SEC Filings and Comment Letters in M&As. This figure illustrates the relevant filings that M&A bidder and target firms file with the SEC and provides a timeline of the comment letter review process in M&As based on the form of the transaction and the method of payment. For mergers that require a target shareholder vote, the definitive proxy statement (DEFM14A) must be filed 20 business days prior to the scheduled target shareholder meeting. Before distributing the definitive proxy statement to shareholders, a preliminary proxy statement (PREM14A) must be filed. For tender offers, the bidder files SC-TO on the same day that the tender offer begins. The subject of the tender offer (the target) must file its response on a Schedule 14D-9 within 10 business days of the tender offer. If the bidder's stock is issued as a method of payment, the bidder files a Securities Act registration statement (Form S-4)

SEC comment letters and the related filing amendments significantly increase the likelihood of price revision. Deals receiving SEC comments have a 4.6% higher probability of a price revision, which is economically significant, given that only 14% of the deals in our sample experience price revisions. We further document that SEC comment letters increase the likelihood of both positive and negative price revisions, suggesting that the SEC review process reveals both positive and negative information.

Finally, we examine the extent to which the SEC review process delays the M&A process. It is possible that the time spent addressing comment letter issues could significantly increase the amount of time to complete M&A deals. However, M&A firms could address SEC comments while working on other M&A procedures, which could mitigate the delays specifically caused by the SEC review process. We therefore examine the effect of SEC reviews on deal duration, measured as the number of days between the deal announcement and deal completion. We find that the receipt of an SEC comment letter increases deal duration by 20.3 days on average, consistent with the comment letter process lengthening the amount of time to complete a deal.

We acknowledge that deals receiving SEC comment letters could be systematically different from deals not receiving comment letters, meaning that omitted variables could drive both the receipt of an SEC comment letter and deal outcomes. Although our cross-sectional analyses help alleviate this concern, we conduct two analyses to further address endogeneity concerns. First, we investigate the possibility that our deal completion results are due to the SEC intentionally choosing to fully review deals that are more likely to be completed ex ante. Using merger arbitrage spread to measure the ex ante likelihood of deal completion, we find that, inconsistent with the SEC selectively reviewing deals with a higher likelihood of completion, merger arbitrage spread is not significantly related to the issuance of comment

letters. Additionally, our deal completion results are robust to controlling for merger arbitrage spread.[5] Second, we use entropy balancing to match deals with comment letters with deals without comment letters on the firm and deal characteristics used in our main tests, and our results remain robust.

Our paper contributes to the literature in the following ways. First, we provide new evidence to the literature on the real costs and benefits of disclosure regulation. Using the setting of M&As—one of the most important corporate events—we show that disclosure regulation reduces information asymmetry and in turn increases the likelihood of deal completion and offer price revision, albeit at the cost of delaying the M&A process. These results contribute to the ongoing debate on the necessity and economic consequences of disclosure regulation (e.g., Stigler 1964; Mahoney 1995). Most importantly, our results suggest that many deals with disclosure deficiency are not fully reviewed, perhaps due to SEC's resource constraints. In this sense, increasing the SEC's resources would likely benefit market participants by allowing the SEC to conduct full reviews for a larger percentage of M&A deals, particularly those with disclosure deficiencies. Our paper therefore complements the growing literature on the effects of government agency resource constraints (Ege et al. 2020; Nessa et al. 2020).

Second, we build on the literature that examines the consequences of the SEC's review process, particularly reviews of transactional filings. Our results differ from previous studies of comment letters in the initial public offering (IPO) setting (Li and Liu 2017; Lowry et al. 2020) because managers face different disclosure incentives in M&A transactions compared to IPOs. Specifically, managers have strong incentives to withhold bad news in IPOs in order to inflate issuance prices. As a result, previous studies document that SEC comment letters are associated with a higher likelihood of IPO withdrawal and lower issuance prices. In contrast, managers' incentives are more nuanced in M&As, which could lead managers to withhold either positive or negative news. Consistent with this conjecture, we show that SEC comment letters for M&A filings facilitate deal completion and lead to both positive and negative price revisions by improving information transparency.[6] A contemporaneous study by Johnson et al. (2022) shows that firms receiving an SEC comment letter during the M&A process are less likely to restate their financial statements or report goodwill impairments after the transaction. We complement their study in that we examine the effects of comment letters on M&A outcomes rather than on the bidder's post-merger accounting quality.

Finally, our study also contributes to the literature on M&As. Information asymmetry is a central question in M&As, and much of the existing literature focuses

[5] Consistent with prior literature (e.g., Mitchell and Pulvino 2001; Mitchell et al. 2004), we find that merger arbitrage spread is a valid measure of ex ante deal completion probability. Additionally, SEC staff communicated to us that they do not consider the merits of a deal when deciding whether to review the deal, and they assume every deal will be completed when merger documents are filed with the SEC.

[6] Prior studies have also investigated the effect of SEC review on disclosure and the information environment (e.g., Bens et al. 2016; Dechow et al. 2016; Bozanic et al. 2017; Heese et al. 2017; Johnston and Petacchi 2017; Brown et al. 2018; Duro et al. 2019; Ryans 2021). Kubick et al. (2016) examine the effect of receiving a tax-related SEC comment on tax avoidance behavior.

on the actions taken by firms to reduce information asymmetry (e.g., DeAngelo 1990; Eckbo et al. 1990; Hansen 1987). However, information asymmetry in M&As remains severe despite these internal mechanisms because the sources of information asymmetry (e.g., market frictions, agency conflicts, managers lacking ability or experience) are often difficult for firms to address themselves. We differ from previous studies by providing new evidence that the SEC, an external force, helps alleviate information asymmetry in M&As and in turn affects important deal outcomes.

2 Institutional background: Shareholder approval and disclosure requirements in M&As

2.1 Shareholder approval in M&As

Corporate control transactions often require shareholder approval. Negotiated mergers always require a target shareholder vote before the transaction can be completed, while tender offers do not require a target shareholder vote (e.g., Cain and Denis 2013; Boone et al. 2018). A bidder shareholder vote is typically *not* required, except when a bidder intends to issue more than 20% of new shares to finance a deal (e.g., Li et al. 2018). If a target shareholder vote or a bidder shareholder vote is required, the SEC requires a firm to disclose all material information to its shareholders when issuing a proxy statement soliciting votes.

2.2 Filing and disclosure requirements in M&As

2.2.1 Requirements in negotiated mergers

When a deal requires target shareholder voting, the target firm must issue a proxy statement (DEFM14A) to its shareholders at least 20 business days prior to the vote. SEC Rule 14d-6 requires the firm to first file a preliminary proxy statement (PREM14A) with the SEC before distributing the definitive proxy statement to shareholders. If the deal consideration consists of bidder shares, then the bidder must file a Securities Act registration statement (Form S-4) for the securities being offered to target shareholders, and the transaction requires a bidder shareholder vote if the new shares exceed 20% of existing bidder shares. For transactions that require both target shareholder and bidder shareholder approval, the target and the bidder often prepare and file, with the SEC, a joint proxy statement soliciting votes from their shareholders.

2.2.2 Requirements in tender offers

A target firm does not issue a proxy statement during a tender offer because target shareholders do not vote on the transaction. In most cases, the bidder commences a cash tender offer by delivering tender offer materials to target shareholders. On the same day, the bidder must file a tender offer statement (SC-TO) with the SEC, which

includes the materials sent to target shareholders and a tender offer schedule. Under SEC Rule 14d-1, the offer must remain open for at least 20 business days; the bidder can then purchase the tendered shares if all conditions to the offer have been either satisfied or waived. Once a bidder has initiated a tender offer, the target firm must file its response to the tender offer, including the target board of directors' recommendations to target shareholders, on a Schedule 14D-9 within 10 business days. In the rare case of a bidder using stock as consideration in tender offers, the bidder must file a security registration statement in addition to SC-TO. Further, similar to negotiated mergers, a bidder shareholder vote is required if the new share issuance is more than 20% of the common stock outstanding.

2.2.3 Requirements in going-private transactions

In a going-private transaction, a small group of investors seeks to acquire all publicly traded shares of a firm either as a negotiated merger or a tender offer. Managerial conflicts of interest in these going-private transactions are widely perceived as unfair to public shareholders (DeAngelo et al. 1984). To address such conflicts of interest, the SEC adopted Rule 13e-3 in 1979, which requires extensive disclosures related to the purpose and fairness of going-private transactions in addition to regular merger/tender offer filings.[7]

Figure 1 summarizes the specific filing and disclosure requirements for each type of deal discussed in this section.[8]

3 Hypothesis development

3.1 Deal completion

Anticipated synergies are a key driver of M&As (e.g., Bradley et al. 1988; Hoberg and Phillips 2010). However, an extensive literature documents severe information asymmetry in M&As, which creates uncertainty about the realization of potential synergies. DeAngelo (1990) argues that the inability to rely on capital markets to value a transaction generates disagreement among shareholders, which can cause even positive NPV transactions to fail because shareholders' cooperation is required to complete them.

Increasing the quality of M&A disclosures can reduce disagreement among capital market participants and in turn the uncertainty about deal completion (e.g., Bens et al. 2016; Lang and Lundholm 1996; Linsmeier et al. 2002). If the SEC review process successfully reduces information asymmetry by improving disclosure

[7] These additional disclosure requirements are summarized on the SEC's website: https://www.sec.gov/fast-answers/answersgoprivhtm.html.

[8] Bidder and target firms sometimes also discuss M&A transactions in Form 10-K, Form 10-Q, and Form 8-K. We do not examine these filings because they are generally not specific to M&As and contain only a small subset of the information included in M&A filings.

quality, then shareholders are more likely to perceive the offer price to be fair and thus vote in favor of the deal.

In the above scenario, the relation between SEC comment letter receipt and deal completion depends on whether the SEC can conduct full reviews of all deals with disclosure deficiencies. If the SEC fully reviews all deals with disclosure deficiencies and uses comment letters to correct all disclosure issues, then deals receiving comment letters and deals not receiving comment letters will have similar disclosure quality after the comment letter process and therefore a similar likelihood of deal completion.

However, prior studies suggest that the SEC faces resource constraints and is thus not able to fully review all transactional filings. Blackburne (2014) and Ege et al. (2020) suggest that although all deals are likely reviewed to some extent, the scope of each review can vary substantially, from a thorough review of all disclosure items to a targeted review of single disclosure items (Blackburne 2014).[9] In this case, some deals with disclosure deficiencies will not receive comment letters. Therefore, deals receiving SEC comment letters could have a higher completion likelihood relative to deals not receiving comment letters, particularly among deals with disclosure deficiencies. We therefore state the following hypothesis:

H1: Deals that receive SEC comment letters have a higher probability of completion relative to deals that do not receive comment letters.

3.2 Price revision

SEC comment letters for M&As generally result in firms revising their public disclosures to address issues raised by the SEC. These filing amendments likely contain relevant information regarding the value of the target firm, the bidder firm, or their combined synergies. For example, target firm managers could withhold positive information in initial M&A filings because they have incentives to sacrifice deal premiums in exchange for obtaining private benefits from the acquirer. Thus, SEC review could result in disclosure of the previously withheld positive information and therefore a positive price revision. Moreover, existing literature documents that information asymmetry in M&As can lower the bidder's offer price (e.g., Officer 2007a; Officer et al. 2009). Thus, reduced information asymmetry resulting from the SEC review process may encourage other potential buyers to bid more aggressively for a deal, which could increase the offer price.

Furthermore, it is well documented in the accounting literature that managers have incentives to withhold bad news (Kothari et al. 2009). In M&As, target managers could hide negative information about target firm value from bidder firms to increase their bargaining power. As a result, SEC comment letters may uncover negative information withheld by target managers, which might lead to negative price

[9] The SEC staff also communicated to us that the efforts they spend reviewing M&A filings can vary significantly, ranging from a few hours to several days, and can involve a single reviewer or multiple reviewers for each filing.

revisions. Finally, target and bidder managers could unintentionally omit value-relevant information from M&A filings due to a lack of expertise (Bozanic et al. 2019). Thus, SEC comment letters may increase the likelihood of price revision, even though the direction of price revision is unclear ex ante. This discussion leads to the following hypothesis:

H2: The receipt of an SEC comment letter in an M&A transaction is positively associated with the likelihood of offer price revision.

However, the SEC review process might not change offer prices, given that bidder firms and target firms have already conducted extensive due diligence during the deal negotiations preceding SEC review. In this case, the deal price prior to the SEC review incorporates all relevant information; thus, any new information revealed through the SEC review process may not be sufficiently material to change the offer price.

3.3 Deal duration

We observe that a comment letter contains 18.3 comments and takes 27.5 days to resolve, on average. Therefore, the comment letter process can potentially increase deal duration. However, the degree of the delay is uncertain because firms could address SEC comments while working on other M&A procedures, which would mitigate the delay that is specifically caused by the comment letter process. We state the following hypothesis.

H3: The receipt of an SEC comment letter in an M&A transaction is positively associated with deal duration.

4 Data, sample selection, SEC comment letter content, and summary statistics

4.1 Data and sample selection

To construct our sample of M&As, we identify all M&A transactions announced from January 1, 2005 to December 31, 2017 in the Thomson One Banker SDC database. We begin our sample period in 2005 because the SEC made comment letter correspondence publicly available starting in August 2004. Table 1 Panel A summarizes our sample selection process. Following prior literature, we impose the following filters: 1) the target firm is classified as "Public"; 2) the deal is classified as "Merger (stock or asset)," "Acquisition of Assets," or "Acquisition of Majority Interest"; 3) the deal value reported by SDC is at least $1 million; 4) the deal status is classified as either "completed" or "withdrawn"; and 5) the bidder is seeking to purchase 50% or more of the target firm's shares. These criteria yield a sample of 3529 deals.

Next, we merge our list of target firms with securities pricing data from CRSP and SEC comment letter data from Audit Analytics.[10] The merged dataset has 2647 observations. For each transaction, we manually verify whether merger documents were filed with the SEC. We identify 120 withdrawn deals where the bidder and target firms did not file merger documents with the SEC, and we exclude them from our analysis because they were not subject to the SEC review process. Our final sample contains 2527 deals from 2005 to 2017. Table 1 Panel B presents the distribution of M&A deals in our sample by year. We observe greater M&A activity in 2005, 2006, and 2007, which is partially attributed to a leveraged-buyout boom during this period (e.g., Kaplan and Stromberg 2009; Officer et al. 2010).

4.2 Issue categories and descriptive statistics

We rely on Audit Analytics to identify deals for which the SEC provides comments on transaction filings between the public merger announcement date and the deal completion/withdrawal date. We manually review each comment letter to ensure that the filing(s) on which the SEC staff comments is (are) indeed M&A-related. Our review revealed that Audit Analytics often incorrectly includes Form S-4 acceleration requests filed by bidder firms in its comment letter database. In addition, Audit Analytics sometimes misclassifies the type of comment letter (e.g., tagging an M&A comment letter as a Form 10-K comment letter). Thus, our review helps address various problems with the Audit Analytics database. Our final sample includes 1238 comment letters issued to 772 deals.

For each comment letter, we hand collect the number of issues raised in the comment letter and the specific content of each issue. We classify the comment letter issues into two broad categories: deal/firm financial information and deal/firm non-financial information. We further create three financial category subgroups and twelve non–financial category subgroups.[11] Table 2 Panel A provides the frequency of each subcategory. The three most frequent subcategories are the background of the merger (raised in 49% of comment letters), the fairness opinion and valuation (48%), and the reasons and recommendations for the merger (39%).[12] The other subcategories that were present in at least 20% of comment letters include company financial information, terms and conditions of the deal, tax consequences, interests of managers, and financing and payments.

[10] Audit Analytics organizes SEC comment letter data at the conversation level, where a conversation is defined as all rounds of exchange between the SEC and the firm for the transaction filing(s). Among other variables, Audit Analytics provides the date of the first letter issued by the SEC, the date of the last letter issued by the SEC, and the name of the filings for which the SEC provides comments.

[11] To create these category subgroups, we first manually review each comment letter to identify all issues raised by the SEC. We then group the issues into 15 categories based on the way that the SEC reviewers organize the comments in their letters. We chose not to apply textual analysis and machine learning techniques because hand collection allows us to better understand the nature of the comments and to classify them in a more accurate manner.

[12] Sixty-five percent of comment letters include issues in the "general compliance" category, which contains miscellaneous issues that do not belong to a specific category in Table 2. Some of these issues relate to presentation or formality, such as requesting that the firm make certain information more prominent, while others may result in additional material disclosures, such as pointing out a missing summary term sheet or requesting that managers explain steps to realize synergies.

Table 1 Sample construction

Panel A: Sample Construction

Sample filters	# of deals
Domestic public target deals announced from 01/01/2005 to 12/31/2017	16,424
Form of the deal: Merger (stock or asset), Acquisition of Assets, or Acquisition of Majority Interest (M, AA, AM)	4838
Deal value: > $1 million	3732
Deal status: Completed or withdrawn	3587
Percentage of shares acquirer is seeking to purchase: >=50%	3529
Target returns information available on CRSP	2707
SEC comment letter data available in Audit Analytics	2647
Remove withdrawn deals without SEC filings to obtain final observations	2527

Panel B: Number of Deals in Sample by Year

Year	# of deals	% of deals
2005	244	9.66%
2006	280	11.08%
2007	300	11.87%
2008	178	7.04%
2009	169	6.69%
2010	209	8.27%
2011	180	7.12%
2012	172	6.81%
2013	163	6.45%
2014	153	6.05%
2015	181	7.16%
2016	170	6.73%
2017	128	5.07%
Total	2,527	100.00%

This table summarizes the construction of our M&A sample. Our sample includes deals announced from 2005 to 2017. Panel A reports sample filters and the number of observations under each filter. Panel B reports the number of deals by year

Table 2 Panel B reports summary statistics for the SEC comment letter variables and the deal outcome variables. We provide detailed variable definitions in Appendix Table 10. Among the 2527 sample M&As, approximately 31% of the transactions receive comment letters, 21% receive comment letters with issues related to financial information, and 27% receive comment letters with issues related to non-financial information. On average, the number of issues (categories of issues) raised by the SEC per deal is 5.5 (1.2).[13] Among the 772 deals that

[13] In our full sample, we assign a value of zero to the number of issues and the number of issue categories if the SEC does not issue a comment letter for a deal. In the sample of deals receiving comment letters, the average number of issues (categories of issues) raised by the SEC is 18.4 (4.1).

Table 2 Summary statistics

Panel A: Comment Letter Issues

Broad Category	%	Specific Category	No.	%
Deal Financial Information	67.36%	Fairness opinion and valuation	371	48.06%
		Company financial information	273	35.36%
		Tax consequences	182	23.58%
Deal Non-Financial Information	88.47%	General compliance	502	65.03%
		Shareholder meeting and voting	131	16.97%
		Solicitation	60	7.77%
		Appraisal rights	43	5.57%
		Background	380	49.22%
		Reasons and recommendations	299	38.73%
		Terms and conditions	223	28.89%
		Financing and payment	178	23.06%
		Interest of managers	186	24.09%
		Risk factors	103	13.34%
		Litigation and legal issues	105	13.60%
		Regulatory approval	38	4.92%

Panel B: Descriptive Statistics on Comment Letter and Deal Outcome Variables

Variables	N	mean	sd	p25	p50	p75
Cl	2527	0.31	0.46	0.00	0.00	1.00
Cl_issue	2527	5.45	12.59	0.00	0.00	3.00
Cl_amendment	2527	0.28	0.45	0.00	0.00	1.00
Cl_noamendment	2527	0.02	0.15	0.00	0.00	0.00
Nocl_amendment	2527	0.29	0.45	0.00	0.00	1.00
Cl_approval	2527	0.24	0.43	0.00	0.00	0.00
Cl_both_approval	2527	0.08	0.28	0.00	0.00	0.00
Cl_target_approval	2527	0.16	0.36	0.00	0.00	0.00
Cl_no_approval	2527	0.07	0.25	0.00	0.00	0.00
Cl_amendment_approval	2527	0.22	0.41	0.00	0.00	0.00
Cl_amendment_both_approval	2527	0.08	0.27	0.00	0.00	0.00
Cl_amendment_target_approval	2527	0.13	0.34	0.00	0.00	0.00
Cl_amendment_no_approval	2527	0.07	0.25	0.00	0.00	0.00
Completion	2527	0.88	0.33	1.00	1.00	1.00
Deal_duration	2527	131.00	91.52	69.00	107.00	164.00
Price_revision	2527	0.14	0.34	0.00	0.00	0.00
Pos_revision	2527	0.10	0.30	0.00	0.00	0.00
Neg_revision	2527	0.04	0.19	0.00	0.00	0.00

Table 2 (continued)

Panel C: Descriptive Statistics on Deal and Firm Characteristics

Variables	N	mean	sd	p25	p50	p75
Deal_size ($M)	2527	2109.00	4983.00	133.90	451.80	1682.00
Diversify	2527	0.46	0.50	0.00	0.00	1.00
Tender	2527	0.17	0.37	0.00	0.00	0.00
Going_private	2527	0.31	0.46	0.00	0.00	1.00
Stock	2527	0.32	0.47	0.00	0.00	1.00
Friendly	2527	0.95	0.23	1.00	1.00	1.00
Public_acquirer	2527	0.58	0.49	0.00	1.00	1.00
Serial_acquirer	2527	0.27	0.45	0.00	0.00	1.00
Premium	2380	0.32	0.31	0.14	0.27	0.43
Board_size	2520	8.17	2.24	7.00	8.00	9.00
Ind_director	2520	0.76	0.13	0.67	0.78	0.86
Insider_own	2518	0.15	0.16	0.04	0.09	0.21
Dual_class	2522	0.05	0.22	0.00	0.00	0.00
Target_res	2527	0.24	0.43	0.00	0.00	0.00
Bidder_res	2527	0.10	0.30	0.00	0.00	0.00
Target_cl	2527	0.68	0.47	0.00	1.00	1.00
Bidder_cl	2527	0.39	0.49	0.00	0.00	1.00
Disclosure_quality	2527	2.59	0.93	2.00	3.00	3.00
Amend_price_reaction	1437	0.07	0.12	0.01	0.03	0.07

This table presents summary statistics for SEC comment letters and key variables in our sample. Panel A reports comment letter issue categories. The "general compliance" category includes all issues about deal non-financial information that do not belong to a specific category listed. Panel B reports descriptive statistics for comment letter variables and deal outcome variables. We assign a value of zero to the number of issues and the number of issue categories if there is no comment letter issued for a deal. Panel C reports summary statistics for deal and firm characteristics. Our sample includes deals announced from 2005 to 2017. Variable definitions are provided in Appendix Table 10

receive comment letters, the average length of time to resolve all issues is 27.5 calendar days. In terms of deal outcomes, 88% of deals are completed and 12% are withdrawn. Price revisions occur in 14% of deals, and the average deal duration is 131 calendar days.

Table 2 Panel C reports summary statistics for deal and firm characteristics. All continuous variables are winsorized at the 1st and 99th percentiles. The mean (median) deal value is $2.1 ($0.45) billion. Approximately 46% of the deals are classified as diversification transactions. About 17% of the deals are tender offers, and 31% are going-private transactions. Bidders use their stock as consideration in about one-third of the deals. Consistent with prior research, including Boone and Mulherin (2007) and Andrade et al. (2001), we find that, on average, target firms receive a substantial offer premium of 32%. Overall, the deal characteristics are consistent with prior research on publicly traded targets.

4.3 Additional disclosure after receiving SEC comment letters

Appendix 2 provides representative examples of the three major categories of merger filing comments listed in Table 2 Panel A and the filing firm's responses to resolve the issues. The first example relates to merger background, in which the SEC requested additional information on "strategic alternatives" discussed by the firm in its proxy statement. In response, the firm revised its disclosure by providing additional information in its amended proxy statement. The second example relates to a fairness opinion issue, where the SEC asked the firm to further discuss the criteria used in its selection of comparable public firms. In response, the firm enhanced its discussion of the criteria in an amendment to its proxy statement. The last example illustrates an issue related to the reasons and recommendations category. The SEC questioned one of the reasons for the merger that the firm provided in its proxy statement. The firm elaborated on the reason in its response and also included the revised disclosure in its amended proxy statement. These examples suggest that firms generally comply with the SEC's requests and make revised disclosures publicly available to investors through filing amendments that include additional information requested by the SEC comment letters.

To further illustrate the types of information that are disclosed during the review process, in Appendix 3, we compare disclosures before and after an SEC comment letter using the fairness opinion example from Appendix 2. In response to the SEC comment letter, the company filed an amendment to the preliminary proxy statement, which disclosed that four out of the nine comparable companies were not used in the analysis because the investment bank determined that any comparable company ratios less than zero or higher than twenty were not meaningful. The company also disclosed the multiples for each of the remaining five comparable companies to justify the range used in the analysis. In this example, although the valuation range remains the same after the comment letter, the underlying support for the range is significantly more detailed. Thus, the revised disclosures help address investors' concerns about the investment bank potentially cherry-picking comparable companies in their valuation analysis.

5 Impact of comment letters on deal outcomes

In this section, we test our hypotheses on the effects of SEC comment letters on deal outcomes, including deal completion, offer price revision, and deal duration.

5.1 Impact of comment letters on deal completion

5.1.1 The relation between comment letters and deal completion

To test *H1* about the effect of SEC comment letters on deal completion, we estimate the following probit regression model:

$$\begin{aligned} Completion \quad =& \beta_0 + \beta_1 Cl + \beta_2 Deal\_size + \beta_3 Diversify \\ &+ \beta_4 Going\_private + \beta_5 Stock + \beta_6 Premium + \beta_7 Board\_size \\ &+ \beta_8 Ind\_director + \beta_9 Insider\_own + \beta_{10} Dual\_class + \beta_{11} Target\_cl \\ &+ \beta_{12} Bidder\_cl + \beta_{13} Target\_res + \beta_{14} Bidder\_res \\ &+ \beta_{15} Tender + \beta_{16} Friendly + \beta_{17} Public\_acquirer + \beta_{18} Serial\_acquirer \\ &+ \varepsilon \end{aligned} \tag{1}$$

where the dependent variable is an indicator variable equal to one for completed deals and zero for withdrawn deals. Our independent variable of interest is an indicator variable for the receipt of an SEC comment letter on an M&A filing (*Cl*). We also examine the number of comment letter issues (*Cl_issue*) and filing amendments made in response to a comment letter (*Cl_amendment*). Control variables include a broad range of deal and firm characteristics as well as the restatement and comment letter history of both target firms and bidder firms because financial reporting quality can affect deal outcomes (e.g., Amel-Zadeh and Zhang 2015).

Table 3 presents the regression results. The independent variable in Column (1) is the comment letter indicator variable (*Cl*). We find that receiving a SEC comment letter significantly increases the likelihood of deal completion by 4%. In Column (2), we observe a significantly positive coefficient on *Cl_issue*, suggesting that deal completion likelihood increases with the number of issues raised by the SEC in the comment letter process.

Next, we examine disclosure amendments as the channel through which SEC comment letters generate new information and in turn impact deal completion. The SEC generally makes M&A comment letters publicly available *after* deal completion. Therefore, prior to deal completion, shareholders primarily observe new information generated during the comment letter process via disclosure amendments to M&A filings.[14] Column (3) in Table 3 presents the results of estimating eq. (1) using a comment letter filing amendment indicator variable (*Cl_amendment*) as our independent variable of interest, which equals one if an M&A filing receives an SEC comment letter and the firm makes a filing amendment, and zero otherwise. We observe a positive significant coefficient on *Cl_amendment*, consistent with filing amendments being the channel through which SEC comment letters reduce information asymmetry and increase the likelihood of deal completion.[15]

In Column (4), we examine two additional indicator variables related to filing amendments. *Cl_noamendment* equals one if an M&A filing receives an SEC comment letter but the firm does not make a filing amendment, and *Nocl_amendment*

[14] Over 80% of the comment letters in our sample are disclosed after deal completion, and firms file amendments in response to comment letters for 92% of the comment-letter observations in our sample. Because bidder amendment filings likely have minimal impact on cash deals, we re-estimate our regressions excluding two cash deals where the bidder firm amended its filings while target filings remain unchanged. Our results continue to hold when excluding these two deals.

[15] We interpret the filing amendment results with caution because the high correlation between *Cl* and *Cl_amendment* (i.e., over 90% of the deals receiving comment letters also have filing amendments) makes it difficult to separate the effects of comment letters with filing amendments and comment letters without filing amendments.

equals one if an M&A firm makes a filing amendment but does not receive an SEC comment letter. The coefficient on *Cl_noamendment* is insignificant (t-stat = 0.26), suggesting that comment letters have little effect on deal completion if the firm does not amend its filings in response to SEC comments. In addition, the *Nocl_amendment* coefficient is economically smaller and less statistically significant (t-stat = 1.87) than the *Cl_amendment* coefficient (t-stat = 3.37), indicating that filing amendments in response to comment letters have a stronger effect on deal completion than voluntary filing amendments.[16]

With respect to the control variables, we find that going-private transactions are less likely to be completed, while tender offers, friendly deals, and deals involving serial acquirers are more likely to be completed. These findings are consistent with prior studies examining deal completion (e.g., Schwert 2000; Masulis et al. 2009; Chen et al. 2007; Bates and Becher 2017). Overall, Table 3 provides evidence that the SEC comment letter process helps mitigate information asymmetry in M&A deals and increases the likelihood of deal completion.

If filing amendments are the channel through which SEC comment letters reduce information asymmetry, then we should observe a significant market reaction to filing amendments for deals with comment letters.[17] Further, the results in Table 3 suggest that filing amendments associated with comment letters are more effective in increasing deal completion likelihood than voluntarily filing amendments. As a result, we expect the market reaction to filing amendments associated with comment letters to be stronger than the market reaction to voluntary filing amendments not associated with comment letters.

We estimate an OLS model where the dependent variable, *Amend_price_reaction*, is the three-day absolute cumulative abnormal return surrounding each filing amendment aggregated at the deal level.[18] This analysis includes deals with at least one filing amendment (e.g., PRER14A, S-4/A) between deal announcement and deal completion or withdrawal. Our independent variable of interest is the comment letter indicator variable (*Cl*). Table 4 presents the results both with and without control variables in Columns (1) and (2). We find that, on average, filing amendments associated with comment letters generate significantly stronger price movements relative to the voluntary filing amendments. In Columns (3) and (4), we repeat this analysis excluding withdrawn deals and document similar results.

[16] The difference between the *Cl_amendment* coefficient and the *Nocl_amendment* coefficient is marginally significant (p value 0.119).

[17] Although amendment filings for non–comment letter deals are certainly not driven by the SEC review process, amendment filings for comment letter deals may occasionally include voluntary amendments in addition to amendments responding to comment letters. One limitation of our analysis is that we are not able to distinguish voluntary amendments from SEC-induced amendments for comment letter deals. This limitation biases against our finding significant results in this analysis.

[18] We focus on unsigned price movement to test whether the amendment filings contain new information, because price changes can be either positive or negative depending on the nature of the information.

Table 3 SEC comment letters and deal completion

	Dependent Variable: *Completion*			
	(1)	(2)	(3)	(4)
Cl	0.037***			
	(2.78)			
Cl_issue		0.002***		
		(3.65)		
Cl_amendment			0.042***	0.056***
			(2.95)	(3.37)
Cl_noamendment				0.010
				(0.26)
Nocl_amendment				0.031*
				(1.87)
Deal_size	0.004	0.004	0.004	0.005
	(0.88)	(0.77)	(0.86)	(0.96)
Diversify_ff	−0.016	−0.016	−0.016	−0.017
	(−1.05)	(−1.10)	(−1.07)	(−1.13)
Going_private	−0.059***	−0.059***	−0.059***	−0.060***
	(−2.70)	(−2.70)	(−2.68)	(−2.74)
Stock	−0.031*	−0.033*	−0.033*	−0.041**
	(−1.83)	(−1.95)	(−1.90)	(−2.23)
Premium	−0.021	−0.020	−0.022	−0.020
	(−0.98)	(−0.95)	(−1.02)	(−0.97)
Board_size	0.003	0.003	0.003	0.003
	(1.19)	(1.09)	(1.19)	(1.17)
Ind_director	−0.051	−0.050	−0.053	−0.060
	(−1.03)	(−1.01)	(−1.06)	(−1.22)
Insider_own	0.035	0.030	0.034	0.028
	(0.88)	(0.75)	(0.84)	(0.72)
Dual_class	−0.011	−0.013	−0.011	−0.010
	(−0.35)	(−0.44)	(−0.37)	(−0.34)
Target_cl	0.015	0.015	0.016	0.015
	(1.17)	(1.12)	(1.20)	(1.17)
Bidder_cl	−0.002	0.000	−0.002	−0.006
	(−0.09)	(0.00)	(−0.12)	(−0.32)
Target_res	−0.014	−0.014	−0.014	−0.013
	(−1.15)	(−1.18)	(−1.16)	(−1.10)
Bidder_res	−0.009	−0.008	−0.009	−0.011
	(−0.45)	(−0.42)	(−0.45)	(−0.54)
Tender	0.070***	0.071***	0.068***	0.055***
	(3.70)	(3.80)	(3.61)	(2.68)
Friendly	0.341***	0.343***	0.342***	0.339***
	(15.06)	(15.05)	(15.02)	(15.04)

Table 3 (continued)

	Dependent Variable: *Completion*			
	(1)	(2)	(3)	(4)
Public_acquirer	−0.009	−0.010	−0.009	−0.010
	(−0.33)	(−0.37)	(−0.32)	(−0.39)
Serial_acquirer	0.040**	0.040**	0.040**	0.039**
	(2.49)	(2.51)	(2.50)	(2.47)
Observations	2348	2348	2348	2348
Industry&Year FE	Yes	Yes	Yes	Yes
Pseudo R-squared	0.254	0.258	0.255	0.257

This table reports the marginal effects of probit regressions of SEC comment letters on deal completion. The dependent variable, *Completion*, is an indicator variable equal to one if the deal is completed, and zero otherwise. Key independent variables include an indicator variable for the receipt of a comment letter (*CI*), the number of issues raised by the SEC in the comment letter (*CI_issue*), an indicator variable for deals that receive comment letters and also file amendments (*CI_amendment*), an indicator variable for deals that receive comment letters but do not file amendments (*CI_noamendment*), and an indicator variable for deals that do not receive comment letters but file voluntary amendments (*Nocl_amendment*). All variables are defined in Appendix Table 10. Standard errors are clustered at the bidder firm level to account for potential serial acquirers. Robust Z-statistics are reported in parentheses. Industry and year fixed effects are included in all regression specifications. Intercepts are not reported for brevity. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively

Table 4 Market reaction to M&A disclosure amendments

	Dependent Variable: *Amend_price_reaction*			
	All Deals		Completed Deals	
	(1)	(2)	(3)	(4)
CI	0.019***	0.020***	0.019***	0.026***
	(3.00)	(3.08)	(3.44)	(4.26)
Observations	1437	1380	1300	1252
Control	No	Yes	No	Yes
Industry&Year FE	No	Yes	No	Yes
R-squared	0.006	0.179	0.009	0.123

This table presents the results on the market reaction to filing amendments aggregated at the deal level. The dependent variable, *Amend_price_reaction*, is the sum of absolute three-day cumulative abnormal return around each filing amendment for a given deal. The key independent variable is *CI*, an indicator variable for the receipt of a comment letter. Columns 1 and 2 report results based on the full sample. Columns 3 and 4 present results for completed deals. The coefficients on the control variables and the intercept are not reported for brevity. The control variables are the same as those included in the main analyses. All variables are defined in Appendix Table 10. Standard errors are clustered at the bidder firm level to account for potential serial acquirers. Robust Z-statistics (t-statistics) are reported in parentheses. Industry and year fixed effects are included in all regression specifications. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively

5.1.2 Additional analyses on the effect of SEC comment letters on deal completion

In this subsection, we conduct four sets of analyses to further examine the relation between SEC comment letters and deal completion.

Ex ante disclosure quality An important assumption underlying *H1* is that some deals with low disclosure quality do not receive SEC comment letters. To investigate this assumption, we construct an ex ante disclosure-quality index, *Disclosure_Quality*, equal to 4 minus the sum of four indicator variables that capture the target and bidder firms' restatement and comment letter history. This index is intended to capture the disclosure quality of the target and bidder firms' pre-merger SEC filings, which is likely correlated with the quality of their merger filings. The four indicator variables include (1) an indicator variable equal to one if the target firm restated any SEC filing in the three years prior to the deal announcement and zero otherwise (*Target_res*); (2) an indicator variable equal to one if the target firm received any SEC comment letters in the last three years and zero otherwise (*Target_cl*); (3) an indicator variable equal to one if the bidder firm restated any SEC filing in the three years prior to the deal announcement (*Bidder_res*) and zero otherwise; and (4) an indicator variable equal to one if the bidder firm received any SEC comment letters in the last three years and zero otherwise (*Bidder_cl*). By construction, the *Disclosure_Quality* measure ranges from 0 to 4, with a higher value indicating higher ex ante disclosure quality (i.e., fewer disclosure issues in the past).

We divide deals not receiving comment letters into two subsamples based on the median *Disclosure_Quality*. The mean *Disclosure_Quality* is 3.31 for the high disclosure quality group and 1.72 for the low disclosure quality group. This considerable variation suggests that the SEC does not conduct full reviews for all deals with disclosure deficiencies. Therefore, we next perform our deal completion analysis separately for the two *Disclosure_Quality* subsamples. First, we compare comment letter deals to non–comment letter deals with high disclosure quality. We expect the effect of a comment letter on deal completion to be weakened if comment letters increase disclosure quality to be equivalent to the non–comment letter deals with high disclosure quality. Columns (1) and (2) of Table 5 Panel A present the results. We observe no association between comment letters and deal completion likelihood for the sample that includes comment letter deals and non–comment letter deals with high disclosure quality.

Second, we compare comment letter deals to non–comment letter deals with *low* disclosure quality. We observe a significant association between SEC comment letters and deal completion likelihood in Columns (3) and (4), where the coefficients are not only significantly positive but also larger than the coefficients in our baseline regressions. This result suggests that the SEC is unable to fully review every deal with disclosure deficiencies, which causes the disclosure quality of comment letter deals to be higher than the disclosure quality of low quality non–comment letter deals.

Shareholder approval If SEC comment letters increase the likelihood of deal completion by alleviating shareholders' disagreement, then we expect the effect of SEC comment letters to be greater for deals that require shareholder approval than for deals that do not require shareholder approval. We therefore construct indicator variables for the comment letter deals that require shareholder approval (*Cl_approval*) and the comment letter deals that do not require shareholder approval (*Cl_no_approval*). We observe a positive and significant coefficient on *Cl_approval* and an insignificant coefficient on *Cl_no_approval* in Table 5 Panel B Column (1).[19]

We further divide the comment letter deals that require shareholder approval into two subgroups according to the level of voting requirement. Specifically, we construct an indicator variable, *Cl_both_approval*, that equals one for comment letter deals that require shareholder approval from both target and bidder shareholders, and an indicator variable, *Cl_target_approval*, that equals one for the comment letter deals that require only target shareholder approval.[20] We expect the effect of SEC comment letters on deal completion to be greater when both target and bidder shareholder approvals are required, relative to when only target shareholder approval is required. In Column (2) of Panel B, we find weak evidence supporting this prediction: the coefficient on *Cl_both_approval* is 41% larger than the coefficient on *Cl_target_approval*, although the difference between these two coefficients is statistically insignificant. When we repeat the regression analyses using the corresponding comment letter filing amendment indicator variables in Columns (3) and (4), we observe similar results. Overall, the results in Panel B of Table 5 indicate that improved information transparency due to the SEC review process facilitates transaction completion by alleviating shareholder disagreement. These results support the arguments in DeAngelo (1986, 1990) that more transparent financial information helps ensure that shareholders perceive the offer price as fair and vote in favor of the deal.[21]

Reasons for withdrawn deals To ensure that our deal completion results are not driven by deals that are withdrawn for reasons unrelated to information asymmetry or disclosure quality (e.g., antitrust issues), we manually review the history of each withdrawn deal in our sample to identify any deals where the reason for termination is unlikely to be related to information asymmetry.[22] We identify 26 deals that are withdrawn due to antitrust/regulatory issues or lack of financing, and we repeat

[19] The difference between the *Cl_approval* coefficient and the *Cl_no_approval* coefficient is statistically significant (p value = 0.079).

[20] Among our sample deals, 420 require both target and bidder shareholder approval, 1691 require only target shareholder approval, four require only bidder shareholder approval, and 412 require no shareholder approval. We exclude the indicator variable for deals that require only bidder shareholder approval since there are only four such deals.

[21] Prior studies argue that the fairness opinion valuations produced by investment banks are biased because of potential conflicts of interest (e.g., Bebchuk and Kahan 1989; Davidoff 2006; Kisgen et al. 2009). Because fairness opinion comments account for the largest percentage of financial comments in our sample, our results are consistent with the SEC's review process leading to enhanced valuation analysis disclosure, which increases shareholder confidence in the underlying valuation analysis produced by investment banks.

[22] We identify several common reasons for deal termination, including: (1) unlikely to gain shareholder approval; (2) the target firm considers a competing offer; (3) regulatory risks; (4) a lack of financing for the acquirer; and (5) other reasons that are not clearly stated.

Table 5 Further analyses on deal completion: mechanisms

Panel A: Cross Sectional Test on Disclosure Quality

	Dependent Variable: *Completion*			
	Cl = 1 vs. High Disclosure Quality Deals		*Cl* = 1 vs. Low Disclosure Quality Deals	
	(1)	(2)	(3)	(4)
Cl	0.025		0.050***	
	(1.60)		(2.95)	
Cl_amendment		0.027		0.094***
		(1.42)		(4.30)
Control	Yes	Yes	Yes	Yes
Observations	1664	1664	1414	1414
Industry&Year FE	Yes	Yes	Yes	Yes
Pseudo R-squared	0.261	0.262	0.284	0.302

Panel B: The Role of Shareholder Approval

	Dependent Variable: *Completion*			
	(1)	(2)	(3)	(4)
Cl_no_approval	−0.014	−0.015		
	(−0.46)	(−0.48)		
Cl_approval	0.045***			
	(3.06)			
Cl_target_approval		0.041**		
		(2.47)		
Cl_both_approval		0.058**		
		(2.00)		
Cl_amendment_no_approval			0.004	0.004
			(0.13)	(0.12)
Cl_amendment_approval			0.063***	
			(3.55)	
Cl_amendment_target_approval				0.058***
				(3.04)
Cl_amendment_both_approval				0.074**
				(2.34)
Control variables	Yes	Yes	Yes	Yes
Observations	2348	2348	2348	2348
Industry&Year FE	Yes	Yes	Yes	Yes
Pseudo R-squared	0.256	0.256	0.259	0.259

Panel C: Analysis of Deal Withdrawals Unrelated to Information Asymmetry

	Dependent Variable: *Completion*			
	Exclude Unrelated Withdrawal		Only Include Unrelated Withdrawal	
	(1)	(2)	(3)	(4)
Cl	0.039***		−0.003	

Table 5 (continued)

	(3.08)		(−0.44)	
Cl_amendment		0.046***		−0.006
		(3.32)		(−0.80)
Control	Yes	Yes	Yes	Yes
Observations	2322	2322	1300	1300
Industry&Year FE	Yes	Yes	Yes	Yes
Pseudo R-squared	0.275	0.276	0.249	0.250

This table presents the additional results on the relationship between comment letters and deal completion. The dependent variable, *Completion*, is an indicator variable equal to one if the deal is completed, and zero otherwise. Key independent variables include an indicator variable for the receipt of a comment letter (*Cl*), an indicator variable for deals that receive comment letters and also file amendments (*Cl_amendment*), an indicator variable equal to one if a deal receives a comment letter and requires some level of shareholder approval (*Cl_approval*), an indicator variable indicator variable equal to one if a deal receives a comment letter and requires shareholder approval from shareholders on both sides (*Cl_both_approval*), an indicator variable equal to one if a deal receives a comment letter and requires only target shareholder approval (*Cl_target_approval*), an indicator variable equal to one if a deal receives a comment letter and does not require shareholder approval (*Cl_no_approval*), an indicator variable equal to one for comment letter deals that have filing amendments and require some level of shareholder approval (*Cl_amendment_approval*), an indicator variable equal to one for comment letter deals that have filing amendments and require shareholder approval from shareholders on both sides (*Cl_amendment_both_approval*), an indicator variable equal to one for comment letter deals that have filing amendments and require only target shareholder approval (*Cl_amendment_target_approval*), and an indicator variable equal to one for comment letter deals that have filing amendments but do not require shareholder approval (*Cl_amendment_no_approval*). Panel A reports results by comparing deals with comment letters with high (low) disclosure quality deals without comment letters. Panel B presents the results on how comment letters and filing amendments affect the completion likelihood for deals with different shareholder approval requirements. Panel C reports results after excluding deals withdrawn due to antitrust and financing reasons in Columns 1 and 2. Columns 3 and 4 of Panel C present the results from a falsification test where we only include completed deals and deals withdrawn due to antitrust and financing reasons. The coefficients on the control variables and the intercept are not reported for brevity. The control variables are the same as those included in the main analyses. All variables are defined in Appendix Table 10. Standard errors are clustered at the bidder firm level to account for potential serial acquirers. Robust Z-statistics (t-statistics) are reported in parentheses. Industry and year fixed effects are included in all regression specifications. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively

our regression analysis after removing these deals. We present the results in Panel C of Table 5. We continue to observe a positive effect of SEC comment letters on deal completion in Columns (1) and (2). As a falsification test, we repeat our regression analysis including only completed deals and the subset of withdrawn deals as a result of antitrust and bidder financing issues and tabulate the results in Columns (3) and (4). We expect that SEC comment letters have no effect on deal completion in this falsification analysis. Indeed, we observe, in Columns (3) and (4), that the coefficients on *Cl* and *Cl_amendment* are slightly negative and statistically insignificant.[23] These results provide further evidence that SEC comment letters affect deal completion via improved information transparency.

[23] While we acknowledge that the insignificant results could be due to a smaller sample size, the magnitude of the coefficient suggests that comment letters are unlikely to have any effects on deal termination among deals that face significant antitrust issues and deals where the bidder fails to obtain financing.

Addressing the reverse causality concern One concern with our deal completion results is that the SEC might consider the likelihood of deal completion when selecting transactions for full review and intentionally choose to fully review deals that are more likely to be completed. We attempt to address this concern in multiple ways. First, we examine whether firms receiving comment letters have a higher ex ante likelihood of deal completion. A commonly used measure of the ex ante likelihood of deal completion is merger arbitrage spread, which captures the profit that merger arbitrageurs realize only if the deal is successfully completed (e.g., Mitchell and Pulvino 2001; Mitchell et al. 2004). A larger arbitrage spread implies a lower probability of deal completion.

We measure merger arbitrage using different approaches for cash mergers and stock mergers. For cash mergers, we calculate merger arbitrage spread as the difference between the cash offer price and the target stock price two days after the transaction is announced, scaled by the target firm's stock price. For stock mergers, we calculate merger arbitrage spread as the difference between the fixed exchange ratio multiplied by bidder stock price and target stock price two days after the merger is announced, scaled by the target firm's stock price. For deals in which the bidder allows target shareholders to receive either a cash payment or a fixed number of bidder shares, we use the cash merger calculation because arbitrageurs can elect to receive cash as payment. Because standard datasets such as SDC do not provide complete information on the exchange ratio and whether target shareholders are allowed to choose between cash and stock, we read through merger filings to manually collect the fixed exchange ratio and to determine whether target shareholders are offered the option to choose between cash and bidder shares.[24]

Table 6 Panel A shows that the average arbitrage spread is 3.9% for deals receiving comment letters, similar to the 3.3% for deals not receiving comment letters. The difference in merger arbitrage spread between these two groups is not significantly different from zero (t-stat = 0.83). This result is inconsistent with the SEC selectively reviewing deals with a higher ex ante likelihood of completion.

Next, we directly control for arbitrage spread in our regression analysis. We follow prior literature and also include an indicator variable, *Neg_spread*, for deals with negative arbitrage spreads.[25] We report the regression results controlling for arbitrage spreads in Table 6 Panel B. Column (1) presents a probit model of SEC comment letter receipt on *Merger_spread* and *Neg_spread* with control variables. The coefficients on both spread measures are insignificant, which is consistent with the univariate evidence in Panel A that merger arbitrage spread is not significantly associated with the receipt of a comment letter. Column (2) presents our deal completion regression after

[24] In some cases, the consideration involves both a cash component and a fixed number of shares, and target shareholders do not have an option to choose between cash and stock. For those deals, merger arbitrage spread is the cash component plus the fixed exchange ratio multiplied by the bidder firm's stock price minus the target firm's stock price, scaled by the target firm's stock price.

[25] While the arbitrage spread is normally positive because the target stock price upon announcement is usually below the bidder's offer price, the arbitrage spread can also be negative in some cases. Negative arbitrage spreads indicate that arbitrageurs anticipate that the bidder will offer a higher price (Officer 2007b; Jindra and Walkling 2004; Hsieh and Walkling 2005), causing the price of the target stock at announcement to be higher than the bidder's offer price.

explicitly controlling for *Merger_spread* and *Neg_spread*. Our independent variable of interest, *Cl*, remains significantly positive. In addition, the coefficient on *Merger_spread* is negative and significant at the 1% level, indicating that merger arbitrage spread indeed captures the probability of deal completion. The coefficient on *Neg_spread* is significantly negative, suggesting a lower ex post likelihood of deal completion when merger arbitrageurs anticipate a higher bidder offer price. Overall, the results in Table 6 help alleviate concerns about reverse causality.

Finally, we also directly contacted SEC staff members in the Division of Corporate Finance Office of Mergers and Acquisitions. We explicitly asked them whether they consider the likelihood of deal completion during their review process, and they informed us that they do not consider the likelihood of deal failure in their review decision.

5.2 Impact of comment letters on offer price revision

To test *H2* on the effect of SEC comment letters on offer price revisions, we estimate the following probit model:

$$\begin{aligned} Price\_revision =& \beta_0 + \beta_1 Cl + \beta_2 Deal\_size + \beta_3 Diversify \\ &+ \beta_4 Going\_private + \beta_5 Stock + \beta_6 Premium + \beta_7 Board\_size + \beta_8 Ind\_director \\ &+ \beta_9 Insider\_own + \beta_{10} Dual\_class + \beta_{11} Target\_cl \\ &+ \beta_{12} Bidder\_cl + \beta_{13} Target\_res + \beta_{14} Bidder\_res + \beta_{15} Tender + \beta_{16} Friendly + \beta_{17} Public\_acquirer \\ &+ \beta_{18} Serial\_acquirer + \beta_{19} Multiple\_bidder + \varepsilon \end{aligned} \tag{2}$$

The regression design is similar to eq. (1) except that the dependent variable, *Price_revision*, is an indicator variable equal to one if the final public offer price has changed from the initial public offer price, and zero otherwise.

We present the results in Panel A of Table 7. In Column (1), we find that receipt of a comment letter is significantly positively associated with offer price revision. The results in Column (2) suggest that the number of issues raised in the comment letter process is also significantly positively associated with price revisions. Column (3) uses *Cl_amendment* as the independent variable of interest, and we continue to observe a significantly positive coefficient. When we include the three filing amendment indicator variables in Column (4), the coefficient on *Cl_amendment* remains significant at the 1% level, while the coefficients on *Cl_noamendment* and *Nocl_amendment* are insignificant.[26] These results indicate that SEC comment letters that do not lead to filing amendments and voluntary filing amendments do not increase the likelihood of offer price revision. Collectively, the results in Panel A of Table 7 provide strong evidence that filing amendments

[26] The difference between the *Cl_amendment* coefficient and the *Nocl_amendment* coefficient is statistically significant (p value = 0.009).

Table 6 Merger arbitrage spread and deal completion

Panel A: Univariate Analysis of Merger Arbitrage Spread

Variable	*Cl* = 1	*Cl* = 0
Merger_Spread	0.039	0.033
	Difference:	0.006
	t-statistic:	(0.83)

Panel B: Regression Analysis of Arbitrage Spread

	Dependent Variable	
	Cl	*Completion*
	(1)	(2)
Merger_Spread	0.025	−0.104***
	(0.37)	(−2.87)
Neg_Spread	−0.007	−0.111***
	(−0.28)	(−8.08)
Cl		0.036***
		(2.68)
Control variables	Yes	Yes
Industry&Year FE	Yes	Yes
Observations	2267	2248
R-squared	0.111	0.285

This table addresses concerns about reverse causality in our deal completion tests by examining whether merger arbitrage spread is a determinant of comment letter issuance. Key variables include an indicator variable for the receipt of a comment letter (*Cl*), an indicator variable for deal completion (*Completion*), a continuous measure of merger arbitrage spread (*Merger_spread*), and an indicator variable for negative merger arbitrage spread (*Neg_spread*). Panel A reports the average merger arbitrage spread between deals with comment letters and deals without comment letters. Panel B reports regression results of regressing *Cl* and *Completion* on the merger arbitrage spread variables and the independent variables in Table 5. All variables are defined in Appendix Table 10. Standard errors are clustered at the bidder firm level to account for potential serial acquirers. Robust Z-statistics are reported in parentheses. Industry and year fixed effects are included in all regression specifications. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively

resulting from SEC comment letters are value-relevant and significantly associated with offer price changes.[27]

Finally, in Panel B of Table 7, we examine the effect of SEC comment letters on positive offer price revision (*Pos_revision*) and negative offer price revisions (*Neg_revision*), respectively. We document that SEC comment letters (*Cl*) and comment letter filing amendments (*Cl_amendment*) are positively associated with the likelihood of both positive and negative price revisions. Overall, the results in Table 7

[27] With respect to the control variables, we find that going-private transactions and stock deals are more likely to experience offer price revisions. Consistent with Bates and Becher (2017), we find that offer price revisions are more likely for tender offers and less likely for friendly deals. Target firms with dual-class ownership, with public buyers, and with competing offers are also more likely to have price revisions.

Table 7 SEC comment letters and offer price revision

Panel A: Offer Price Revision

	Dependent Variable: *Price_revision*			
	(1)	(2)	(3)	(4)
Cl	0.046***			
	(3.36)			
Cl_issue		0.002***		
		(3.60)		
Cl_amendment			0.051***	0.059***
			(3.64)	(3.01)
Cl_noamendment				−0.011
				(−0.22)
Nocl_amendment				0.014
				(0.62)
Deal_size	−0.004	−0.004	−0.004	−0.003
	(−0.83)	(−0.98)	(−0.83)	(−0.76)
Diversify_ff	−0.002	−0.004	−0.002	−0.002
	(−0.13)	(−0.25)	(−0.12)	(−0.11)
Going_private	0.048*	0.050*	0.049*	0.049*
	(1.80)	(1.84)	(1.82)	(1.85)
Stock	0.073***	0.072***	0.071***	0.067***
	(3.74)	(3.61)	(3.60)	(3.06)
Premium	−0.026	−0.026	−0.026	−0.027
	(−1.05)	(−1.07)	(−1.07)	(−1.09)
Board_size	0.000	0.000	0.000	0.000
	(0.01)	(0.00)	(0.02)	(0.02)
Ind_director	−0.075	−0.069	−0.076	−0.077
	(−1.48)	(−1.36)	(−1.49)	(−1.51)
Insider_own	−0.060	−0.060	−0.062	−0.064
	(−1.44)	(−1.45)	(−1.48)	(−1.52)
Dual_class	0.085***	0.084***	0.083***	0.083***
	(3.25)	(3.23)	(3.19)	(3.18)
Target_cl	−0.001	−0.000	−0.001	−0.000
	(−0.09)	(−0.02)	(−0.04)	(−0.02)
Bidder_cl	−0.023	−0.022	−0.024	−0.026
	(−1.26)	(−1.17)	(−1.29)	(−1.38)
Target_res	0.020	0.019	0.019	0.019
	(1.29)	(1.21)	(1.24)	(1.24)
Bidder_res	0.019	0.021	0.019	0.018
	(0.88)	(0.98)	(0.88)	(0.84)
Tender	0.042**	0.045**	0.040**	0.034
	(2.27)	(2.51)	(2.15)	(1.52)
Friendly	−0.142***	−0.135***	−0.142***	−0.145***

Table 7 (continued)

	(−3.50)	(−3.27)	(−3.51)	(−3.51)
Public_acquirer	0.059**	0.058**	0.058**	0.057*
	(2.03)	(1.99)	(1.99)	(1.96)
Serial_acquirer	−0.024	−0.023	−0.024	−0.024
	(−1.49)	(−1.47)	(−1.50)	(−1.54)
Multiple_bidder	0.201***	0.204***	0.201***	0.201***
	(9.38)	(9.53)	(9.35)	(9.40)
Observations	2082	2082	2082	1903
Industry&Year FE	Yes	Yes	Yes	Yes
Pseudo R-squared	0.157	0.159	0.159	0.159

Panel B: Positive and Negative Offer Price Revision

	Dependent Variable			
	Pos_revision	*Neg_revision*		
	(1)	(2)	(3)	(4)
Cl	0.032***		0.018*	
	(2.99)		(1.85)	
Cl_amendment		0.035***		0.021**
		(3.15)		(2.19)
Control variables	Yes	Yes	Yes	Yes
Observations	2082	2082	1903	1903
Industry&Year FE	Yes	Yes	Yes	Yes
Pseudo R-squared	0.217	0.218	0.142	0.144

This table reports the marginal effects of SEC comment letters on offer price revision for the sample of completed deals. The dependent variable in Panel A, *Price_revision*, is an indicator variable equal to one if the final public offer price is different from the initial public offer price and zero otherwise. Key independent variables include an indicator variable for the receipt of a comment letter (*Cl*), the number of issues raised by the SEC in the comment letter (*Cl_issue*), an indicator variable for deals that receive comment letters and also file amendments (*Cl_amendment*), an indicator variable for deals that receive comment letters but do not file amendments (*Cl_noamendment*), and an indicator variable for deals that do not receive comment letters but file voluntary amendments (*Nocl_amendment*). We separately examine positive price revision and negative price revision in Panel B. The dependent variable in Columns 1 and 2 of Panel B is an indicator variable for deals where the final offer price is higher than the initial offer price (*Pos_revision*). The dependent variable in Columns 3 and 4 of Panel B is an indicator variable for deals where the final offer price is lower than the initial offer price (*Neg_revision*). All variables are defined in Appendix Table 10. Standard errors are clustered at the bidder firm level to account for potential serial acquirers. Robust Z-statistics are reported in parentheses. Industry and year fixed effects are included in all regression specifications. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively

suggest that the SEC comment letter process for M&As reveals new information to investors, which leads to both positive and negative offer price revisions.

5.3 Impact of comment letters on deal duration

To test *H3* on the extent to which the SEC comment letter process increases deal duration, we estimate the following OLS model:

Table 8 SEC comment letters and deal duration

	Dependent Variable: *Deal_duration*			
	(1)	(2)	(3)	(4)
Cl	0.166***			
	(6.58)			
Cl_issue		0.007***		
		(8.28)		
Cl_amendment			0.161***	0.190***
			(6.34)	(4.81)
Cl_noamendment				0.183***
				(2.67)
Nocl_amendment				0.041
				(0.99)
Deal_size	0.033***	0.030***	0.033***	0.034***
	(4.46)	(4.09)	(4.44)	(4.42)
Diversify	−0.033	−0.039	−0.033	−0.033
	(−1.34)	(−1.59)	(−1.32)	(−1.34)
Going_private	0.087	0.089	0.093*	0.085
	(1.59)	(1.64)	(1.68)	(1.60)
Stock	0.234***	0.226***	0.233***	0.219***
	(7.71)	(7.54)	(7.54)	(6.21)
Premium	0.016	0.015	0.015	0.017
	(0.48)	(0.43)	(0.44)	(0.48)
Board_size	0.020***	0.020***	0.021***	0.020***
	(3.83)	(3.84)	(3.87)	(3.79)
Ind_director	0.316***	0.339***	0.311***	0.311***
	(3.83)	(4.04)	(3.76)	(3.79)
Insider_own	−0.166*	−0.177**	−0.165*	−0.169**
	(−1.94)	(−2.09)	(−1.93)	(−2.00)
Dual_class	0.174***	0.170***	0.176***	0.173***
	(3.34)	(3.38)	(3.37)	(3.32)
Target_cl	−0.037*	−0.024	−0.034	−0.036*
	(−1.75)	(−1.20)	(−1.63)	(−1.73)
Bidder_cl	−0.082***	−0.076***	−0.083***	−0.085***
	(−2.97)	(−2.78)	(−3.00)	(−3.07)
Target_res	0.016	0.011	0.016	0.017
	(0.73)	(0.48)	(0.70)	(0.75)
Bidder_res	−0.029	−0.020	−0.028	−0.031
	(−0.79)	(−0.55)	(−0.77)	(−0.84)
Tender	−0.514***	−0.501***	−0.516***	−0.535***
	(−15.90)	(−15.94)	(−15.83)	(−11.87)
Friendly	−0.365***	−0.335***	−0.366***	−0.370***
	(−2.78)	(−2.58)	(−2.76)	(−2.79)
Public_acquirer	0.120**	0.116**	0.119**	0.117**

Table 8 (continued)

	Dependent Variable: *Deal_duration*			
	(1)	(2)	(3)	(4)
	(2.46)	(2.41)	(2.43)	(2.46)
Serial_acquirer	−0.103***	−0.104***	−0.105***	−0.103***
	(−4.34)	(−4.41)	(−4.40)	(−4.36)
Observations	2082	2082	2082	2082
Industry&Year FE	Yes	Yes	Yes	Yes
Pseudo R-squared	0.462	0.468	0.460	0.462

This table reports OLS regression results of deal duration on the receipt of SEC comment letters for completed deals. The dependent variable, *Deal_duration*, is the natural logarithm of one plus the number of days between deal announcement and completion. Key independent variables include an indicator variable for the receipt of a comment letter (*Cl*), the number of issues raised by the SEC in the comment letter (*Cl_issue*), an indicator variable for deals that receive comment letters and also file amendments (*Cl_amendment*), an indicator variable for deals that receive comment letters but do not file amendments (*Cl_noamendment*), and an indicator variable for deals that do not receive comment letters but file voluntary amendments (*Nocl_amendment*). All variables are defined in Appendix Table 10. Standard errors are clustered at the bidder firm level to account for potential serial acquirers. Robust t-statistics are reported in parentheses. Industry and year fixed effects are included in all regression specifications. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively

$$\begin{aligned} Deal\_duration =& \beta_0 + \beta_1 Cl + \beta_2 Deal\_size + \beta_3 Diversify + \beta_4 Going\_private \\ &+ \beta_5 Stock + \beta_6 Premium + \beta_7 Board\_size + \beta_8 Ind\_director \\ &+ \beta_9 Insider\_own + \beta_{10} Dual\_class + \beta_{11} Target\_cl \\ &+ \beta_{12} Bidder\_cl + \beta_{13} Target\_res + \beta_{14} Bidder\_res \\ &+ \beta_{15} Tender + \beta_{16} Friendly + \beta_{17} Public\_acquirer \\ &+ \beta_{18} Serial\_acquirer + \varepsilon \end{aligned} \tag{3}$$

The dependent variable, *Deal_duration*, equals the natural logarithm of one plus the number of calendar days between the deal announcement and deal completion.

Table 8 reports the regression results. In Column (1), our independent variable of interest is the comment letter indicator variable (*Cl*). The coefficient on *Cl* indicates that receipt of a comment letter increases deal duration by approximately 18.1%, or 20.3 days, consistent with the SEC review process significantly increasing deal duration.[28] This delay is shorter than the 27.5 average number of days to resolve comment letter issues, suggesting that firms are somewhat able to alleviate the delay caused by the comment letter process. The effect is economically significant, given that the average time to complete a deal is 131 days for our sample firms. In Column (2), we test whether the number of comment letter issues affects deal duration. The significantly positive coefficient on *Cl_issue* suggests that comment letters with

[28] The dependent variable in our deal duration analysis is log-transformed, so 18.1% represents the exponentiated regression coefficient ($e^{0.166} = 18.1\%$). We further derive the 20.3 days by multiplying 18.1% by 112 days, which is the average number of days from deal announcement to deal completion for the deals without comment letters included in this regression.

Table 9 Entropy balancing: SEC comment letters and deal outcomes

	Dependent Variable		
	Completion	*Price_revision*	*Deal_duration*
	(1)	(2)	(3)
CI	0.043***	0.055***	0.162***
	(3.34)	(3.15)	(6.46)
Observations	2348	2082	2082
Controls	Yes	Yes	Yes
Industry&Year FE	Yes	Yes	Yes
R-squared	0.250	0.159	0.496

This table reports results on the relations between SEC comment letters and deal completion, price revision, and deal duration using entropy balancing. The deal completion test includes both withdrawn and completed deals; the price revision and deal duration tests include completed deals only. Each regression includes treated deals and control deals with different weights. The weight assigned to each control observation is obtained through an iterative process that ensures that the mean and variance of all matching variables are approximately the same between the treated sample and the control sample. In Column 1, the dependent variable, *Completion*, is an indicator variable that equals one if the deal is completed and zero otherwise. In Column 2, the dependent variable, *Price_revision*, is an indicator variable that equals one if the final public offer price is different from the initial public offer price, and zero otherwise. In Column 3, the dependent variable, *Deal_duration*, is the natural logarithm of one plus the number of days between deal announcement and completion. The control variables include all independent variables in the corresponding OLS/Probit regressions. All variables are defined in Appendix Table 10. Standard errors are clustered at the bidder firm level to account for potential serial acquirers. Robust Z-statistics (t-statistics) are reported in parentheses in Columns 1 and 2 (Column 3). Industry and year effects are included in all regression specifications. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively

more issues cause significantly longer delays in the M&A process. We observe similar results when using *CI_amendment* as the independent variable of interest in Column (3). Interestingly, Column (4) suggests an increase in deal duration associated with SEC comment letters regardless of whether the comment letter results in filing amendments.

Overall, the results in Tables 3, 4, 5, 6, 7 and 8 suggest that there is a trade-off between the costs and benefits of the SEC review process. On one hand, SEC comment letters mitigate information asymmetry for investors in M&A deals, as evidenced by the higher likelihood of deal completion and price revision. On the other hand, the lengthy comment letter process can also significantly delay deal completion.

6 Entropy balancing analysis

We acknowledge that deals receiving SEC comment letters could be systematically different from deals not receiving comment letters, meaning that deal-specific or firm-specific characteristics could drive both the receipt of an SEC comment letter

and deal outcomes. Although the endogeneity concern is to some extent alleviated by our cross-sectional analyses, we use entropy balancing, a matching technique developed in Hainmueller (2012), to address potential differences in observable characteristics between deals with comment letters and deals without comment letters. Although propensity score matching (PSM) is commonly used in accounting and finance research, more recent literature highlights that the approach is subject to several caveats.[29] Unlike propensity score matching, entropy balancing almost always achieves a high covariate balance. It appropriately reweights each control observation through an iterative process until the first, second, and even third moments of the control group equal those of the treated group.

To implement entropy balancing, we match on the firm and deal characteristics used in our main deal outcome tests, because these variables might affect both comment letter issuance and deal outcomes. We match the mean and variance of deals receiving comment letters (treated sample) with deals not receiving comment letters (control sample) using the entropy balancing technique provided in Hainmueller and Xu (2013). After multiple iterations, the mean and variance of each variable between the treatment group and the control group are balanced. Each control observation is assigned a weight, and we use these weights to estimate the regressions. We present descriptive statistics of each variable before and after entropy balancing in Appendix Table 11.

We report our deal outcome results using entropy balancing in Table 9. Each regression consists of treated deals and control deals based on their weights. We examine deal completion, offer price revision, and deal duration in Columns (1) to (3), respectively. We continue to observe positive and significant coefficients on *Cl* across all three tests, and the magnitudes of the coefficients are comparable to those observed in our main tests. The results in Table 9 thus provide further evidence that SEC comment letters facilitate deal completion and increase the likelihood of price revision, albeit at the cost of increasing deal duration.

7 Conclusion

This study explores the role of the SEC review process in mergers and acquisitions (M&As). We find that the SEC issues comment letters for 31% of the transactions in our sample. In our main analysis, we examine the effects of SEC comment letters on multiple deal outcomes. Our results suggest that the SEC review process reduces information asymmetry via M&A firms amending their merger filings to disclose new information in response to comment letters. The receipt of an SEC comment letter significantly increases the likelihood of deal completion. We observe stronger results among a subsample that consists of comment letter

[29] Our results are also robust to propensity score matching.

deals and non–comment letter deals with low disclosure quality, indicating that resource constraints likely prevent the SEC from fully reviewing all deals. Furthermore, the effect is concentrated in deals that require shareholder voting, suggesting that additional disclosures associated with comment letters help alleviate shareholder disagreement.

We also find that the receipt of an SEC comment letter significantly increases the likelihood of price revisions, consistent with the SEC review process likely revealing new value-relevant information. The positive effects of the SEC review process on deal completion and offer price revisions come at the cost of significantly increasing the length of time between the deal announcement and deal completion. To alleviate concerns about endogeneity, we implement entropy balancing matching.

Our study contributes to both the literature on the consequences of the SEC review process and the M&A literature by providing new evidence on the SEC's review of transactional filings. Our results suggest that SEC resource constraints could have a significant impact on the M&A review process. The SEC's review of M&A filings is time-sensitive because these filings contain important information about ongoing corporate events and investors rely on such information to make immediate decisions (e.g., whether or not to give up the control rights of their company). If an M&A deal with low quality disclosures is not selected for a full review due to the SEC's resource constraints, the potential benefits of a full review will never come to fruition, because a delayed review is not possible. Our findings therefore suggest that increasing the SEC's resources would likely benefit market participants because the SEC could conduct full reviews for a larger percentage of M&A deals, particularly deals with disclosure deficiencies.

Appendix 1

Table 10 Variable definitions

Variable	Definition
Comment Letter Variables	
Cl	An indicator variable equal to one if the target or bidder receives at least one SEC comment letter between deal announcement and deal completion/withdrawal.
Cl_issue	The number of issues in all SEC comment letters that a deal receives.
Cl_amendment	An indicator variable equal to one if a deal receives at least one comment letter and makes at least one filing amendment.
Cl_noamendment	An indicator variable equal to one if a deal receives at least one comment letter but does not make any filing amendments.
Nocl_amendment	An indicator variable equal to one if a deal does not receive any comment letter but makes at least one filing amendment.
Cl_approval	An indicator variable equal to one if a deal receives a comment letter and requires some level of shareholder approval.
Cl_both_approval	An indicator variable equal to one if a deal receives a comment letter and requires shareholder approval from shareholders on both sides.
Cl_target_approval	An indicator variable equal to one if a deal receives a comment letter and requires only target shareholder approval.
Cl_no_approval	An indicator variable equal to one if a deal receives a comment letter and does not require shareholder approval.
Cl_amendment_approval	An indicator variable equal to one if a deal receives a comment letter, makes a filing amendment, and requires some level of shareholder approval.
Cl_amendment_both_approval	An indicator variable equal to one if a deal receives a comment letter, makes a filing amendment, and requires shareholder approval from shareholders on both sides.
Cl_amendment_target_approval	An indicator variable equal to one if a deal receives a comment letter, makes a filing amendment, and requires only target shareholder approval.
Cl_amendment_no_approval	An indicator variable equal to one if a deal receives a comment letter, makes a filing amendment, and does not require shareholder approval.
Deal and Firm Characteristics	
Deal_size	The natural logarithm of the dollar value of the deal in millions.
Diversify	An indicator variable equal to one if the target and the bidder are in different Fama-French 48 industries.
Tender	An indicator variable equal to one for tender offers and zero for mergers.
Going_private	An indicator variable equal to one if the target goes private as a result of the deal.
Stock	An indicator variable equal to one if a deal at least partially uses stock financing.
Friendly	An indicator variable equal to one for friendly deals based on the classification in SDC.
Public_acquirer	An indicator variable equal to one if the bidder is public.
Serial_acquirer	An indicator variable equal to one if the bidder has conducted at least one M&A deal in the last five years.

Table 10 (continued)

Variable	Definition
Premium	The initial offer price divided by the target stock price one week prior to the deal announcement minus one; The final offer price is used if the initial offer price is missing in SDC.
Board_size	The number of directors on the target's board of directors disclosed in the most recent proxy statement prior to deal announcement.
Ind_director	The percentage of independent directors on the target's board of directors disclosed in the most recent proxy statement prior to deal announcement.
Insider_own	The percentage of target shares owned by the target's officers and directors prior to deal announcement.
Dual_class	An indicator variable equal to one if the target has more than one class of shares prior to deal announcement.
Target_res	An indicator variable equal to one if the target had a restatement during the three years prior to deal announcement.
Bidder_res	An indicator variable equal to one if the bidder had a restatement during the three years prior to deal announcement.
Target_cl	An indicator variable equal to one if the target received at least one SEC comment letter during the three years prior to deal announcement.
Bidder_cl	An indicator variable equal to one if the bidder received at least one SEC comment letter during the three years prior to deal announcement.
Completion	An indicator variable equal to one if a deal is completed and zero if a deal is withdrawn.
Merger_spread	The difference between the offer price and the target's stock price two days after the deal announcement scaled by the target's stock price two days after the deal announcement.
Neg_spread	An indicator variable equal to one if *Merger_spread* is negative.
Price_revision	An indicator variable that equals one if there is a price revision from the initial offer price to the final offer price.
Pos_revision	An indicator variable that equals one if there is a positive price revision from the initial offer price to the final offer price.
Neg_revision	An indicator variable that equals one if there is a negative price revision from the initial offer price to the final offer price.
Deal_duration	The number of days between deal announcement and deal completion.
Multiple_bidder	An indicator variable equal to one if there is more than one bidder in a deal.
Amend_price_reaction	The sum of absolute three-day cumulative abnormal return to all filing amendments related to a deal.
Disclosure_quality	Four minus the sum of *Target_res*, *Bidder_res*, *Target_cl*, and *Bidder_cl*.

Appendix 2

Examples of SEC Comment Letters and Company Responses

1. SEC Comment Letter on Merger Background

Below is an example of an SEC comment related to the merger background. This is one of four merger background issues that the SEC raised in this comment letter. Please see the following link for more details:
https://www.sec.gov/Archives/edgar/data/1397821/000119312513101769/0001193125-13-101769-index.htm
SEC's Comment:

> Please revise your disclosure on page 34 to provide further detail on the "strategic alternatives" discussed by the Board of Directors and Centerview. In addition, please provide more detailed disclosure regarding the reasons the Board chose not to pursue those alternatives.

Company's Response:

> As requested, the Company has revised the disclosure to address the Staff's comment. Please see pages A-39 and A-40 of the blackline of the Preliminary Proxy Statement attached as Exhibit A.

2. SEC comment letter on fairness opinion

Below is an example of an SEC comment related to the fairness opinion. This is one of four fairness opinion issues that the SEC raised in this comment letter. Please see the following link for more details:
https://www.sec.gov/Archives/edgar/data/913165/000119312518004738/0001193125-18-004738-index.htm
SEC's Comment:

> Please further describe the selection criteria used for the selected publicly traded companies and transactions. If any companies or transactions meeting the selection criteria were excluded from the analyses, please state the reasons for making such exclusions.
>
> Company's Response:
>
> In response to the Staff's comment, the Company has modified the disclosures appearing on pages 36 and 37 of Amendment No. 1 to the Proxy Statement to include additional detail surrounding the selection criteria used for the selected public traded companies and transactions. No companies or transactions meeting the selection criteria were excluded from the analyses.

3. SEC comment letter on reasons and recommendations

Below is an example of an SEC comment related to the reasons and recommendations for the merger. Please see the following link for more details:
https://www.sec.gov/Archives/edgar/data/886835/000095012311102170/0000950123-11-102170-index.htm
SEC's Comment:

> Explain why the Board believes that being the only "mid-cap" oilfield services company will make "the combined company better equipped to compete with the largest oilfield services companies".

Company's Response:

> Large oil and gas producers in North America typically prefer to contract for services from larger service providers. The reasons for this are primarily because these service providers typically have a wider variety of products and services, more engineered solutions, and better balance sheets to support larger and complex projects, as well as potential liabilities. Because of this, Superior's board of directors believes that the combined company will have a competitive advantage over smaller oilfield service companies which will afford Superior a better opportunity to gain market share in the North American land market. In addition, larger service companies tend to attract new employees and retain employees before smaller ones. This is especially a strong barrier to growth in the North American land market. Labor is attracted to larger companies as a result of better recruiting efforts, benefits, training and career growth opportunities. Finally, Superior's board of directors also believes that it will be more successful in expanding into new international markets as a larger company due to better product line diversity and reputation, and a stronger balance sheet.

Appendix 3

An Example of Original and Revised Filings

1. Before SEC Comment Letter: Preliminary Proxy Statement (PREM14A)[30]

Using publicly available information, J.P. Morgan calculated, for each selected company, the ratio of the company's firm value (calculated as the market value of the Common Stock on a fully diluted basis, plus preferred equity, any debt and minority interest, less cash and cash equivalents) to the consensus equity research analyst estimate for the company's EBITDA (calculated as earnings before interest, taxes, depreciation and amortization) for the year ending December 31, 2018 (the "2018E FV/EBITDA").

[30] https://www.sec.gov/Archives/edgar/data/913165/000119312517359740/d497992dprem14a.htm.

	Implied Per Share Equity Value	
	Low	High
2018E FV/EBITDA	$ 33.25	$ 51.00

Based on the results of this analysis, J.P. Morgan selected a multiple reference range for 2018E FV/EBITDA of 9.0x −14.0x. After applying such range to the projected adjusted EBITDA for the Company for the year ending December 31, 2018 based on projections provided by the Company's management, the analysis indicated the following implied per share equity value range for the Common Stock, rounded to the nearest one quarter US dollar.

	Implied Per Share Equity Value	
	Low	High
2018E FV/EBITDA	$ 33.25	$ 51.00

2. After SEC Comment Letter: Amendment (PRER14A)[31]

Using publicly available information, J.P. Morgan calculated, for each selected company, the ratio of the company's firm value (calculated as the market value of the Common Stock on a fully diluted basis, plus preferred equity, any debt and minority interest, less cash and cash equivalents) to the consensus equity research analyst estimate for the company's EBITDA (calculated as earnings before interest, taxes, depreciation and amortization) for the year ending December 31, 2018 (the "2018E FV/EBITDA"). *J.P. Morgan determined, in its professional judgment, that any ratios less than 0.0x or greater than 20.0x were not meaningful ("NM") to the analysis. Results of the analysis are as follows:*

Company	***2018E FV/ EBITDA***
Globus Medical, Inc.	*13.7x*
NuVasive, Inc.	*12.4x*
Wright Medical Group N.V.	*NM*
CONMED Corporation	*13.8x*
Orthofix International N.V.	*11.3x*
K2M Group Holdings, Inc.	*NM*
RTI Surgical, Inc.	*9.6x*
ConforMIS, Inc.	*NM*
SeaSpine Holdings Corporation	*NM*

Based on the results of this analysis, J.P. Morgan selected a multiple reference range for 2018E FV/EBITDA of 9.0x −14.0x. After applying such range to the projected adjusted EBITDA for the Company for the year ending December 31, 2018 based on projections provided by the Company's management, the analysis indicated the following implied per share equity value range for the Common Stock, rounded to the nearest one quarter US dollar

[31] https://www.sec.gov/Archives/edgar/data/913165/000119312518004739/d497992dprer14a.htm.

Appendix 4

Table 11 Entropy balancing descriptive statistics

Panel A: Comparison of Entropy Balancing Covariates for Deal Completion Analysis

	Before Entropy Balancing				*After Entropy Balancing*			
	$Cl=1$		$Cl=0$		$Cl=1$		$Cl=0$	
	Mean	Variance	Mean	Variance	Mean	Variance	Mean	Variance
Deal_size	6.33	3.59	6.17	3.03	6.33	3.59	6.33	3.59
Diversify_ff	0.44	0.25	0.47	0.25	0.44	0.25	0.44	0.25
Going_private	0.33	0.22	0.31	0.21	0.33	0.22	0.33	0.22
Stock	0.42	0.24	0.27	0.20	0.42	0.24	0.42	0.24
Premium	0.30	0.08	0.33	0.10	0.30	0.08	0.30	0.08
Board_size	8.30	5.31	8.12	4.91	8.30	5.31	8.30	5.31
Ind_director	0.75	0.02	0.76	0.02	0.75	0.02	0.75	0.02
Insider_own	0.15	0.03	0.15	0.02	0.15	0.03	0.15	0.03
Dual_class	0.08	0.08	0.04	0.03	0.08	0.08	0.08	0.08
Target_cl	0.74	0.19	0.65	0.23	0.74	0.19	0.74	0.19
Bidder_cl	0.44	0.25	0.38	0.24	0.44	0.25	0.44	0.25
Target_res	0.24	0.18	0.24	0.18	0.24	0.18	0.24	0.18
Bidder_res	0.11	0.10	0.09	0.08	0.11	0.10	0.11	0.10
Tender	0.23	0.18	0.14	0.12	0.23	0.18	0.23	0.18
Friendly	0.94	0.05	0.95	0.05	0.94	0.05	0.94	0.05
Public_acquirer	0.61	0.24	0.57	0.25	0.61	0.24	0.61	0.24
Serial_acquirer	0.24	0.18	0.30	0.21	0.24	0.18	0.24	0.18

Panel B: Comparison of Entropy Balancing Covariates for Price Revision Analysis

	Before Entropy Balancing				*After Entropy Balancing*			
	$Cl=1$		$Cl=0$		$Cl=1$		$Cl=0$	
	Mean	Variance	Mean	Variance	Mean	Variance	Mean	Variance
Deal_size	6.36	3.45	6.17	2.90	6.36	3.45	6.36	3.45
Diversify_ff	0.42	0.24	0.46	0.25	0.42	0.24	0.42	0.24
Going_private	0.30	0.21	0.29	0.21	0.30	0.21	0.30	0.21
Stock	0.44	0.25	0.26	0.19	0.44	0.25	0.44	0.25
Premium	0.30	0.08	0.33	0.09	0.30	0.08	0.30	0.08
Board_size	8.35	5.36	8.11	4.81	8.35	5.36	8.34	5.36
Ind_director	0.75	0.02	0.76	0.02	0.75	0.02	0.75	0.02
Insider_own	0.16	0.03	0.15	0.02	0.16	0.03	0.16	0.03
Dual_class	0.08	0.08	0.03	0.03	0.08	0.08	0.08	0.08
Target_cl	0.74	0.19	0.65	0.23	0.74	0.19	0.74	0.19
Bidder_cl	0.46	0.25	0.39	0.24	0.46	0.25	0.46	0.25

Table 11 (continued)

Target_res	0.23	0.18	0.23	0.18	0.23	0.18	0.23	0.18
Bidder_res	0.11	0.10	0.09	0.08	0.11	0.10	0.11	0.10
Tender	0.22	0.17	0.16	0.13	0.22	0.17	0.22	0.17
Friendly	0.98	0.02	0.99	0.01	0.98	0.02	0.98	0.02
Public_acquirer	0.64	0.23	0.59	0.24	0.64	0.23	0.64	0.23
Serial_acquirer	0.24	0.18	0.32	0.22	0.24	0.18	0.24	0.18
Multiple_bidder	0.08	0.07	0.04	0.04	0.08	0.07	0.08	0.07

Panel C: Comparison of Entropy Balancing Covariates for Deal Duration Analysis

	Before Entropy Balancing				*After Entropy Balancing*			
	$Cl=1$		$Cl=0$		$Cl=1$		$Cl=0$	
	Mean	Variance	Mean	Variance	Mean	Variance	Mean	Variance
Deal_size	6.36	3.45	6.17	2.90	6.36	3.45	6.36	3.45
Diversify_ff	0.42	0.24	0.46	0.25	0.42	0.24	0.42	0.24
Going_private	0.30	0.21	0.29	0.21	0.30	0.21	0.30	0.21
Stock	0.44	0.25	0.26	0.19	0.44	0.25	0.44	0.25
Premium	0.30	0.08	0.33	0.09	0.30	0.08	0.30	0.08
Board_size	8.35	5.36	8.11	4.81	8.35	5.36	8.34	5.36
Ind_director	0.75	0.02	0.76	0.02	0.75	0.02	0.75	0.02
Insider_own	0.16	0.03	0.15	0.02	0.16	0.03	0.16	0.03
Dual_class	0.08	0.08	0.03	0.03	0.08	0.08	0.08	0.08
Target_cl	0.74	0.19	0.65	0.23	0.74	0.19	0.74	0.19
Bidder_cl	0.46	0.25	0.39	0.24	0.46	0.25	0.46	0.25
Target_res	0.23	0.18	0.23	0.18	0.23	0.18	0.23	0.18
Bidder_res	0.11	0.10	0.09	0.08	0.11	0.10	0.11	0.10
Tender	0.22	0.17	0.16	0.13	0.22	0.17	0.22	0.17
Friendly	0.98	0.02	0.99	0.01	0.98	0.02	0.98	0.02
Public_acquirer	0.64	0.23	0.59	0.24	0.64	0.23	0.64	0.23
Serial_acquirer	0.24	0.18	0.32	0.22	0.24	0.18	0.24	0.18

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