Journal of Accounting Research

DOI: 10.1111/1475-679X.12128
Journal of Accounting Research
Vol. 55 No. 1 March 2017
*Printed in U.S.A.*

CHICAGO BOOTH

# Disclosure Versus Recognition: Inferences from Subsequent Events

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Received 24 April 2013; accepted 13 May 2016

ABSTRACT

Standard setters explicitly state that disclosure should not substitute for recognition in financial reports. Consistent with this directive, prior research shows that investors find recognized values more pertinent than disclosed values. However, it remains unclear whether reporting items are recognized because they are more relevant for investing decisions, or whether requiring recognition itself prompts differing behavior on the part of firms and investors. Using the setting of subsequent events, I identify the differential effect of requiring disclosure versus recognition in a setting where the accounting treatment of an item is exogenously determined. For comparable events, I find a stronger initial market response for firms required to recognize relative to firms that must disclose, although the large magnitude of the identified effect

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Accepted by Christian Leuz. This paper is based on my dissertation, completed at the University of Colorado Boulder (recipient of the 2014 FARS Best Dissertation Award). I am indebted to the members of my committee for their insightful comments and continued guidance: Bjorn Jorgensen (chair), Yonca Ertimur, Alan Jagolinzer, Mattias Nilsson, and Steve Rock. I also thank Brian Bushee, Paige Patrick, an anonymous reviewer, and seminar participants at the 2013 Financial Accounting and Reporting Section Midyear Meeting (especially Paul Zarowin, discussant), Arizona State University, Boston College, University of Chicago, University of Colorado Boulder, Columbia University, Harvard University, Massachusetts Institute of Technology, University of Michigan, University of Minnesota, New York University, Northwestern University, University of Pennsylvania, Pennsylvania State University, University of Rochester, Stanford University, and University of Washington for their helpful remarks. I gratefully acknowledge financial support from the Deloitte Foundation and research assistance from Raghav Bhargava, John Dong, Mihir Jain, John Lin, Betsy Modayil, Tanya Paul, and Aaron Zhang. An online appendix to this paper can be downloaded at http://research.chicagobooth.edu/arc/journal-of-accounting-research/onlinesupplements

calls into question whether this difference can be attributed to accounting treatments alone. In examining various reasons for the stronger market response to recognized values, I fail to find support for the hypothesis that this difference is due to differential reliability of disclosed and recognized values. I do find some evidence that investors underreact to disclosed events, consistent with investors incurring higher processing costs when using disclosed information.

**JEL codes:** G14; M41; M48

**Keywords:** mandatory disclosure; recognition; subsequent events

## *1. Introduction*

Prior research indicates that investors typically find recognized values more pertinent than disclosed values (Aboody [1996], David-Friday et al. [1999], Ahmed, Kilic, and Lobo [2006]). These findings are consistent with the concept that disclosure should not substitute for recognition (FASB [1984]). Why investors find recognized values more relevant than disclosed values remains an open question. Investors may rely more heavily on recognized values because of differences in the types of firms that choose to recognize rather than disclose, because of differences in the characteristics of transactions that are recognized rather than disclosed, or because of a change in the perceived importance of a reporting item when regulators require recognition of a previously disclosed item. When these differences are held equal, however, it is unclear whether investors continue to value recognition more than disclosure. That is, investors may not value recognition per se, but rather characteristics of firms or transactions that are associated with recognition. Discerning whether requiring recognition alone results in a stronger market reaction to an accounting item is difficult, as accounting standards typically require similar transactions to be uniformly recognized or disclosed (Bernard and Schipper [1994]). As a result, little variation exists in the accounting treatment for similar transactions, either across or within firms. What variation does exist is typically nonrandom, precluding the establishment of causal inferences.

In this paper, I provide evidence on the differential effect of requiring disclosure as opposed to recognition by exploiting the required accounting treatment for subsequent events. A subsequent event is an event occurring after a firm's balance sheet date but before the firm issues its financial statements. A firm must disclose a subsequent event if not disclosing the event would cause the financial statements to be misleading. An example of a subsequent event requiring disclosure is the loss of inventory or property, plant, and equipment from a fire or natural disaster. However, a similar event that occurred prior to the balance sheet date would require immediate recognition. Thus, in this setting, the timing of a natural disaster determines if a firm must disclose or immediately recognize an event's financial effect. As nature determines this timing, the setting of subsequent events

can potentially yield causal inferences on the effect of mandated disclosure relative to mandated recognition.

I conduct my analysis on a sample of firms experiencing natural disasters. Firms that experience these disasters as subsequent events make up the disclosing firms in my sample. I match each subsequent event firm to a comparable firm that experienced a natural disaster prior to its quarter-end, and thus must immediately recognize the event's effect. I then compare abnormal market returns following the event through the firms' filing of their financial statements across the disclosing and recognizing firms. I find a stronger initial market reaction for recognizing firms relative to disclosing firms, consistent with investors relying more on recognition. The magnitude of the difference in returns is quite large, however, which calls into question whether this difference can be attributed to accounting treatments alone. Recognizing firms experience abnormal returns in the initial event window of −6.02%, compared to 0.95% for disclosing firms. These returns relate to recognized and disclosed losses that are 0.37% and 0.53% of assets, respectively. Returns between the two groups of firms converge over time, consistent with the events being of comparable magnitudes. However, returns between the two groups of firms remain statistically different until the third quarterly filing date after the event.

While my research design is relatively well suited for identifying whether investors react differently to disclosure versus recognition, I am less able to distinguish between the multiple mechanisms through which this result may attain. A variety of different causal mechanisms may exist. For example, being assigned to recognition may cause a firm to measure an accounting item with greater precision or less bias than a disclosed item, either because managers view recognized values as more important or because the recognized values receive greater scrutiny from auditors. That is, requiring different accounting treatments may drive differences in an item's informational properties. Further, even if the informational attributes of disclosed and recognized values are on average equal, investors may rely more on recognized values if recognized values are more accessible or require less effort to use. In additional analyses, I explore these alternative explanations. I fail to find support for the hypothesis that differential reliability causes investors to perceive recognized values and disclosed values differently. I do find some evidence of a delayed investor response to disclosed items. These results suggest that investors may find disclosed information relatively costly to use, and rely primarily on recognized numbers instead.

Some of the causal mechanisms outlined above rely on managers behaving differently depending on whether they are required to disclose or recognize an event. This is possible because, while a firm has little choice over whether it must disclose or recognize an item, the firm knows which accounting treatment it has been assigned to and can alter its behavior accordingly. Thus, one may think of the effect I identify as the effect of the *assignment* to a particular accounting treatment, as opposed to just the effect of the *act* of disclosure or recognition. While investors may respond

differently to just the act of disclosure or recognition, my research design does not separate this response from any market response to actions the firms take as a result of their required accounting treatments.

Further, while the setting of subsequent events offers a relatively clean natural experiment for examining the effects of disclosure and recognition, several threats to causal inferences remain. First, the paper's inferences rely on the economic magnitude of the events in my sample being on average the same across the disclosing and recognizing firms. As the true economic effect is unobservable, I cannot guarantee that my results are not driven by differences in the events instead of differences in the accounting treatments. The randomization provided by the research design helps mitigate this concern, and I also match the sample on characteristics of the firms and events. Nonetheless, the large observed difference in market returns previously discussed between the disclosing and recognizing firms underscores this concern. To the extent it is implausible that requiring different accounting treatments results in such a large effect, this is evidence of a difference in the economic magnitude of the events between the two groups of firms.

Differences in the timing of events present another issue. Since the timing of an event relative to a firm's quarter-end and filing date provides the identifying variation in disclosure and recognition, firm characteristics related to a firm's filing speed may relate to the assigned accounting treatment in a nonrandom way. Further, since the firms experiencing the event after their quarter-end are required to disclose, disclosing firms will have less time on average between the date of the event and their upcoming filing date. This shorter amount of time between the event date and filing date for disclosing firms may affect the market reaction to the disclosure in a way that is not directly related to the required accounting treatment. I discuss these issues related to timing differences, and the steps I take to address them, in detail in section 7.

Notwithstanding these issues, this study contributes to the accounting literature by addressing several challenges to causal inferences typically encountered in studies of disclosure versus recognition. As there is often little variation in disclosure and recognition for comparable transactions, prior research has relied on a variety of unique settings where firms may choose different accounting treatments,[1] or where a change in accounting treatment is imposed upon a firm, as in a regulatory change.[2] While

[1] Aboody [1996] exploits the fact that oil and gas firms may recognize or disclose impairments depending on whether the firm chose the full cost or successful effort method to capitalize costs of developing wells. Campbell, Sefcik, and Soderstrom [2003] examine discretion in recognizing or disclosing contingent liabilities in the chemical industry. Ahmed, Kilic, and Lobo [2006] examine derivative accounting in bank holding companies, where the fair value of the derivative was recognized or disclosed, depending on the underlying asset or liability.

[2] Davis-Friday et al. [1999] compare the disclosed liability for retiree benefits other than pensions to the recognized liability post SFAS No. 106 for firms that chose immediate, full

this prior work makes important strides in furthering our understanding of mandatory disclosures, concerns regarding the self-selection of which firms choose to disclose or recognize make it difficult to reach definitive conclusions regarding the causal effects of disclosure and recognition, as firm incentives influencing the disclosure or recognition choice are also likely linked to the market reaction to an accounting item (Amir and Ziv [1997], Aboody, Barth, and Kasznik [2004]).

Even in the context of regulatory changes, firms are often able to choose the timing of the accounting change through voluntary early adoption (Ayres [1986], Ali and Kumar [1994]). Additionally, regulations requiring recognition of a previously disclosed item are often in response to a perceived deficiency in the reporting system. The regulation itself draws attention to this perceived deficiency, and thus any effect of the regulation may be due to heightened awareness of the reporting item rather than the change in accounting treatment. Further, firms may respond to the regulatory change by altering their "real" actions (Mittelstaedt, Nichols, and Regier [1995], Bens and Monahan [2008], Choudhary, Rajgopal, and Venkatachalam [2009], Zhang [2009], Amir, Guan, and Oswald [2010], Chuk [2013]). Here, "real" actions refer to the investment or production decisions of the firm, as opposed to the reporting of those transactions. For example, Mittelstaedt, Nichols, and Regier [1995] show a reduction in the provision of retirement benefits post–SFAS No. 106, which required these benefits to be recognized on an accrual, rather than cash, basis. Choudhary, Rajgopal, and Venkatachalam [2009] find firms accelerated the vesting of employee stock options in response to SFAS No. 123-R in order to avoid recognizing a previously disclosed expense. These studies illustrate that reporting requirements can alter the real activities of a firm's managers (e.g. Kanodia [1980], Kanodia and Sapra [2016]). While these effects of accounting regulations on firms' investment and production decisions are interesting in their own right, changes in the choices of managers make it difficult to isolate the effect of an accounting change from the change in the underlying economics of the firm. In the setting of subsequent events, initial differences in reporting requirements seem less likely to influence managers' actions, as the measurement and reporting of the event is ultimately the same for all firms.[3] Thus, this paper contributes to the existing literature by providing evidence on how investors respond to required disclosure relative to required recognition in a setting where the transactions are similar, the regulatory regime is held constant, and concerns of self-selection are minimized.

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recognition of the liability. Ahmed, Kilic, and Lobo [2006] contrast derivatives whose fair value was disclosed pre-SFAS No. 133 to the recognized fair value of these derivatives following the standard's adoption for bank holding companies that chose to hold only disclosed derivatives prior to the standard.

[3] Like any event, subsequent events must be recognized at the next filing date, in the quarter in which they occurred.

## 2. Background

FASB Accounting Standards Codification (ASC) 855-10 defines a subsequent event for SEC filers as an event or transaction that occurs after the balance sheet date, but before the financial statements are issued.[4] There are two types of subsequent events. The first type consists of events or transactions that provide additional evidence about conditions that existed at the date of the balance sheet. This type of event requires recognition in the financial statements. The second type of subsequent event consists of events that provide evidence about conditions that did not exist at the date of the balance sheet but arose subsequent to that date. This second type of subsequent event is not immediately recognized and provides the setting for this study. When I refer to subsequent events in this paper, I am referring to this second type; that is, nonrecognized subsequent events.

Firms must disclose nonrecognized subsequent events if not disclosing them would cause the financial statements to be misleading. Firms must disclose the nature of the event and estimate its financial effect, or state that such an estimate cannot be made. The financial effect that the firm must disclose is the same as the financial effect that the firm would have recognized had the event occurred within the accounting period. The accounting standard encourages firms to consider presenting pro forma statements indicating the effect of the event as if it had occurred on the balance sheet date.[5]

The FASB specifically gives as an example of a nonrecognized subsequent event the loss of plant or inventories as a result of a fire or natural disaster that occurred after the balance sheet date but before the financial statements were issued. To the extent such events occur randomly with respect to the balance sheet date, they provide a natural experiment for testing the differential effect of requiring disclosure versus requiring recognition. The effect of a natural disaster occurring just before the end of a fiscal period must be recognized, but only disclosed for a similar firm with a slightly earlier balance sheet date. Figure 1 gives a timeline demonstrating how differences in balance sheet dates with respect to event dates result in variation of required disclosure and required recognition. I construct my sample by identifying firms experiencing subsequent events and then matching each of these disclosing, subsequent event firms to a comparable firm that must immediately recognize a similar event.

## 3. Hypothesis Development

In most settings, the informational attributes of a reporting item will determine whether that item is recognized or only disclosed in the financial

[4] Subsequent events were similarly defined and accounted for under precodification standards.

[5] However, I do not observe any firms that prepare pro forma statements.

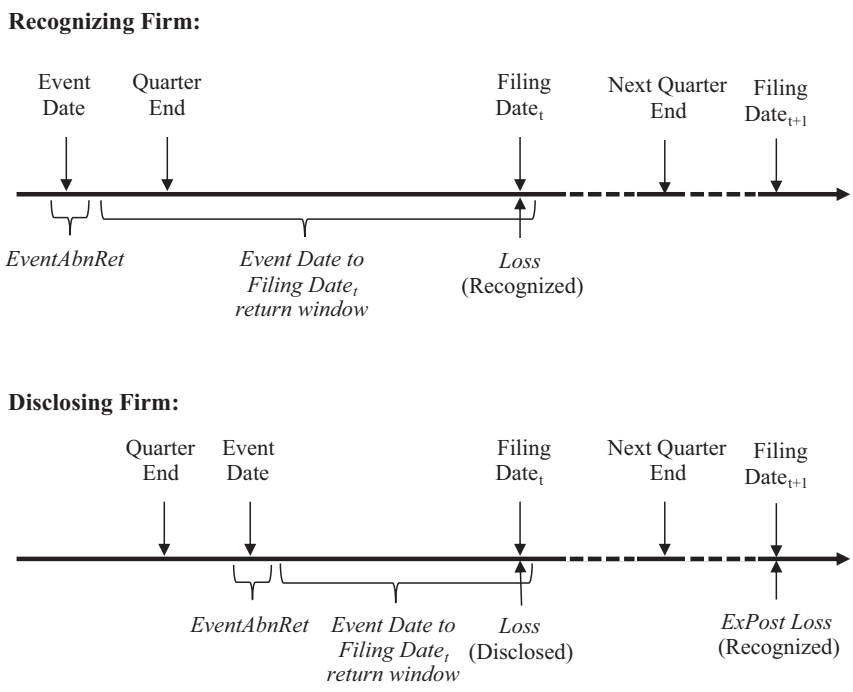


FIG. 1.—How event timing creates variation in accounting treatment and timeline of variable measurement.

statements. Items meeting the criteria for recognition—measurability, relevance, reliability, and definition of a financial statement element—must be recognized (FASB, Concepts Statement No. 5). Reporting items failing to meet these criteria are candidates for disclosure. As Schipper [2007] notes, the criterion most likely to distinguish recognition from disclosure is reliability. Schipper [2007] further highlights that investors may rationally give recognized items greater weight than disclosed items if recognized items are more reliable.

In the setting of this paper, however, the required accounting treatment is not determined by informational properties such as reliability, but rather by the timing of a natural disaster. In this setting, the disclosed and recognized items are therefore not a priori distinct in their information content. Absent market frictions or differences in the informational properties of disclosed and recognized items, one would expect no difference in the market reaction to disclosed items relative to recognized items. However, assigning a transaction to disclosure or recognition may affect how a firm prepares a reporting item. Further, the presentation of a reporting item may influence how easily investors can process the item's information content. Thus, disclosed and recognized information may not substitute for one another even in a setting where the required accounting treatment

does not follow directly from the reporting item's informational attributes. In the following, I discuss how assigning an item to disclosure or recognition may affect its use by investors. In particular, I consider the attributes of precision, bias, and the cost of processing the information.

Mandating recognition of an item may lend it greater reliability through increased precision. In particular, recognition forces firms to estimate the magnitude of an item as a point estimate. That is, while a firm may disclose the effect of an event within a range, it can only recognize a singular value, which is presumably more precise (Baginski, Conrad, and Hassell [1993]). Greater auditor scrutiny of recognized values could also lend them greater precision relative to disclosed values (Libby, Nelson, and Hunton [2006]). If lax auditing of disclosed items results in management exercising less care in preparing disclosed amounts, then disclosed values may contain a greater amount of noise than recognized values. The greater amount of noise in disclosed values would result in investors relying less on disclosed items when revising their beliefs concerning the value of the firm.[6]

Greater auditor attention to recognized items could also restrict the amount of bias management can introduce into the measurement of recognized items. Alternatively, greater incentives to manipulate recognized items could result in them having greater bias. For example, Choudhary [2011] finds that firms underestimate recognized costs as compared to disclosed costs. Investors anticipating this manipulation could result in recognized items having greater valuation coefficients, if investors undo the bias.[7]

It is also possible that investors respond differently to disclosed and recognized items not because of differences in the items' informational properties, but because of differences in how the investors process the information.[8] Previous work in this area shows that, to impact decisions, information must not simply be available, but be available in a format that users are able to process (Russo [1977], Johnson, Payne, and Bettman [1988]). When information is costly to obtain or use, the informativeness of prices will be inversely related to the cost of becoming informed (Grossman and Stiglitz [1980], Barth, Clinch, and Shibano [2003]). Disclosed items may require greater effort or cognitive resources to understand, resulting in investors relying primarily on recognized items. Theory developed in experimental work supports this prediction (Hirst and Hopkins [1998], Dietrich

[6] This is a straightforward application of conditional expectation. For example, see Verrecchia [2001, p. 105].

[7] This discussion assumes a multiplicative bias. An additive bias would be undone through the intercept term (Fischer and Verrecchia [2000, p. 237]).

[8] Another reason investors might respond differently to disclosed values versus recognized values is that recognized values may be more likely to serve as inputs into contracts than disclosed values. However, this difference between disclosure and recognition is less likely to be important in the setting of subsequent events, as the disclosed subsequent event amounts must be recognized in the following fiscal period. Thus, disclosed values in this setting also have contracting implications.

et al. [2001], Hodge, Kennedy, and Maines [2004]). Consistent with this, prior empirical work finds markets react to previously available information once it is recognized (Hand [1990]) or otherwise redistributed (Huberman and Regev [2001], Tetlock [2011]). This would predict a delayed reaction to disclosed items.

Higher processing costs associated with footnote disclosures relative to information presented on the face of the financial statements also lends predications for how investors will respond to recognized values. In this paper, firms are experiencing losses from relatively infrequent events. If investors do not use the additional information contained in the footnotes to understand the nature of the loss, they may fail to understand how the current loss will map into future performance. While investors may use footnote information to make adjustments to recognized values for common transactions (e.g., Bratten, Choudhary, and Schipper [2013]), they may fail to adjust for more infrequent occurrences. If investors perceive the loss to be a permanent component of earnings, they may overreact to the initial recognition of the loss. Alternatively, investors may initially respond to the loss as if it only affects the current period, while the event may impact future periods through lost sales. This would predict an initial underreaction.

In summary, required disclosure may cause less reliable measurement of an accounting item. It may also result in investors relying less on that reporting item if it is more costly for investors to incorporate disclosed information into their decision process. Less reliable measurement and higher processing costs both predict a weaker initial market reaction to disclosed values relative to recognized values. For recognizing firms, the footnotes also contain information that can help investors gauge the persistence of the loss. Thus, higher processing costs could predict an initial overreaction or underreaction to recognized items, depending on the persistence of the event's effects and the degree of processing costs.

Finally, in the setting of subsequent events, the initially disclosing firms must recognize the previously disclosed items in the following quarter. Therefore, one would expect any difference in returns due to the accounting treatments to revert once the initially disclosed items become recognized.[9] Any remaining difference in returns after both groups of firms have recognized may indicate a difference in the economic magnitude of the events. While this difference may also be due to the differing accounting treatments, it represents an upper bound on any difference in the economic magnitude of the events. As more time passes, remaining differences

[9] As previously discussed, requiring different accounting treatments may have more lasting impacts if the different reporting requirements result in managers taking different real actions. However, in the setting of this paper, all firms must eventually recognize the loss, either in the current accounting period or the next. Thus, the incentives to take different real actions depending on the firm's initial accounting assignment would seem diminished. In other words, while the measurement and disclosure of accounting information may affect managers' actions in general (e.g., Kanodia [1980]), the ultimate measurement and disclosure requirements end up being the same for all firms in my sample.

in returns between the recognizing and disclosure firms more likely reflect a difference in the economic magnitude of the events rather than the different accounting treatments.

## *4. Sample Selection*

I construct the sample by searching firms' EDGAR filings to identify firms experiencing a natural disaster or fire. Those firms experiencing the natural disaster as a subsequent event, after their quarter-end, but prior to filing their financial statements, make up the disclosing subsample. Those firms experiencing the event prior to their quarter-end make up the recognizing subsample. Figure 1 illustrates how an event's timing relative to a firm's quarter-end determines whether the firm must disclose or recognize the event at the upcoming filing date.

I begin the sample selection with the intersection of all firms covered in both Compustat and CRSP. For these firms, I search all 10-K filings on EDGAR to identify instances where a firm discusses the financial effect of a natural disaster. Specifically, I search for variants of the keywords "hurricane," "tornado," "earthquake," "storm," "fire," or "flood" occurring within 50 words of a dollar amount. This search is designed to maximize the recall of relevant events at the cost of also retrieving many irrelevant items. For example, a firm discussing its fire insurance premium would also be retrieved. The EDGAR database begins coverage in 1994 and I conduct my search through the end of the 2012 calendar year. The search retrieves potential events from 18,964 annual filings for 4,773 unique firms. The vast majority of these filings do not contain relevant items. Instead, they relate to things such as the example of the insurance premium, or are duplicate mentions of a single event. Each potentially relevant item retrieved is read to determine if it relates to a firm experiencing a natural disaster. I exclude firms in SIC industries of 6300–6399 (insurance carriers) and 4900–4999 (utilities). I exclude these industries because they are uniquely affected by natural disasters. Unlike most firms, insurance companies' primary operations relate to the occurrence of perils such as natural disasters. Utilities are often able to defer the recognition of costs associated with natural disasters through rate increases and the associated regulatory asset.

The keywords I search for identify events involving the loss of inventories or property, plant, and equipment as the result of a fire or natural disaster. Of the specific examples of nonrecognized subsequent events listed in FASB ASC 855-10-55-2, this type of event is the most likely to be unassociated with strategic choices of the firm.[10] This helps me avoid many of the

[10] Other examples of nonrecognized subsequent events given in FASB ASC 855-10-55-2 are the sale of a bond or capital stock, a business combination, settlement of litigation when the event giving rise to the claim took place after the balance sheet date, losses on receivables resulting from conditions arising after the balance sheet date, changes in the fair value of

self-selection problems that would otherwise be associated with the decision to disclose or recognize an item.

For each relevant natural disaster identified, I next find the first 10-Q or 10-K that was filed on EDGAR after the event occurred. While I initially identify events from 10-K filings, I gather information regarding the effect of the event from this first 10-Q or 10-K. Initially searching only annual filings reduces the amount of duplicate events and irrelevant items returned by the search. For an event to be included in the sample, I require this first filing after the event to contain a disclosure quantifying the effect of the event on the firm. I also require that the date of the event can be determined. The quantified loss amount comes from the footnote disclosures for both disclosing and recognizing firms. The key distinction is recognizing firms also include this amount in their financial statement totals (FASB [1984]). I define the variable *Loss* as the pretax income effect of the event as a percentage of total assets at the beginning of the quarter. I measure *Loss* net of expected insurance recoveries. If a disclosing firm gives a range of loss amounts, I take the minimum of this range.[11] The variable *Loss* is signed in all analyses, so a more negative value indicates a larger loss. *Loss* captures impairments to property, plant, and equipment, and inventory as a result of the event. It does not include any lost sales related to the event from the associated business interruption.

This procedure identifies a sample of 78 disclosed, subsequent events and 345 recognized events with sufficient data on Compustat and CRSP to construct the variables necessary for the research design. Panel A of table 1 gives summary statistics for the full sample. I further discuss these sample characteristics and differences between the disclosing and recognizing subsamples in section 5.

## 5. *Empirical Specification and Main Results*

In this section, I outline my primary identification strategy and main results. I first describe how I match the sample of disclosing, subsequent event firms to a comparable sample of recognizing firms. I then compare market returns in response to the events to evaluate whether investors respond differently to the reporting of firms that have been assigned to disclose versus recognize.

### 5.1 ESTIMATING THE EFFECT OF REQUIRING DISCLOSURE VERSUS RECOGNITION

If the assignment of firms to the disclosing and recognizing subsamples is truly random, simply comparing the mean abnormal returns across these

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assets or liabilities or foreign exchange rates, and entering into significant commitments or contingent liabilities.

[11] I take the minimum of the disclosed range to be consistent with the way uncertain loss amounts within a range are recognized (FASB ASC 450-20-30-1).

**TABLE 1**
*Summary Statistics*

**Panel A: Full sample**

| | Subsequent Events: Disclosed | | | | All Other Events: Recognized | | | | Difference in Means | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean | Median | SD | N | Mean | Median | SD | Diff. | *t*-Stat | Standardized Bias |
| Matching variables | | | | | | | | | | | |
| *Loss* | 78 | −0.53 | −0.15 | 1.20 | 345 | −0.27 | −0.09 | 0.89 | −0.26** | −2.17 | −0.25 |
| *EventAbnRet* | 78 | −1.12 | −1.08 | 5.19 | 345 | −0.15 | −0.10 | 5.08 | −0.97 | −1.51 | −0.19 |
| *Size* | 78 | 6.78 | 6.82 | 1.74 | 345 | 7.52 | 7.55 | 1.93 | −0.74*** | −3.10 | −0.40 |
| *MTB* | 78 | 2.08 | 1.77 | 1.52 | 345 | 2.53 | 1.90 | 3.83 | −0.45 | −1.03 | −0.16 |
| *Leverage* | 78 | 33.13 | 30.19 | 27.95 | 345 | 32.50 | 29.36 | 21.84 | 0.62 | 0.22 | 0.03 |
| *PPE* | 78 | 39.74 | 40.26 | 25.58 | 345 | 35.55 | 31.58 | 27.48 | 4.20 | 1.23 | 0.16 |
| *Inventory* | 78 | 12.97 | 11.29 | 11.88 | 345 | 10.07 | 3.54 | 14.25 | 2.90* | 1.67 | 0.22 |
| *GeoSegments* | 78 | 0.66 | 0.69 | 0.73 | 345 | 0.59 | 0.00 | 0.75 | 0.08 | 0.82 | 0.10 |
| *ROAttm* | 78 | 1.41 | 4.19 | 15.05 | 345 | 2.52 | 3.12 | 8.81 | −1.11 | −0.86 | −0.09 |
| Outcome variables | | | | | | | | | | | |
| *AbnReturn* | 78 | 0.95 | 0.55 | 14.61 | 345 | −4.80 | −3.64 | 17.92 | 5.76*** | 2.64 | 0.35 |
| *AbnSpread* | 78 | −0.09 | −0.01 | 1.34 | 345 | 0.27 | 0.11 | 0.72 | −0.36*** | −3.30 | −0.33 |

*(Continued)*

**TABLE 1**—*Continued*

**Panel B: Matched sample**

| | Subsequent Events: Disclosed | | | | Matched Events: Recognized | | | | Difference in Means | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean | Median | SD | N | Mean | Median | SD | Diff. | *t*-Stat | Standardized Bias |
| Matching variables | | | | | | | | | | | |
| *Loss* | 78 | −0.53 | −0.15 | 1.20 | 78 | −0.37 | −0.11 | 0.96 | −0.16 | −0.94 | −0.15 |
| *EventAbnRet* | 78 | −1.12 | −1.08 | 5.19 | 78 | −1.00 | −0.54 | 3.58 | −0.12 | −0.17 | −0.02 |
| *Size* | 78 | 6.78 | 6.82 | 1.74 | 78 | 7.17 | 7.25 | 1.51 | −0.39 | −1.48 | −0.21 |
| *MTB* | 78 | 2.08 | 1.77 | 1.52 | 78 | 1.92 | 1.76 | 1.21 | 0.16 | 0.71 | 0.05 |
| *Leverage* | 78 | 33.13 | 30.19 | 27.95 | 78 | 29.00 | 27.45 | 18.66 | 4.13 | 1.09 | 0.17 |
| *PPE* | 78 | 39.74 | 40.26 | 25.58 | 78 | 37.33 | 38.32 | 24.37 | 2.41 | 0.60 | 0.09 |
| *Inventory* | 78 | 12.97 | 11.29 | 11.88 | 78 | 11.24 | 9.00 | 11.17 | 1.72 | 0.93 | 0.13 |
| *GeoSegments* | 78 | 0.66 | 0.69 | 0.73 | 78 | 0.67 | 0.35 | 0.78 | −0.01 | −0.04 | −0.01 |
| *ROAttm* | 78 | 1.41 | 4.19 | 15.05 | 78 | 2.78 | 3.55 | 11.55 | −1.37 | −0.64 | −0.11 |
| Outcome variables | | | | | | | | | | | |
| *AbnReturn* | 78 | 0.95 | 0.55 | 14.61 | 78 | −6.02 | −3.50 | 16.57 | 6.98*** | 2.79 | 0.43 |
| *AbnSpread* | 78 | −0.09 | −0.01 | 1.34 | 78 | 0.22 | 0.04 | 0.62 | −0.31* | −1.85 | −0.29 |

*Loss* is the pretax income effect of the event as a percentage of total assets at the beginning of the quarter. *EventAbnRet* is the market-adjusted three-day abnormal return centered on the event date. *Size* is the natural logarithm of assets at the beginning of the quarter. *MTB* is the market value of equity divided by the book value of equity, both measured at the beginning of the quarter. *Leverage* is current liabilities plus long-term debt as a percentage of total assets, all measured at the beginning of the quarter. *PPE* is net property, plant, and equipment at the beginning of the quarter as a percentage of total assets. *Inventory* is beginning of quarter inventory as a percentage of total assets. *GeoSegments* is the natural logarithm of the number of geographic segments. *ROAttm* is net income over the past four quarters as a percentage of total assets. *AbnReturn* is the buy-hold market-adjusted abnormal return for the period beginning three days after the event and ending three days after the next quarterly filing date. *AbnSpread* is the average spread during the period beginning three days after the event and ending three days after the next quarterly filing date, minus the average spread during the time period beginning 301 days prior to the reporting date and ending 46 days prior. Bid-ask spreads are calculated as in Corwin and Shultz [2012].

$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$ (for two-tailed tests).

two groups should suffice to identify the effect of requiring disclosure relative to recognition. However, while the assignment of the accounting treatment is likely to be more random in the current setting than in cases where a firm has an explicit choice between disclosure and recognition (such as stock options under SFAS 123), the observed disclosed and recognized values may still depend on firm characteristics to a degree. In particular, the materiality threshold that prompts the disclosure of a subsequent event may differ from that of a recognized event. And this threshold may depend on firm characteristics such as size or the relative importance of property, plant, and equipment or inventory in the firm (since these are the types of assets most likely affected by the natural disaster events in my sample). So a smaller, more inventory-intensive firm may be more likely to issue a subsequent event disclosure than a larger firm with little inventory. Even if the assignment of the accounting treatments were truly random, this would only ensure that the *expected* difference in firm characteristics would be zero between the disclosing and recognizing subsamples. Given the smaller sample size, the observed differences may vary.

These concerns are realized in the data. Panel A of table 1 shows that the mean disclosing firm is significantly smaller and has more inventory as a percentage of total assets when compared to the mean recognizing firm. The effect of the event on the mean disclosing firm is also significantly greater in magnitude, as measured by *Loss*. The standardized bias given in table 1, calculated as the difference in means between the two subsamples divided by the square root of the average of their variances, gives a scale-free measure of differences in a variable across samples. Unlike the *t*-statistic, the denominator of this statistic will not change with the size of the samples being compared, making it useful for evaluating the effectiveness of a matching routine (Rosenbaum and Rubin [1985]). Biases of 0.25 or greater are typically considered to indicate imbalance on a control variable between samples (Stuart [2010]). Thus, this measure also illustrates imbalance on the variables of *Loss* and *Size*.

For these reasons, I identify the effect of requiring disclosure relative to recognition using a matching-based estimator. I match on variables that are likely related to the magnitude of a natural disaster's effect on a firm: *Loss*, *EventAbnRet*, *Size*, *MTB*, *Leverage*, *PPE*, *Inventory*, *GeoSegments*, and *ROAttm*. *Loss* directly measures the financial statement effect of the event on the firm in terms of book value. While *Loss* is measured from the footnote disclosures for both disclosing and recognizing firms, the key distinction is recognizing that firms also include this amount in their financial statement totals (FASB [1984]). So, *Loss* will be reflected in net income for recognizing firms, but not for disclosing firms. *EventAbnRet*, the market-adjusted three-day abnormal return centered on the event date, directly captures the market's perception of the event's impact on the firm. Unlike *Loss*, this variable captures foregone future profits as well as the book value effect of an event. *Size* is the natural logarithm of assets at the beginning of the quarter. *MTB* is the market value of equity divided by the book value of equity, both

measured at the beginning of the quarter. Larger firms may be better able to absorb the impact of a one-time event, while the event may be more disruptive for growth firms. *Leverage* is current liabilities plus long-term debt as a percentage of total assets, all measured at the beginning of the quarter. Loss events may more negatively impact leveraged firms, as the events may affect the firm's ability to service its debt. *PPE* is net property, plant, and equipment at the beginning of the quarter as a percentage of total assets. *Inventory* is beginning of quarter inventory as a percentage of total assets. Again, firms with more physical assets may be more sensitive to natural disasters.[12] *GeoSegments* is the natural logarithm of the number of geographic segments. More geographically dispersed businesses are likely less affected by any one natural disaster, as their assets are dispersed over several locations. *ROAttm* is net income summed over the four quarters prior to the event quarter as a percentage of total assets. More profitable firms may be in a better financial position to deal with the loss event. I do not match on a profitability measure for the current quarter, as this measure would be affected by the natural disaster event for recognizing firms.

Using these variables, I construct the matched sample. For each disclosed firm-event, I select, with replacement, the recognized firm-event that is closest based on the Mahalanobis distance of the matching variables.[13] This distance metric is similar to a normalized Euclidian distance, but it also accounts for correlations between variables (Abadie and Imbens [2011]). Zhao [2004] demonstrates that Mahalanobis matching outperforms other matching metrics in relatively small samples. Panel B of table 1 reports the summary statistics for the disclosing sample and the matched recognizing sample. None of the differences in means between the matching variables across the subsamples are significantly different from zero. The matching also reduces the standardized bias for *Loss* from −0.25 to −0.15 and for *Size* from −0.40 to −0.21.

One difference that I am not able to eliminate between the two groups of firms is the time from the event to the firm's filing date. This is a feature of the setting of subsequent events. As disclosing firms always experience the event after their quarter-end, they will have less time from the event until their filing date. This can be observed in figure 1. By extension, disclosing firms will also have less time from the event until their earnings announcement date. In fact, nine disclosing firms experience the event after their earnings announcement. Table 2 illustrates these differences in event timing relative to the earnings announcement and filing date. On average, the events occur about 44 days earlier, relative to the filing date, for disclosing firms relative to recognizing firms. Figure 2 graphically represents the timing differences. Note that, due to differences across firms in the time from

[12] In the online appendix, I also provide evidence on the particular assets affected by the natural disasters by tabulating how frequently specific items are mentioned in the footnotes of disclosing and recognizing firms.

[13] Results are robust to using propensity score matching (see online appendix).

**TABLE 2**

*Number of Days Between the Event, Earnings Announcement, and Filing Date*

| | Disclosers (Subsequent Events) | | | Recognizers (Matched Events) | | | Difference in Means | |
|---|---|---|---|---|---|---|---|---|
| Number of days from | Mean | Median | SD | Mean | Median | SD | Diff. | *t*-Stat |
| Event to EA | 18.54 | 15.50 | 21.38 | 64.94 | 61.50 | 19.18 | −46.40*** | −14.27 |
| EA to filing date | 10.15 | 4.00 | 13.73 | 7.92 | 4.00 | 11.27 | 2.23 | 1.11 |
| Event to filing date | 28.69 | 23.50 | 19.74 | 72.86 | 71.00 | 18.68 | −44.17*** | −14.35 |

Note that the disclosed events may occur after the earnings announcement (EA), but recognized events always occur prior to the EA. This is because recognized events always occur prior to the quarter-end and disclosed events always occur after the quarter-end (see figure 1).

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$ (for two-tailed tests).

quarter-end to the filing date, recognizing firms do not *always* have more time until the filing date relative to disclosing firms. I explore differences in timing and potential issues it creates in more detail in section 7.

While the matching procedure is designed to construct a sample of disclosing and recognizing firms that experience comparable events, the true economic impact of the events remains unobservable. So, the possibility remains that the two groups of firms are experiencing economic losses of different magnitudes, and any difference in the market reaction is driven by this difference in the events rather than a difference in the required accounting treatments. The natural experiment provided by the setting of subsequent events is the principle safeguard against this alternative explanation. Further, in the setting of subsequent events, the initial difference in the required accounting treatments is undone in future periods, as firms disclosing a subsequent event are required to recognize that event in the following period. Thus, if the only difference between the two groups

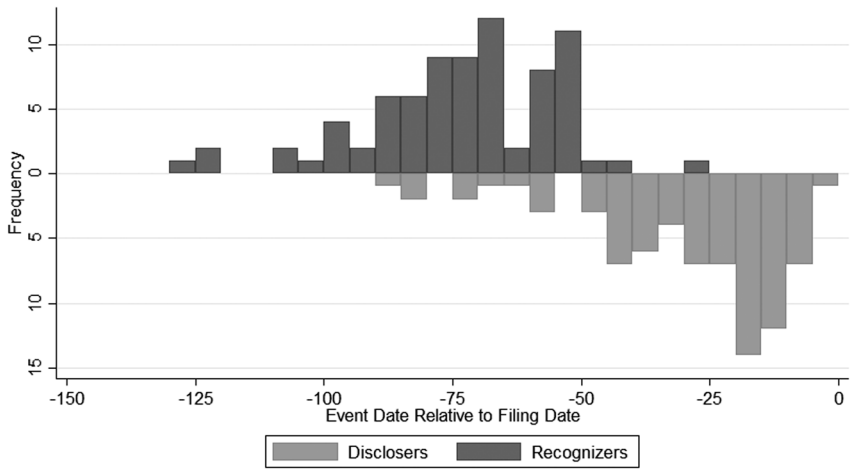


FIG. 2.—Timing of events relative to the filing date for disclosing versus recognizing firms.

of firms is their initial required accounting treatment, one would expect their abnormal market returns to converge over time. Therefore, I compare long-window market returns across the two groups of firms to provide additional evidence on whether the economic losses are of different magnitudes. Note that this assumes that the initial required accounting treatment will not have lasting effects. This may not be true if the assigned reporting requirements result in managers taking different real actions (e.g., Kanodia [1980]). However, as previously noted, this seems relatively less likely in the current setting, as the difference in reporting requirements is only temporary, with recognition eventually being required for all firms.[14] To provide additional evidence that some unmeasured variable is not driving the paper's inferences, I also quantify how large this unobserved variable's association with returns and the assigned accounting treatment would have to be to invalidate the paper's findings. I also demonstrate that the results are robust to estimating a selection model for the disclosing firms. These additional tests are described in greater detail in the following sections.

### 5.2 MAIN RESULTS: DIFFERENCES IN MARKET RETURNS

After constructing the matched sample, I compare market returns for disclosing firms to the returns of recognizing firms. The relevant event window over which to compare market returns, however, is not immediately apparent. While the formal act of disclosure or recognition may not occur until the firm files its financial statements with the SEC, much of the market reaction to the disclosure or recognition likely precedes this date. For example, Li and Ramesh [2009] find limited market reactions to 10-Q and 10-K filings, except when these filings also mark the first release of earnings news. Beyer et al. [2010] show that 10-Q and 10-K filings provide less than 4% of accounting-based information. Thus, focusing entirely on the date a firm files its financial statements would ignore the fact that a firm can communicate information regarding the impact of the event to the market prior to this date. Further, at the date of the event, a firm is aware of whether it will be required to disclose or recognize the event's effect in its upcoming filing. Thus, the assignment to the disclosing or recognizing sample may influence the firm's reporting actions between the date of the event and the eventual filing date, and the incremental market reaction at the filing date will be relative to these earlier actions taken by the firm. To the extent these different actions that firms take are driven by the firm's assigned accounting treatment, these actions are part of the effect I wish to capture. That is, they are one of the causal pathways linking the assigned accounting treatment to the market's reaction to the event. Therefore, I calculate

[14] Returns may also evolve differently across the two groups of firms if initially disclosed values contain greater uncertainty and investors have preferences over the timing of uncertainty resolution (e.g., Duffie, Schroder, and Skiadas [1997]). The possibility of differential reliability of disclosed values is examined in section 6.

**TABLE 3**

*Matching-Based Estimates of the Effect of Assignment to Disclosure Versus Recognition*

| Return Window = Event date to: | Buy-Hold Abnormal Returns to Date | | | |
|---|---|---|---|---|
| | Disclosers (Subsequent Events) | Recognizers (Matched Events) | Diff. | Bias-Adjusted Diff. |
| *Filing Date*$_t$ | 0.95 | −6.02*** | 6.98*** | 9.47*** |
| | (0.58) | (−3.21) | (2.58) | (3.23) |
| *Filing Date*$_{t+1}$ | −2.60 | −12.38*** | 9.78** | 12.40*** |
| | (−1.00) | (−4.16) | (2.51) | (3.12) |
| *Filing Date*$_{t+2}$ | −5.01 | −9.81** | 4.80 | 7.77 |
| | (−1.22) | (−2.39) | (0.95) | (1.54) |
| *Filing Date*$_{t+3}$ | −8.87* | −8.09 | −0.78 | 3.92 |
| | (−1.81) | (−1.49) | (−0.10) | (0.51) |
| *Filing Date*$_{t+4}$ | −11.65** | −7.79 | −3.87 | 1.61 |
| | (−2.04) | (−1.21) | (−0.43) | (0.18) |

This table shows differences in average buy-hold abnormal returns across the matched samples. Observations are matched on the "Matching variables" from table 1. Each disclosing (subsequent event) firm is matched to a recognizing firm (78 matched pairs). Matches are based on Mahalanobis distance. The bias adjustment to the Mahalanobis distance matches is performed on the matching variables, as in Abadie and Imbens [2011]. Each event window begins three dates after the event date and ends three days after the filing date listed in the first column. *Filing Date*$_t$ is the first filing day after the event. This filing is for the quarter of the event for recognizing firms and for the quarter preceding the event for disclosing firms (see figure 1). The return window ending after *Filing Date*$_t$ is the return window during which the loss is initially disclosed or recognized and is the primary return window of interest. *Filing Date*$_{t+1}$ is for the second filing date after the event. Similarly, *Filing Date*$_{t+2}$, *Filing Date*$_{t+3}$, and *Filing Date*$_{t+4}$ represent the third, fourth, and fifth filing dates after the event, respectively.

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$ (for two-tailed tests). $t$-statistics are in parentheses.

my primary outcome variable as the buy–hold market-adjusted abnormal return from three days after the event to three days after the firm's filing date.[15] This variable, *AbnReturn*, thus captures the market's response to all actions taken by a firm as a result of its assignment to the disclosing or recognizing subsample, including the formal disclosure or recognition at the filing date. The effect identified is thus the effect of being *assigned* to disclose versus recognize. Figure 1 illustrates the timing of the measurement of abnormal returns and other key variables in the study.

Table 3 presents the paper's main results, comparing buy–hold abnormal returns across the matched samples. In the primary return window of interest, from three days after the event to three days after the firm's filing date, abnormal returns are less negative for disclosing firms than recognizing firms by 6.98 percentage points.[16] This difference is statistically significant, with a $p$-value of 0.010. The difference in the test statistics between tables 1 and 3 results from the fact that table 3 test statistics are calculated from robust standard errors that account for the fact that the analysis is per-

[15] Results are robust to beginning the window for calculating *AbnReturn* from one day prior to the event (see online appendix).

[16] The magnitude of this effect is similar to that found in Aboody [1996]. He finds a significantly negative reaction to recognized values of −7.9%, but finds disclosed values are not significantly associated with returns. However, similar to this paper, he relies on a small sample (72 firms).

formed on the matched sample (Abadie and Imbens [2006]). In addition to simply comparing differences in means across the two subsamples, I also perform a bias-adjusted Mahalanobis match, as in Abadie and Imbens [2011].[17] The bias adjustment accounts for imperfect matching on the set of covariates. This adjustment results in a greater difference in returns between the disclosing and recognizing firms, in both magnitude (9.47) and statistical significance ($p$-value of 0.001).[18] The magnitude and statistical significance of this result is comparable when winsorizing or truncating returns at the 1% level. Thus, the result does not seem to be driven by a few extreme observations. Overall, the results from the first row of table 3 suggest that, for comparable events and firms, investors react more strongly for firms assigned to recognition relative to those firms assigned to disclosure, even when the assigned accounting treatment is randomly allocated.

The large magnitude of the difference in market returns between the disclosing and recognizing firms, however, creates a concern. While the paper's hypotheses predict the potential for differences in the market response to the disclosed and recognized events, it is questionable whether such large differences can be plausibly attributed to accounting treatments alone. In particular, while the book value of the losses is not statistically different, at 0.53% and 0.37% of total assets for disclosing and recognizing firms, respectively, disclosing firms do not experience a market response that is significantly different from zero while recognizing firms lose about 6% of their market value. The large difference in returns suggests that the recognizing firms may experience more substantial events on average, in spite of the research design and matching routines.

Exploring this concern further, the remaining rows of table 3 demonstrate how the difference in abnormal returns between disclosing and recognizing firms evolves over time. Figure 3 depicts this path of returns graphically. If the economic importance of the events the firms face is equal, and the firms do not take real actions as a result of their assigned accounting treatments, the abnormal returns for the two groups of firms should converge over time. This is because subevent events, while initially disclosed, must be recognized in the following fiscal period. Thus, after the end of the following fiscal period, the differences in accounting treatments will have been undone.

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[17] For recent implementations of this estimator, see Malmendier and Tate [2009], Ozbas and Scharfstein [2010], and De Brauw and Hoddinott [2011].

[18] Since the event window over which returns are calculated will be longer on average for recognizing firms, I use an equal length return window following the event as an additional robustness test. Specifically, I compare abnormal returns for a 90-day window beginning three days after the event. Returns in this window are also less negative for disclosing firms by 10.55 percentage points ($p = 0.004$). I also standardize *AbnReturn* to a quarterly return for all firms, and find that the difference remains statistically significant at 19.17 ($p = 0.009$). These additional tests are tabled in the online appendix.

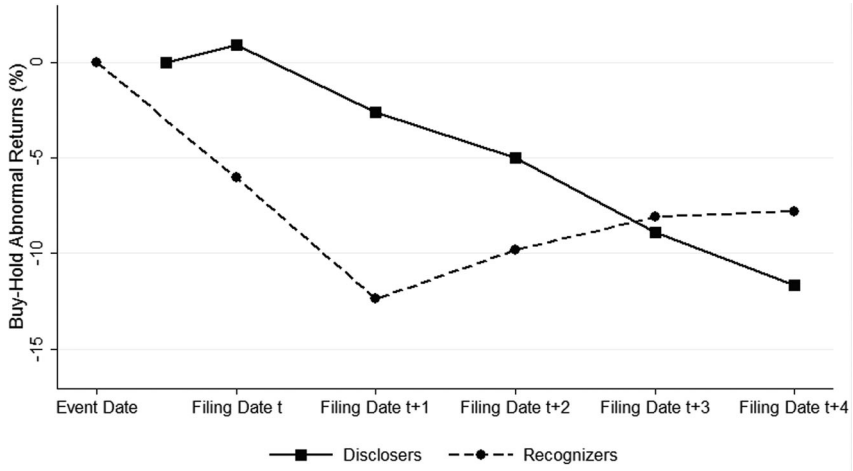


FIG. 3.—Buy-hold abnormal returns for disclosing versus recognizing firms over time.

Each successive row of table 3 extends the return window by an additional quarter. The second row shows that after one quarter the difference in buy–hold abnormal returns between the firms is still significant. As initially disclosing firms recognize the events' effects at *Filing Date*$_{t+1}$, this indicates that the difference in the total market response is still significantly different three days after both sets of firms have recognized the events' effects. During this quarter, returns for recognizing firms continue to decline. This continued decline could reflect investors failing to anticipate the extent to which the loss impacted future operations, including lost sales. However, the failure of the returns between the two groups of firms to converge can again be interpreted as the events being of different economic magnitudes.

After this point, however, returns begin to converge. As seen in the third row, the difference in abnormal returns is no longer statistically significant by the second quarter following the event, and remains insignificant as returns are extended into future periods. This convergence of returns gives some comfort that the events in the sample are of similar magnitudes; however, it remains something of a puzzle why the returns do not converge more immediately. Also, the returns of recognizing firms revert somewhat following the first quarter after the event, perhaps consistent with an earlier overreaction. The path of disclosing firms' returns could be consistent with either underreaction or lesser reliability of disclosed values. I explore the possibility of lesser reliability in disclosed values in greater detail in the following section.

Note that the differences in returns can likely be explained by both a difference in the economic magnitudes of the events and the difference in accounting treatments. While I attempt to control for differences in economic magnitudes, the results suggest these controls may be incomplete, which limits the ability to fully attribute the observed differences to accounting treatments alone.

## 6. *Additional Analysis on the Potential for Differing Reliability of Disclosed and Recognized Items*

The previous section provides the main result of the paper: initial market returns are more pronounced for firms assigned to recognize an event rather than disclose. The delayed reaction to disclosed values is consistent with investors incurring higher processing costs to use disclosed values, but it is also consistent with disclosed values having lesser reliability. In this section, I therefore offer evidence on the possibility that differing levels of precision or bias between disclosed and recognized values explain the difference in the initial market response.

### 6.1 ROLE OF PRECISION IN EXPLAINING DIFFERENTIAL EFFECTS OF DISCLOSURE VERSUS RECOGNITION

As discussed in section 3, investors may place greater weight on recognized values if recognized amounts are more precise than disclosed amounts. Firms can only recognize point estimates of losses. Disclosed amounts, however, may be given as a range or even as an open interval. I use the variation in disclosing firms' estimation of the loss as a point, range, or open interval as a proxy for the precision of the estimate (Baginski, Conrad, and Hassell [1993], Pownall, Wasley, and Waymire [1993]). Prior literature assumes point estimates to be the most precise, while open interval estimates are assumed to be the least precise. Open interval estimates include statements such as "the loss will be at least $10 million" or "the loss could be as much as $10 million."

I estimate an ordinary least squares regression to examine whether the difference in returns between disclosing and recognizing firms varies depending on the form of the loss disclosure. If the greater flexibility in disclosing a less-precise range estimate causes disclosed values to be less reliable than recognized values, I expect markets to react more strongly to recognized items relative only to disclosed items that are disclosed as a range or open interval. I first estimate a baseline model, regressing *AbnReturn* on *Disclose*, an indicator variable for an observation representing a firm disclosing the loss as a subsequent event, and control variables. Next, I add the additional indicator variables of *Range* and *OpenInterval* to capture the incremental difference in returns for firms disclosing ranges and open intervals of losses:

$$AbnReturn = \alpha_0 + \alpha_1 Disclose + \sum_i \alpha_i Control_i + \varepsilon \tag{1}$$

$$AbnReturn = \beta_0 + \beta_1 Disclose + \beta_2 Range + \beta_3 OpenInternal + \sum_i \beta_i Control_i + \varepsilon. \tag{2}$$

**TABLE 4**

*Role of Precision in Explaining Differential Effects of Disclosure Versus Recognition*

| Dependent Variable: *AbnReturn* | (1) | (2) |
|---|---|---|
| Constant | 1.151 | 2.183 |
| | (0.13) | (0.24) |
| *Disclose* | 7.956*** | 7.056** |
| | (3.12) | (2.24) |
| *Range* | | −1.049 |
| | | (−0.30) |
| *OpenInterval* | | 4.131 |
| | | (0.90) |
| *Loss* | 1.264 | 1.094 |
| | (0.90) | (0.77) |
| *EventAbnRet* | 0.023 | 0.016 |
| | (0.05) | (0.03) |
| *Size* | −0.044 | −0.235 |
| | (−0.04) | (−0.19) |
| *MTB* | 0.914 | 1.008 |
| | (0.64) | (0.70) |
| *Leverage* | −0.077 | −0.071 |
| | (−0.97) | (−0.89) |
| *PPE* | −0.060 | −0.062 |
| | (−1.06) | (−1.09) |
| *Inventory* | −0.228 | −0.254* |
| | (−1.57) | (−1.74) |
| *GeoSegments* | −1.905 | −1.500 |
| | (−1.02) | (−0.77) |
| *ROAttm* | 0.062 | 0.066 |
| | (0.31) | (0.34) |
| Adj. $R^2$ | 0.08 | 0.08 |
| *N* | 156 | 156 |

The dependent variable is *AbnReturn*, the buy-hold market-adjusted abnormal return for the period beginning three days after the event and ending three days after the next quarterly filing date. *Disclose* is an indicator variable for an observation being a firm disclosing the loss as a subsequent event. *Range* is an indicator variable for an observation being a disclosing firm that disclosed the loss amount within a range of values. *OpenInterval* is an indicator variable for an observation being a disclosing firm that disclosed the loss amount as an open interval (e.g., the loss was at least...). *Loss* is the pretax income effect of the event as a percentage of total assets at the beginning of the quarter. *EventAbnRet* is the market-adjusted three-day abnormal return centered on the event date. *Size* is the natural logarithm of assets at the beginning of the quarter. *MTB* is the market value of equity divided by the book value of equity, both measured at the beginning of the quarter. *Leverage* is current liabilities plus long-term debt as a percentage of total assets, all measured at the beginning of the quarter. *PPE* is net property, plant, and equipment at the beginning of the quarter as a percentage of total assets. *Inventory* is beginning of quarter inventory as a percentage of total assets. *GeoSegment* is the natural logarithm of the number of geographic segments. *ROAttm* is net income over the past four quarters as a percentage of total assets.

$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$ (for two-tailed tests). *t*-statistics are in parentheses.

If the lesser precision of range and open interval disclosures results in less market reaction to these disclosures, I expect positive coefficients on *Range* and *OpenInterval* (as *AbnReturn* is signed).

Table 4 presents the results of this analysis. The first column of table 4 shows results from the baseline model of equation (1). The coefficient on *Disclose* is positive and statistically significant. The coefficient of 7.956 is comparable in magnitude to the estimates given by the matching

models in table 3. None of the control variables in the model are statistically significant. This is unsurprising, as the matching on these variables has already controlled for much of their variation.

While the research design mitigates the potential for biases due to correlated omitted variables in this regression, I provide evidence on how strong an omitted variable would need to be to invalidate the inferences from the regression. In particular, I calculate the impact threshold for a confounding variable (ITCV) as in Frank [2000] and Larcker and Rusticus [2010]. For this regression, the ITCV is 0.133. This indicates an omitted variable would need a correlation, conditional on the other covariates, with both *AbnReturn* and *Disclose* of 0.365 to invalidate the result that returns are statistically different for disclosing firms (note $0.365 = \sqrt{0.133}$). The observed partial correlations among the included controls and returns indicate that associations of this magnitude are unlikely. With partial correlations of 0.104 with *AbnReturn* and 0.135 with *Disclose*, *MTB* has the largest impact (0.014) of any control variable. Thus, an omitted variable would need to have a considerably stronger impact than *MTB* to overturn the results of the regression. Note that if an omitted variable is largely distinct and relates to the magnitude of the event and assigned accounting in a way unrelated to any of the included controls, the observed partial correlations will be less informative of how large a problem such a variable represents.

The second column of table 4 shows the results of equation (2), where returns are allowed to vary depending on the form of the disclosure. The coefficient on *Disclose* of 7.056 is significantly positive. This is consistent with investors reacting less negatively to values disclosed as point estimates relative to recognized values. As point estimates are presumed to be the most precise disclosure method, this result indicates that the lesser precision of range and open interval estimates do not drive the differential market response to disclosed items relative to recognized items. Further, the coefficients on *Range* and *OpenInternal* are both not significantly different from zero. Thus, I fail to find evidence that investors react differently to disclosed values depending on the form of the disclosure.[19]

### 6.2 ANALYSIS OF POTENTIAL FOR DIFFERENTIAL UNCERTAINTY IN DISCLOSED VALUES RELATIVE TO RECOGNIZED VALUES

My next model tests the prediction that if disclosed values contain more noise than recognized values, then disclosed values will be less effective than recognized values in decreasing information asymmetries. In the context of this study, the events themselves (natural disasters) are likely to introduce uncertainty regarding the firm's value. Some market participants may

[19] Rather than disclosing an imprecise range or open interval estimate, a firm could disclose that it is unable to estimate the amount of the loss. This could be thought of as a disclosure with zero precision (or infinite noise). As an additional test, I estimate a selection model and show that the finding that returns are more pronounced for recognizing firms is robust to modeling a firm's choice to quantify its loss disclosure (see online appendix).

be better able to process information about the event into informed judgments of the firm's value (Kim and Verrecchia [1994]). Thus, the events may induce an increase in information asymmetry. If disclosures are less precise than recognized values, then disclosures will resolve this information asymmetry less effectively, as the lesser precision allows investors to more broadly interpret what impact the event may have on firm value. Therefore, if recognized values are more precise, I expect the average level of information asymmetry associated with the release of recognized amounts to be lower relative to the level associated with disclosed amounts. Thus, I test whether bid–ask spreads are on average different for disclosed and recognized items:

$$AbnSpread = \gamma_0 + \gamma_1 Disclose + \sum_i \gamma_i Control_i + \varepsilon. \quad (3)$$

To calculate the dependent variable, *AbnSpread*, I subtract the average spread for the time period beginning 301 days before the event and ending 46 days before the event from the average spread during the same event window over which *AbnReturn* is calculated. I calculate bid–ask spreads as in Corwin and Shultz [2012].[20] I use abnormal spreads as opposed to raw spreads, as bid–ask spreads may vary across firms for reasons other than the event being studied (Bushee et al. [2010]).

In equation (3), I expect the coefficient on *Disclose* to be positive if disclosed values are less effective at resolving uncertainty than recognized values, and thus do less to reduce the likelihood of differentially informed traders. The vector of control variables in equation (3) is the same as in equation (1), with the addition of the absolute value of *AbnReturn*.

Table 5 presents the results of this analysis. The coefficient on *Disclose* is negative and statistically significant. I am therefore unable to reject the hypothesis that bid–ask spreads are on average *higher* for disclosed values. The finding that abnormal bid–ask spreads are significantly lower for disclosing firms, however, is perhaps not surprising given the earlier results that market returns are negative for recognizing firms but are insignificantly different from zero for disclosing firms. That is, given the market does not seem to find the disclosed events to be a source of information regarding market value, it would be surprising to find that the disclosed events are a source of information asymmetry. As the market only reacts to the recognized events, it seems consistent to find that beliefs among investors change more for these firms.

[20] Corwin and Shultz [2012] demonstrate how to derive bid–ask spread estimates from daily high and low prices. They demonstrate an approximately 0.9 correlation between this measure and true spreads.

**TABLE 5**
*Analysis of Potential for Differential Uncertainty in Disclosed Values Relative to Recognized Values*

| Dependent Variable: *AbnSpread* | (1) | (2) |
|---|---|---|
| Constant | −0.071 | −0.306 |
| | (−0.16) | (−0.73) |
| *Disclose* | −0.320** | −0.271* |
| | (−2.29) | (−1.91) |
| *Loss* | −0.175 | −0.164 |
| | (−1.20) | (−1.14) |
| *EventAbnRet* | −0.025 | −0.030 |
| | (−0.86) | (−1.01) |
| *Size* | 0.041 | 0.062 |
| | (0.45) | (0.69) |
| *MTB* | 0.086 | 0.070 |
| | (1.10) | (0.89) |
| *Leverage* | −0.005 | −0.004 |
| | (−0.60) | (−0.52) |
| *PPE* | −0.004 | −0.005 |
| | (−0.74) | (−0.91) |
| *Inventory* | 0.002 | 0.001 |
| | (0.41) | (0.21) |
| *GeoSegments* | 0.013 | 0.004 |
| | (0.13) | (0.04) |
| *ROAttm* | −0.003 | −0.000 |
| | (−0.32) | (−0.02) |
| *Abs(AbnReturn)* | | 0.012* |
| | | (1.91) |
| Adj. $R^2$ | 0.03 | 0.04 |
| *N* | 156 | 156 |

The dependent variable is *AbnSpread*, the average spread during the period beginning three days after the event and ending three days after the next quarterly filing date, minus the average spread during the time period beginning 301 days prior to the reporting date and ending 46 days prior. Bid-ask spreads are calculated as in Corwin and Shultz [2012]. *Disclose* is an indicator variable for an observation being a firm disclosing the loss as a subsequent event. *Loss* is the pretax income effect of the event as a percentage of total assets at the beginning of the quarter. *EventAbnRet* is the market-adjusted three-day abnormal return centered on the event date. *Size* is the natural logarithm of assets at the beginning of the quarter. *MTB* is the market value of equity divided by the book value of equity, both measured at the beginning of the quarter. *Leverage* is current liabilities plus long-term debt as a percentage of total assets, all measured at the beginning of the quarter. *PPE* is net property, plant, and equipment at the beginning of the quarter as a percentage of total assets. *Inventory* is beginning of quarter inventory as a percentage of total assets. *GeoSegments* is the natural logarithm of the number of geographic segments. *ROAttm* is net income over the past four quarters as a percentage of total assets. *Abs*(*AbnReturn*) is the absolute value of the buy-hold market-adjusted abnormal return for the period beginning three days after the event and ending three days after the next quarterly filing date.

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$ (for two-tailed tests). *t*-statistics are in parentheses.

## 6.3 ANALYSIS OF BIAS AND EX POST RECOGNIZED LOSS VALUES FOR DISCLOSING FIRMS

Next, I test the hypothesis that firms measure the events' financial impacts with bias, and the level of bias differs depending on whether the amount is disclosed or recognized. If recognizing firms introduce a greater bias toward zero in their measurement of expenses, as suggested by Choudhary [2011], then regression coefficients for recognizing firms could be larger if investors undo this bias. Analyzing the amount of bias contained in

a recognized value, however, is problematic as it would require comparing the recognized loss to the unobservable "true" loss amount. For disclosing firms, however, it is possible to compare the amount of *Loss* disclosed to the amount of loss that is ultimately recognized. Figure 1 illustrates how the loss, previously disclosed as a subsequent event, is represented as a recognized amount at the second filing date after the subsequent event occurred. For disclosing firms, I define this eventually recognized amount as the variable *ExPost Loss*. I am able to gather this *ExPost Loss* from the next 10-Q or 10-K filing for 68 of the 78 disclosing firms. I then compare the mean *Loss* and *ExPost Loss* within disclosing firms to offer evidence on whether the loss amounts change significantly depending on whether they are disclosed or recognized.

With a mean of −0.39, the *ExPost Loss* is significantly smaller in magnitude than the initially disclosed *Loss* ($p$-value of 0.073). This may be due to disclosing firms overestimating potential losses to ensure that they do not put themselves in danger of having to unfavorably revise their estimates. If investors understand this behavior, and undo the bias, this could drive the weaker response to the disclosed values. To investigate this possibility, I replicate the analysis from equation (1), except I allow the association between *Loss* and *AbnReturn* to vary depending on whether a firm has been assigned to disclosure or recognition:

$$AbnReturn = \delta_0 + \delta_1 Disclose + \delta_2 Loss + \delta_3 Disclose \times Loss + \sum_i \delta_i Control_i + \varepsilon. \quad (4)$$

The results of this regression are given in the first column of table 6. As expected, there is a positive relation between recognizing firms' losses and returns, as indicated by the coefficient of 4.738 on *Loss*. However, this association is significantly weaker for disclosing firms, as shown by the negative coefficient of −5.651 on the interaction *Disclose* × *Loss*. To investigate if this result is driven by a bias in disclosed amounts, I reestimate equation (4), replacing *Loss* with *ExPost Loss* for the disclosing, subsequent events firms. As shown in the second column of table 6, inferences are unchanged, with the coefficient on the interaction *Disclose* × *Loss* remaining significantly negative at −5.255.[21] Thus, I am unable to provide evidence that differences in the amount of bias in disclosed and recognized values drive my results.

## 7. *Timing Differences*

As previously alluded to in the discussion of table 2 and figure 2, recognizing firms will have more time than disclosing firms to estimate an event's financial impact in the setting of subsequent events. If this greater time for

[21] The matching estimate from table 3 is also robust to using *ExPost Loss* in place of *Loss* for disclosing firms in the bias adjustment (see online appendix).

**TABLE 6**

*Differential Impact of Disclosure Versus Recognition on Returns: ExPost Recognized Loss Values for Disclosing Firms*

| Dependent Variable: *AbnReturn* | (1) | (2) |
|---|---|---|
| Constant | 3.171 | 4.101 |
| | (0.37) | (0.43) |
| *Disclose* | 5.572** | 6.518** |
| | (2.20) | (2.39) |
| *Loss* | 4.738* | 4.877* |
| | (1.87) | (1.91) |
| *Disclose* × *Loss* | −5.651** | −5.255* |
| | (−2.03) | (−1.71) |
| *EventAbnRet* | 0.050 | −0.060 |
| | (0.11) | (−0.11) |
| *Size* | −0.066 | −0.405 |
| | (−0.06) | (−0.32) |
| *MTB* | 0.993 | 1.109 |
| | (0.71) | (0.75) |
| *Leverage* | −0.106 | −0.086 |
| | (−1.30) | (−0.91) |
| *PPE* | −0.063 | −0.059 |
| | (−1.12) | (−1.03) |
| *Inventory* | −0.203 | −0.187 |
| | (−1.43) | (−1.22) |
| *GeoSegments* | −1.898 | −1.533 |
| | (−1.05) | (−0.82) |
| *ROAttm* | 0.049 | 0.080 |
| | (0.25) | (0.33) |
| Adj. $R^2$ | 0.11 | 0.12 |
| *N* | 156 | 146 |

The dependent variable is *AbnReturn*, the buy-hold market-adjusted abnormal return for the period beginning three days after the event and ending three days after the next quarterly filing date. *Disclose* is an indicator variable for an observation being a firm disclosing the loss as a subsequent event. *Loss* is the pretax income effect of the event as a percentage of total assets at the beginning of the quarter. In the second column of this table, *ExPost Loss* replaces *Loss*. *ExPost Loss* is the loss taken from the second filing issued after the event date for disclosing firms (i.e., the filing in which the loss became recognized). I am able to gather this ex post recognized loss from the next 10-Q or 10-K filing for 68 of the 78 disclosing firms. *EventAbnRet* is the market-adjusted three-day abnormal return centered on the event date. *Size* is the natural logarithm of assets at the beginning of the quarter. *MTB* is the market value of equity divided by the book value of equity, both measured at the beginning of the quarter. *Leverage* is current liabilities plus long-term debt as a percentage of total assets, all measured at the beginning of the quarter. *PPE* is net property, plant, and equipment at the beginning of the quarter as a percentage of total assets. *Inventory* is beginning of quarter inventory as a percentage of total assets. *GeoSegments* is the natural logarithm of the number of geographic segments. *ROAttm* is net income over the past four quarters as a percentage of total assets.

$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$ (for two-tailed tests). *t*-statistics are in parentheses.

recognizing firms allows them to better estimate the loss, this timing difference could contribute to a differential market response in a way that is not directly related to recognition or disclosure. However, the greater time recognizing firms have to estimate the loss suggests that their loss estimates should be more precise, which is something for which I fail to find empirical support.

A firm's ability or desire to file financial statements quickly after its quarter-end also presents an issue related to timing. While a firm's fiscal

period end is presumably set in advance, the firm does have some control over the speed with which it files its financial statements. Choudhary, Merkley, and Schloetzer [2013] argue that filing speed is likely a persistent characteristic and unlikely related to specific events. Consistent with this, I fail to find evidence that firms adjust their filing speed in an effort to be classified as a disclosing or recognizing firm. Specifically, I find that the change in filing lag (the difference between the quarter-end date and the filing date) from a year ago to the current quarter is insignificantly different between disclosing and recognizing firms.

Another issue, however, arises if firm characteristics related to filing quickly are correlated with the *AbnReturn* variable. This is because firms with a longer filing lag have a higher likelihood of being classified as disclosing firms. Indeed, the average filing lag for disclosing firms (53 days) is significantly longer than for recognizing firms (44 days). If firms with greater economic resources are able to file more quickly, as argued and demonstrated in Choudhary, Merkley, and Schloetzer [2013], this could bias my results, as firms with greater economic resources may also be better able to deal with the natural disasters in my sample.[22] However, this bias would seem to work against the effect I find, as greater economic resources should be positively associated with filing speed (and thus negatively associated with disclosure) and positively associated with the signed market reaction. Further, I match on and control for variables likely related to the ability to file more quickly, notably *Size* and *ROAttm* (Choudhary, Merkley, and Schloetzer [2013]). Finally, in a robustness test, I also directly control for these timing differences, and my results are unchanged. The bias-adjusted Mahalanobis distance matching estimator shows *AbnReturn* is on average 11.59 percentage points less negative for disclosing values ($p = 0.000$) relative to recognizing firms when adding the natural logarithm of the number of days between a firm's quarter-end and filing date as an additional control variable (see online appendix).

Finally, I consider how the timing of an event may affect the amount of attention the event receives at the firm's earnings announcement. Obviously, the firm cannot discuss the event at the earnings announcement if the event occurs after this date. This occurs for nine of the disclosing firms. Further, the focus of the earnings announcement is the current quarter's earnings. Thus, management may be more likely to discuss the event when the loss relates to recognized earnings. This suggests another possible channel through which recognized values receive greater attention from investors. In examining the firms' earnings announcement conference call transcripts, I find that recognizing firms discuss the event's effect more frequently. About 68% of recognizing firms mention the event, compared to 51% of disclosing firms. About 62% of recognizing firms quantify the

[22] See section 6.1 for a discussion of how large an omitted variable's correlation would need to be to invalidate the paper's inferences.

event's effect in the conference call, compared to 38% of disclosing firms. However, the greater discussion of the event at the earnings announcement by recognizing firms does not explain the difference in returns between disclosing and recognizing firms. In particular, the difference in returns remains around 7% ($p < 0.01$) when I control for the degree to which the event was discussed at the earnings announcement, as well as the three-day abnormal return centered on the earnings announcement date. This additional analysis is tabled in the online appendix.

## 8. *Conclusion*

This study analyzes differences in how investors respond to required disclosure versus recognition. I use the setting of subsequent events to provide a natural experiment, where the timing of natural disasters determines which firms are required to disclose or recognize the financial effects of similar events. My results show a stronger market response for firms that have been assigned to recognition relative to those firms assigned to disclosure. My research setting reduces the concern that this result is driven by firms self-selecting their accounting treatment. I attempt to further control for any differences in the underlying economics of the transaction by matching my sample on firm and event characteristics.

Having established a stronger market response for recognizing firms, I conduct additional analysis to provide evidence on why this difference exists. I fail to find support for the hypothesis that differential reliability between disclosed and recognized values drives my results. I do, however, find some evidence that investors underreact to disclosed events, only responding to these events after they are recognized. This suggests that investors may incur higher processing costs when using disclosed values, resulting in investors relying primarily on recognized numbers instead.

It is important to note that these inferences rely on the economic magnitude of the disclosed and recognized events being on average the same. If the events are of different magnitudes, differences in investor reactions could be attributed to differences in the events rather than to differences in the accounting treatments. I attempt to minimize this concern by relying on the random variation in accounting treatments provided by the natural experiment and by matching the sample on firm and event characteristics. Upon observing the results, however, the large magnitude of the difference in returns (6.98%) calls into question whether accounting treatments alone can cause such a large effect or whether recognizing firms experience more severe events. Further, if the economic magnitudes of the events are comparable, the returns of the two groups of firms should converge over time. However, the results show that the firm's returns do converge, but not immediately after the differences in the initial accounting treatments are undone. In particular, a difference in returns of 9.78% exists at the second filing date after the event, but at the third filing date after the event the difference in returns is insignificantly different from zero.

The large observed effect could also be explained by the low power associated with my small sample. Small samples may result in noisy estimates of true effects. Therefore, only studies that by chance draw a sample where the estimated effect happens to be large will pass the threshold of statistical significance, a phenomena sometimes referred to as the "winner's curse" (Ioannidis [2008], Button et al. [2013]). This highlights the importance of further research in the area of disclosure versus recognition, including larger sample studies.

Another threat to the paper's inferences is the fact that disclosing firms have less time on average from the event until their filing date, relative to recognizing firms. This is a feature of the setting of subsequent events. It is possible that this shorter amount of time between the event date and filing date for disclosing firms affects the market reaction to the disclosure in a way that is not directly related to the required accounting treatment. For example, a manager will have less time to develop a precise estimate of the event's effect. However, the analysis fails to find evidence of differential reliability between the disclosed and recognized amounts.

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Additional Supporting Information may be found in the online version of this article at the publisher's website:

Online appendix