Market Reaction to Corporate Press Releases

Andreas Neuhierl, Anna Scherbina, and Bernd Schlusche*

Abstract

We classify a unique and comprehensive data set of corporate press releases into topics and study the market reaction to various types of news. While confirming prior findings regarding strong stock price responses to financial news, we also document significant reactions to news about corporate strategy, customers and partners, products and services, management changes, and legal developments. Consistent with regulators' expectations, the level of informational asymmetry in the market declines following most types of press releases. At the same time, return volatility frequently increases in the post-announcement period, which we show can be attributed to higher levels of valuation uncertainty.

I.   Introduction

On Jan. 9, 2007, Apple Inc. issued a press release, headlined "Apple Reinvents the Phone with iPhone," which stated:

> iPhone . . . ushers in an era of software power and sophistication never before seen in a mobile device, which completely redefines what users can do on their mobile phones.

It contained a pronouncement from CEO Steve Jobs that "iPhone is a revolutionary and magical product that is literally five years ahead of any other mobile phone," and it described the new product's features. On the day of the announcement, the stock trading volume increased more than fourfold and remained almost as high on the following day before dropping by half the day after that. The stock

price also rose, and in the period from the day before to 5 days after the announcement, Apple's stock earned a cumulative return of 9.31% in excess of the market. Moreover, the stock became much more volatile: In the 10 days following the press release, its idiosyncratic volatility increased by 28% relative to the level in the 10 days prior to the announcement.

Following the adoption of Regulation Fair Disclosure (Reg FD) in Oct. 2000 and of the Sarbanes-Oxley Act (SOX) in July 2002, corporate press releases became a prevalent method of communicating new developments to investors. These regulations mandate that publicly traded companies disclose all private information that may have an impact on their market values and report changes in their "financial conditions or operations" in a timely fashion and simultaneously to all market participants. In particular, Reg FD states: "With advances in information technology, most notably the internet, information can be communicated to shareholders directly and in real time, without the intervention of an intermediary."[1] Reg FD further suggests that communicating information via press releases is the preferred means of achieving timeliness and nonexclusivity.

Corporate press releases reach investors almost instantaneously via services such as PR Newswire, Business Wire, GlobeNewswire, Marketwire, and the like.[2] We form our data set of corporate press releases issued between Apr. 2006 and Aug. 2009 by combining observations of official corporate press releases from all major newswire services. We believe that our data set contains nearly all press releases that were issued in this time period. We manually classify these press releases into major news categories and their subcategories based on content. For example, Apple's press release mentioned earlier is classified under the major category *Products & Services* and the subcategory *New Product*. After removing the press release categories for which we have no priors with respect to the expected market impact (e.g., announcements about establishing new awards, participation in new employee and industry initiatives, and the like) and eliminating infrequent news categories with fewer than 30 press release observations, we are left with a total of 10 major news categories, further subdivided into 60 subcategories. We analyze how various types of corporate announcements affect stock returns, volatility, bid-ask spreads, and trading volume, each of these measures providing different metrics for the informativeness of news.

The importance of firm-level news should not be assessed solely by its immediate impact on the stock price but also by its effect on trading volume and the information environment of the firm. Some announcements may not lead to a large change in the equilibrium price because they will not substantially move the consensus belief regarding the firm value. However, as long as they cause individual traders to revise their expectations, the informational impact of news may be reflected in abnormal trading volume. Moreover, the assumption that the market

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[1]The entire document can be found at http://www.sec.gov/rules/final/33-7881.htm.

[2]Firms usually sign up for an account with one of the newswire services and issue all of their press releases through that service. Typically, a basic account is free but a fee is charged for each press release. Newswire services then post press releases on their own Web sites and also distribute them, typically free of charge, to local and global media outlets, trade magazines, and financial Internet sites. Often, firms must pay extra for wider distribution. Newswire services compete on price, the breadth of their distribution network, and the quality of customer service.

will always be able to quickly quantify the impact of news on the firm value is unrealistic. In particular, when it comes to managerial decisions, this view would fail to recognize the value of managerial expertise, as it implicitly presumes that investors could have made these decisions themselves.[3] We find that many types of news lead to subsequent volatility increases, as the announcement weakens valuation priors and prices start to react more strongly to subsequent news signals. Finally, we show that press releases remove the informational advantage of firm insiders, as evidenced by almost universal decreases in bid-ask spreads in the post-announcement period.

This paper contributes to the corporate news event-study literature in four respects. First, we consistently apply the same event-study design to all types of corporate news (rather than focusing on one type of event at a time, as was generally done in prior literature) in order to assess their relative importance to the market in a systematic manner. Moreover, unlike prior event studies that frequently inferred event dates from newspaper articles, we are able to tell the exact time when market participants learn the news. Second, owing to the breadth of our data set, we are able to include types of corporate news events that have not received much attention in the literature. Third, even for news categories that have been extensively studied before, we investigate whether the documented regularities still hold in this more recent and significantly broader data set. Fourth, in addition to stock price reactions, we investigate the patterns of changes in stock volatility, bid-ask spreads, and trading volume following different types of news, which has not been consistently done in earlier papers. For the analysis of the post-announcement information environment, an advantage of our data set is that it contains news that was delivered by firms directly to investors rather than being disclosed by information intermediaries, such as the financial media; the latter would likely distort the post-announcement information environment by including their take on the news being disclosed in the news article.

The impact of financial news has been studied extensively in prior literature. We confirm that several previously documented regularities still exist in the most recent data. Moreover, we find that other types of news are just as important as financial news. In the past, it was not required to make many such announcements in a timely manner, if at all. This changed with the adoption of Reg FD, which requires that firms disclose all news that could be deemed "material" for stock prices such that "there is a substantial likelihood that a reasonable shareholder would consider it important" (p. 9 of the regulation).[4] We are, therefore, able to show that stock prices react strongly to nonfinancial news as well. In particular, the market reacts negatively to news about customer losses, management terminations, Food and Drug Administration (FDA) rejections, and product defects. News releases about new products, patent awards, exiting unsuccessful ventures, new partnerships formed, legal settlements, management additions, FDA approvals,

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[3]We appreciate this insight from Jack Treynor.

[4]We were told by staff at the Securities and Exchange Commission (SEC) that the language of the regulation and the definition of the types of news that need to be disclosed are intentionally left vague in order to prevent firms from gaming the system. Hence, firms may disclose a wider range of news than what is considered "material" by investors or regulators.

and successful research outcomes are all accompanied by significantly positive abnormal returns. Prices also react significantly positively to such seemingly uninformative news as reaching a sales milestone or winning a company award. The underlying reason might be a temporary or a permanent increase in investor attention (Merton (1987)).[5]

Ranking the news categories by the magnitude of the price reaction within 7 trading days around the announcement date, the five categories that elicit the most positive significant market responses are: i) pre-announcements of better-than-expected financial results, ii) announcements of share buybacks, iii) FDA approvals, iv) special dividends, and v) an intent to spin off a subsidiary. The five news categories that elicit the most negative significant market reactions are: i) pre-announcements of disappointing financial results, ii) announcements of FDA rejections, iii) customer losses, iv) product defects, and v) earnings restatements.

Investigating post-announcement changes in the information environment, we find that most stocks experience volatility increases in the post-announcement period. We further show that we can reject the hypothesis that the volatility increases can be attributed solely to price shocks that occur on announcement days. Moreover, news that appears to be more nonroutine in nature leads to more prevalent volatility increases. Both of these results indicate that the informational content of press releases leads to higher valuation uncertainty for some types of news, which manifests itself in higher volatility levels. Finally, in line with regulators' expectations, press releases tend to reduce the informational advantage of firm insiders, resulting in lower bid-ask spreads.

This paper studies the market reaction to news originating from the primary news source (i.e., corporations themselves). Another strand of literature that has gained momentum recently focuses on the importance of news media and the Internet in disseminating new information to the market. Many of these studies try to assess whether new information has a positive or negative content based on the presence of positive or negative words in news stories or chat board messages and investigate whether news stories quantified in this way can predict future returns (e.g., Chan (2003), Antweiler and Frank (2004), and Das and Chen (2007) for Internet message boards; Tetlock (2007) and Dougal, Engelberg, Garcia, and Parsons (2012) for *Wall Street Journal* (*WSJ*) articles about the market; Tetlock, Saar-Tsechansky, and Macskassy (2008) for news stories about individual stocks; and Engelberg (2008) for qualitative information that is released along with earnings reports). Using textual-similarity analysis, Tetlock (2011) finds that investors react to previously reported information, causing subsequent return reversals. Using the Dow Jones news archive for the period 1979–2007, Tetlock (2010) shows that returns earned on days when firm-specific news is released are less likely to be subsequently reversed. He also finds that news stories typically reduce the level of informational asymmetry. Most similar in spirit to ours is the study by Antweiler and Frank (2005), which classifies news stories that have appeared in the *WSJ* from 1973 to 2001 into topics and runs event studies for each

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[5]The importance of investor attention for firm valuations is evidenced by the fact that newswire services compete on the breadth of their network.

type of news.[6] An important objective of our study is to provide a reasonable classification for firm-level press releases and assess their impact on stock prices and the information environment. Questions about firm characteristics that determine the speed of price discovery are beyond the scope of this paper and are left to future research.

The remainder of the paper proceeds as follows: Section II provides an overview of the regulations affecting mandatory disclosures and describes the data. Section III explains the test methodology and presents our test results. Section IV concludes.

II. New Disclosure Requirements and the News Data Set

A. New Regulations to Ensure More Complete and Timely Information Disclosure

Prior to the adoption of Reg FD, corporations were required to disclose important material information using the SEC's Form 8-K. However, it was permitted for these forms to be filed with a delay of up to 4 business days after the occurrence of an event (p. 2 of Form 8-K), and the news likely reached investors with an even further delay. Within that time, a subset of market participants (notably, analysts and investment funds) could have benefited from selective information disclosure, and this knowledge would have already been (partially) incorporated in stock prices at the time of the official disclosure to the public. Reg FD was adopted in Oct. 2000 in response to a series of analyst scandals caused by firms' selective information disclosure to a subset of analysts in return for favorable stock recommendations. The regulation states that firms must disclose all relevant information, favorable or unfavorable, without any delay and to all market participants at once. The Sarbanes-Oxley Act was adopted in July 2002 to address a series of accounting scandals, and, among other objectives, aimed to improve the quality of financial information disclosure. The SEC responded by adding the new Section 13(1) to the Exchange Act that obligates public companies to disclose "on a rapid and current basis" nonpublic information "concerning material changes in the financial condition or operations."

Prior to these increased information disclosure requirements, press releases were a popular method of communicating information, but, left to corporate discretion, they likely conveyed predominantly favorable news. Reg FD states

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[6]Our data set offers three advantages. First, as Antweiler and Frank (2005) point out, the *WSJ* tends to cover only relatively large firms and print the news stories that are likely to attract readers' attention. While their sample contains, on average, 18 announcements per day, our sample is much more comprehensive and contains, on average, 218 announcements per day. Second, as a result of the recently implemented disclosure regulations, the timing of the information disclosures can be identified more precisely with our data set; as we discuss later in the paper, during the time period covered by Antweiler and Frank (2005), firms were allowed to report important news with a delay of up to 4 days; being picked up by the *WSJ* would delay it by at least another day. Finally, our news stories are hand-classified into news categories, while the majority of the sample in their paper is classified by a computer algorithm. Interestingly, we do not observe the conspicuous patterns of overreaction documented by the authors, probably because the press release announcements in our data set do not attract as much attention from retail investors as the *WSJ* articles.

explicitly that firms have to disclose *all* relevant information in order to eliminate the informational advantage of firm insiders. The advances in information technology and, specifically, the Internet are singled out as the technological innovations that allow firms to disclose information to shareholders "directly and in real time, without the intervention of an intermediary" (p. 3 of the regulation). The SEC further suggests that issuing a press release should be the first step in conveying new information to investors (p. 15 of the regulation).

Our data set of corporate press releases provides an improvement over a set of corporate news that could have been constructed using Form 8-K reports over the same time period for three reasons. First, as discussed earlier, the information reported on these forms reaches the market with a significant delay, and the news already may have been, at least partially, incorporated into stock prices. Second, the set of news that firms disclose via press releases under Reg FD and SOX is broader than the information that was to be reported in Form 8-K.[7] Finally, after the passage of the regulations, the SEC reduced the Form 8-K reporting requirements as part of the Paperwork Reduction Act, so that much of the news announced via press releases does not have to be reported again via Form 8-K. Given that our data set contains over 90% of all publicly traded firms, it appears that most firms comply with Reg FD and SOX by disclosing new information via press releases.

B.   The Data Set

Our data set comprises corporate press releases issued between Apr. 2006 and Aug. 2009. The press releases are issued via newswire services, which further disseminate the firm news via their Web interfaces and news distribution networks. The distribution networks contain local and global media outlets (newspapers, magazines, radio, and TV stations), trade magazines, Internet sites (e.g., Yahoo and Google), financial news service providers (e.g., Bloomberg, Dow Jones/Factiva, and Thomson Reuters), some of which, especially those with limited space capacities, then further decide whether or not to feature the press releases in their news stories. Newswire companies do not charge members of their news distribution networks but charge the firms issuing the press releases.[8] Although there may be a tendency to release bad news to smaller networks, this practice is discouraged by regulators.

Our data set is consolidated from all of the major newswire services, including PR Newswire, Business Wire, GlobeNewswire, and Marketwire. PR Newswire contains 50%–60% of all publicly traded firms, Business Wire about 30%, and GlobeNewswire and Marketwire are next in terms of coverage, with the rest

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[7]For example, in the year 2000, the SEC estimated that Reg FD would increase the number of required firm disclosures by 70,000 per year (this estimate can be found on http://www.sec.gov/rules/proposed/34-42259.htm).

[8]For instance, Business Wire does not charge an annual fee for maintaining an account with them but charges for each press release based on its length and the width of the agreed-upon distribution network. Fees start at $210 for the first 400 words, and additional charges are added for photos and graphics.

containing significantly fewer firms. Our coverage shows an upward time trend; in 2006, 75.94% of all publicly traded firms appear in our data set, in 2007 coverage increases to 91.00%, in 2008 to 97.23%, and in 2009, since data extend only through August, coverage drops slightly to 96.67% of all publicly traded firms. The firms that are missing tend to be smaller than the firms present in the data set. Over the entire sample period, the mean (median) market capitalization of the firms present in our data set is equal to $2,596 ($321) million, while the mean (median) market capitalization of the firms absent from the data set is equal to $1,307 ($228) million.

We use only news releases issued by corporations themselves rather than by news agencies (among all postings, official corporate press releases can be identified by the news "source" printed at the bottom of the report). The press releases are then manually classified into news categories based on their information content. In the future, the news classification can be easily automated with the use of search words. Our objective in defining news categories is to achieve the best trade-off between the precision of each classification and its frequency of occurrence.

Perhaps as a result of the vagueness of the SEC's information disclosure requirements, firms tend to err on the side of releasing too much information. Additionally, firms may prefer to announce immaterial news in order to attract the attention of potential investors. For the sake of brevity, we remove news categories likely to be considered uninformative by the market: We discard press releases announcing the firm's participation in charity events, environmental initiatives, news campaigns, and various corporate surveys (e.g., surveys assessing the diversity of the labor force, security, etc.); declaring the filings of various documents with the stock exchanges and the SEC; announcing the establishment of industry awards and competitions; making statements regarding labor strikes; describing new employee and industry initiatives; publicizing changes in internal policies; announcing speaking engagements of their executives; and so on. We also discard news categories with fewer than 30 press release observations. This leaves us with 271,867 corporate press releases.[9] Furthermore, we exclude small stocks in order to reduce the impact of market microstructure effects in our event study analysis, requiring that all firms in our sample have a market capitalization of at least $100 million and a share price of at least $5/share before the announcement, and also count as a single observation multiple press releases in the same news category issued on the day. This reduces our data set to 203,621 observations of unique press releases, which are then split into 10 major news categories and 60 subcategories. (We obtain qualitatively similar results when using all firms in the sample.) Table 1 presents descriptions of all subcategories, and Online Appendix A (www.jfqa.org) provides representative press release headlines. Our news categorizations are designed to be rather general in nature in order to capture the average effect of a particular news type; moreover, they lend themselves to the possibility of easy automation through keyword searches of press release headlines. For this reason and due to space constraints, we refrain from

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[9]Throughout the paper, we use the terms "(corporate) press release," "news event," and "news announcement" interchangeably.

forming the finer subpartitions that have been proposed by follow-up studies of several frequently investigated news events (e.g., we do not separate acquisitions into stock- and cash-based, newly awarded patents into "broad" or "narrow" in scope, new debt issues into convertible and straight, and so on).

The largest category, *Financial*, is comprised of 39,933 press releases and contains announcements about earnings, dividends, accounting restatements, stock splits, seasoned debt and equity offerings, and share buybacks. *Meetings and Events* is the second largest category, with a total of 36,793 observations. The third largest category is *Customers and Partners*, with 35,538 observations; it contains announcements about customer losses or wins, new partnerships formed, and

TABLE 1

Press Release Categories

Table 1 provides brief descriptions of the news categories and reports the total number of press release observations in each major news category (in parentheses), as well as in each subcategory. The sample period is Apr. 2006–Aug. 2009.

Category	Subcategory	No. of Obs.	Description
1. Awards (10,486)	Company Award	8,445	Company being awarded for its achievements
	Product Award	2,041	Company being awarded for one of its products
2. Customers & Partners (35,538)	Customer Loss	56	Customer lost or orders reduced
	Customer Win	16,946	New business from a new or an existing customer secured
	New Partnership	17,795	New strategic agreement with another firm signed
	Reaching a Milestone	741	Sales milestone or an anniversary reached
3. Exchange (811)	Noncompliance	736	Notice of exchange noncompliance/potential delisting received
	Return to Compliance	75	Problems causing exchange noncompliance successfully addressed
4. Financial (39,933)	Dividend—Decreased	688	Dividend decrease or suspension declared
	Dividend—Generic	14,424	Generic dividend declaration issued
	Dividend—Increased	2,276	Dividend increase or initiation declared
	Dividend—Preferred Stock	852	Dividend to be paid to preferred stockholders declared
	Dividend—Special Dividend	130	Special dividend declared
	Financial Results—Strong	7,712	Strong financial results (e.g., high earnings)
	Financial Results—Weak	3,780	Weak financial results (e.g., low earnings)
	Pre-Announcement—Negative	348	Pre-announcement of weak financial results
	Pre-Announcement—Positive	553	Pre-announcement of strong financial results
	Restatement	293	Revision of fiscal results or restatement of a company's outlook
	Seasoned Offering: Debt	2,925	Announcement of debt offering/issuance
	Seasoned Offering: Equity	2,629	Announcement of stock offering/issuance
	Share Buyback	2,994	Initiation of a share repurchase plan
	Stock Split—Forward	268	Initiation of a forward stock split
	Stock Split—Reverse	61	Initiation of a reverse stock split
5. Legal (2,617)	Class Action	536	Class action lawsuit filed against company
	Legal Problem	125	Lawsuit filed against company or appeal dropped
	SEC Investigation	140	Announcement of initiation or outcome of an SEC investigation
	Settlement	1,816	Settlement of litigation against the firm
6. M&A (13,206)	Acquisition—Certain	9,376	Completed/secured approval to acquire another firm
	Acquisition—Intent	45	Plan to acquire another firm being considered
	Acquisition—Target	85	Target firm's announcement of being acquired
	IPO	56	Filing for initial public offering of a "carved-out" subsidiary
	Merger	170	Agreement to merge or completion of a merger
	Spinoff—Certain	2,745	Completed/secured approval to spin off a subsidiary/line of business
	Spinoff—Intent	729	Plan to spin off a subsidiary/line of business being considered

TABLE 1 (continued)

Press Release Categories

	Category	Subcategory	No. of Obs.	Description
7.	Management (25,142)	Addition	16,113	Recruitment or election of top management or board members
		Compensation	53	Statements on compensation of management and employees
		Promotion	5,510	Promotion of top management members
		Reorganization	869	Organizational change or change among the top management/board
		Retirement	1,157	Retirement of top management or board members
		Termination	1,440	Resignation/departure of top management or board members
8.	Meetings & Events (36,793)	Company-Sponsored Event	2,577	Company hosts or sponsors an industry event
		Industry Event	31,827	Presentation or participation in an industry event announced
		Investor Meeting	2,389	Presentation or participation in an investor conference or meeting
9.	Products & Services (31,881)	FDA Approval	1,279	Announcement of an FDA product approval
		FDA Investigation	506	Start of an FDA investigation
		FDA Rejection	36	Rejection of product by the FDA
		New Product	22,568	Launch of a new service or introduction of a new product
		Patent Award	549	Company receives a new patent
		Pharmaceutical Approval EU	238	Approval of a pharmaceutical product in Europe
		Product Approval	1,514	Authorization or certification of a new business or product
		Product Defect	150	Issuance of a warning regarding a product or recall of a product
		Research Failure	104	Failure of a research effort
		Research Success	1,406	Successful completion of a research effort
		Updates & Upgrades	3,531	Improvement or update of a product/service
10.	Strategy & Performance (7,214)	Credit News—Negative	137	Financing difficulties or debt downgrades
		Credit News—Positive	851	Success in securing new credit
		Infrastructure—Downsizing	48	Decision to close facilities or exit certain markets
		Infrastructure—Expansion	4,819	Decision to expand the firm's business or open new facilities
		Profitability—Declining	210	Declining performance (e.g., decrease in sales or revenues)
		Profitability—Improving	1,149	Improving performance (e.g., increase in sales or revenues)

various company milestones.[10] The category *Products and Services* comes fourth, with a total of 31,881 observations; it includes announcements about product approvals, new products, updates and upgrades to existing products and services, patent awards, product defects, and outcomes of firms' research projects. The fifth largest category, with 25,142 observations, is *Management*, describing various changes in the management team. In sixth place, with 13,206 observations, is the *M&A* category, which contains press releases about mergers, acquisitions, and spinoffs. The *Awards* category ranks seventh, with 10,486 observations, and includes announcements of company and product awards. With 7,214 observations, *Strategy and Performance* comes next and includes announcements about decisions to expand or scale back firm operations, credit news, and trends in

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[10]The subcategory *Reaching a Milestone* also could have been assigned to the major category *Corporate Strategy & Performance*, but it frequently describes milestones reached in sales to customers or anniversaries of customer and partner relationships, thus signifying enduring business ties.

performance and profitability.[11] The ninth largest category, with 2,617 observations, is *Legal*, which contains announcements of (class action) lawsuits, SEC investigations initiated against the firm, and settlements of ongoing lawsuits. The smallest category, with 811 observations, is *Exchange*; it contains announcements about the receipt of noncompliance notices from the stock exchange and the return to compliance with exchange rules.[12]

Table 2 presents summary statistics for monthly press release activity across firms (the table only includes the press release observations that we kept). Panel A reports the statistics for the entire sample and shows that the average number of monthly press releases per firm is 0.88. However, a typical firm issues zero press releases per month, implying that the positive average is driven by a subset of firms issuing a relatively large number of monthly press releases. Panel B presents the mean/median monthly press release numbers by firm size, the left-hand side of the panel for NYSE-based size quintiles and the right-hand side for sample-based size quintiles, formed every month, so that all sample-based quintiles contain roughly the same number of stocks. Predictably, the number of press releases tends to increase with firm size. The average number of monthly press releases for NYSE-based (sample-based) quintiles increases from 0.21 (0.82) for the smallest to 1.98 (1.14) for the largest quintile.

TABLE 2

Descriptive Statistics on Monthly Press Release Activity

Table 2 presents descriptive statistics for monthly press release activity across firms. Panel A presents the statistics for the entire sample and Panel B shows the statistics by size quintiles. The size quintiles in Panel B are formed every month based on NYSE size break points (left-hand side) and sample size break points (right-hand side), where each size quintile contains roughly an equal number of stocks.

Panel A. Sample Statistics

Mean	Median	Std. Dev.	25%	75%	No. of Obs.
0.88	0.00	0.20	0.00	1.00	203,621

Panel B. Sample Statistics by Size Quintile

	NYSE-Based Quintiles				Sample-Based Quintiles			
Size	Mean	Median	Std. Dev.	No. of Obs.	Mean	Median	Std. Dev.	No. of Obs.
1 (small)	0.21	0.00	0.05	7,505	0.82	0.00	0.21	35,190
2	0.44	0.00	0.10	19,976	0.83	0.00	0.18	35,611
3	0.67	0.00	0.15	30,969	0.85	0.00	0.20	38,468
4	0.96	0.00	0.21	45,642	0.91	0.00	0.23	41,761
5 (large)	1.98	1.00	0.52	99,529	1.14	0.00	0.29	52,591

[11]Subcategories *Profitability—Declining* and *Profitability—Improving* are related to the subcategories describing strong and weak financial results under the major category *Financial*, but instead of focusing on current earnings, these announcements provide big-picture assessments of patterns and trends in firm sales, revenues, and profitability.

[12]Often, notices of noncompliance are triggered by periods of bad performance, such as bid prices staying below the exchange-set minimum for a prespecified number of consecutive days, or the total value of publicly held shares falling below a minimum value set by the exchange. Noncompliance notices are also triggered by delays in providing exchange-mandated information releases, such as annual and quarterly reports and disclosures about the firm's corporate governance. Announcements of various firm filings with the exchanges (including requests for listing or delisting) have been omitted from this data set.

III.   Empirical Tests

In this section, we investigate the impact of various types of news on stock prices and the information environment. Much news may be so major in nature that, rather than simply offering an independent signal that helps investors refine their firm valuation models, it may instead force them to adopt an entirely different model. Consider a market maker observing a news announcement. Suppose that the announcement induces her to revise both her estimate of the fair value of the stock, v, and the precision with which it is estimated, σ_v^2, thus replacing the old valuation model, $V^{\text{FIRM}} \sim N(v, \sigma_v^2)$, with the new one, $V^{\text{FIRM}} \sim N(v_{\text{NEW}}, \sigma_{v,\text{NEW}}^2)$. The change in the mean of the distribution, $v_{\text{NEW}} - v$, will be captured by the abnormal return at the time of the announcement. The change in the precision with which it is estimated, $\sigma_{v,\text{NEW}} - \sigma_v$, will be manifested in the change in the stock's subsequent idiosyncratic volatility. If the valuation priors are weakened ($\sigma_{v,\text{NEW}} > \sigma_v$), then the price will react more strongly than before to subsequent information signals (e.g., analyst reports, news media stories, and various follow-up information releases issued by the firm), increasing the post-event idiosyncratic volatility. If the valuation priors are instead strengthened ($\sigma_{v,\text{NEW}} < \sigma_v$), the post-announcement volatility will decrease. Additionally, Grundy and Kim (2002) show that the post-announcement volatility will increase if traders interpret the news differently and have different valuation priors.

If corporate insiders have beforehand knowledge of the information to be released, the adverse selection in trade decreases in the post-announcement period, and trading costs decrease as well (according to the models of Glosten and Milgrom (1985) and Kyle (1985)). If instead a group of more sophisticated traders has an advantage in interpreting the news, adverse selection will be higher in the post-announcement period and trading costs will increase (e.g., Kim and Verrecchia (1994)).

Compared to the considerable literature on event-induced abnormal returns, the number of papers conducting investigations of event-driven changes in volatility and liquidity is much smaller. Yet, firm management should be concerned with both. As noted by Clayton, Hartzell, and Rosenberg (2005), higher idiosyncratic volatility reduces the attractiveness of firms' equity as a medium for acquisitions and stock-based employee compensation, and it exacerbates the conflict of interest between bondholders and stockholders. Reduced liquidity increases the required rate of return and, hence, the firm's cost of capital.

Trading volume provides an additional insight into the informativeness of the news. A news announcement may manifest itself in abnormal trading volume if it causes individual investors to revise their beliefs, even when not accompanied by abnormal returns. (Indeed, Cready and Hurtt (2002) show that the magnitudes of the price and volume responses to earnings announcements are largely independent.) Karpoff (1986) models how volume may react to news by considering two groups of investors: the stock owners and the nonowners. He shows that trading volume should be expected to increase if a news announcement causes investors to interpret the information differently, because it is then more likely that beliefs will be jumbled and the nonowners will develop higher valuations than the owners. Obviously, volume increases when the nonowners increase their

valuation by a larger amount than the owners. When the reverse is true and the owners increase their valuations by a larger amount than the nonowners, trading volume declines. In addition to these considerations, Verrecchia (1981) shows that even when investors have identical prior beliefs and an identical interpretation of new information, they still trade if the news changes state-contingent security payoffs and investors have different levels of risk tolerance. Changes in the post-announcement level of informational asymmetry have a separate effect on volume. If discretionary liquidity traders can choose when to trade, they will stay out of the market when the level of informational asymmetry is high and trade when it is low (e.g., Admati and Pfleiderer (1988), Foster and Viswanathan (1990), and Tetlock (2010)). Therefore, depending on whether a news announcement increases or decreases informational asymmetry, the post-announcement trading volume could increase or decrease.

A.   Impact on Stock Returns

1.   Event Study Methodology

To assess the immediate impact of news releases on stock prices, we follow the common event study methodology. For each firm i, the abnormal return on day t, AR_{it}, is specified as

$$(1) \qquad AR_{it} = R_{it} - E(R_{it}|X_t),$$

where R_{it} and $E(R_{it}|X_t)$ are the actual and expected returns, respectively, for day t, and X_t is the conditioning information for the predictive model. Assuming that returns can be described by the market model, the abnormal return is defined as

$$(2) \qquad AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt},$$

where R_{mt} is the day-t return on the market portfolio, which we proxy with the Center for Research in Security Prices value-weighted index. The coefficients $\hat{\alpha}_i$ and $\hat{\beta}_i$ are the ordinary least squares estimates from the regression of firm i's daily returns on market returns over the 200 days prior to the event window.

The event window extends from 1 day before to 5 days after the day of the press release (as is common in event studies, we start the window 1 day before the actual announcement day in case the news has leaked to the market just before the actual press release). For all our event studies we assume that if a press release was made after trading hours, the announcement day is the next trading day. We keep the event window relatively short for two reasons: We are interested in the immediate impact of news on stock prices, and we want to minimize the chance that another press release is issued by the firm within the same window. Thus, we compute the average daily abnormal return for each firm i issuing a press release on day t as[13]

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[13]Henceforth, for convenience we will refer to the average daily abnormal return as the cumulative abnormal return (CAR) despite the fact that it is averaged over the 7 days from $t - 1$ to $t + 5$. Therefore, in all tables and figures, reported CARs should be multiplied by 7 to obtain the cumulative excess return earned over the 7-day period around the announcement.

$$(3) \qquad \text{CAR}_{it} \quad = \quad \frac{1}{7} \sum_{\tau=t-1}^{t+5} \text{AR}_{i\tau}.$$

Next, we calculate the average CAR ($\overline{\text{CAR}}$) for each news category across all press release observations and test whether the null hypothesis ($H_0 : \overline{\text{CAR}} = 0$) is violated. In order not to understate the standard errors for statistical inference, we correct for possible correlation of individual CARs estimated in overlapping event windows by clustering errors by the week in which press releases were issued.

2. Event Study Results

Figure B1 in Online Appendix B plots individual CAR observations for each news category. It shows that the distribution of CARs is somewhat right skewed. However, when computed with a sufficiently large number of observations, the distribution of sample means should approach normal. (As mentioned earlier, we eliminated news categories with fewer than 30 observations.) As an additional check, we also conduct a nonparametric test for whether the sample CARs are different from 0 for samples that contain fewer than 100 observations. Specifically, the nonparametric test evaluates how frequently the CAR is different from 0. Setting $p := \text{Pr}(\text{CAR} \geq 0)$ (or, equivalently, we can define $p := \text{Pr}(\text{CAR} \leq 0)$), we test the null hypothesis, $H_0 : p = 0.5$, against the alternative, $H_A : p \neq 0.5$, using a signed-rank test.

Table 3 presents average CARs and the p-values of the tests of H_0. For the news categories that contain fewer than 100 press releases, the p-values are

TABLE 3

Test Results for Abnormal Returns

Table 3 presents the mean cumulative abnormal return associated with each news category ($\overline{\text{CAR}}$) computed over the event window $[-1, +5]$ and the p-value for H_0: $\overline{\text{CAR}} = 0$. For categories containing fewer than 100 observations, the p-values are italicized, and the 1%, 5%, and 10% significance levels of nonparametric tests are indicated by symbols a, b, and c, respectively; categories significant at the 10% level, based on either test, are in bold.

Category		Subcategory	$\overline{\text{CAR}}$	p-Value
1.	Awards	**Company Award**	0.049%	0.000
		Product Award	0.014%	0.586
2.	Customers & Partners	**Customer Loss**	−0.704%	*0.002*[a]
		Customer Win	0.106%	0.000
		New Partnership	0.082%	0.000
		Reaching a Milestone	0.142%	0.003
3.	Exchange	Noncompliance	0.192%	0.104
		Return to Compliance	0.065%	*0.747*
4.	Financial	**Dividend—Decreased**	−0.144%	0.035
		Dividend—Generic	0.057%	0.000
		Dividend—Increased	0.167%	0.000
		Dividend—Preferred Stock	0.055%	0.325
		Dividend—Special Dividend	0.420%	0.012
		Financial Results—Strong	0.363%	0.000
		Financial Results—Weak	−0.145%	0.000
		Pre-Announcement—Negative	−1.709%	0.000
		Pre-Announcement—Positive	0.685%	0.000
		Restatement	−0.317%	0.066
		Seasoned Offering: Debt	−0.054%	0.152
		Seasoned Offering: Equity	−0.139%	0.000
		Share Buyback	0.438%	0.000
		Stock Split—Forward	0.295%	0.002
		Stock Split—Reverse	−0.087%	*0.807*

(continued on next page)

TABLE 3 (continued)

Test Results for Abnormal Returns

Category	Subcategory	$\overline{CAR}$	p-Value
5. Legal	Class Action	−0.086%	0.202
	Legal Problem	−0.240%	0.101
	SEC Investigation	0.183%	0.460
	Settlement	0.199%	0.000
6. M&A	**Acquisition—Certain**	0.105%	0.000
	Acquisition—Intent	0.020%	*0.948*
	Acquisition—Target	0.410%	*0.046^c*
	IPO	0.161%	*0.126*
	Merger	0.158%	0.249
	Spinoff—Certain	0.365%	0.000
	Spinoff—Intent	0.417%	0.001
7. Management	**Addition**	0.042%	0.003
	Compensation	0.201%	*0.515*
	Promotion	0.002%	0.906
	Reorganization	0.047%	0.571
	Retirement	−0.004%	0.931
	Termination	−0.174%	0.003
8. Meetings & Events	Company-Sponsored Event	−0.021%	0.379
	Industry Event	0.030%	0.000
	Investor Meeting	0.055%	0.131
9. Products & Services	**FDA Approval**	0.423%	0.001
	FDA Investigation	−0.080%	0.518
	FDA Rejection	−1.033%	*0.030^b*
	New Product	0.037%	0.000
	Patent Award	0.147%	0.059
	Pharmaceutical Approval EU	0.280%	0.104
	Product Approval	0.062%	0.098
	Product Defect	−0.500%	0.001
	Research Failure	−0.134%	0.461
	Research Success	0.226%	0.006
	Updates & Upgrades	0.032%	0.201
10. Strategy & Performance	Credit News—Negative	0.151%	0.455
	Credit News—Positive	0.013%	0.866
	Infrastructure—Downsizing	0.266%	*0.031^c*
	Infrastructure—Expansion	0.009%	0.620
	Profitability—Declining	−0.009%	0.968
	Profitability—Improving	0.113%	0.018

italicized, and the 1%, 5%, and 10% significance levels of the nonparametric tests are indicated by symbols *a*, *b*, and *c*, respectively. The results confirm previously reported regularities, especially when it comes to financial news, which has been extensively studied in prior literature. For illustration, Figure B2 in Online Appendix B plots average CARs for all news categories.

a. Financial News

Under the assumption of informational asymmetries between managers and investors, financial decisions can be viewed as signals revealing managers' private information about whether the firm is under- or overvalued (see, e.g., the models of Myers and Majluf (1984), Myers (1984), and Miller and Rock (1985), as well as the discussions in chaps. 13–17 of Brealey, Myers, and Allen (2006)). Additionally, Jensen (1993) argues that managers tend to waste cash (he calls this tendency the "free-cash-flow problem") and, therefore, decisions to pay out the excess cash should be value increasing.

Dividends signal both the availability of cash and the willingness to pay out this cash instead of wasting it; as a result, dividend announcements, and especially dividend initiations or increases, are typically accompanied by positive returns (e.g., Healy and Palepu (1988), Yoon and Starks (1995)). In our sample,

we subdivide dividend announcements into several subgroups. Dividend initiations or increases are accompanied by a significantly positive mean CAR, and it is almost three times as high as the mean CAR associated with generic dividend announcements, which do not reveal information about the relative magnitude of the dividend payment.[14] The mean CAR associated with dividend suspensions or decreases is significantly negative and roughly equal in absolute value to the mean CAR associated with dividend increases. The highest price reaction in the dividend subgroup (and the fourth highest among all significant subcategories) is associated with announcements of special dividends. Finally, announced dividend payments to preferred stockholders do not elicit a significant price reaction.

Share repurchases are another way to distribute excess cash back to investors; in addition, the decision to buy back shares can be interpreted as a signal that the firm's equity is undervalued. Announcements of share repurchases are shown to be accompanied by positive market reactions (e.g., Lakonishok and Vermaelen (1990), Grullon and Michaely (2004)). In our sample, the average CAR associated with share repurchase announcements is the second highest among all significant subcategories and is highly significant.

Seasoned equity offerings (SEOs) signal that the firm's equity might be overpriced or that the firm is running out of cash. Prior studies show that equity prices tend to decline in response to SEO announcements (e.g., Smith (1986), Corwin (2003)). In our sample, the average CAR associated with SEOs is significantly negative and 10th lowest among all significant news categories.

Similarly, the issuance of debt might be interpreted as a signal that the firm is overvalued and/or short of cash. However, the evidence on whether or not stock prices fall upon announcements of debt issuances is mixed. Smith (1986) documents a negative price reaction following announcements of convertible bond issuances but finds no price reaction following announcements of straight debt issuances (the latter result is also confirmed by Shyam-Sunder (1991)). However, Akhigbe, Easterwood, and Pettit (1997) show that prices react negatively to announcements of new debt issuances when they are motivated by the need to raise funds due to an unexpected cash shortfall. Although the authors do not investigate price reactions to straight and convertible debt issuances separately, most observations in their sample (90% of the 399 announcements they study) are for straight debt. We also do not separate announced debt issuances into straight and convertible debt and find a negative, albeit insignificant average price reaction.

Announcements of forward stock splits are previously shown to generate positive price reactions, as suggested by signaling models (e.g., Ikenberry, Rankine, and Stice (1996)). In our sample, the price reactions to forward splits are also positive and significant. Investigating a sample of 32 reverse split announcements, Woolridge and Chambers (1983) observe a significantly negative average price reaction. The average CAR in our sample is also negative, but insignificant.

It has been shown that prices react strongly to positive and negative earnings surprises (e.g., Ball and Kothari (1991), Kothari (2001), and Vega (2006)). Our findings are in line with these studies; announcements of disappointing

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[14]We use the terms "mean CAR," "average CAR," and sometimes, for brevity, just "CAR" interchangeably.

financial results (*Financial Results—Weak*) are accompanied by significantly negative CARs, while announcements of strong financial results (*Financial Results—Strong*) trigger significantly positive price reactions. Frequently, financial results are pre-announced, and we find that the market reacts to positive pre-announcements almost twice as strongly, and to negative pre-announcements more than 10 times as strongly, as to the regularly scheduled announcements of strong/weak results, possibly because firms tend to pre-announce earnings that deviate considerably from the expectations. In fact, the average CAR associated with negative pre-announcements is the lowest in our sample.

Finally, restatements, which are usually caused by either genuine accounting errors or deliberate earnings manipulation, are usually accompanied by negative price reactions unless the accounting errors are to the firms' disadvantage (e.g., Callen, Livnat, and Segal (2006)). In our sample, the average CAR associated with restatements is significantly negative and the fifth lowest among all significant news categories.

b. M&A News

The market reaction to merger and acquisition (M&A) decisions is another extensively studied area in finance. Some M&A plans never come to fruition because of a lack of shareholder approval or government interventions enforcing compliance with antitrust laws. Whenever possible, we separate M&A-related press releases into announcements of intent and of imminent or executed transactions. Mergers and acquisitions are similar in nature, in that two stand-alone firms combine and start trading as one. In acquisitions, the acquirer is almost always larger than the target, and the combined firm usually keeps the name of the acquirer. In mergers, the two firms behave more like equals, and the combined entity often takes on a new name. The frequently stated motivation for M&As is that two firms are deemed to be worth more together than apart (e.g., due to synergies, economies of scale, increased market power, and higher tax efficiency). If a bidding war for the target erupts, the acquirer faces the danger of overpaying, and the target emerges as the clear beneficiary. Another caveat is that even if the valuation gain for both the target and the acquirer is positive, the price effect is more noticeable for the target firm, since it tends to be smaller than the acquirer. Moreover, when an acquirer chooses to pay for the target with its stock rather than cash, a negative signal is sent that its shares might be overvalued. It has been shown that acquirers' prices generally fall when stock-financed acquisitions are announced and register a small gain when cash-financed acquisitions are announced, while targets' prices tend to significantly increase (e.g., Franks, Harris, and Titman (1991), Andrade, Mitchell, and Stafford (2001)). Consistent with these studies, we find that target firms experience significantly positive announcement returns, ranked sixth-highest among all significant news categories. As for the acquiring firms, we do not separate acquisitions into cash- and stock-financed, and our results show that, on average, the price reaction to announcements of a certain acquisition, albeit not very high, is significantly positive.[15] The returns

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[15]We have many more press releases issued by acquirers than by targets because many of the latter are private firms not present in our data set.

associated with acquirers' announcements of the intent to acquire are positive but insignificant. Likewise, merger announcements generate a positive average CAR, which, however, is indistinguishable from 0.

Divestiture announcements typically elicit a positive price reaction (e.g., Schipper and Smith (1983)). Several explanations have been considered for why valuations of parent firms may increase upon announcement. First, by divesting lines of business that are a "poor fit," the management of the parent company can refocus on its main activity. Second, the fact that the management chooses to raise funds by issuing equity in the subsidiary rather than issuing equity in the consolidated corporation signals that the parent firm is undervalued relative to the subsidiary (Nanda (1991)). Third, divestitures make parent firms more transparent, which leads to a better alignment of managers' and shareholders' interests and further ensures that funds from more profitable lines of business will not be diverted to support an unprofitable division of the firm. Subsidiaries may be divested via a spinoff when at least 80% of the shares in the subsidiary are distributed to the parent firm shareholders, or via equity carve-outs when some or all of the subsidiary's stock is offered directly to the public in the form of an initial public offering (IPO).[16] The first method is more tax efficient. In our sample, announcements of both a spinoff intent and an imminent or completed spinoff lead to highly positive and significant CARs, which rank fifth and seventh, respectively, relative to all significant news categories. The average price reaction associated with equity carve-outs (*IPOs*), which are less prevalent in our sample, although positive, is not statistically significant.

c. Other News Categories

As expected, among the other news categories, press releases describing developments that are likely to increase or stabilize future cash flows are accompanied by positive price reactions, and news likely to result in lower and more volatile cash flows by negative price reactions. News about *Products & Services* and *Customers & Partners* stands out as potentially having a fairly immediate impact on cash flows.

Product-related news sheds light on future sales. The price reaction to FDA approvals ranks third highest and to FDA rejections second lowest among all news categories (Bosch and Lee (1994) also document large reactions to FDA decisions). The reaction to *Product Defect* announcements is fourth most negative in our sample. This is in line with prior studies (e.g., Jarrell and Peltzman (1985) and Barber and Darrough (1996); possibly due to the damaging effect on firm reputation, Jarrell and Peltzman find that for product recalls, the negative return penalty surpasses the direct costs associated with the recall). *New Product* introductions are accompanied by significantly positive abnormal returns, confirming the evidence in Woolridge and Snow (1990) and Chaney, Devinney, and Winer (1991). The market reaction to *Patent Award* announcements is significantly positive; this finding is consistent with prior research documenting that new patent awards are associated with positive abnormal returns (e.g., Austin (1993)) and improved future performance and higher valuations (e.g., Bloom and Reenen (2002)).

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[16]Sales of a subsidiary to another firm are included in the "spinoff" category.

Announcements about the successful completion of research projects also lead to a significantly positive average price reaction, and the market reaction to research failures is negative but insignificant.

News about *Customers & Partners* sheds light on future product demand as well as advertising and production costs, and it tends to be accompanied by significant price reactions. The significantly positive CARs associated with announcements of a *New Partnership* that we observe have been previously documented by McConnell and Nantell (1985) using a sample of 210 firms involved in 136 joint ventures and by Woolridge and Snow (1990) using 197 joint venture announcements. Signaling lower future demand, *Customer Loss* is the category with the third-lowest price reaction. The average price response to announcements of a *Customer Win* is significantly positive but almost seven times lower in absolute value than the reaction to customer losses.

Investigating corporate investment decisions, Woolridge and Snow (1990) show that the market tends to react positively to corporate investment announcements. We, however, document no significant reaction to such announcements, though the direction is, on average, positive (*Infrastructure—Expansion*). We do find that the market reacts significantly positively to corporate decisions to shut down unprofitable operations (*Infrastructure—Downsizing*), consistent with the free-cash-flow concern of Jensen (1993).

Turning to *Legal* news, it has been previously shown that announcements of negative legal issues, such as stockholder or patent infringement lawsuits, lead to negative price reactions, and announcements of legal settlements lead to positive price reactions (e.g., Bhagat, Brickley, and Coles (1994), Bizjak and Coles (1995), and Griffin, Grundfest, and Perino (2004)). In our sample, the average price reaction to negative legal developments is negative, though statistically insignificant. However, in unreported results, we find it to be significantly negative for the full sample of firms that also includes firms with a market capitalization under $100 million and a share price under $5, probably because for smaller firms it is less likely that the information has leaked out prior to the official announcement. Announcements of class action lawsuits also elicit a negative, albeit insignificant, reaction, possibly because the news has already been revealed by law firms or plaintiffs prior to the press release. Announcements of legal settlements are accompanied by significantly positive CARs of almost the same magnitude as announcement of legal problems.

Changes in the firm *Management* could have large valuation consequences, but it is very difficult to assess their immediate impact. Nonetheless, in our sample, additions to the top management are accompanied by significantly positive returns, while management terminations (voluntary and involuntary combined) are accompanied by significantly negative abnormal returns that are more than four times larger in magnitude; in fact, this is the category with the sixth-lowest significant CAR.

The average market reactions to announcements about *Noncompliance* and *Return to Compliance* with exchange rules are insignificant. This is not unexpected, since the released information is already public prior to the announcement. For example, notices of noncompliance are often triggered by poor past performance and, in particular, by prices falling below an exchange-specified

minimum. This information is not only public, but also already priced in. Other types of noncompliance, which are triggered by delays in providing exchange-mandated reports, are probably inconsequential for firm valuation. Likewise, the return to compliance with exchange rules is secured either by the rise of stock prices (and, by this, already priced in) or by the submission of the overdue forms, and unlikely to be valuation-relevant.

Finally, announcements about winning a *Company Award* may send a positive signal about the quality of the firm, which would explain the significantly positive price reaction (this is consistent with the evidence of positive abnormal returns associated with quality award announcements, documented in Hendricks and Singhal (1996)). Alternatively, such awards do not convey new information but simply increase the firm's visibility, as do announcements about *Reaching a Milestone* or participating in an *Industry Event*, which are also accompanied by significantly positive abnormal returns. Higher visibility broadens the investor base and lowers the firm's cost of capital, increasing the market value (Merton (1987)).

d.   Longer Event Windows

Figure 1 plots the CARs, calculated over the period from 21 trading days before to 21 trading days after news announcements $[-21, +21]$ (spanning approximately one calendar month before and after the announcement) for the seven most positive and significant as well as the seven most negative and significant CAR categories, as reported in Table 3. The figure is meant to capture pre- and post-announcement price drifts. It shows that most press releases convey value-relevant information, as the CAR plots start to fan out on the announcement day ($t = 0$). Moreover, most price reactions appear to be permanent, with only a few lines showing reversals. The reaction to bad news often starts prior to the press release date. Individual CAR plots for the period $[-21, +21]$ for the eight most positive and the eight most negative, significant CAR categories of Table 3 are presented in Online Appendix B.

Daniel, Hirshleifer, and Subrahmanyam (1998), in their model of investor overconfidence, distinguish between "selective" and "nonselective" corporate events. The first type is defined as being dependent in its occurrence on the prior mispricing, and the second is not. For example, share repurchases are likely to be initiated by managers as a result of equity being undervalued and new share issues as a result of equity being overvalued; these are selective events. In contrast, external decisions, such as FDA approvals or rejections, are independent of the current level of mispricing. One of the model predictions is that good/bad selective events occur more frequently when the firm is under-/overvalued. If prior high/low returns are indicative of over-/undervaluation, we find consistent results among the events plotted. Decisions to repurchase equity are associated with low prior returns. This graph is consistent with previously documented evidence of a pre-repurchase share price decline (e.g., Lakonishok and Vermaelen (1990), Comment and Jarrell (1991)). Spinoff decisions are preceded by high returns, making it likely that the spun-off division is overvalued by the market. Target firm acquisitions are preceded by poor prior returns of the target, indicating that it is likely underpriced. These are examples of selective decisions that may generate a financial gain for the firm. Other selective decisions, such as forward splits,

FIGURE 1

Cumulative Abnormal Returns Computed Over Longer Event Windows

Figure 1 plots the cumulative abnormal returns computed using the market model over the period from 21 days before to 21 days after the press release date ($t = 0$) for the subcategories with the seven highest and the seven lowest, statistically significant abnormal returns, reported in Table 3.
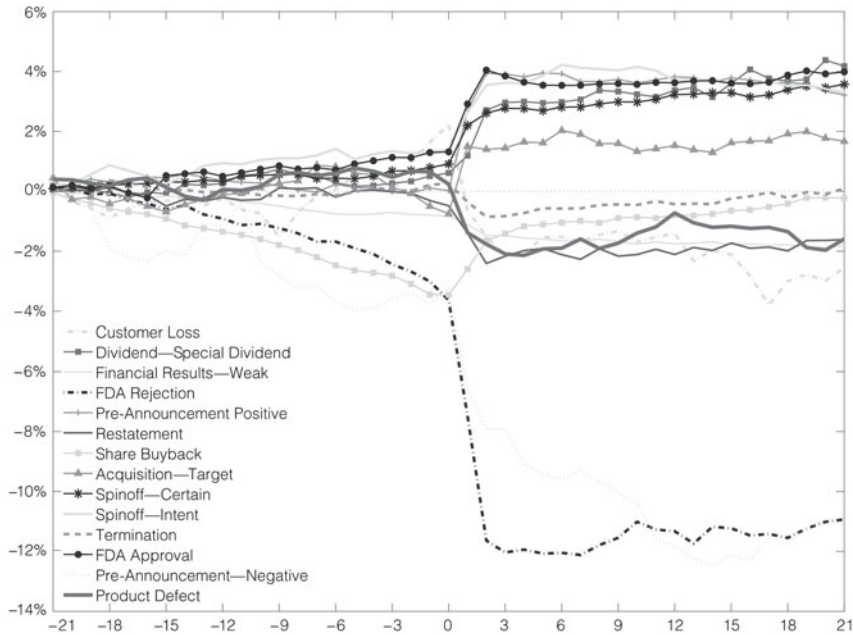
may be used for signaling, and yet other types, such as dividend decreases, may be necessitated by dwindling profits and cash balances; in our sample, these decisions also appear to be related to prior returns.

Another prediction of the Daniel et al. (1998) model is that the market will underreact to selective events intended to exploit mispricing because overconfident investors will revise their prior valuations too little at the time of the announcement, and, as a result, post-event returns will be positively correlated with event-date returns. On the contrary, for nonselective events, since their occurrence is uncorrelated with mispricing, and, hence, with investors' priors, their price impact should be fully reflected at the time of the announcement and no post-event drift should be observed. Our results only partially align with these predictions. Among the set of selective events designed to exploit mispricing, we find that, consistent with the model, share repurchases are followed by a positive price drift; in conflict with the model's predictions, we observe no post-announcement drift for acquisition targets. Among the set of nonselective events, in line with the model's predictions, we detect no post-announcement drift for FDA approvals and product defect announcements; yet, at odds with the model, we observe a drift following announcements of FDA rejections and customer losses.

Interestingly, for *FDA Approval* and *FDA Rejection* announcements, prices start to move even before the official press release is made. The leakage of FDA decisions prior to the official announcement matches the evidence in Bosch and

Lee (1994). In fact, for the FDA rejection category, the pre- and post-announcement drifts are so large that the total CAR equals about -11.2% when calculated over the period $[-21, +21]$, and only about -7.2% when computed over the period $[-1, +5]$ (as reported in Table 3).

Patterns of overreaction and reversals are observed for *Termination* of top managers, *Dividend—Decrease*, and, to a lesser extent, *Spinoff—Intent* and *Financial Results—Strong*. However, as discussed earlier, these patterns are not universal across announcement categories. In contrast, Antweiler and Frank (2005) document that the market tends to overreact to corporate news events reported in the *WSJ*. Further investigation is warranted into whether the overreaction is limited to a set of announcements that attract the attention of retail investors, in particular, by being re-reported by various media outlets.

B.   Impact on the Firm's Information Environment

Here, we investigate announcement-induced changes in volatility, turnover, and bid-ask spreads as our measure of trading costs.

1.   Effect on Volatility

In order to investigate the effect that press releases have on volatility in the short period after the information becomes public, we follow the realized volatility approach outlined in Andersen, Bollerslev, Diebold, and Labys (2003). We estimate realized volatility from Trade and Quote (TAQ) data, sampling from equidistant 5-minute intervals using the midpoint of the quoted bid-ask spread (this methodology for estimating realized volatility is discussed by Andersen and Benzoni (2009) and implemented by Hansen and Lunde (2006)). One important advantage of this approach is that it allows us to obtain precise estimates of volatility over short time intervals. We would like to keep the post-announcement period short in order not to inadvertently include subsequent press releases. An additional advantage is that we can obtain consistent estimates of volatility that are very robust to the underlying assumption about the return generating process. In particular, recent research in financial econometrics is often concerned with the role of jumps in the return generating process (see, e.g., Andersen, Bollerslev, and Diebold (2007)). As we are analyzing realized volatility in an environment when new information becomes public, we cannot rule out the presence of jumps. It is therefore important to highlight that our estimates are consistent in the presence of jumps.

In order to conduct inference about realized volatility, we need an asymptotic theory for realized volatility. This is a nontrivial matter, as the asymptotic theory depends heavily on the assumptions about the underlying stochastic process driving returns. In fact, in the presence of jumps, there is no asymptotic theory, as in this case realized volatility is not in the domain of attraction of the normal law (Andersen and Benzoni (2009)). We therefore follow a simple nonparametric strategy to analyze changes in volatility following press releases. Specifically, we first calculate the frequency of volatility increases in the event window relative to the pre-event window. Specifically, define $X := \sum_{i=1}^{n} 1_{\sigma_i^{\text{POST}} > \sigma_i^{\text{PRE}}}$, where σ_i^{POST} and σ_i^{PRE} are the event-window and pre-event-window volatility realizations.

The variable X follows the binomial distribution, $X \sim B(n,p)$, where n is the number of observations and $p := \Pr(\sigma_i^{POST} > \sigma_i^{PRE})$. We are testing the null hypothesis, $H_0 : p = 0.5$, against the alternative, $H_A : p \neq 0.5$.

The event window is constructed to have the same endpoint as the event window we use for calculating CARs. However, here we skip the event day in order to exclude the large price movement immediately around the announcement (Figure C1 in Online Appendix C confirms that there is a large volatility increase on the day of the announcement). Therefore, we set our event window to $[+1, +5]$ and the pre-event window to the same length, $[-5, -1]$. The results are presented in Table 4. The table indicates that volatility increases in the post-announcement period for most of the news categories, and that for 27 out of 60 categories the null hypothesis can be rejected at the 10% significance level.[17] Regularly scheduled and pre-announced earnings, as well as earnings restatements, result in the most prevalent volatility increases. Volatility increases following some types of announcements appear quite pervasive but are not indicated as significant due to the low power of our nonparametric test (e.g., FDA rejections, customer losses, and reverse stock splits).

Previous studies that investigated the effect of public news on volatility calculated volatility from daily returns and, therefore, used longer event windows, making them not directly comparable to our results. Consistent with our results, it has been shown that stock splits lead to higher volatility (e.g., Ohlson and

TABLE 4

Test Results for Changes in Volatility

Table 4 presents the percentage of firms experiencing an increase in realized volatility in the event window $[+1, +5]$ relative to the pre-event window $[-5, -1]$ and the p-value of the nonparametric test that it is different from 50%. Categories significant at the 10% level are in bold.

Category	Subcategory	Percent of Obs. with Volatility Increases	p-Value
1. Awards	**Company Award**	48.43%	0.005
	Product Award	49.54%	0.360
2. Customers & Partners	Customer Loss	57.45%	0.191
	Customer Win	51.17%	0.003
	New Partnership	50.55%	0.089
	Reaching a Milestone	51.42%	0.249
3. Exchange	**Noncompliance**	44.09%	0.010
	Return to Compliance	46.15%	0.339
4. Financial	Dividend—Decreased	47.50%	0.136
	Dividend—Generic	51.68%	0.000
	Dividend—Increased	53.77%	0.001
	Dividend—Preferred Stock	53.31%	0.042
	Dividend—Special Dividend	61.84%	0.025
	Financial Results—Strong	67.94%	0.000
	Financial Results—Weak	66.61%	0.000
	Pre-Announcement—Negative	74.76%	0.000
	Pre-Announcement—Positive	65.73%	0.000
	Restatement	64.50%	0.000
	Seasoned Offering: Debt	48.32%	0.059
	Seasoned Offering: Equity	47.18%	0.008
	Share Buyback	50.50%	0.319
	Stock Split—Forward	58.82%	0.007
	Stock Split—Reverse	57.14%	0.332

[17]We experiment with window lengths of 3 and 10 days around the announcement and find that the results are somewhat stronger for the 3-day and somewhat weaker for the 10-day event window.

TABLE 4 (continued)

Test Results for Changes in Volatility

	Category	Subcategory	Percent of Obs. with Volatility Increases	p-Value
5.	Legal	**Class Action**	44.93%	0.014
		Legal Problem	50.40%	0.542
		SEC Investigation	57.63%	0.059
		Settlement	49.43%	0.339
6.	M&A	**Acquisition—Certain**	52.17%	0.000
		Acquisition—Intent	55.88%	0.304
		Acquisition—Target	50.70%	0.500
		IPO	54.00%	0.336
		Merger	47.76%	0.198
		Spinoff—Certain	49.87%	0.458
		Spinoff—Intent	53.21%	0.061
7.	Management	Addition	50.29%	0.257
		Compensation	52.00%	0.444
		Promotion	51.17%	0.057
		Reorganization	51.92%	0.159
		Retirement	51.96%	0.121
		Termination	52.15%	0.077
8.	Meetings & Events	Company-Sponsored Event	48.99%	0.176
		Industry Event	50.14%	0.323
		Investor Meeting	53.53%	0.001
9.	Products & Services	FDA Approval	51.73%	0.139
		FDA Investigation	55.94%	0.012
		FDA Rejection	60.61%	0.148
		New Product	50.31%	0.198
		Patent Award	49.89%	0.500
		Pharmaceutical Approval EU	47.92%	0.307
		Product Approval	52.21%	0.067
		Product Defect	57.14%	0.065
		Research Failure	54.55%	0.228
		Research Success	53.49%	0.011
		Updates & Upgrades	52.22%	0.010
10.	Strategy & Performance	**Credit News—Negative**	57.36%	0.056
		Credit News—Positive	49.86%	0.485
		Infrastructure—Downsizing	61.90%	0.082
		Infrastructure—Expansion	49.68%	0.349
		Profitability—Declining	60.82%	0.003
		Profitability—Improving	49.43%	0.374

Penman (1985), Dravid (1987), and Koski (1998)), and at least some of the post-split volatility increase may be attributable to market microstructure effects. While we find that stock dividend announcements increase volatility over the subsequent 5 days, and Koski documents a significant increase over the next 20 days, Dravid observes a significant decrease over the next 35 days; however, he finds a significant volatility increase following reverse stock splits over the same period, which is consistent with the economically large (though statistically insignificant) volatility increase in our sample. Finally, Clayton et al. (2005) document that CEO departures, especially those that are forced, which in the authors' view create "higher uncertainty over the firm's strategic direction and management's ability to run the firm," lead to significant increases in stock volatility. In our sample, volatility increases for the majority of firm-events following all management-related announcements, but the increases are significant only for the categories *Promotion* and *Termination*.

a. Volatility Changes Subsequent to News and Nonnews Days

In this section, we address the concern that the post-announcement increases in realized volatility that we observe may be explained solely by the price shock

that accompanies news releases rather than by the valuation-uncertainty-inducing aspect of the new information. For this purpose, we separate returns into those driven by news and those driven by liquidity shocks, as has been done in prior literature. If a more uncertain post-announcement information environment is responsible for the increased volatility level, then the news-driven price shocks would result in higher volatility increases than liquidity-driven shocks of a similar magnitude.

We follow Chan (2003) and Tetlock (2010) in separating returns driven by news from those driven by liquidity shocks. We begin by classifying as news days the days on which the firm issued a press release. Next, on each day, we sort stocks into 20 groups based on the abnormal return on that day. Within each return-sorted group of stocks, we proceed to sort stocks into two further groups, the news and the nonnews groups, based on whether or not the day on which the abnormal return is observed is a news day for the stock. Thus, for each level of a daily price shock, we obtain two firm-day groups, one for which the return can be attributed to news, and one for which it is likely to be attributed to a liquidity shock.

For both groups, we check the subsequent volatility changes in the 5 days after the group assignment day ($t = 0$), $[+1, +5]$, relative to the 5 days before, $[-5, -1]$, using the nonparametric test described earlier. Finally, for each return group, we check the difference-in-difference of the post-formation volatility change between the news and the nonnews firm-day groups, using a simple t-test for the null hypothesis that both groups contain equal fractions of stocks that experience post-formation volatility increases. This way, we can separate out volatility changes attributable to news-induced valuation uncertainty from those attributable to price shocks.

The results are presented in Table 5. The news group contains just over 4% of the firm-day observations of the nonnews group. Volatility increases are more pervasive for the news group, but they are sometimes indicated as less significant than the relatively lower percentage volatility increases for the nonnews group because of the low power of our nonparametric test (for this test, all else being equal, having a large number of observations helps achieve higher significance levels). Still, for the news group, the percentage volatility increases are statistically significant for the six highest and six lowest abnormal return groups. However, in these abnormal return groups, the nonnews sample of stocks also experiences significant volatility increases.[18] Yet, as indicated by the difference-in-difference tests, the fraction of stocks that experience volatility increases tends to be significantly higher for the news sample than for the nonnews sample even after controlling for the magnitude of the abnormal return.[19] This result implies that the post-announcement volatility increases that we observe in Table 4 must be at least partly driven by the valuation-uncertainty-increasing content of the news being released.

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[18]Note that during our sample period, realized volatility exhibits a slightly increasing trend, which is why the average fraction of stocks that experienced a volatility increase in the post-formation period is slightly higher than 0.5.

[19]We have also experimented with changing the volatility measurement windows to 3 or 10 days and with including days with macroeconomic announcements in the news category and obtained qualitatively similar results.

TABLE 5

Test Results for Changes in Volatility on News and Nonnews Days

Every day, stocks are classified into 20 groups based on the abnormal return on that day. Within each abnormal return group, stocks are further classified into two groups based on whether or not a firm issued a press release on that day. The percentage of firms experiencing an increase in realized volatility estimated during the window $[+1, +5]$, relative to the window $[-5, -1]$, with $t = 0$ being the day on which the groups are formed, is calculated; p-values reported in columns 4 and 7 correspond to the test of the null hypothesis that the frequency of volatility increases for the observations in each group is equal to 50%, and the p-value in the last column corresponds to the t-test for the null hypothesis that the frequency of volatility increases is the same for the news and the nonnews groups. The p-values below 10% in the last two columns are in bold.

Abnormal Return Group	Nonnews Sample			News Sample			p-Value of the Difference
	Abnormal Return	% Volatility Increased	p-Value	Abnormal Return	% Volatility Increased	p-Value	
1	−8.00%	61.14%	0.000	−9.11%	71.21%	**0.000**	**0.000**
2	−4.02%	55.15%	0.000	−4.10%	58.40%	**0.000**	**0.000**
3	−2.87%	53.17%	0.000	−2.95%	56.02%	**0.000**	**0.000**
4	−2.18%	51.92%	0.000	−2.23%	53.29%	**0.000**	**0.017**
5	−1.68%	51.02%	0.000	−1.72%	53.49%	**0.000**	**0.000**
6	−1.28%	50.48%	0.000	−1.32%	52.09%	**0.000**	**0.007**
7	−0.96%	50.11%	0.165	−0.98%	50.63%	0.119	0.121
8	−0.67%	49.93%	0.266	−0.69%	50.19%	0.361	0.182
9	−0.42%	49.70%	0.002	−0.44%	49.43%	0.145	0.182
10	−0.19%	49.86%	0.100	−0.19%	49.77%	0.338	0.226
11	0.04%	49.72%	0.005	0.04%	50.59%	0.143	**0.066**
12	0.27%	49.72%	0.005	0.27%	50.23%	0.335	0.126
13	0.51%	50.00%	0.497	0.53%	50.38%	0.242	0.155
14	0.79%	50.24%	0.014	0.81%	50.16%	0.382	0.229
15	1.12%	50.57%	0.000	1.15%	50.83%	**0.055**	0.182
16	1.52%	50.78%	0.000	1.55%	52.62%	**0.000**	**0.002**
17	2.04%	51.79%	0.000	2.08%	53.29%	**0.000**	**0.008**
18	2.78%	52.82%	0.000	2.84%	54.74%	**0.000**	**0.001**
19	4.06%	55.39%	0.000	4.15%	60.55%	**0.000**	**0.000**
20	9.44%	62.53%	0.000	11.02%	71.86%	**0.000**	**0.000**

One possible concern is that some press releases may be issued in response to a recent volatility increase, and we may observe higher subsequent volatility levels simply because volatility is persistent. To address this possibility, we augment the test described above by further sorting each abnormal return bin into two groups based on the sign of the prior volatility change and then compare the subsequent change in volatility between the news and the nonnews subsamples for each abnormal return/prior volatility change bin. The results are qualitatively similar: Even after controlling for the prior volatility change and the magnitude of the abnormal return, firms that make a news announcement tend to experience higher subsequent volatility (these results are available from the authors).

b. Volatility Changes Subsequent to Less-Routine-Sounding News

We check whether volatility increases are more prevalent following less-routine-sounding types of press releases that are likely to induce larger valuation uncertainty, compared to more routine news. In particular, we search headlines across all news categories for the words "surprising," "unexpected," "ground-breaking," "revolutionary," "unprecedented," "exceptional," "extraordinary," "unique," "shocking," and their synonyms, as well as spelling variations. This search produces vastly different numbers of qualifying headlines across the different news categories, indicating that some types of announcements are inherently more prone to be of a routine nature. We keep the categories for which the number of "nonroutine" headlines exceeds either 20 observations or 1% of the

total observations in that category, comprising the following news categories: announcements about profitability improvements, new products, product upgrades, legal settlements, share buybacks, new partnerships, infrastructure expansion, industry events, and company awards.

We then combine all the nonroutine announcements from these "parent" categories into one "nonroutine" group of news. The remainder of the press releases in the "parent" categories are similarly combined into one "routine" news group. The total number of news in the combined nonroutine group is 753, and the total number of news in the combined routine group is 94,191. As before, we use the nonparametric test with the same event and pre-event windows to investigate the significance of post-announcement volatility changes in the two groups.

As expected, nonroutine news induces more prevalent post-announcement volatility increases: Volatility increases for 53.51% of firms in the nonroutine news category, with an associated p-value of 4.11%, and for 50.12% of firms in the routine category, which is not statistically significant. The statistically more powerful t-test, which we use to test whether the fraction of firm-events with post-announcement volatility increases is the same for both categories, returns a significant difference between the two groups, with an associated p-value of 3.20%. Therefore, despite our relatively crude way of identifying nonroutine, uncertainty-inducing press releases, we are able to obtain the intuitively appealing result that such news induces larger volatility increases.

2. Effect on the Bid-Ask Spread and Turnover

We conduct event studies on the bid-ask spread and turnover using the common event study methodology. We begin by calculating the unexpected value of the variable of interest (X) in the event window as

$$(4) \qquad \mathrm{U}_{it} \;=\; X_{it} - \mathrm{E}\left(X_{it}\right).$$

The expected value of the variable, $\mathrm{E}(X)$, is calculated as its mean realization in the pre-event window. We then compute the standardized unexpected value as the unexpected value scaled by the standard deviation of variable X in the pre-event window (σ_i):

$$(5) \qquad \mathrm{SU}_{it} \;=\; \frac{\mathrm{U}_{it}}{\sigma_i}.$$

As in the abnormal return tests, we test the null hypothesis $H_0 : \overline{\mathrm{SU}} = 0$, using a standard t-test and clustering standard errors by the week in which the announcement was made in order to account for possible cross-correlations in turnover and bid-ask spreads, respectively. As before, for categories with fewer than 100 announcements, we also report the significance levels of the nonparametric tests that evaluate how frequently the abnormal variable falls above or below the baseline value of 0 for each news category.

The pre-event window is set to 50 days, $[-51, -2]$ (the results are similar when we shorten the estimation window to 30 days). For turnover, the event window is set to be the same as for the CAR estimation, $[-1, +5]$, as before, starting

1 day prior to the announcement in order to account for early trading induced by potential news leakage. Figure C1 confirms that turnover frequently increases on day -1. For the bid-ask spread, we start the window on the day of the announcement because prior research has shown that the bid-ask spread may be unusually high just before the scheduled announcement due to high adverse selection in trading (e.g., Chae (2005), Graham, Koski, and Loewenstein (2006)), and we would like to focus exclusively on the post-announcement information environment. Figure C1 confirms that the bid-ask spreads tend to increase on day -1. Therefore, the event window for the bid-ask spread event study is set to [0, +5].

a. Bid-Ask Spread

The bid-ask spread series is computed daily as the natural logarithm of the time-weighted intraday bid-ask spreads reported in the TAQ data set: $\text{SPREAD}_{it} = \ln\left(\overline{\text{ASK}_{it} - \text{BID}_{it}}\right)$. The results of the bid-ask spread event studies are presented in Table 6. The table shows that the bid-ask spread decreases for almost all news categories, and the decrease is significant for 39 out of 60 categories. These results are consistent with Tetlock (2010), who shows that the price impact of order flow is substantially lower on news days and in the following 5 days, implying that public news releases reduce informational asymmetry in the market.

Chae (2005) investigates what happens to the information environment of the firm prior to scheduled and unscheduled information releases; for his study, he considers three classes of news: i) earnings announcements, ii) announcements made by corporate targets, and iii) announcements by acquirers about upcoming acquisitions. The first class of announcements is classified as scheduled news and the latter two as unscheduled news. Chae finds that the informational asymmetry, measured as the price impact of trade, is lower before both scheduled and unscheduled announcements. Even though it is not known in advance that an unscheduled announcement is coming, he hypothesizes that market makers can infer the higher-than-usual likelihood of informed trading from their order books. Consequently, after either scheduled or unscheduled news is announced, the bid-ask spreads should narrow. The press releases in our data set are mostly unscheduled, and we indeed find that the spreads decline following most types of announcements.

Prior literature has researched bid-ask spread responses to a variety of news. Graham et al. (2006) study changes in bid-ask spreads around dividend announcements. They subdivide such announcements into two groups: those whose timing is highly predictable because they are made at roughly the same time every quarter, and announcements of dividend initiations, which cannot be anticipated in advance. The authors find that spreads significantly decrease in the period of up to 3 days following the regularly scheduled dividend announcements and significantly increase in the following 2 days for the unanticipated dividend initiation announcements. We do not attempt to infer whether the timing of dividend announcements can be predicted in our sample and find that spreads decrease following all types of dividend announcements with the exception of dividend increases, a category that incidentally includes dividend initiations.

Investigating the effect of earnings announcements on bid-ask spreads, Affleck-Graves, Callahan, and Chipalkatti (2002) show that spreads significantly

TABLE 6

Test Results for Changes in Bid-Ask Spread

Table 6 presents the standardized abnormal logarithm of the daily time-weighted bid-ask spread for each news category, computed over the event window [0, +5], and the p-value for the null hypothesis of its being equal to 0. For categories containing fewer than 100 observations, the p-values are italicized, and the 1%, 5%, and 10% significance levels of non-parametric tests are indicated by symbols a, b, and c, respectively; categories significant at the 10% level, based on either test, are in bold.

	Category	Subcategory	Standardized Abnormal Log Spread	p-Value
1.	Awards	**Company Award**	−0.024	0.000
		Product Award	−0.011	0.085
2.	Customers & Partners	**Customer Loss**	−0.082	*0.038*[b]
		Customer Win	−0.016	0.000
		New Partnership	−0.021	0.000
		Reaching a Milestone	−0.038	0.000
3.	Exchange	**Noncompliance**	−0.017	0.097
		Return to Compliance	−0.009	*0.771*
4.	Financial	**Dividend—Decreased**	−0.039	0.000
		Dividend—Generic	0.005	0.013
		Dividend—Increased	−0.002	0.709
		Dividend—Preferred Stock	−0.015	0.154
		Dividend—Special Dividend	−0.057	0.011
		Financial Results—Strong	−0.004	0.203
		Financial Results—Weak	−0.041	0.000
		Pre-Announcement—Negative	−0.127	0.000
		Pre-Announcement—Positive	−0.019	0.143
		Restatement	−0.016	0.413
		Seasoned Offering: Debt	−0.045	0.000
		Seasoned Offering: Equity	−0.057	0.000
		Share Buyback	−0.016	0.004
		Stock Split—Forward	−0.010	0.587
		Stock Split—Reverse	−0.002	*0.938*
5.	Legal	**Class Action**	−0.089	0.000
		Legal Problem	−0.033	0.128
		SEC Investigation	−0.009	0.708
		Settlement	−0.019	0.006
6.	M&A	**Acquisition—Certain**	−0.024	0.000
		Acquisition—Intent	0.000	*0.999*
		Acquisition—Target	−0.095	*0.004*[a]
		IPO	0.012	*0.764*
		Merger	−0.035	0.003
		Spinoff—Certain	−0.025	0.000
		Spinoff—Intent	−0.016	*0.127*
7.	Management	**Addition**	−0.024	0.000
		Compensation	−0.026	*0.502*
		Promotion	−0.026	0.000
		Reorganization	−0.030	0.001
		Retirement	−0.032	0.000
		Termination	−0.029	0.000
8.	Meetings & Events	**Company-Sponsored Event**	−0.021	0.000
		Industry Event	−0.019	0.000
		Investor Meeting	−0.026	0.000
9.	Products & Services	**FDA Approval**	−0.020	0.009
		FDA Investigation	−0.039	0.002
		FDA Rejection	−0.068	*0.129*[b]
		New Product	−0.022	0.000
		Patent Award	−0.005	0.689
		Pharmaceutical Approval EU	−0.018	0.349
		Product Approval	−0.016	0.030
		Product Defect	−0.061	0.009
		Research Failure	−0.040	0.173
		Research Success	−0.014	0.065
		Updates & Upgrades	−0.013	0.007
10.	Strategy & Performance	Credit News—Negative	0.010	0.699
		Credit News—Positive	−0.009	0.400
		Infrastructure—Downsizing	−0.048	*0.241*
		Infrastructure—Expansion	−0.029	0.000
		Profitability—Declining	−0.005	0.791
		Profitability—Improving	−0.037	0.000

decrease in the 3 days following earnings announcements for firms with difficult-to-forecast earnings; such firms also experience widened bid-ask spreads in the 3 days leading up to the earnings announcement. For firms with easily predictable earnings, spreads are roughly unchanged both before and after the earnings announcement. In our sample, spreads are unchanged following the announcements of positive earnings surprises and decline following announcements of negative earnings surprises. Since during our time period it was not uncommon for management to guide analysts to beatable earnings forecasts, one could argue that the latter category includes firms with difficult-to-forecast earnings.

Consistently with our result, Franz, Rao, and Tripathy (1995) show that bid-ask spreads on NASDAQ-traded stocks narrow after announcements of open-market stock repurchases. They argue that this happens because such announcements reduce the level of informational asymmetry by signaling managers' private information about the future prospects of a firm.

Conrad and Niden (1992) look into changes in the bid-ask spreads of 42 NYSE-traded acquisition targets, following announcements that appeared in the *WSJ*. They find that the spreads significantly decrease on days $t = -1$ and $t = 0$. We also find a large, significant decline in the spreads for target firms; in fact, the magnitude of the decline is the second largest of all significant categories. The largest decline observed is around negative earnings pre-announcements, and the third largest is around announcements of class action lawsuits.

Finally, turning to announcements revealing the progress of firms' research and development (R&D) projects, such as press releases about in-house research outcomes and FDA decisions, all of them show significant declines in spreads with the exception of announcements about research failures; for this category the spread decline, though large in magnitude, is insignificant. This is in line with the evidence presented in Aboody and Lev (2000) that R&D-related information is a source of considerable informational advantage to corporate insiders who realize large trading gains. Making this information public should, therefore, greatly reduce the level of informational asymmetry of firms involved in R&D.

b. Turnover

Turnover is calculated as the natural logarithm of daily trading volume divided by shares outstanding. Campbell, Grossman, and Wang (1993) notice that the market log turnover series is nonstationary, with a positive time trend, and suggest detrending it by the moving average to achieve stationarity. We, therefore, detrend individual stocks' log turnover by the past-100-day moving average.[20]

The results for the turnover event studies are presented in Table 7. The table indicates that turnover changes significantly around 22 out of 60 types of news announcements. The largest increases in turnover accompany reverse stock splits, positive pre-announcements, and announcements of better-than-expected

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[20]During our sample period, high-frequency algorithmic trading becomes more prevalent, sometimes causing large swings in volume. In order to mitigate the influence of the outliers, we trim the top and bottom 1% of observations for both the turnover and the bid-ask spread series. However, the turnover series still remains quite volatile and, as a consequence, the nonparametric tests tend to indicate more universally significant turnover increases around press releases than the parametric tests, which are more influenced by outliers.

TABLE 7

Test Results for Changes in Turnover

Table 7 presents the standardized abnormal log turnover for each news category, computed over the event window $[-1, +5]$, and the p-value for the null hypothesis of its being equal to 0. For categories containing fewer than 100 observations, the p-values are italicized, and the 1%, 5%, and 10% significance levels of nonparametric tests are indicated by symbols a, b, and c, respectively; categories significant at the 10% level, based on either test, are in bold.

	Category	Subcategory	Standardized Abnormal Log Turnover	p-Value
1.	Awards	Company Award	0.022	0.234
		Product Award	0.026	0.479
2.	Customers & Partners	Customer Loss	−0.308	*0.152*
		Customer Win	0.053	0.000
		New Partnership	0.014	0.254
		Reaching a Milestone	−0.041	0.489
3.	Exchange	Noncompliance	0.058	0.242
		Return to Compliance	−0.129	*0.418[b]*
4.	Financial	Dividend—Decreased	0.055	0.355
		Dividend—Generic	0.039	0.001
		Dividend—Increased	0.084	0.012
		Dividend—Preferred Stock	0.064	0.245
		Dividend—Special Dividend	−0.040	0.720
		Financial Results—Strong	0.133	0.000
		Financial Results—Weak	−0.120	0.000
		Pre-Announcement—Negative	−0.482	0.000
		Pre-Announcement—Positive	0.240	0.001
		Restatement	−0.136	0.197
		Seasoned Offering: Debt	0.027	0.375
		Seasoned Offering: Equity	−0.202	0.000
		Share Buyback	−0.013	0.669
		Stock Split—Forward	−0.042	0.697
		Stock Split—Reverse	0.252	*0.123[a]*
5.	Legal	**Class Action**	−0.251	0.001
		Legal Problem	−0.030	0.791
		SEC Investigation	−0.119	0.450
		Settlement	0.071	0.060
6.	M&A	Acquisition—Certain	−0.022	0.203
		Acquisition—Intent	0.108	*0.535[b]*
		Acquisition—Target	0.198	*0.217[a]*
		IPO	0.014	*0.944*
		Merger	0.125	0.052
		Spinoff—Certain	0.073	0.019
		Spinoff—Intent	0.122	0.044
7.	Management	Addition	0.013	0.307
		Compensation	0.166	*0.479*
		Promotion	−0.036	0.103
		Reorganization	−0.082	0.172
		Retirement	0.010	0.837
		Termination	0.007	0.868
8.	Meetings & Events	Company-Sponsored Event	0.014	0.658
		Industry Event	0.011	0.235
		Investor Meeting	−0.006	0.875
9.	Products & Services	**FDA Approval**	0.170	0.000
		FDA Investigation	−0.028	0.714
		FDA Rejection	0.043	*0.901*
		New Product	0.081	0.000
		Patent Award	0.059	0.381
		Pharmaceutical Approval EU	−0.075	0.488
		Product Approval	0.111	0.010
		Product Defect	−0.035	0.806
		Research Failure	−0.150	0.363
		Research Success	0.115	0.010
		Updates & Upgrades	0.019	0.509
10.	Strategy & Performance	Credit News—Negative	−0.021	0.896
		Credit News—Positive	0.121	0.043
		Infrastructure—Downsizing	−0.015	*0.943*
		Infrastructure—Expansion	−0.019	0.418
		Profitability—Declining	−0.185	0.077
		Profitability—Improving	0.043	0.381

earnings. In general, increases in turnover tend to be larger around positive announcements (such as new products, FDA approvals, customer wins, dividend increases, lawsuit settlements, good outcomes of research projects, etc.) than negative announcements, some of which even lead to significant declines in turnover (e.g., announcements and pre-announcements of disappointing earnings, low profitability, SEOs, and class-action lawsuits). This asymmetric volume response is consistent with prior empirical evidence, summarized by Karpoff (1987), that for equities, volume is positively correlated with returns (as well as absolute returns). An empirically supported explanation for the asymmetric volume response to news is costly short sales. Indeed, Barber and Odean (2008) show that retail investors are more likely to buy stocks that are in the news; however, short-sale costs may prevent those who do not already hold the stock from selling it in response to bad news. Additionally, stock owners may be unwilling to sell shares at a loss following a negative announcement due to the disposition effect.

Prior research on volume reactions to corporate news mainly centered on the response to earnings and dividend announcements and showed that these types of announcements are accompanied by higher-than-usual trading volume (e.g., Bajaj and Vijh (1995), Kandel and Pearson (1995), Affleck-Graves et al. (2002), Chae (2005), and Graham et al. (2006)). We observe the same, with the exception of announcements of disappointing earnings. Earnings and dividend announcements are typically scheduled in advance, and if liquidity traders can refrain from trading until after the information is made public in order to avoid adverse selection, post-announcement volume should increase.

The news categories in our data set that are unrelated to earnings or dividends likely contain unscheduled news. Reasons other than discretionary liquidity trading, such as belief revisions or portfolio rebalancing discussed earlier, may be driving investor trading responses around unscheduled news. There are fewer investigations on the volume reaction around unscheduled announcements. Among them are the aforementioned paper by Conrad and Niden (1992) and a study by Sanders and Zdanowicz (1992) investigating acquisition announcements for 30 target firms; both find that the target firm trading volume increases significantly on days $t = -1$ and $t = 0$. Based on the nonparametric test, we also find that target-firm trading volume significantly increases in our event window.

IV.   Conclusions

For this paper we collect a unique data set of corporate press releases. As a consequence of more strenuous reporting requirements mandated by new regulations, these announcements represent a comprehensive set of corporate news, which has the potential to materially affect firm valuations. Moreover, the time stamp on the press releases accurately captures the time at which market participants first learned the news. This data set therefore allows us to conduct event studies on a comprehensive set of corporate news while applying the same test design across all news categories. Our contribution lies in describing and classifying important corporate events into news categories and in analyzing how the market reacts to the different types of news in terms of immediate changes in firm valuations and in the firms' information environments. We confirm earlier findings

on the reactions to financial news and show that less frequently researched news about corporate strategy, products, the management team, and legal developments are also highly value relevant. Moreover, we show that volatility tends to increase following most types of announcements, and we attribute these volatility increases to higher levels of news-induced valuation uncertainty. At the same time, as expected by regulators, press releases remove the informational advantage of firm insiders, resulting in lower post-announcement bid-ask spreads.

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