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Advertising and disclosure: Do firms time advertising during disclosure periods?

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Abstract

Using a large sample of monthly advertising data, I examine whether U.S. firms use advertising strategically during disclosure periods. I find that firms schedule some advertising to appear around their SEC 10-K, 10-Q filings and around their earnings announcements, consistent with advertising being used to increase visibility and attract investor attention during disclosure periods. This effect is stronger for firms reporting good news, for firms with high individual investor ownership, for firms in the retail industry, and for young firms. In addition, firms increase their advertising through media with broad target audiences and through business-to-consumer media around their disclosures (i.e. SEC 10-K, 10-Q filings and earnings announcements). Furthermore, I use the SEC acceleration filing rule as an exogenous shock to the timing of firms' mandatory disclosures. Using a Difference-in-Difference design, I find that advertising expenditures co-move with the change in timing of the 10-K filings. Parallel trend analysis and falsification test results further validate this causal inference that firms' mandatory disclosures *cause* the timing of firms' advertising. Finally, the results also suggest that firms with high information asymmetry and lower market liquidity advertise more when they have disclosures. Taken together, the findings provide new evidence about the real effects of disclosure on firm-specific investment, showing that firms consider disclosure timing when making advertising investment decisions.

Keywords: disclosure, advertising, firm investment, real effects, monthly data

JEL Classification: G14, G18, M41, M37

1. Introduction

Do firms strategically schedule their advertising campaign during disclosure periods? If they do, how do they time their advertising to disclosures? In this paper, I investigate the relation between firms' disclosures and the timing of their advertising investment. Specifically, I examine whether and how firms use advertising strategically to increase visibility and attract investor attention during disclosure periods. Recent studies in finance literature show that in addition to the benefits in the consumer product market, advertising also attracts investor attention, which increases firm market liquidity and breadth of investor ownership in the investment market (e.g., Grullon, Kanatas, and Weston, 2004; Chemmanur and Yan, 2009; Joshi and Hanssens, 2010; Lou, 2014). The basic mechanism of this impact lies in the spillover effect as product market advertising is also visible to the investment market. However, it is unclear whether this increased investor attention is a result of firm's strategic use of advertising, or simply a result of the spillover effect of advertising in the investment market, (i.e., an unintended byproduct of consumer-directed activities).

To answer this question, I examine whether firms advertise strategically during disclosure periods to attract more investor attention and increase market liquidity. It is not clear ex ante whether firms will stage advertising campaigns during disclosure periods. On the one hand, the aforementioned studies find that advertising attracts investor attention and improves market liquidity, and that managers manipulate firm advertising partially to realize abnormal short-term gains through insider trading, which could induce firms to increase their advertising during disclosure periods. On the other hand, advertising that is in addition to regular product marketing could be costly, as it could lead to consumer-related costs outweighing investor-related benefits. For example, exceeding the optimal level of investment in advertising may attract additional investors, but add direct costs to the firm.

Given that both advertising and disclosure can attract investor attention and have market liquidity benefits,[1] firms can decrease (as a substitute) or increase (as a complement) their advertising when they have more disclosures. Conditional on firms having a high level of disclosure, the marginal benefit of the spillover effect of advertising on investor attention is reduced

[1] Grullon, Kanatas, and Weston (2004) show that advertising increases firm market liquidity and investor ownership, and Lou (2014) finds that management is aware of this effect and gets personal gain strategically through insider trading during the advertising period; while Diamond and Verrecchia (1991), Hail and Leuz (2006), and Bushee and Noe (2000) show that disclosures lead to higher liquidity, lower costs of capital, and a broader investor base, respectively.

due to the benefit incurred through the disclosures. An increase in advertising outside of the disclosure periods would substitute for the lack of disclosures, suggesting a negative relation between advertising and disclosure, such that advertising is a substitute for firms' disclosures.

Conversely, advertising can be a complement to firms' disclosures. The literature based on attention theory (e.g., Grossman and Stiglitz, 1980; Merton, 1987; Hong and Stein, 1999; Hirshleifer and Teoh, 2003; Blankespoor, Miller, and White, 2014) shows that investors have limited time and resources to acquire information. Thus, investor recognition is very important for firms who want to attract attention-limited investors (e.g., Lehavy and Sloan, 2008), especially individual investors, who have more limited attention (e.g., Aboody, Lehavy, and Trueman, 2010). Due to the short time they have to attract investors, firms have incentives to attract investor attention to their disclosures, and advertising can be an effective mechanism due to its spillover effects (e.g., Grullon, Kanatas, and Weston, 2004). Thus, there may be a positive relation between advertising and disclosure, such that advertising complements firms' disclosures.

Taken together, whether firms strategically advertise during disclosure periods to attract more investor attention and whether advertising complements or substitutes disclosures are empirical questions. To answer these questions, I explore a novel dataset from Ad$pender™ that contains all the U.S. advertisers across 18 media outlets from 1996 to 2005.[2] This dataset includes monthly advertising spending data for each company across all available media in both U.S. dollars and number of units. Ad$pender monitors advertising expenditures and occurrence information for more than 3 million brands across all major media and marketplaces. I track and identify the advertising expenditures for each firm by month, which allows me to capture more accurately the timing of their advertising around corporate events, such as firm disclosures.

Using a sample of 164,751 firm-month observations for 2,157 U.S. firms for the 1996-2005 sample period, I find that firms increase advertising around their SEC 10-K and 10-Q filings, consistent with advertising complementing disclosures. In terms of economic magnitude, the results also show that firms increase their monthly advertising expenditures by about 3% (or 10% in number of units of advertisements) above average in the month when they have 10-K filings and 1% (or 2% in units) above average when they have 10-Q filings. Consistent with advertising being

[2] The sample period is from 1996 to 2005, due to 1) my identification strategy to use the U.S. Securities and Exchange Commission (SEC) acceleration filing rule in 2002, which happened in the middle of the sample period from 1996 to 2005; 2) the sample period of the main tests ends in 2005 due to the inception of social media after 2005 (e.g., Twitter and Facebook), which may have confounding effects on advertising spending in conjunction with firm disclosure (Blankespoor, Miller, and White, 2014). Using advertising on the Internet as a raw proxy for firms' use of social media, I also perform an additional test for the out-of-sample period from 2006 to 2015, and find robust results.

used to attract investor attention during disclosure periods, I find in cross-sectional tests that this effect is stronger for firms reporting good news, for firms with high individual investor ownership, for firms in the retail industry, and for young firms. In addition, firms increase advertising through media with broad target audiences and through business-to-consumer media when they submit 10-K and 10-Q filings. All the results are robust after controlling for confounding effects or alternative explanations at the industry and firm levels, as well as the impact of macroeconomic conditions and unobserved firm-specific characteristics on firms' advertising. The results also hold after a battery of robustness tests.

Furthermore, I use the SEC's rules 33-8128 and 33-8644 for the acceleration of filing dates as an exogenous shock to 10-K filing timing to validate the causal inference of firms' SEC filings on the timing of their advertising.[3] Difference-in-difference test results show that advertising schedules change after the adoption of the acceleration filing regulation for firms truly affected by the new rules compared to those that are not, suggesting that firms' mandatory disclosures *cause* their advertising during disclose periods. Parallel trend analysis and falsification test results further validate this causal inference by ruling out confounding effects that happened before the SEC's rules or at about the same time.

Moreover, using bid-ask spread, trading volume, and trading shares as measures for market liquidity, I further investigate the relation between disclosure and advertising with respect to market liquidity. I find that firms with high information asymmetry and lower liquidity advertise more when they have disclosures. This is consistent with my findings that firms consider disclosures when making advertising investment decisions, especially when they have high individual investor ownership or are young firms, which usually face high information asymmetry problems.

My paper makes several contributions to the literature. First, it contributes to the growing literature on the real effects of disclosure on firm-specific investment decisions and policies (e.g., Gigler, Kanodia, Sapra and Venugopalan, 2014; Kanodia and Sapra, 2016; Leuz and Wysocki, 2016). This paper provides new evidence concerning the economic outcomes of disclosures on firms' advertising investments. Miller and Skinner (2015) point out that most researchers tend to

[3] The timing of disclosures may be endogenous to the timing of advertising in that disclosures usually happen during the same period every year, and their occurrences are relatively fixed, and may coincide with advertising. To solve this endogeneity issue, I use the SEC acceleration filing rule as an exogenous shock to change the timing of disclosures. As SEC rules require accelerated filers to accelerate their 10-K filings for 30 days, my monthly advertising spending data capture whether the timing of advertising spending for treatment firms (accelerated filers that do accelerate their filings for more than a month after the regulation change) also accelerates for one month due to the filing acceleration as opposed to the control group firms (accelerated filers that do not have to accelerate their filings as they had already had timely filings before the regulation change). See Subsection 4.3 and Figure 1 for the identification strategy.

view firms' disclosures and investments as separate decisions and generally do not consider their interrelation. They suggest that researchers investigate how managers integrate disclosure and investment decisions, which is the focus of this paper. In addition, advertising is an economically important contributor to firm performance and long-term strategy.[4] For example, according to the Ad$pender database, advertising spending for all the advertisers in the U.S. was USD 248.7 billion in 2016.[5] Anecdotal evidence that I find shows that, to a certain extent, firms also time their advertising campaigns in accordance with their disclosures, especially during their disclosure periods (see ABB Ltd. example in Appendix A1 for more detail, which shows how a firm times their advertising with respect to the disclosures).[6] Anecdotal evidence also shows that a firm's advertising strategy (e.g., budget and planning) is ultimately approved by CEO, and that firm-level disclosures are validated by CFO. Thus, it is reasonable to believe that management at CEO and CFO level jointly coordinates the advertising and disclosures planning. Moreover, a firm's accounting and marketing departments usually work together in practice.[7] Taken together, these anecdotal evidences suggest that firms use advertising to attract broader investment market attention when they make disclosures.

Second, this paper contributes to the literature by providing evidence about the decision concerning advertising timing and disclosures with respect to market liquidity. I find that firms with high information asymmetry and low market liquidity increase their advertising when they make disclosures. The literature shows that both disclosures and advertising provide liquidity benefits in terms of lower information asymmetry as measured by higher liquidity, i.e., lower bid-ask spread, lower cost of capital, and higher trading volume [For examples of the disclosure effect on liquidity, see Diamond and Verrecchia (1991), Hail and Leuz (2006), and Bushee and Noe (2000). For examples of the spillover effect of advertising on liquidity, see Grullon, Kanatas, and Weston (2004) and Lou (2014).]. However, little is known about management's decisions concerning disclosure timing and how it relates advertising to increase visibility and liquidity in

[4] Bagwell (2007) provides a thorough survey of this research. Consistent with this line of literature, advertising has investment-type features, in which current spending results in higher subsequent profits (Fee, Hadlock, and Pierce, 2009). Moreover, Graham, Harvey, and Rajgopal (2005) and Gunny (2009) both document that real earnings management by reducing the aggregate amount of R&D, advertising, and SG&A has negative consequences on future operating performance. Accordingly, the market also perceives advertising investment as a signal of firm future sales performance.

[5] Ad Age's annual "200 Leading National Advertisers" also reports that advertising spending for the top 200 advertisers in US has reached 137.8 billion USD in 2014. In addition, Ad$pender database also shows that listed advertisers during their disclosure periods in the United States reached 14.7 billion USD in 2015.

[6] Some other anecdotal evidence in the literature shows that certain corporate disclosures (e.g., corporate social responsibility) are used in firms' advertising campaigns to help build brand recognition and to increase firm value (Servaes and Tamayo, 2013).

[7] See the following link for more detail. http://smallbusiness.chron.com/accounting-marketing-work-together-38276.html

the investment market. Using monthly data, I investigate this question and provide insights into reconciling the two strategies with respect to market liquidity. My findings also imply that firms understand the market liquidity benefits of advertising and disclosures, and that they care about using both of them.

Third, using monthly advertising data for all public and private advertisers through 18 media outlets in the U.S., I provide full descriptions of the novel data. Advertising data in the Compustat database has plausible selection issues and endogeneity problems due to firms' flexible discretion in disclosing their advertising expenditures in financial statements and SEC filings after the SEC's Financial Reporting Release No. 44 (FRR44) in 1994. I will explain the selection issues and endogeneity problems in detail in the data section. In this paper, the Ad$pender dataset enables me to directly examine advertising scheduling with respect to disclosure timing.

The rest of the paper is organized as follows. In Section 2, I discuss the related literature and develop my hypotheses. In Section 3, I describe the data and sample selection procedure, and I present the research design and identification strategy in Section 4. In Section 5, I discuss the results and provide robustness tests. Concluding remarks are in Section 6.

2. Literature Review and Hypotheses Development

2.1. Related literature

The disclosure literature shows that firm disclosure reduces information asymmetry [e.g., Healy and Palepu (2001), Beyer, Cohen, Lys, and Walther (2010), and Leuz and Wysocki (2016) for reviews of the disclosure literature]. This benefit of disclosure enables firms to realize higher liquidity (Diamond and Verrecchia, 1991), lower cost of capital (Hail and Leuz, 2006), and a broader investor base (Bushee and Noe, 2000). One stream of the disclosure literature in line with attention theory (e.g., Grossman and Stiglitz, 1980; Merton, 1987; Hong and Stein, 1999; Hirshleifer and Teoh, 2003; Blankespoor, Miller, and White, 2014) shows that investors have limited time and resources to acquire information. For this reason, investor recognition is important for firms to attract these attention-limited investors (e.g., Lehavy and Sloan, 2008). Moreover, individual investors are even more attention and resource constrained than institutional investors (e.g., Aboody, Lehavy, and Trueman, 2010; Lou, 2014), and prefer to invest in firms with high recognition (Frieder and Subrahmanyam, 2005) and better familiarity (Grinblatt and Keloharju, 2001; Huberman, 2001; Grullon, Kanatas, and Weston 2004; Barber and Odean, 2008).

In the media and intermediaries literature, Blankespoor, Miller, and White (2014) show that firms can reduce information asymmetry by more broadly disseminating their news through Twitter™. In addition, Bushee, Jung, and Miller (2011) find that firms use conference presentations to attract analyst and investor attention. On the informational role of media, Bushman, Williams, and Wittenberg-Moerman (2017) find that the media plays an important informational role in the private lending market, and media sentiment can help reduce information asymmetries. Furthermore, Bushee and Miller (2012) document that the investor relation (IR) activities used by small-cap and less visible firms successfully improves their visibility, investor following, and market value. Although increased disclosure may influence visibility, other communication channels to increase visibility can also be used to attract different audiences (e.g., advertising). For example, Gurun, Matvos, and Seru (2016) investigate how advertising attracts borrowers, and find that lenders advertise to attract less sophisticated borrowers to buy their expensive mortgages. Servaes and Tamayo (2013) show some anecdotal evidence that certain corporate disclosures (e.g., corporate social responsibility) are used in firms' advertising campaigns to increase brand recognition. In this connection, firms consider both advertising and disclosure as a means of communication to reduce information asymmetry in the market.

In the literature on the market impact of advertising, the basic mechanism is that advertising exerts a spillover effect in the investment market (e.g., Grullon, Kanatas, and Weston, 2004; Joshi and Hanssens, 2010; Lou, 2014), and that any product market advertising published by the firm is also visible to the investment market (Chemmanur and Yan, 2009). For example, Grullon, Kanatas, and Weston (2004) show that a firm's product market advertising benefits its ownership structure and improves liquidity (lower bid-ask spread and relative price impact). They also show that advertising has a stronger effect on individual investors than institutional investors, suggesting that individual investors make investment decisions based on familiarity. Lou (2014) also provides evidence that advertising attracts individual investors. He also shows that management is aware of this benefit and uses advertising for personal gain through insider trading. In addition, Joshi and Hanssens (2010) document that advertising spending has direct positive effects on investor response and long-term firm value, while the indirect positive effects on firm value are realized through sales revenue and profits. Consistent with the mechanism of the spillover effect of advertising on the investment market, Chemmanur and Yan (2009) examine the interaction between a firm's product market advertising and its corporate financing decisions, and document

that firms increase product market advertising when they are planning to issue new equity. Moreover, Cohen, Mashruwala, and Zach (2010) document that managers have the flexibility to time advertising spending, thus to manipulate monthly advertising expenditures to meet or beat the accounting benchmark i.e. real earnings management (Roychowdhury, 2006).

2.2. Hypotheses development

Whether firms strategically time their advertising during disclosure periods is an open question. On the one hand, firms may not schedule their advertising during disclosure periods on purpose, as the main goal of advertising is to promote the firm, brand, and product in the consumer market. Advertising during disclosure periods may not be the focus of an advertising strategy, and by doing so firms may incur additional costs due to abundant advertising spending outside consumer product market, which suggest that there is no relation between firms' disclosures and advertising spending.

On the other hand, firms may consider disclosures when they plan their advertising strategy. And if they do, according to the disclosure and attention theory literature, advertising can either complement or substitute firms' disclosures with respect to firms' market liquidity. Recent evidence on the spillover effect of advertising in the investment market (e.g., Grullon, Kanatas, and Weston, 2004; Lou, 2014) shows that advertising increases firms' market liquidity and investor ownership, but the effect of disclosure on the investment market is overlooked in these studies, whose impact is important for liquidity. In theory, both advertising and disclosure can have a positive effect on market liquidity. However, when firms have high levels of disclosure, the marginal benefit from the advertising spillover effect is reduced, due to the benefits already brought to the market through their disclosures including increased visibility, investor attention, and market liquidity. Thus, firms should adjust their advertising strategy and will be better-off to reduce advertising spending due to the reduced marginal benefit through advertising, suggesting a negative (substitute) relation between advertising and disclosure.

Alternatively, the disclosure literature based on attention theory (e.g., Grossman and Stiglitz, 1980; Merton, 1987; Hong and Stein, 1999; Hirshleifer and Teoh, 2003; Blankespoor, Miller, and White, 2014) shows that investors have limited time and resources to acquire information. Thus, increasing investor recognition becomes crucial (e.g., Lehavy and Sloan, 2008). Therefore, even though firms have high disclosure levels, they still have incentives to attract investor attention and increase visibility. Advertising can be an effective mechanism thanks to its spillover effect in the

investment market (e.g., Grullon, Kanatas, and Weston, 2004; Joshi and Hanssens, 2010; Lou, 2014). Thus, firms increase advertising to attract investors' attention when they have more disclosures, suggesting that advertising complements disclosures.

Taken together, firms trade-off between advertising and disclosure mechanisms, and whether advertising is related (as a complement or a substitute) to disclosures is an empirical question. Therefore, I state the first hypothesis in the alternative form as follows.

H1a: A firm's advertising expenditures change when it has disclosures.

Furthermore, some of the objectives of advertising are to promote the firm and to attract more attention. This motivation can be driven by whether a firm has good news to report. Thus, advertising depends on whether a firm disseminates good or bad news in its disclosures (e.g., Miller, 2002; Lennox and Park, 2006; Chen, Matsumoto, and Rajgopal, 2011; Boulland and Dessaint, 2017). Similarly, Verrecchia (1983, 2001) and Dye (1985) argue that firms voluntarily disclose good news and withhold bad news. If a firm discloses good news, it may have incentives to increase advertising spending due to the advertising spillover effect in the investment market (Chemmanur and Yan, 2009; Grullon, Kanatas, and Weston 2004; Joshi and Hanssens, 2010; Lou 2014). However, on the other hand, all else being equal, a firm may conversely have more incentives to advertise if it has bad news to disclose, in an attempt to use advertising to compensate for a potential downgrading of its reputation. Based on this line of reasoning, I posit this prediction in the following hypothesis.

H1b: A firm's advertising is associated with its disclosures of good news or bad news.

To further improve the internal validity of my findings, I develop a second set of hypotheses for a cross-sectional comparison in certain types of firms and industry, to argue whether the relation between advertising and disclosure is stronger. Bushee, Matsumoto, and Miller (2003) examine the determinants and effects of making conference call decisions. They find that firms with relatively more shareholders and relatively fewer institutional holders are more likely to open their conference calls to investors. Their findings suggest that the nature of the firm's investor base helps determine how widely the firm may want to disseminate information.

Moreover, individual investors are even more attention- and resource-constrained than institutional investors. Aboody, Lehavy, and Trueman (2010) show that stocks with sharp run-ups tend to attract individual investors' attention and investment dollars, particularly before earnings announcements. Grullon, Kantas, and Weston (2004) and Lou (2014) both find that advertising is

used by firms to attract unsophisticated and individual investors. Lou (2014) shows that managers are aware of the information spillover effect between the product market and the investment market, and that advertising is used to attract individual investors due to their more limited resources and attention span.

Based on findings of the investor base and individual investors' limited attention in the literature, my prediction is that firms with high individual investor ownership (or low institutional ownership) will use more advertising at the time of disclosures to amplify the advertising spillover effect and attract individual investors. Thus, I posit this prediction in the following hypothesis.

H2a: The relation between a firm's advertising and its disclosures is stronger for firms with high individual investor ownership.

Furthermore, individual investors prefer to invest in firms with high recognition (Frieder and Subrahmanyam, 2005) and better familiarity (e.g., Grinblatt and Keloharju, 2001; Huberman, 2001; Grullon, Kanatas, and Weston, 2004; Barber and Odean, 2008). Frieder and Subrahmanyam (2005) argue that individual investors prefer to invest in stocks with easily recognized products. Thus, individuals prefer holding stocks with high recognition and greater information precision. "Buy what you know" That's is what Peter Lynch, the famous former portfolio manager of Fidelity's Magellan Fund, advises to investors. This advice is especially true for individual investors, because they are typically more resource and attention limited than institutional investors. This phenomenon is consistent with the "home bias" argument and implies that people do indeed bias their investment decision in favor of the "familiarity" (Huberman, 2001; Grullon, Kanatas, and Weston, 2004). Individual investors are familiar with the brands they use, thus retail firms have incentives to advertise more to attract limited attention when they have disclosures to take advantage of the spillover effect of advertising. I thus posit the following hypothesis.

H2b: The relation between a firm's advertising and its disclosures is stronger in the retail industry.

Bushee and Miller (2012) show that investor relation (IR) activities successfully improve visibility, investor following, and market value for small-cap and less visible firms. Although increased disclosure may impact visibility, other communication channels to increase visibility may also be used to attract investor attention and increase visibility (e.g., advertising). Young firms are an example of less visible firms, and they have strong motivation to promote themselves and

to attract more investors when they have disclosures (Chemmanur and Yan, 2009). Thus, I posit the following hypothesis.

H2c: The relation between a firm's advertising and its disclosures is stronger for young firms.

Bagwell (2007) argues that the breadth of the media outlets through which firms advertise has an important impact on consumer recognition. Accordingly, the advertising spillover effect in the investment market also depends on the breadth of the media outlets. Media outlets with broad target audiences can have a greater impact on the spillover effect of advertising in the investment market compared to outlets with narrow and specific target audiences. Media outlets with broad target audiences include national newspapers and broadcasting organizations, as opposed to narrow and specific channels like local newspapers. I thus posit the following hypothesis.

H2d: The relation between a firm's advertising and its disclosures is stronger in media outlets with broad target audiences.

Finally, disclosures and advertising affect firm's liquidity by reducing information asymmetry (e.g., Diamond and Verrecchia, 1991; Bushee and Noe, 2000; Grullon, Kanatas, and Weston, 2004; Hail and Leuz, 2006; Lou, 2014). As argued in H1a, advertising and disclosures can be either related or unrelated to each other, and if they are related, they can be either positively (as a complement) or negatively (as a substitute) related. For example, when a firm advertises a product, consumers will react differently to it, which may lead to different trading perspectives (e.g., whether or not to trade the firm, and if trading, whether to buy or short sell) based on their anticipation of the product's future.

Taken together, how firms determine their disclosures and advertising with respect to liquidity and what role market liquidity plays in these decisions is unknown. Thus, I posit the following hypothesis.

H3: A firm's advertising and its disclosures are jointly determined with respect to the firm's liquidity.

3. Data and Sample Selection

I use advertising data from Ad$pender to restrict data selection in an attempt to rule out any endogeneity issues that may be associated with a firm's voluntary decisions to disclose its proprietary information of advertising expenditures. Prior to 1994, the SEC required industrial and

commercial firms to provide a Supplementary Income Statement Information schedule. The SEC's Financial Reporting Release No. 44 (FRR44) in December 1994 eliminated this requirement, as advertising spending is considered proprietary information whose disclosure to the public may reduce shareholders' equity. After implementation of this regulation, generally accepted accounting principles (GAAP) require firms to disclose advertising expenditures, but only if managers determine the information to be material. Thus, firms have the discretion of whether to disclose their advertising expenditures and/or how much and in which account category to disclose in their filings and financial statements (Simpson, 2008; Heitzman, Wasley, and Zimmerman, 2010).[8] This explains why there is little data and many missing values reported in Advertising Expense (XAD) in SEC filings and Compustat datasets.[9] The issue of many missing values can create serious selection bias in any study.[10]

Instead of using advertising expenditure data in Compustat, which is largely used in prior studies (e.g., Barth, Kasznik, and McNichols, 2001; Grullon, Kanatas, and Weston, 2004; Servaes and Tamayo, 2013; Lou, 2014), I use Ad$pender advertising data to rule out any potential endogeneity issues associated with a firm's voluntary decision to disclose advertising expenditures.[11] Ad$pender contains monthly data of advertising spending across 18 media outlets[12] for each advertiser in the U.S.; it covers advertising spending beginning in from 1996.[13] My sample period is from fiscal year 1996 to fiscal year 2005. I choose this sample period to have complete data merged with fiscal year 1996 financial data in Compustat, and to have 2005 to end due to the inception of social media after 2005 (e.g., Twitter and Facebook), which may have confounding effects on advertising spending in conjunction with firm disclosure (Blankespoor, Miller, and

[8] Advertising expenditures are a required disclosure item only when the total expenditures exceed a certain percentage of total revenues. Even though the data are available, they are often included in a broader category of expenses: "Selling, General & Administrative Expenses." This category can include many things in addition to advertising expenditures, which makes the measure of advertising spending noisier. Moreover, if the total amount of advertising expenditures falls below the required disclosure percentage, data may be "missing" and will not be disclosed.

[9] Even though the Compustat dataset provides non-missing advertising expenses for certain firms, it provides only annual data, and no monthly or even quarterly data are provided.

[10] For example, similar to the nature of advertising expenditures, R&D expenditure disclosure received a similar regulation change within the framework of the U.S. Statement of Financial Accounting Standards No.2 (SFAS2), which only requires firms to disclose material R&D expenditures. Koh and Reeb (2015) find that firms which do not disclose R&D expenditures are very innovative, as measured by the number of their patent filings. Thus, like R&D expenditures, using advertising expenses (XAD) in SEC filings or Compustat may introduce selection issues.

[11] The SEC's FRR44 from December 1994 amended Section 210.5-04 of Article 5 in Regulation S-X (SEC's file No. S7-12-94).

[12] That 18-media coverage includes network TV, spot TV, Spanish Language Network TV, cable TV, syndication, magazines, Sunday magazines, local magazines, Hispanic magazines, B-to-B magazines, national newspapers, newspapers, Hispanic newspapers, network radio, national spot radio, local radio, U.S. Internet, and outdoor (for more detail, please see extract from Ad$pender Methodology Help Manual in Appendix A2). It also provides breakdown information by category, ultimate owner, parent, subsidiary, advertiser, brand and product in both dollar amount and unit measure. For more detail, please see the Ad$pender™ User Manual, January 2011. http://products.kantarmediana.com/documents/AdSpenderManual.pdf.

[13] For example, prospectuses through private channels are not covered in the Ad$pender dataset.

White, 2014). I also run a robustness test in the out-of-sample period from 2006 to 2015 and find robustness results. [14] Furthermore, my main identification strategy is to use the SEC regulation change, as exogenous shock effective on December 15, 2002 to claim causal inference of firms' mandatory disclosure on their advertising expenditures, and fiscal year 2002 (the effective year of the regulation) is in the middle of my sample period.

To collect the advertising data, I generate a link table between Ad$pender and Compustat to merge the two datasets. The link table is created by matching on firm name and/or parent-subsidiary tie according to Bloomberg/S&P Global Market Intelligence databases. I apply fuzzy matching on company name with a 0.95 similarity threshold and manually checked every matched company, then verified every firm for the total 28,000 firms with Compustat North America firms in the full available period between 1995 and 2016 for Ad$pender. Parent companies and subsidiaries are also identified and matched manually for the sample period. Thus, I get a balanced dataset in Ad$pender of 1,128,072 monthly observations for 8,546 firms (including both listed and private firms) from 1996 to 2005. I then merge the Ad$pender dataset with Compustat data for all available listed firms in the U.S.; this matching provides 441,237 firm-month observations for 5,232 firms. Firms that never advertise during the sample period and those whose total assets are under 10 million USD are excluded. Firms with missing values for all the variables used in the regression models are also excluded. Moreover, I exclude all the financial investment companies (Fama-French 48 industries: code 47) to rule out the confounding effect of disclosure on advertising in investment companies, since the SEC imposes rules on the accuracy, truthfulness, and timeliness of advertising and prospectuses produced by investment companies when they approach their prospect investors.[15] This produces 164,751 firm-month observations for 2,157 U.S. listed firms. The sample selection procedure is provided in detail in Table 1.

4. Research Design

4.1. Advertising and firm disclosures

To examine the effects of a firm's disclosures on its advertising, I estimate baseline regression

[14] I run a robustness test for the out-of-sample period from 2006 to 2015 to check the robustness of the findings. I cannot run the main tests for 2006-2015 due to the lack of precise data on firms' use of social media to disseminate information and attract investor attention. Instead, I use advertising on Internet as a loose raw proxy for firms' use of social media from 2006 to 2015, and find robust results.

[15] SEC rule 17 CFR Parts 230, 239, 270, and 274, which went into effect on November 15, 2003. This rule requires investment companies (open-end mutual funds) to report in their advertisements and prospectus the most up-to-date performance of the fund as of the most recent month-end.

model that is applied to two models with different measures of the dependent variables and the corresponding control variables. The unit of analysis is firm-month. The model is as follows:

Model 1:

$$\begin{aligned} Advertising_{i,m} = {} & \beta_0 + \beta_1 \cdot SEC\ 10\text{-}K_{i,m} + \beta_2 \cdot SEC\ 10\text{-}Q_{i,m} + \beta_3 \cdot SEC\ 8\text{-}K_{i,m} + \beta_4 \cdot EA_{i,m} \\ & + \beta_5 \cdot MEF_{i,m} + \beta_6 \cdot Ln\ Sales_{i,q-1} + \beta_7 \cdot Ln\ Market\ Cap_{i,q-1} \\ & + \beta_8 \cdot Book\text{-}to\text{-}Market_{i,q-1} + \beta_9 \cdot Book\ Leverage_{i,q-1} + \beta_{10} \cdot Ln\ Firm\ Age_{i,t} \\ & + \beta_{11} \cdot ROA_{i,q-1} + \beta_{12} \cdot Loss_{i,q-1} + \beta_{13} \cdot Ln\ Analyst\ Following_{i,q-1} \\ & + \beta_{14} \cdot Institutional\ Ownership_{i,q-1} + \beta_{15} \cdot Suspect_{i,q} + \beta_{16} \cdot Suspect\ X\ Month3_{i,m} \\ & + \beta_{17} \cdot Industry\ Sales\ Normalized\ HHI_{i,q-1} \\ & + \beta_{18} \cdot Industry\ Total\ AD\ Normalized\ HHI_{i,q-1} \\ & + \beta_{19} \cdot Industry\ Monthly\ Advertising_{i,m} \\ & + Firm\ Fixed\ Effects + Year\text{-}Quarter\ Fixed\ Effects + \varepsilon_{i,m}. \end{aligned} \quad (1)$$

In equation (1), *i* denotes the firm, *m* denotes the month, and *q* denotes the quarter. For monthly advertising, $Advertising_{i,m}$, I use two measures: $Ln\ Total\ AD\ MUSD_{i,m}$ and $Ln\ Total\ AD\ Unit_{i,m}$. First, I examine firms' advertising spending, $Ln\ Total\ AD\ MUSD_{i,m}$, calculated as the natural logarithm of 1 plus the advertising expenditure of firm *i* spent in the current month *m*.[16] In order to rule out the impact of advertising quality and unit price fluctuation on advertising strategy, I investigate the quantity of advertisements made by firms. $Ln\ Total\ AD\ Unit_{i,m}$ is measured as the natural logarithm of 1 plus the number of units of advertising made by firm *i* in the current month *m*.[17]

The variables of interest are the firm's disclosure measures, SEC 10-K, 10-Q, and 8-K filings, as well as earnings announcements and management earnings forecasts. $SEC\ 10\text{-}K_{i,m}$ is a binary variable equal to 1 if firm *i* submitted a 10-K filing in the current month *m*, and 0 otherwise. $SEC\ 10\text{-}Q_{i,m}$ is a binary variable equal to 1 if firm *i* submitted a 10-Q filing in the current month *m*, and 0 otherwise. $SEC\ 8\text{-}K_{i,m}$ is a binary variable equal to 1 if firm *i* submitted an 8-K filing in the current month *m*, and 0 otherwise. $EA_{i,m}$ is a binary variable equal to 1 if firm *i* has an earnings announcement in the current month *m*, and 0 otherwise. $MEF_{i,m}$ is a binary variable equal to 1 if

[16] Following the same argument and measures in Grullon, Kanatas, and Weston (2004), I use advertising spending instead of using advertising spending scaled by sales or assets, because the various scaled measures do not capture the scope of advertising. Grullon, Kanatas and Weston (2004, p. 448) explain as follows, "For example, General Motors (GM), one of the largest advertisers in the United States, spent $3.7 billion on advertising in 1998. While this amount represented less than 3% of its sales, GM most likely gained considerable recognition from its advertising campaign. On the other hand, Audible Inc. spent only $0.3 million on advertising in 1998, but this amount represented more than 82% of its sales. Since it is quite likely that an advertising campaign of $3.7 billion will reach a wider population of potential investors than an advertising campaign of $0.3 million, we expect the dollar amount of advertising to be a better proxy for investor visibility than the scaled measures." Moreover, other measures like advertising intensity (change in advertising relative to change in sales) used in, for example, Servaes and Tamayo (2013), has a different meaning than advertising spending itself. Furthermore, I control for firm's sales in the model to account for the effect of sales on advertising spending and add firm- and year-quarter fixed effects to the specifications, which can rule out the issues related to unscaling by sales.

[17] Due to data availability in Ad$pender, three media outlets—national spot radio, network radio, and outdoor—only have advertising spending in USD and do not have quantity statistics for the number of units. However, this is a minor issue, as those three channels are not important advertising channels in terms of advertising spending in the U.S. compared to all other channels.

firm *i* released a management earnings forecast in the current month *m*, and 0 otherwise. In line with hypothesis H1a, if advertising and disclosure are complementary, I predict coefficients of those variables of interest to be positive and significant, and negative and significant if they are substitutive. Insignificant coefficients suggest no relation between advertising and disclosures.

In the model, I control for firm- and industry-level characteristics that impact the relation between disclosures and advertising. Firm-level controls include firm sales *Ln Sales* (Lou, 2014), firm size *Ln Market Cap* (Grullon, Kanatas, and Weston, 2004), growth and financing needs and constraints *Book-to-Market* (Fee, Hadlock, and Pierce, 2009), financing structure and need for issuing new equity *Book Leverage* (Chemmanur and Yan, 2009; Fee, Hadlock, and Pierce, 2009), firm age *Ln Firm Age* (Grullon, Kanatas, and Weston, 2004), firm performance *ROA* and *Loss*, information environment as measured by analyst forecast *Ln Analyst Following* (Barth, Kasznik, and McNichols, 2001), and *Institutional Ownership*. Cohen, Mashruwala, and Zach (2010) document that suspect firms use advertising to manipulate earnings to just have non-zero ROA, and such real-earnings management happens frequently in the third month of the fiscal quarter. Thus, I include two control variables for real earnings management: *Suspect* and *Suspect X Month3*. I also control for factors at the industry level that may impact advertising. They include industry-level sales and advertising concentration, as well as competition *Industry Sales Normalized HHI* and *Industry Total AD Normalized HHI*, monthly time-variant economic trend, and advertising spending fluctuation at the industry level *Ln Industry Total AD MUSD* and *Ln Industry Total AD Unit*.[18] All the control variables are values in the lagged fiscal quarter, unless otherwise indicated (i.e., monthly industry advertising fluctuation). Refer to Appendix A3 for variable definitions.

In addition, I add firm fixed effects to control for unobserved firm-level and time-invariant characteristics that may affect disclosure and advertising. I control for unobserved fundamental economy-level and time-variant fluctuation (e.g., real economy, business and budget cycle) by adding year-quarter fixed effects. All continuous variables are winsorized at 1% level and standard errors are clustered at the firm-quarter level.

[18] Following Cohen, Mashruwala, and Zach (2010), this line of control variables excludes advertising of the firm in question in the current month. Monthly industry advertising spending captures industry advertising seasonality, budgeting cycle and firms' mimicking strategy in the same industry, see Kedia and Philippon (2009) for mimicking strategy.

4.2. Cross-sectional tests

To test hypotheses H2a to H2c, I design cross-sectional tests for firms with high individual investor ownership, for firms in the retail industry, and for young firms. The specification is as follows:

Model 2:

$$\begin{aligned} Advertising_{i,m} = {} & \beta_0 + \beta_1 \cdot Attraction + \beta_2 \cdot SEC\ 10\text{-}K_{i,m} + \beta_3 \cdot Attraction\ X\ SEC\ 10\text{-}K_{i,m} \\ & + \beta_4 \cdot SEC\ 10\text{-}Q_{i,m} + \beta_5 \cdot Attraction\ X\ SEC\ 10\text{-}Q_{i,m} + \beta_6 \cdot SEC\ 8\text{-}K_{i,m} \\ & + \beta_7 \cdot Attraction\ X\ SEC\ 8\text{-}K_{i,m} + \beta_8 \cdot EA_{i,m} + \beta_9 \cdot Attraction\ X\ EA_{i,m} \\ & + \beta_{10} \cdot MEF_{i,m} + \beta_{11} \cdot Attraction\ X\ MEF_{i,m} + \sum \lambda_n \cdot Firm\text{-}Level\ Controls \\ & + \sum \theta_n \cdot Industry\text{-}Level\ Controls + Firm\ Fixed\ Effects \\ & + Year\text{-}Quarter\ Fixed\ Effects + \varepsilon_{i,m}, \end{aligned} \quad (2)$$

where *Attraction* is one of three cross-sectional variables: *Individual*, *Retail*, and *Young*. The dependent variable and all other variables are defined the same as for Model 1. *Individual* is a binary variable equal to 1 if institutional investor ownership in the lagged firm-quarter is in the lowest quartile of the entire sample, and 0 otherwise. *Retail* is a binary variable equal to 1 if a firm is in the retail industry based on the Fama-French five-industry classification code, and 0 otherwise. *Young* is a binary variable equal to 1 if a firm's first coverage in CRSP is after 1995, the beginning of my sample period, and 0 otherwise. Variables of interest are the interaction terms between *Attraction* (i.e., *Individual*, *Retail*, and *Young*) and *SEC 10-K*, *SEC 10-Q*, *SEC 8-K*, *EA*, and *MEF*, respectively. Assuming that advertising and disclosure are complementary and have a positive relation and if this relation is stronger in those cross-sections, I predict the coefficients of variables of interest will be positive and significant, but they will be negative if the relation is weaker.

4.3. Identification strategy: SEC acceleration filing

To investigate the causal inference of a firm's disclosure of its advertising expenditure, I use 10-K acceleration filing as an exogenous shock that changes mandatory disclosure timing but does not directly or indirectly change advertising timing in theory (exclusion restriction). Specifically, I examine a setting with an exogenous regulation introduced by SEC rules 33-8128 and 33-8644, where the SEC required "accelerated filers" and "large accelerated filers" to file their 10-K/10-Q filings earlier. As SEC rules require accelerated filers to accelerate their 10-K filings for 30 days, my monthly advertising expenditure data can capture whether the timing of advertising spending for treatment firms (accelerated filers that do accelerate their filings for more than a month after the regulation's implementation) also moves for one month due to the filing acceleration, as

opposed to the control group firms (accelerated filers that do not have to accelerate their filings as they had already timely fillings before the regulation's implementation).

4.3.1. Institutional background

SEC rules 33-8128 and 33-8644,[19] effective on November 15, 2002, reduce the 10-K (10-Q) filing period for large accelerated filers and accelerated filers from 90 (45) days after fiscal year-end (quarter-end) to 60 (35) and 75 (40) days, starting from the first fiscal year end after December 15, 2003[20]. Large accelerated filers are firms with a public float greater than 700 million USD, and accelerated filers are firms with public float between 75 and 700 million USD.

4.3.2. Research design

Due to the variation of fiscal year end across firms over time, SEC regulation change provides a good setting to use the difference-in-difference (Diff-in-Diff) design with staggered adoption over time across firms as the identification strategy.[21] I use the Diff-in-Diff approach with the pre- and post-period identified by the first adoption of the accelerated 10-K filings for each firm. Accelerated filers are defined by the SEC as firms whose public float is greater than 75M USD. This definition has the potential to generate endogeneity issues due to the fundamental difference between large and small firms, as large firms whose public float is greater than 75 million USD are fundamentally different from small firms whose public float is lower than 75 million USD [see Iliev (2010) for more detail].[22] Therefore, I drop all the non-accelerated filers (public float less than 75 million USD), and I define treatment group firms as the accelerated filers that do accelerate their

[19] Acceleration of Periodic Report Filing Dates and Disclosure Concerning Website Access to Reports. See the SEC's 17 CFR Parts 210, 229, 240, and 249 [Release nos. 33-8128; 34-46464; FR-63; File No. S7-08-02] RIN 3235-AI33. Revisions to accelerated filer definition and accelerated deadlines for filing periodic reports. See the SEC's 17 CFR PARTS 210, 229, 240, and 249 [Release nos. 33-8644; 34-52989; File No. S7-08-05] RIN 3235-AJ29.

[20] Some firms may adopt the acceleration filing rule immediately after the effective date on November 15, 2002 for the first fiscal year end after December 15, 2002. Other firms may adopt gradually when their free float reaches 75 million USD bar for the first time after December 15, 2003, this provides identification with staggered adoption over time across firms.

[21] Gao, Wu, and Zimmerman (2009) document that there is an endogeneity issue when using this acceleration rule change due to firms' voluntary manipulation to manage their public float so as to remain small firms not subject to the acceleration regulation change. Such concern of avoiding accelerated filing is not correlated with a firm's advertising spending. Even though there might be unobserved correlation between avoidance of accelerated filings and advertising, this issue would by no means work in the current study for me to find the results. I manually checked the free float of firms two years before the regulation change and compared them after the regulation change. I only find nine firms that voluntarily manipulate their free float to avoid complying with the acceleration filing; those firms account for less than 2% in my Diff-in-Diff test sample size.

[22] I hand-collect the public float data for each firm-year through the SEC EDGAR database, because this is the only official source for the SEC to define accelerated filers, large accelerated filers and non-accelerated filers. The exact public float of the firm can only be provided by the firm itself, as it is the market value of all common stock outstanding excluding those held by non-affiliates of the firm, and only the firm has the accurate definition of those affiliates. For more explanation of this issue, see Iliev (2010).

filings for at least one month after the regulation change and control group firms as the accelerated filers that do not accelerate their filings because they had already timely filings before SEC regulation change. Thus, by excluding non-accelerated filers in the Diff-in-Diff analysis, I rule out the incomparability between the treatment and control groups, and make sure that treatment group firms are not qualitatively different from control group firms. This also ensures that the Diff-in-Diff results are not driven by other confounding effects correlated with firm size. I perform a univariate comparison analysis of the average for each variable between treatment and control groups to check whether they are significantly different in one group than the other.

I also restrict the sample for the Diff-in-Diff test to only firms with complete data for two years before (pre-period) and after (post-period) the first adoption of the acceleration filing rule. I only keep monthly data for firms with 10-K filings and drop all other monthly data. To capture the advertising timing change due to the filing change, I keep 10-K filing month data for both treatment and control group firms in the pre-period. For treatment group firms in the post-period, I replace their firm-month data (the real 10-K filing month data) with the would-have-been firm-month data if there was no regulation change. I keep firm-month data as it is for control group firms in the post-period as they do not change their filing month.

For example, a firm submitted its 10-K filing in the third fiscal month before the implementation of the acceleration filing regulation is required to submit in the second fiscal month after the regulation due to the 30-day acceleration stipulation. For the treatment group, based on my previous findings, given that a firm increases its advertising expenditures in the SEC filing month, I should observe a decrease in advertising expenditures in the third fiscal month after the implementation compared to the third fiscal month before it, as opposed to the non-timing-change control group, because the filing month for treatment firms moves to the second fiscal month. This example is illustrated in Figure 1. The control variables in Model 3 are the same as in the Model 1. The specification for the Diff-in-Diff is:

Model 3:

$$\begin{aligned} Advertising_{i,m} = {} & \beta_0 + \beta_1 \cdot Post + \beta_2 \cdot Treat\ X\ Post + \sum \lambda_n \cdot Firm\text{-}Level\ Controls \\ & + \sum \theta_n \cdot Industry\text{-}Level\ Controls + Firm\ Fixed\ Effects \\ & + Year\text{-}Quarter\ Fixed\ Effects + \varepsilon_{i,m}. \end{aligned} \quad (3)$$

The variable *Treat* denotes the treatment group, which is measured as a binary variable equal to 1 if the firm is an accelerated filer and accelerated its 10-K filing to an earlier month in the post-period, and is 0 otherwise. *Post* is a binary variable equal to 1 if it is in the post-period, and 0 if it

is in the pre-period.[23] The variable of interest is the interaction term *Treat X Post*, whose coefficient is β_2. If a treatment group firm alters its advertising expenditures in the post-period due to the exogenous shock of the 10-K filing acceleration, the coefficient β_2 of the interaction term should be negative and significant. All the control variables are defined the same as for Model 1.

4.3.3. Parallel trend analysis

Even though the Diff-in-Diff approach can help address causal inference, there might be other unobserved confounding effects that drive the variation in advertising expenditures. To further validate the internal and construct validity of the exogenous shock on advertising spending through change of timing in firm mandatory disclosure of SEC 10-K filing, I conduct a parallel trend analysis for the two-year period before and after the regulation change. If the parallel trend assumption holds, I should observe that the change only occurs after the firm's first regulation change adoption year.[24] The specification of parallel trend test is shown as follows:

Model 4:

$$\begin{aligned} Advertising_{i,m} = {} & \beta_0 + \beta_1 \cdot Pre\ FY1 + \beta_2 \cdot Post\ FY1 + \beta_3 \cdot Post\ FY2 + \beta_4 \cdot Treat\ X\ Pre\ FY1 \\ & + \beta_5 \cdot Treat\ X\ Post\ FY1 + \beta_6 \cdot Treat\ X\ Post\ FY2 + \sum \lambda_n \cdot Firm\text{-}Level\ Controls \\ & + \sum \theta_n \cdot Industry\text{-}Level\ Controls + Firm\ Fixed\ Effects \\ & + Year\text{-}Quarter\ Fixed\ Effects + \varepsilon_{i,m}. \end{aligned} \quad (4)$$

Pre FY1 is a binary variable equal to 1 if it is in the last year of the pre-period, and is 0 otherwise.[25] *Post FY1* is a binary variable equal to 1 if it is in the first year of the post-period, and is 0 otherwise. *Post FY2* is a binary variable equal to 1 if it is in the second year of the post-period, and is 0 otherwise. The variables of interest are the interaction terms between *Treat* and *Pre FY1*, *Post FY1*, and *Post FY2*, respectively, in the Diff-in-Diff parallel trend test. If the shock of 10-K filing acceleration is exogenous and valid to rule out other confounding effects, the coefficient β_4 of the interaction term *Treat X Pre FY1* in the pre-period will not be significant, while the coefficients β_5 and β_6 of the interaction terms *Treat X Post FY1* and *Treat X Post FY2* in the post-period will be negative and significant. All the control variables are defined the same as for Model 1.

[23] For treatment group, *Post* equals to 1 if it is after firm's first adoption of acceleration filing, and 0 if it is before firm's first adoption of acceleration filing. For control group, *Post* equal to 1 if it is after the effective date of regulation, and 0 if it is before that date.

[24] The first adoption year is staggered over time for different firms with different fiscal year ends. This such staggered adoption helps to partially rule out the confounding effects of other regulation changes occurring during this time period. For example, other policies in the Sarbanes–Oxley Act of 2002 (SOX).

[25] In model 4, each firm in the sample must have data for at least two years before and after the regulation change. The theoretical variable *Pre FY2* (two years before regulation change) is omitted by construction, as it serves as the baseline benchmark in the regression model.

4.3.4. Falsification test

In all of the Diff-in-Diff tests with staggered adoption as well as the parallel trend tests, it is assumed that there should not be any significant change in advertising expenditures of the treatment group firms in the real disclosure month after the regulation change, because these firms alter their advertising spending earlier in timing to the accelerated month after the regulation change. To further validate the Diff-in-Diff test of the exogenous shock in timing, I conduct a falsification test with the same specification but with a different sample, which includes only the treatment and control groups firms in the real 10-K filing month in the pre- and post-periods.

However, the month in the post-period for treatment group is not the month of disclosure in the pre-period. If my Diff-in-Diff approach is valid and disclosure timing drives advertising expenditures, such that treatment firms move their advertising expenditures to an earlier month due to acceleration of filing, I should not observe any significant change in advertising expenditures in the falsification test. Because the advertising spending should not be different in the filing month before and after the adoption in treatment group as opposed to control group.

4.4. Liquidity

I next examine the firm's disclosure and advertising decisions as they relate to liquidity. I estimate one regression model that is applied to three measures of the dependent variable. The unit of analysis is at firm-month level. The model is:

Model 5:

$$\begin{aligned} Liquidity_{i,m} = {} & \beta_0 + \beta_1 \cdot AD_{i,m} + \beta_2 \cdot SEC\ 10\text{-}K_{i,m} + \beta_3 \cdot SEC\ 10\text{-}K\ X\ AD_{i,m} + \beta_4 \cdot SEC\ 10\text{-}Q_{i,m} \\ & + \beta_5 \cdot SEC\ 10\text{-}Q\ X\ AD_{i,m} + \beta_6 \cdot SEC\ 8\text{-}K_{i,m} + \beta_7 \cdot SEC\ 8\text{-}K\ X\ AD_{i,m} + \beta_8 \cdot EA_{i,m} \\ & + \beta_9 \cdot EA\ X\ AD_{i,m} + \beta_{10} \cdot MEF_{i,m} + \beta_{11} \cdot MEF\ X\ AD_{i,m} + \beta_{12} \cdot Ln\ Market\ Cap_{i,q-1} \\ & + \beta_{13} \cdot Book\text{-}to\text{-}Market_{i,q-1} + \beta_{14} \cdot Book\ Leverage_{i,q-1} + \beta_{15} \cdot ROA_{i,q-1} + \beta_{16} \cdot Loss_{i,q-1} \\ & + \beta_{17} \cdot Ln\ Analyst\ Following_{i,q-1} + \beta_{18} \cdot Institutional\ Ownership_{i,q-1} \\ & + \beta_{19} \cdot Quarterly\ Stock\ Return_{i,q-1} + \beta_{20} \cdot Stock\ Return\ Volatility_{i,q-1} \\ & + \beta_{21} \cdot Special\ Items_{i,q-1} + Firm\ Fixed\ Effects + Year\text{-}Quarter\ Fixed\ Effects + \varepsilon_{i,m}. \quad (5) \end{aligned}$$

I employ three distinct measures for monthly $Liquidity_m$: *Spread 100*, *Trade Volume*, and *Trade Share*. I use a firm's bid-ask spread, *Spread 100*, as a measure of the quality of public information about the firm. This measure encompasses all sources of public information, and is an ex-post proxy for the firm's information asymmetry and the overall quality of the public information (e.g., Balakrishnan, Core, and Verdi, 2014). I measure the daily bid-ask spread as the difference between the quoted closing ask and bid, scaled by the closing daily CRSP price. I then calculate the average daily bid-ask spread in the current month and multiply it by 100 to determine the basis point(s),

labeled *Spread 100*. *Trade Volume* is measured as the daily average of trading value of a firm's stock in the current month, scaled by its market value of equity in the lagged fiscal quarter. *Trade Share* is the daily average of the number of trading shares of a firm's stock in the current month scaled by its number of shares outstanding in the lagged fiscal quarter.

I follow the literature to include control variables for size (*Ln Market Cap*), growth (*Book-to-Market*), financing structure and financing need (*Book Leverage*), firm performance (*ROA* and *Loss*), information environment (*Ln Analyst Following* and *Institutional Ownership*), daily average stock return in the lagged quarter (*Quarterly Stock Return*), stock return volatility (*Stock Return Volatility*), and extraordinary events *Special Items* (McVay, 2006). Firm- and year-quarter fixed effects are also included, all continuous variables are winsorized at 1% level and standard errors are clustered at the firm-quarter level.

5. Results

5.1. *Calendar-year* vs. *fiscal-year* seasonality of advertising expenditures

Univariate analysis of the differences between *calendar-year* and *fiscal-year* advertising spending seasonality helps to provide an understanding of what motives might drive the spending. This univariate analysis is used to differentiate the commercial incentives for firms to advertise (based on *calendar-year* seasonality of advertising spending) from the financial reporting incentives to advertise (based on the *fiscal-year* seasonality of advertising spending). On the one hand, *calendar-year* seasonality reflects economic growth during a calendar year. Thus, *calendar-year* seasonality accounts for consumer market variation and represents firms' advertising incentives for their business development purposes (e.g., sales growth, product and brand promotion). On the other hand, Oyer (1998) documents that there are budgeting and financial reporting reasons for firms to decide their fiscal-year end. *Fiscal-year* seasonality mainly explains a firm's incentives for its accounting and financial reporting.

I also examine whether there is a mismatch between commercial and financial incentives for listed firms with a fiscal-year end other than December. I select those firms as their *calendar-year* seasonality and *fiscal-year* seasonality are mismatched and can be differentiated. Otherwise, the calendar year and fiscal year seasonality is the same for firms with fiscal-year end in December, and the two incentives cannot be disentangled. This process generates 56,490 firm-month observations for 681 firms whose fiscal year end is not in December, and is 34.29% of the entire

sample.[26] This subsample is mainly composed of firms in the following industries: business equipment (36.09%), retail (29.65%), manufacturing, energy, and utilities (16.54%), healthcare, medical equipment, and drug (5.48%), and other (12.24%), based on the Fama-French five-industry classification.

Figure 2 shows the seasonality of advertising spending and quantity in the calendar year, which captures the commercial incentives for firms to advertise, as opposed to those in fiscal year, which captures the financial reporting incentives for firms to advertise shown in Figure 3. In Figure 2, I can see that *calendar-year* seasonality of advertising follows variation in the economy. The peak of advertising in November and December arises due to Black Friday, Thanksgiving, and Christmas, while the trough in July results from the summer holiday season. Advertising spending in both value and volume confirm this pattern, suggesting that advertising expenditures follow an unsystematic and non-repetitive pattern in a calendar year.

However, the *fiscal-year* seasonality shown in Figure 3 demonstrates a different pattern with more structural and persistent fixed trends by fiscal quarter over the fiscal year, and those trends are regular and repetitive, matching the fiscal quarter financial reporting cycle by quarter with peaks in the months when firms make SEC filings. For example, increases in advertising spending (quarterly spike) emerge around SEC filing months in the third fiscal month (most of the firms file their previous annual results in 10-K filings in the third fiscal month after the previous fiscal year end). Other quarterly spikes with increasing patterns emerge around SEC filing in the 4^{th}-5^{th}, 7^{th}-8^{th}, and 10^{th}-11^{th} fiscal months when 10-Q filings are submitted (most firms file Q1 quarterly results in 10-Q filings in the 4^{th} or 5^{th} fiscal month, their Q2 quarterly results in 10-Q filings in the 7^{th} or 8^{th} fiscal month, and their Q3 quarterly results in 10-Q filings in the 10^{th} or 11^{th} fiscal month) (see Figure 3). Apparently, this fiscal-year seasonality of advertising spending follows reporting and disclosure incentives other than the economic growth drivers shown in Figure 2. The largest contrast is the difference between the trough in July in the calendar year and the peak in the 7^{th} month in the fiscal year, as well as the difference between the peak in December in the calendar year and the trough in the 12^{th} month of the fiscal year. One plausible reason is due to a firm's disclosure and filing incentives, as the fiscal year seasonality of advertising spending corresponds with the accounting and financial reporting seasonality. This finding is consistent with Oyer (1998) as there are budgeting and financial reporting reasons for firms to determine their fiscal-year end.

[26] The rest of firms with December as fiscal year end account for 65.71% of the sample for 1,476 firms with 108,261 firm-month observations.

This finding suggests that fiscal-year seasonality peaks in advertising arise with disclosures, and firms consider financial reporting incentives when they time their advertising strategy.[27]

Typically, the firm's fiscal-year end decision is made by the firm, and may be correlated with other reasons than for accounting and financial reporting purposes. Although this can have potential endogeneity issues, my univariate results provide preliminary evidence of disclosure incentives for advertising expenditures.

5.2. Descriptive statistics

Table 2 provides the sample composition through time by fiscal year. It reveals that, on average, there are 1,442 Compustat sample firms in each year, with the number ranging from 1,390 in 1996 to 1,343 in 2005. Table 2 also shows that, on average, 46 industries out of Fama-French 48 industries are represented in the sample, with relatively stable fluctuation from 45 to 47 over the sample period.[28] The average number of firms in each industry ranges from 29.1 to 34.9 over years. The average of the yearly means is 31.4 firms per industry.

In Table 2, advertising frequency, monthly advertising spending and quantity, and number of media outlets, on average, increase over the sample period. On average, only 26.94% of the firm-month observations have advertising in 1996; however, this increases to 54.29% in 2005. Average monthly advertising spending more than doubles—from 0.5 million USD in 1996 to 1.1 million USD in 2005. A similar trend is found in the number of advertisements per month, with 271 advertisements in 1996 and 810.3 in 2005. Firms also advertise broadly through more media outlets, growing from 0.7 media outlet in 1996 to 1.6 in 2005.

Table 3 provides the descriptive statistics. On average, around half of the firms advertise each month (47.6% of firm-month observations include advertising expenditures). The average advertising spending per month is 803 thousand USD (0.2% of previous quarterly sales), which accounts for 480 advertisements. On average, 1.2 different media outlets are used by firms. The

[27] I run a falsification test in an out-of-sample of private firms and draw the seasonality of advertising spending and volume of private firms. I conduct this falsification test to compare listed firm seasonality to rule out the confounding effects in the seasonality of advertising, which in turn enables me to check whether commercial advertising incentives are different from financial reporting incentives. Private firms are not subject to listed firms' mandatory disclosure requirements (e.g., 10-Q and 10-K filings) and should not have the same advertising spending seasonality as the fiscal-year seasonality of listed Compustat firms. In untabulated results, the calendar-year seasonality in the sample of private firms reflects the unsystematic and non-repetitive pattern of economic seasonality and does not follow the regular and repetitive fiscal-year seasonality of listed Compustat firms. These results also confirm the validity of listed firms' calendar-year seasonality of advertising spending to reflect real economy. They provide further evidence that listed firms have reporting incentives to advertise when they have SEC filings.

[28] Due to the regulation on advertising for investment companies, the trading industry in the Fama-French 48 industries classification is excluded to rule out the effect of this specific regulation on advertising.

average monthly advertising amount in outlets with a broad target audience[29] is 621 thousand USD, which is equivalent of 306.2 advertisements per month.

For firms' disclosures statistics, 4.6% of firm-month observations have 10-K filings, in which 2.2% have good news, while 2.4% have bad news. In addition, 17.4% of firm-month observations have 10-Q filings, in which 8.1% report good news while 9.4% report bad news, which is consistent with around three times the frequency of 10-K filings. Approximately 17.8% of firm-month observations have 8-K filings, out of which 9.9% report good news while 10.5% report bad news.[30] Earnings announcements are the most frequent disclosures, which are 32.7% of all the firm-month observations (16.6% good news and 16% bad news). Management earnings forecast is the least frequent disclosure, where only 2.8% of firm-month observations include management earnings forecasts (1.2% good news and 1.6% bad news).

As shown in Table 3, the average quarterly sales is 420 million USD, the average quarterly market capitalization is 3.03 billion USD, the book-to-market ratio is 68.7%, and the book leverage is 18.2%. This is consistent with average Compustat firms. Firms are 13 years old on average, the average quarterly ROA is negative -0.3%, and 26.9% of firm-month observations incur loss with negative quarterly ROA. In each quarter, 3.5 analysts issue quarterly forecasts. The average institutional ownership is 28%. In terms of industry concentration, the normalized HHI index in sales is 0.132 on average, suggesting relatively competitive markets for each industry. The average normalized HHI index for advertising spending is 0.261, suggesting relatively competitive markets of advertising expenditure. In total, monthly industry advertising spending is 1.2 million USD. There are 721 advertisements on average in each industry, and average monthly industry advertising in media outlets with a broad target audience is 953 thousand USD and includes 506.1 advertisements.

Liquidity measures show that the bid-ask spread is on average 2.2 bps per month, monthly trading volume is 14.2% of the market capitalization, and trading shares are 13.6% of the total number of shares outstanding per month. These measures suggest that markets are relatively liquid. In addition, quarterly stock volatility is 0.038 and quarterly special items are -0.04% of the total assets.

Table 4 provides a correlation matrix for the main measures. The market liquidity measures are

[29] Media outlets with broad target audiences include cable TV, magazines, national newspapers, national spot radio, network radio, network TV, spot TV, and syndication.
[30] Firms can file more than one 8-K filing per month.

all correlated with the advertising measures in a beneficial manner, suggesting that advertising helps firms increase their liquidity, which is consistent with the findings of Grullon, Kanatas and Weston (2004). Specifically, the coefficients of *AD*, *Ln Total AD MUSD*, *Ln Total AD Unit*, and *Ln No. Media Outlets* are all negatively correlated with *Spread 100* and are significant at the 1% level. This suggests that advertising decisions, spending, quantity, and media outlets all help firms reduce information asymmetry, thereby reducing the bid-ask spread by around 20 bps per month. Moreover, the advertising measures are also positively correlated with *Trade Volume* and *Trade Share* and are significant at the 1% level, suggesting that advertising helps firms increase liquidity and transactions of their common stocks by about 4%.

Consistent with disclosure theory (e.g., Diamond and Verrecchia, 1991; Hail and Leuz, 2006), I find that disclosures are also correlated with liquidity in a beneficial manner. Specifically, the coefficients of *SEC 10-K*, *SEC 10-Q*, *SEC 8-K*, *EA*, and *MEF* are all negatively correlated with *Spread 100* and are significant at the 1% level, suggesting that disclosures help firms reduce information asymmetry, as well as the bid-ask spread. Regarding *Trade Volume* and *Trade Share*, except for *SEC 10-Q*, the coefficients of all other disclosures variables are positively correlated with *Trade Volume* and *Trade Share* and are significant at the 1% level, suggesting that disclosures help firms reduce information asymmetry, which helps to increase liquidity and the transactions of their common stocks.

With respect to firms' disclosures and advertising strategy, *SEC 10-K*, *SEC 10-Q*, *SEC 8-K*, and *EA* are all positively correlated with *AD*, suggesting that firms are more likely to advertise when they have 10-K, 10-Q, and 8-K filings and earnings announcements in the same month. Moreover, firms also advertise more and use more media outlets when they have those disclosures, but only increase advertising expenditures when they have 8-K filings. However, *MEF* is negatively correlated with all the advertising measures, suggesting that firms are less likely to advertise when they issue management earnings forecasts in the same month, and that they also spend and advertise less through fewer media outlets.

5.3. Advertising and firm disclosures

In Panel A of Table 5, I present the regression results that pertain to the effect of a firm's disclosures on its advertising expenditure. Columns (1) - (5) show the results for the five disclosure measures separately, and column (6) shows the results with all the disclosure measures in the same

model. The results in column (6) suggest that a firm will increase their monthly advertising spending by 6,219 (2,403) USD or 3% (1%) more if they file a 10-K (10-Q) in the same month (significant at the 1% level).

In Panel B of Table 5, I present the regression results that pertain to the effect of a firm's disclosures on its number of advertisements. The specifications are the same as those for Panel A. The results in column (6) suggest that a firm will increase its monthly advertising by 46.3 (10.4) advertisements or 10% (2%) more advertisements if they file a 10-K (10-Q) in the same month. Taken together, the results in Table 5 suggest that a firm's advertising expenditures are associated with its disclosures, especially for mandatory disclosures of 10-K and 10-Q filings.

In Panels A and B of Table 5, the signs of the explanatory variables are generally consistent with the literature. For instance, larger firms (*Ln Market Cap*) with higher sales (*Ln Sales*), lower growth opportunity (*Book-to-Market*), lower leverage (*Book Leverage*), worse firm performance (*ROA*), and higher analyst coverage (*Ln Analyst Following*) spend more on advertising and generate more advertisements. As opposed to young firms, mature firms (*Ln Firm Age*) spend less but generate more advertising in quantity. Firms with lower institutional ownership have higher advertising expenditures and produce more advertising, which is consistent with findings in Grullon, Kantas and Weston (2004) and Lou (2014) such that advertising is used by firms to attract unsophisticated and individual investors. Advertising within an industry also has an impact on a firm's advertising strategy. The more competitive the industry, the more firms will advertise.

The positive coefficients on the mandatory disclosures measures, *SEC 10-K* and *SEC 10-Q*, suggest that advertising complements a firm's mandatory disclosures. Overall, the findings provide supportive evidence for hypothesis H1a, where I posit that a firm's advertising is associated with its disclosures.

5.4. Cross-sectional tests

5.4.1. Good news vs. bad news

To test hypothesis H1b, where I posit that a firm's advertising is associated with its disclosures of good news of bad news, I measure news using the cumulative abnormal return (CAR)[31] over the three-day window around the disclosure date. There are at least three advantages to using short-

[31] CARs are calculated based on the market model (MM). The results are robust if the CAR is calculated as market-adjusted return (MAR).

window CARs as a measure for good and bad news. First, short-window event studies can be used to isolate the confounding effects of other events that occur at the same time. Second, in prior literature analyst forecasts consensus is used as a benchmark to measure good versus bad news. This measure depends on the fact that analysts provide forecasts for every period in question. Although not every firm has an analyst following and even if it has, it may not have analyst forecasts for every period. Third, in my study, if analyst forecast consensus is used as benchmark for measures of good and bad news, earnings announcements and 10-K or 10-Q filings for the same period would have the same analyst forecast consensus, and the news would be perfectly correlated among the earnings announcements and 10-K or 10-Q filings. Thus, the CARs are used as proxies for good or bad news and it measures this good or bad news specifically in the standalone SEC 10-K or 10-Q filings after the earnings announcements.

Table 6 shows the good vs. bad news results. The variables of interest, *SEC 10-K*, *SEC 10-Q*, *SEC 8-K*, *EA*, and *MEF*, are split into good news (*GN*) or bad news (*BN*). For example, *SEC 10-K GN* (*SEC 10-K BN*) is a binary variable equal to 1 if a firm submitted a 10-K filing containing good news (bad news) in the current month, and is 0 otherwise. Good news (Bad news) is measured by CARs over the three-day window around the filing date, equal to 1 if CAR is positive (negative) and 0 otherwise. Thus, this variable is equal to 0 if there is no filing in the current month or if there is bad news (good news) in the filing. All other variables for good or bad news in the disclosures are defined in the same way.

In Table 6, specifications vary across columns. Columns (1) and (5) show only good news measures, while columns (2) and (6) show only bad news measures. Columns (3) and (7) show the coefficients for good news (GN) and bad news (BN), respectively, for each disclosure measure; the variables of interest are the differences between the coefficients of good news (GN) and bad news (BN) for each disclosure variable. The coefficients in columns (4) and (8) are the results of good news (GN) measures for each disclosure conditional on having those disclosures. The coefficients in columns (1) and (5) show that advertising spending and quantity are positively associated with good news in 10-K and 10-Q filings, significant at the 1% level except for at 5% level for 10-Q good news measure in advertising quantity model in column (5). The difference between the coefficients of *SEC 10-K GN* and *SEC 10-K BN* in column (3) is also positive and statistically significant at the 5% level, suggesting that advertising spending is driven more by good

news than bad news in 10-K filings.[32] Similarly, advertising spending is also positively driven more by good news than bad news in 10-Q filings. The difference between the coefficients of *SEC 10-Q GN* and *SEC 10-Q BN* is significant at the 10% level in column (3) and the coefficient of *SEC 10-Q GN* is positive and significant at the 10% level in column (4).

Overall, the findings provide supportive evidence for hypothesis H1b, where I posit that a firm's advertising spending is associated with its disclosures of good news in its 10-K and 10-Q filings.

5.4.2. Individual investor ownership

Table 7 provides the cross-sectional regression results. Results in column (1) and (2) pertain to the effect of a firm's disclosures on its advertising spending and advertisements for firms with high individual investor ownership. The results show that the interaction term *Individual X SEC 10-Q* is positive and statistically significant at the 1% level in column (1), and significant at the 10% level in column (2). This suggests that firms with high individual investor ownership have higher advertising spending and more advertisements than those with low individual investor ownership in the month when they have SEC 10-Q filings as opposed to when they do not have 10-Q filings. Moreover, the results in column (2) also show that *Individual X SEC 8-K* is positive and significant at the 5% level, suggesting that firms with high individual investor ownership generate more advertisements in quantity than those with low individual investor ownership in the month when they have 8-K filings as opposed to no SEC 8-K filings. Finally, the results also show that *Individual X EA* is positive and significant at the 1% and 10% levels in columns (1) and (2), respectively, suggesting that firms with high individual investor ownership have higher advertising spending and generate more advertisements than those with low individual investor ownership in the month when they have earnings announcements as opposed to no earnings announcement.

Overall, the findings provide supportive evidence for hypothesis H2a, where I posit that the relation between a firm's advertising and disclosures is stronger for firms with high individual investor ownership when they have 10-Q and/or 8-K filings and earnings announcements.

[32] One may argue the endogeneity issue among disclosure variables in that if a firm encounters negative market reaction when they announce earnings, and then deliberately put more good news in the immediate SEC 10-K or 10-Q filings to attract positive market reaction after its SEC filings, then the interpretation of the results is spurious due to this manipulation in the SEC filing disclosed later. To rule out this concern, I checked the correlation between those variables in Table 4. For example, the correlation between EA GN and SEC 10-K GN is -0.0162 (significant at 1% level), which is negative and not highly correlated; while the correlation between EA BN and SEC 10-K GN is -0.0362 (significant at 1% level), which is also negative and not highly correlated. Both rule out the endogeneity issue with a firm's manipulation of news issuance in earnings announcement and SEC 10-K or 10-Q filings.

5.4.3. Retail industry

Columns (3) and (4) in Table 7 provide the regression results that pertain to the effect of a firm's disclosures on its advertising in the retail industry. The results in column (3) show that the interaction term *Retail X SEC 10-K* is positive and statistically significant at the 1% level, suggesting that firms in the retail industry have higher advertising expenditures than firms in other industries in the month when they have 10-K filings as opposed to when they do not have 10-K filings. Furthermore, the results in columns (3) and (4) show that *Retail X SEC 10-Q* is positive and significant at the 1% level, suggesting that firms in the retail industry have higher advertising expenditure and generate more advertising in quantity than firms in other industries in the month when they have 10-Q filings as opposed to when they do not. Moreover, the results also show that *Retail X SEC 8-K* is positive and significant at the 1% level in column (3) and the 5% level in column (4), suggesting that firms in the retail industry have higher advertising expenditures and generate more advertisements than firms in other industries in the month when they have 8-K filings as opposed to when they do not.

Overall, the findings provide supportive evidence for hypothesis H2b, where I posit that the relation between a firm's advertising and disclosures is stronger for firms in the retail industry when they have 10-K, 10-Q, and 8-K filings.

5.4.4. Young firms

Columns (5) and (6) in Table 7 provide the regression results that pertain to the effect of a young firm's disclosures on its advertising expenditures and number of advertisements. The results in column (5) show that the interaction term *Young X SEC 10-K* is positive and statistically significant at the 5% level, suggesting that young firms are more likely than other firms to advertise in the month when they have SEC 10-K filings as opposed to when they do not. In addition, *Young X SEC 8-K* is positive (negative) and significant at 1% (10%) level in column 5 (6), suggesting that young firms have higher advertising spending per advertisements (or higher total advertising spending, but few advertisements) than other firms in the month when they have 8-K filings as opposed to when they do not. Moreover, the results also show that *Young X EA* is negative and significant at the 5% level in column (5), suggesting that young firms have lower advertising spending than other firms in the month when they have earnings announcements as opposed to when they do not. Finally, the results in column (5) also suggest that young firms have higher

advertising spending, significant at the 1% level, than other firms in the month when they have management earnings forecasts as opposed to when they do not.

Overall, the findings provide supportive evidence for hypothesis H2c, where I posit that the relation between a firm's advertising and disclosures is stronger for young firms when they have 10-K and/or 8-K filings and management earnings forecasts.

5.4.5. Media outlets

In Table 8, I present the regression results that pertain to the effect of a firm's disclosures on its advertising in different media outlets – with broad vs specific target audiences and business-to-consumer (B-to-C) vs. business-to-business (B-to-B) media outlets. Media outlets with broad target audience include cable TV, magazines, national newspaper, national spot radio, network radio, network TV, spot TV and syndication. Those are media outlets and advertising outlets with reach to a broad target audience in the US in the sample period, as opposed to the remaining media outlets that only have specific or local focus. Business-to-consumer (B-to-C) media outlets include all the media outlets except for business-to-business (B-to-B). Business-to-business advertising in Ad$pender reports occurrence and expenditure data for over 650 business-to-business publications. SRDS category of Business-to-Business covers mostly industry expertise reading materials and magazine, whose audience are only industry experts, analysts, corporate stakeholders and institutional investors among others.[33] The classification of audience breadth for each media outlet is based on the methodology described in the Ad$pender dataset. See Appendix A2 for more detail on the data collection methodology.

Similar to the research design for the main test in model 1, I use two distinct measures for monthly advertising spending and number of advertisements for the different media outlets. Thus, I have eight measures: *Ln Broad AD MUSD* and *Ln Broad AD Unit* versus *Ln Specific AD MUSD* and *Ln Specific AD Unit* on the one hand, and *Ln B-to-C MUSD* and *Ln B-to-C Unit* versus *Ln B-to-B MUSD* and *Ln B-to-B Unit* on the other.

In Table 8, the results in columns (1) and (2) are all stronger than those for the main tests shown column (6) in Panel A and B of Table 5, suggesting that firms spend more and generate more advertisements in media outlets with a broad target audience when they have 10-K and 10-Q filings. The results in columns (3) and (4) suggest that firms choose media outlets with narrow and specific

[33] http://www.srds.com/frontMatter/portal/directmarketing/classifications.html

target audiences when they have 8-K filings. The results in columns (5) - (8) suggest that firms spend more and generate more advertisements in business-to-consumer media outlets when they have 10-K and 10-Q filings, and reduce spending in business-to-business outlets. These results also suggest that firms use advertising to attract individual investors, not institutional investors, because business-to-business advertising is directed toward professional agents (e.g., suppliers, professional customers, and institutional investors, etc.) and they have less-limited attention to firm's disclosures through other information channels.

Taken together, the results in Table 8 are consistent with H2d in that the relation between a firm's advertising and disclosures is stronger in media outlets with broad target audience base and in Business-to-Consumer media outlets, especially when firms have SEC 10-K and 10-Q filings.

5.5. Event study of SEC acceleration filing

The results of a univariate comparison in Table 9 Panel A confirm that treatment and control group firms are on average not significantly different from each other for most of the variables. This evidence further validates the validity of the Diff-in-Diff analysis and the exogenous shock, suggesting that there is no major endogeneity issue associated with firm size between the two groups.

Table 9 Panel B provides the multivariate results of the Diff-in-Diff and parallel trend analyses. The dependent variable is *Ln Total AD MUSD* in the regression for the results in columns (1) - (4) and *Ln Total AD Unit* in the regression for the results in columns (5) - (8). Columns (1), (3), (5), and (7) show the results of the basic Diff-in-Diff analysis, and columns (2), (4), (6), and (8) show the results of the parallel trend analysis. An additional control variable *SEC 10-K GN* is added to the regression for columns (3), (4), (7), and (8) to rule out any endogeneity issue that may be associated with 10-K filings containing good news as opposed to bad news.

The results of the Diff-in-Diff analysis in columns (1) and (3) show that the coefficients of the interaction term *Treat X Post* are negative and significant at the 5% level, suggesting that advertising expenditures timing shifts after the implementation of the acceleration filing regulation.[34]

Moreover, parallel trend results in columns (2) and (4) in Table 9 Panel B show that the coefficients of *Treat X Pre FY1* in the pre-period are not significant in both specifications, while

[34] Results are also robust if year-quarter fixed effect is replaced by year-month fixed effects in the regression.

coefficients of *Treat X Post FY1* and *Treat X Post FY2* in the post-period are negative and significant at the 5% level. These findings suggest that the exogenous shock is not effective before the acceleration regulation, and is only effective in the first year after firm's first adoption and lasts for at least two years. The parallel trend results rule out unobserved confounding effects that may occur during the same period (e.g., SOX). Untabulated non-significant results for the falsification test further confirm the validity of the Diff-in-Diff results. However, I do not find significant results for the number of advertisements, partially due to the measurement errors embedded in Ad$pender for the number of units for all the radio outlets. For all the radio outlets, Ad$pender only provides the dollar amount of advertising expenditures, not the number of advertisements for the outlets.

The Diff-in-Diff results confirm the relation between mandatory disclosures and advertising expenditures in timing, and provide additional evidence of causal inference of mandatory disclosure on advertising expenditures. Thus, both help rule out unobserved endogeneity issues that are associated with mandatory disclosures and advertising. However, the causal inference of voluntary disclosure on advertising is not the focus of this study, as it is challenging to solve the endogeneity issue associated with voluntary disclosure and advertising, which both have voluntary features and can be jointly determined by firms.

5.6. Advertising and disclosure decisions with respect to liquidity

In this subsection, I further investigate the relation between disclosure and advertising with respect to market liquidity using bid-ask spread, trading volume, and trading shares as measures of liquidity. The results in Table 10 show that advertising and disclosure can each increase liquidity by reducing the bid-ask spread; disclosures can also increase trading volume and trading shares. In column (2), the coefficients of the interaction terms *SEC 10-K X AD*, *SEC 10-Q X AD*, *SEC 8-K X AD*, and *MEF X AD* are positive and significant at the 1% level, suggesting that firms with high information asymmetry and lower liquidity advertise more when they have disclosures. When I examine trading volume and trading shares as measures of liquidity, the results in columns (4) and (6) also suggest that firms with high information asymmetry and lower liquidity advertise more when they have disclosures.

5.7. Robustness tests

I also run robustness tests for the main measures and specifications. The results remain largely

unchanged if I use advertising spending scaled by sales. The results are still robust if I measure good news and bad news based on market-adjusted return instead of the market model. The results also hold if I change the high individual investor ownership cut-off at the quintile, tier or half.

Furthermore, firms may also use advertising to attract both institutional and individual investors, and not only individual investors. I regress change of institutional ownership by quarter on quarterly advertising expenditures and find that the coefficient is negative and significant, suggesting that advertising expenditures are associated with a decrease in institutional ownership (or increase of individual investor ownership). This finding suggests that advertising attracts more individual investors than institutional investors. In this connection, I also exclude the advertising through professional investment information channels, for example, *The Wall Street Journal*, to alleviate the confounding mechanism that firms make advertisements specifically about the financial information and disclosures themselves. The results are still robust.

Moreover, examining monthly advertising data is not necessarily sufficient to adequately measure the impact of disclosure on advertising spending. There might be a delay between disclosures and advertising campaigns, and disclosures can happen very early or very late in the month. To check whether my results still hold with respect to the disclosure timing in the month, I extend the measuring window of advertising to a rolling three-month window around the month in question (i.e., previous month, current month, or following month). The results do not change qualitatively, and the findings are still robust.

Finally, due to the lack of data about firms' use of social media (i.e., Twitter, Facebook or LinkedIn) to disclose and disseminate information, which may have confounding effects on the relation between advertising and disclosures, I end the sample period at the end of 2005, the last year before the inception of Twitter and Facebook (Blankespoor, Miller, and White, 2014). In addition, I run an out-of-sample test for the 2006-2015 period and present the results in Table 11. In columns (1) and (2), I use the same specifications as for column (6) in Panel A and B of Table 5. However, for columns (3) and (4), I change the specifications due to the presence of the social media. I use advertising on the Internet as a loose proxy for the use of social media. The mechanism is that firms' use of social media could be highly correlated with their advertising expenditures spent on the Internet. Thus, I subtract advertising on the Internet from both dependent variables and add the corresponding control variables of advertising on the Internet to account for the effect of use of social media. The results in columns (1) and (2) show that in the 2006-2015 period, the

relation between advertising and all the disclosures become weaker except for 10-Q filings compared to the main results in Table 5, suggesting that firms' use of social media has a substitutive impact to compensate the use of advertising when they have disclosures. The results in columns (3) and (4) also confirm that social media has an impact as firms often use Twitter to announce their disclosures.

Due to the limitations of the dataset, I address the caveats of the study as follows. First, the Ad$pender dataset provides information on advertising spending and quantity through different channels, but I cannot identify whether the advertisements are for new products or existing products, which may have different impacts on the investment market. However, I attempt to mitigate this issue by testing how young firms (which typically launch new products than existing products that public has already known) advertise as opposed to other firms in a cross-sectional test. Second, there are also other channels that firms may use for disclosures (e.g., press releases) or other corporate events (e.g., M&A, SEO, new debt or equity issuance, [Chemmanur and Yan, 2009]) happening at the same time around disclosures and advertising. Although those channels or events are hard to measure, 8-K filings in those cases can be considered as a control variable for those channels and corporate events, because firms are required to submit 8-K filings immediately after they occur.

6. Conclusion

Using a large sample of monthly data, I examine whether U.S. firms use advertising to complement or substitute their disclosures and investigate their joint decision with respect to market liquidity. I find that firms use advertising to complement mandatory disclosures of 10-K and 10-Q filings, and that they have higher advertising expenditures when those filings contain good news. In addition, the relation between disclosure and advertising is stronger for firms with higher individual investor ownership, for firms in the retail industry, and for young firms. Moreover, firms advertise more through media outlets with broad target audiences and through business-to-consumer media than outlets with narrow target audiences and business-to-business outlets when firms submit 10-K and 10-Q filings.

Furthermore, using the SEC acceleration filing rule as an exogenous shock to the timing of firms' mandatory disclosure in a Diff-in-Diff analysis, I find that advertising expenditures co-moves with the change in timing of the 10-K filing. Parallel trend analysis and falsification test

results further validate this causal inference that firms' mandatory disclosures *cause* the timing of firms' advertising investment. Finally, advertising and disclosure each provide benefits to firms, as firms with high information asymmetry and low market liquidity advertise more when they have disclosures.

My paper provides new evidence on the real effects of disclosure on firms' advertising investment and contributes to the economics of advertising literature through exploring novel dataset. Future study can extend this line of literature to accurately examine the change in visibility of firms after using advertising, and its implications on investor attention. Those are all theoretically important and practically useful questions, but novel datasets and/or unique settings are needed to answer these empirically challenging questions, as visibility and investor attention are highly endogenous and difficult to disentangle.

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Appendix
A1. Advertising in Magazines

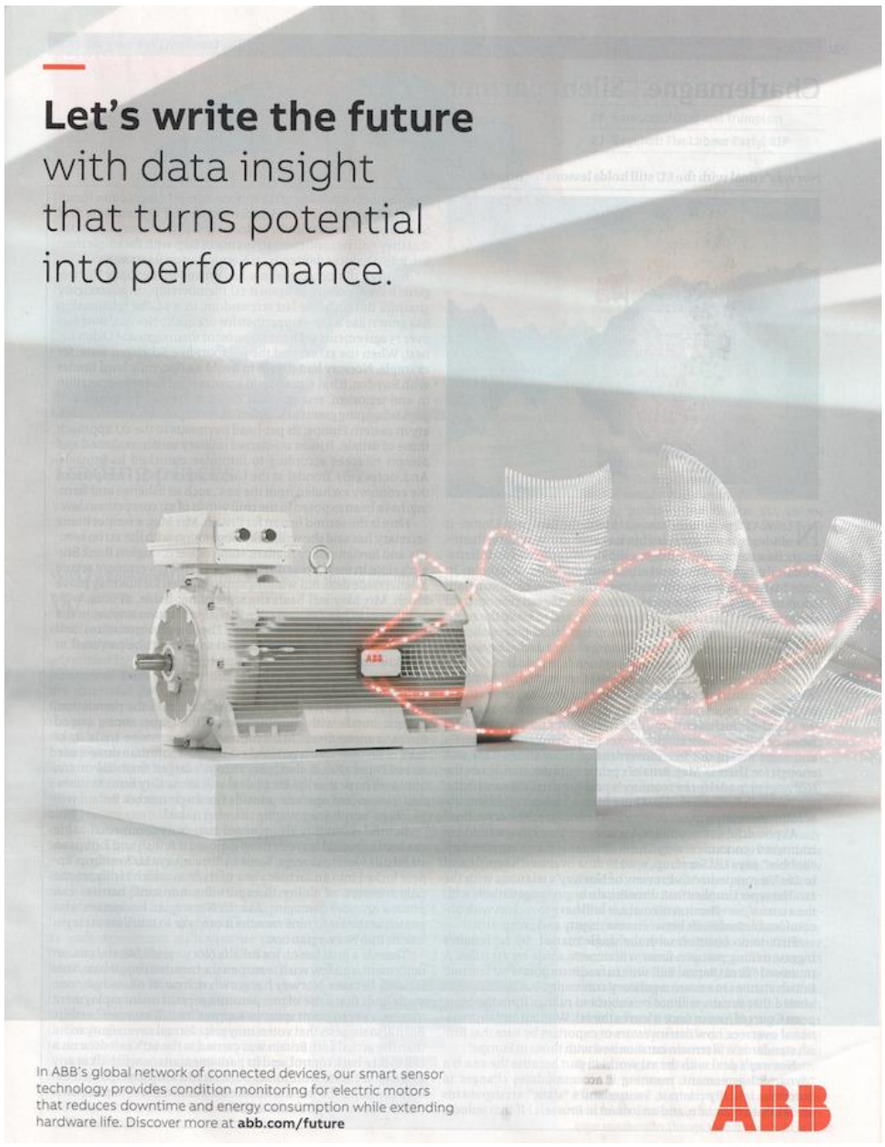


ABB Ltd.'s full-page advertising promoting its "future technology"
Source: *The Economist*. February 4-10, 2017

On February 8, 2017, ABB Ltd. submitted a 6-K filing to the SEC about its business growth and growing orders in 2016:Q4. In the same filing, it also provided 2016:Q4 financial information and its full year 2016 highlights. During the same week, ABB Ltd. issued a full-page advertisement promoting its "future technology" in the February 4-10, 2017 issue of The Economist. This anecdotal evidence suggests that firms advertise more around their disclosure dates, consistent with advertising complementing firms' disclosures.

A2. Excerpt of Methodology Applied in Ad$pender[35]

Cable Television
The Cable Television Network Service provides commercial occurrences and expenditure information for 99 cable television networks. Cable Television is monitored via satellite 24 hours a day, 365 days a year.

Rates Sources
A combination of cable networks and agencies supply preliminary daypart and/or program rates. Each monitored cable network is contacted to solicit rate card information. Cable network submissions vary from monthly submissions to quarterly, yearly or none. Currently several cable networks do not supply Kantar Media with rate card information. For these networks, agency submissions are used.

Each month, networks are contacted for actual revenue totals. Revenue totals for networks that do not supply these data are estimated.

Consumer Magazines
Kantar Media measures and compiles all paid advertising space and expenditure data for Publishers Information Bureau, Inc. Publications measured must be members of PIB, and currently number 350+ consumer magazines. Throughout the years, certain magazines are added and deleted from the service. The full list is can be found by selecting Consumer Magazines within the Media Set step and visiting the Properties tab.
House ads, contributed space and public service advertising are not credited in the service.

Units:
In Ad$pender, units equal the number of ad insertions, which may include multiple regional and demographic editions.

Rates:
All full run revenues reported are based on current onetime open rates, excluding commissions, frequency, volume, remnant, spreads, category or multiple page discounts. No premiums are allowable, with the exception of bleed, color or cover premiums where applicable. Gross onetime rates are used to compute revenues for demographic editions; regional rates are supplied by publishers. Each member publication is required to supply a current rate card and marked issues of national editions. Marked issues give detailed information about each advertisement. Tear sheets of all ads appearing in regional/demographic editions must also be submitted. All new members are required to provide prior year issues of their publications for measurement.

Not-Itemized Advertising:
Advertising in less than full run or sectional editions (regional, state, metro, demographic) with less than 5% of the publication's total circulation.
Advertising in directories including Schools & Camps, Financial, Kennels, Game Breeders, WheretoGo, Real Estate, Restaurants, Hotels & Resorts, Postage Stamps & Coins, Business Propositions, etc.
Classified advertising (sold at the word rate).
Magazine buying networks (e.g., Media Networks, Inc., Women's Marketing, Inc.) advertising.
Magazine data are fitted into Broadcast week timetables. If a publication is weekly, the data reside in the corresponding broadcast week. If the publication is monthly, then the data reside in the first broadcast week of the month. Any change to the Magazine database is reflected in Stradegy. If a magazine is deleted from the service, the prior years of data remain in the database. Magazine title changes will be made retroactively.
Custom-monitored Magazine Newsstand data are not included in Ad$pender.
Full-year 2004, and January through April 2005 PIB revenue and page numbers reflect a slight adjustment to PIB reporting guidelines, which impacts how PIB reports magazine buying networks data. For more information, please contact your Kantar representative.

National Newspapers
Kantar Media measures three National Newspapers: New York Times, USA Today and Wall Street Journal. All national and regional editions are measured.
Data for the Wall Street Journal and USA Today are measured within Kantar's Magazine Service. Refer to the magazine tab for data collection and rates methodology. Data for the New York Times are measured In Kantar's Newspaper Service. Refer to the newspaper tab for data collection and rates methodology. Because these services use different methodologies, advertising occurrence and expenditure information for these publications may be reported differently within each service.
Please note: Category B999 is exclusive to Wall Street Journal and includes all brands that ran 50 lines or less, too small to be classified elsewhere. All such brands are identified with "(W)" after the brand name.

National Spot Radio
Kantar Media's National Spot Radio Service provides nationally placed spot radio data for approximately 4,000 stations in more than 225 markets.
Reported expenditures are based on audited billings from contract information provided by major national station representative organizations.
Summarized monthly expenditure information is collected by market, and is classified according to parent, brand and category. Radio data are mapped to the 210 monitored TV markets, and to the All Other designation when appearing outside these markets. Monthly expenditures are pro-rated across broadcast calendar weeks, according to the number of days in each week that fall within the standard calendar month.

[35] For a complete view of the methodology applied in all the media outlets, see the Kantar Media Ad$pender methodology help manual for full detail.

The National Spot Radio Service and the Local Radio Historical Service each provide market-level brand expenditures, but no station occurrence detail. The Local Radio Service reports station-level occurrences and dollars for advertised brands.
Some advertising expenditures contained within the National Spot Radio Service are also reported in the Local Radio or Local Radio Historical media. The overlap occurs because the same advertising spot may be reported twice, once by the local station and once by the station's national sales rep. The magnitude of the overlap is not known by Kantar Media because the National Spot Radio expenditure information is provided at the market-level, not the station-level.

Network Radio
Kantar Media currently receives data from the following radio network companies:

- American Urban
- Cumulus Media
- Dial Global
- Premiere Networks
- Radio Disney

Each company supplies monthly ad expenditures by brand/product. Kantar Media maps each brand/product record to a corresponding entry in our master Brand Central database and then applies the provided expenditures. Network promotions and public service announcements are excluded from reporting.
Radio formats used RADAR, Sports, Short Form, and Long Form programming

Network Television
The Network Television Service provides commercial occurrence and expenditure information for seven broadcast networks:
ABC effective January 1981
CBS effective January 1981
FOX effective January 1993
NBC effective January 1981
PAX/i effective September 1998 Discontinued December 2005
MNTV effective September 2006 Discontinued December 2010
CW effective September 2006
This service continuously monitors the East Coast satellite feeds of these seven networks. Kantar Media relies on networks to supply information on regional advertising. The networks provide the regional positions, the advertisers sharing each position and each advertiser's percent share of the buy. The information provided by the networks does not specify the particular regions covered by each share. Through the application, this activity can be shown separately by choosing the option in the sorts section.
The networks do not supply information on sectional advertising, neither does the Kantar report.

Rates Sources
The rates used to estimate advertising expenditures are supplied primarily by the networks. Kantar may also use information from other sources such as agencies and advertisers to determine the program rate. Kantar Media maintains the confidentiality of the rates information received and their respective sources.

Rate Determination Process
The networks send Kantar average 30second program rates by program title on a monthly basis after the completion of the monitored month. Once this information is received, rates specialists check it for consistency, completeness and special episode titling. Any discrepancies are resolved with the respective networks prior to publication.

Regional Buys
Network provided percentages for each advertiser are applied to the program rate to estimate dollars for regional advertising.

Specials
Kantar Media normally applies a single rate to all commercials airing in a program during a given month. However, occasionally a network will dictate special rates for certain programs or spots within a program. Kantar will apply specific rates to occurrences as directed by the networks, however, will not apply different rates for occurrences within the same commercial pod.

Spot Length Conversions
Estimated advertising expenditures are assigned to every commercial based on the average 30second rate for the program. When the commercial is longer or shorter than 30 seconds, the reported dollars are automatically converted in proportion to the number of seconds in the spot.

Business to Business
Magazines Kantar Media reports occurrence and expenditure data for over 650 Business-to-Business publications. The publications are obtained via paid or complimentary subscription. Advertiser and brand expenditures as well as pages are reported by publication on a monthly basis.
The data collection consists of 650+ magazines from a wide range of SRDS categories. The data is collected and account names are assigned using Brand Central Kantar Media's classification system. The rates are obtained from either the publication or those published in SRDS. The rates are based upon the onetime open line rate for full page black & white. Premiums are added for location and coloration. Edition, Issue Date, Ad Type, Size, Page Number, and Color are captured by Kantar Media but are not broken out within the application.

Internet (available only after 01/01/2001)
Kantar's Internet Service (Evaliant, a division of Kantar Media) provides company, brand, and web site expenditure information within Ad$pender for over 4500 sites, including AOL proprietary, and 90,000 brands in the United States and Canada
The proprietary Kantar spider probes the sites on an ongoing basis and was designed to handle large amounts of data in a timely manner - allowing "next day" access to new activity. The "anonymous spider" makes an initial pass of each page to deal with issues of non-standard characters, non-standard HTML code, missing tags and other syntax related errors which might cause the spider to fail to recover potential advertisements from the pages. The spider then analyzes the remaining HTML code for advertising images. The virtual spider automatically detects changes in URL's and dynamically tracks them as they change - without manual intervention - to avoid gaps and delays in data retrieval.
Every image on the page is captured and stored. Each image is compared against a list of previously detected ads and non-ads. If there is a match on a previously identified ad, the date, time, and page where the image was detected are added to the ad units database. Also, a copy of the page is saved so it is possible to view an ad later in the context within which it was displayed to site visitors. If there is a match on a non-ad, the image is set aside.

Ad Sizes and Types
The Kantar spider captures banners and buttons of all sizes and shapes and some rich media types.

Data Processing
All non-identified images are passed to Kantar Media's Data Operations team for processing and classification. The data administrative system provides "intelligent" guesses to suggest possible brand matches for the ad. The analyst then confirms or corrects the guess by making the determination if the new image is a) for an existing brand and advertiser, b) for a new brand for an existing advertiser or c) for an entirely new advertiser. The analyst also classifies the brand into the appropriate industry, sector and product/service.

Kantar's spider processes millions of images each month. Automated processing accounts for more than 98% of the images retrieved. The remaining advertising creatives are processed manually by Data Operations.

Brand Classification
Kantar Media's Internet Service utilizes the Kantar Product Classification and Account Naming Conventions.

Rates Sources
Rate cards are provided by the sites and are updated on a periodic basis. If a site refuses to supply a rate card, the site category average CPM rate is used.

Rate Determination Process
Estimated advertising expenditures are assigned to every ad unit. Revenue estimates are based on relative site size, ad activity and individual site CPM averages to level the influence of frequency, targeted placement, or volume discounts. In order to reflect estimated "actual," not straight rate card expenditure, Kantar applies factors to the average rate card CPM's, driven by client input, industry trends and public domain documents.

House Advertising
Sites may run self-promotional or "house" advertising, for which they book no revenue. This advertising is not included in the default expenditure estimates.

A3. Variable Definitions and Data Sources

Variables	Definition	Data Source
Advertising Variables		
AD	Binary variable equal to 1 if a firm has advertising in the current month, and 0 otherwise.	Ad$pender
Total AD MUSD	Advertising expenditure of a firm spent in the current month, the amount is in millions USD.	Ad$pender
Ln Total AD MUSD	Natural logarithm of 1 plus *Total AD MUSD*.	Ad$pender
Total AD Unit	Number of advertisements made by a firm in the current month.	Ad$pender
Ln Total AD Unit	Natural logarithm of 1 plus *Total AD Unit*.	Ad$pender
No. Media Outlets	Number of media outlets through which a firm advertises in the current month.	Ad$pender
Ln No. Media Outlets	Natural logarithm of 1 plus *No. Media Outlets*.	Ad$pender
Broad AD MUSD	Advertising expenditures of a firm in all the media outlets with a broad target audience in the current month. The amount is in millions USD. These outlets include cable TV, magazines, national newspapers, national spot radio, network radio, network TV, spot TV, and syndication.	Ad$pender
Ln Broad AD MUSD	Natural logarithm of 1 plus *Broad AD MUSD*.	Ad$pender
Broad AD Unit	Number of advertisements by a firm in all the media outlets with a broad target audience in the current month. Media outlets with broad target audience include cable TV, magazines, national newspaper, national spot radio, network radio, network TV, spot TV, and syndication.	Ad$pender
Ln Broad AD Unit	Natural logarithm of 1 plus *Broad AD Unit*.	Ad$pender
Specific AD MUSD	Advertising expenditures of a firm in all the media outlets with a narrow target audience in the current month. The amount is in millions USD. These outlets include business-to-business, Internet display, local newspapers, outdoor, and Sunday magazines.	Ad$pender
Ln Specific AD MUSD	Natural logarithm of 1 plus *Specific AD MUSD.*	Ad$pender
Specific AD Unit	Number of advertisements made by a firm in all the media outlets with a narrow target audience in the current month. These outlets include business-to-business, Internet display, local newspapers, outdoor, and Sunday magazines.	Ad$pender
Ln Specific AD Unit	Natural logarithm of 1 plus *Specific AD Unit.*	Ad$pender
B-to-C MUSD	Advertising expenditures of a firm through business-to-consumer media outlets in the current month. The amount is in millions USD. These outlets include cable TV, magazines, national newspapers, national spot radio, network radio, network TV, spot TV, syndication, local newspapers, outdoor, Internet display, and Sunday magazines.	Ad$pender
Ln B-to-C MUSD	Natural logarithm of 1 plus *B-to-C MUSD*.	Ad$pender
B-to-C Unit	Number of advertisements made by a firm through business-to-consumer media outlets in the current month. These outlets include cable TV, magazines, national newspapers, national spot radio, network radio, network TV, spot TV, syndication, local newspapers, outdoor, Internet display, and Sunday magazines.	Ad$pender
Ln B-to-C Unit	Natural logarithm of 1 plus *B-to-C Unit*.	Ad$pender
B-to-B MUSD	Advertising expenditures of a firm in business-to-business media outlets in the current month. The amount is in millions USD.	Ad$pender
Ln B-to-B MUSD	Natural logarithm of 1 plus *B-to-B MUSD*.	Ad$pender
B-to-B Unit	Number of advertisements made by a firm through business-to-business media outlets in the current month.	Ad$pender
Ln B-to-B Unit	Natural logarithm of 1 plus *B-to-B Unit*.	Ad$pender
Disclosure Variables		
SEC 10-K	Binary variable equal to 1 if a firm submitted a 10-K filing in the current month, and 0 otherwise.	WRDS SEC Filings Index
SEC 10-K GN	Binary variable equal to 1 if a firm submitted a 10-K filing in the current month and this filing contains good news, and 0 otherwise. Good news is measured by CARs over the 3-day window around the	Eventus

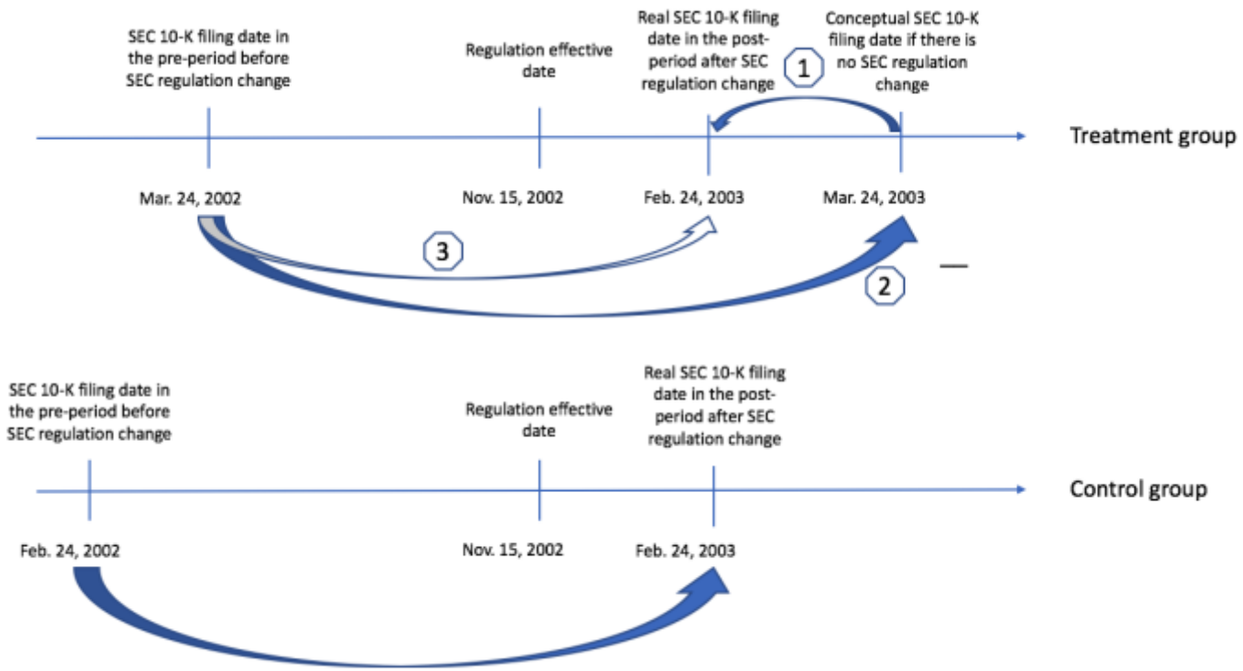
Variables	Definition	Data Source
	filing date, equal to 1 if positive and 0 otherwise. This variable is equal to 0 if there is no filing in the current month.	
SEC 10-K BN	Binary variable equal to 1 if a firm has submitted a 10-K filing to SEC in the current month and this filing represents bad news, and 0 otherwise. Bad news is measured by CARs over the 3-day window around the filing date, equal to 1 if negative and 0 otherwise. This variable equal to 0 if there is no filing in the current month .	Eventus
SEC 10-Q	Binary variable equal to 1 if a firm has submitted a 10-Q filing to SEC in the current month, and 0 otherwise.	WRDS SEC Filings Index
SEC 10-Q GN	Binary variable equal to 1 if a firm has submitted a 10-Q filing to SEC in the current month and this filing represents good news, and 0 otherwise. Good news is measured by CARs over the 3-day window around the filing date, equal to 1 if positive and 0 otherwise. This variable equal to 0 if there is no filing in the current month.	Eventus
SEC 10-Q BN	Binary variable equal to 1 if a firm has submitted a 10-Q filing to SEC in the current month and this filing represents bad news, and 0 otherwise. Bad news is measured by CARs over the 3-day window around the filing date, equal to 1 if negative and 0 otherwise. This variable equal to 0 if there is no filing in the current month.	Eventus
SEC 8-K	Binary variable equal to 1 if a firm has submitted an 8-K filing to SEC in the current month, and 0 otherwise.	WRDS SEC Filings Index
SEC 8-K GN	Binary variable equal to 1 if a firm has submitted an 8-K filing to SEC in the current month and this filing represents good news, and 0 otherwise. Good news is measured by CARs over the 3-day window around the filing date, equal to 1 if positive and 0 otherwise. This variable equal to 0 if there is no filing in the current month.	Eventus
SEC 8-K BN	Binary variable equal to 1 if a firm has submitted an 8-K filing to SEC in the current month and this filing represents bad news, and 0 otherwise. Bad news is measured by CARs over the 3-day window around the filing date, equal to 1 if negative and 0 otherwise. This variable equal to 0 if there is no filing in the current month.	Eventus
EA	Binary variable equal to 1 if a firm has earnings announcement in the current month, and 0 otherwise.	Compustat Fundamentals Quarterly
EA GN	Binary variable equal to 1 if a firm has earnings announcement in the current month and this earnings announcement represents good news, and 0 otherwise. Good news is measured by CARs over the 3-day window around the announcement date, equal to 1 if positive and 0 otherwise. This variable equal to 0 if there is no announcement in the current month.	Eventus
EA BN	Binary variable equal to 1 if a firm has earnings announcement in the current month and this earnings announcement represents bad news, and 0 otherwise. Bad news is measured by CARs over the 3-day window around the announcement date, equal to 1 if negative and 0 otherwise. This variable equal to 0 if there is no announcement in the current month.	Eventus
MEF	Binary variable equal to 1 if a firm has released management earnings forecast in the current month, and 0 otherwise.	I/B/E/S
MEF GN	Binary variable equal to 1 if a firm has released management earnings forecast in the current month and this release represents good news, and 0 otherwise. Good news is measured by CARs over the 3-day window around the release date, equal to 1 if positive and 0 otherwise. This variable equal to 0 if there is no release in the current month.	Eventus
MEF BN	Binary variable equal to 1 if a firm has released management earnings forecast in the current month and this release represents bad news, and 0 otherwise. Bad news is measured by CARs over the 3-day window around the release date, equal to 1 if negative and 0 otherwise. This variable equal to 0 if there is no release in the current month.	Eventus
Firm-Level Control Variables		
Sales	Quarterly sales of a firm in the lagged fiscal quarter, the value is in millions USD.	Compustat Fundamentals Quarterly

Variables	Definition	Data Source
Ln Sales	Natural logarithm of 1 plus *Sales*.	Compustat Fundamentals Quarterly
Market Cap	Market value of equity at the lagged fiscal quarter end, the value is in millions USD.	Compustat Fundamentals Quarterly
Ln Market Cap	Natural logarithm of 1 plus *Market Cap*.	Compustat Fundamentals Quarterly
Book-to-Market	Book value of equity divided by the market value of equity at the lagged fiscal quarter end.	Compustat Fundamentals Quarterly
Book Leverage	Book value of total debt divided by the book value of total assets at the lagged fiscal quarter end.	Compustat Fundamentals Quarterly
Firm Age	Number of years since a firm's initial coverage in CRSP.	CRSP
Ln Firm Age	Natural logarithm of 1 plus *Firm Age*.	CRSP
ROA	Net income of the lagged fiscal quarter divided by the total assets at the lagged fiscal quarter end.	Compustat Fundamentals Quarterly
Loss	Binary variable equal to 1 if net income of the lagged fiscal quarter is negative and 0 otherwise.	Compustat Fundamentals Quarterly
Analyst Following	Number of analysts issuing a forecast in the most recent consensus date up to one quarter (90 days) prior to the lagged fiscal quarter end as captured by I/B/E/S.	I/B/E/S
Ln Analyst Following	Natural logarithm of 1 plus *Analyst Following*.	I/B/E/S
Institutional Ownership	Average percentage of institutional ownership over the lagged fiscal quarter.	Thomson Reuters
Suspect	Binary variable equal to 1 if a firm's ROA of the current fiscal quarter is greater than 0 and less than 0.125%, and 0 otherwise.	Compustat Fundamentals Quarterly
Suspect X Month3	Binary variable equal to 1 if a firm's ROA of the current fiscal quarter is greater than 0 and less than 0.125% AND the current month is the third month of the current fiscal quarter, and 0 otherwise.	Compustat Fundamentals Quarterly
Industry-Level Control Variables		
Industry Sales Normalized HHI	Normalized Herfindahl–Hirschman Index for quarterly sales in the lagged fiscal quarter within each industry defined by Fama-French 48 industries classification. A higher value of normalized HHI indicates less competition in sales within each industry.	Compustat Fundamentals Quarterly
Industry Total AD Normalized HHI	Normalized Herfindahl–Hirschman Index for quarterly advertising expenditure in the lagged fiscal quarter within each industry defined by Fama-French 48 industries classification. A higher value of normalized HHI indicates less competition in advertising expenditure within each industry.	Ad$pender
Industry Total AD MUSD	Average total advertising expenditure in each industry excluding the firm in question in the current month. Industry is defined by Fama-French 48 industries classification. This value is in millions USD.	Ad$pender
Ln Industry Total AD MUSD	Natural logarithm of 1 plus *Industry Total AD MUSD*.	Ad$pender
Industry Total AD Unit	Number of units of advertising in each industry excluding the firm in question in the current month. Industry is defined by Fama-French 48 industries classification.	Ad$pender
Ln Industry Total AD Unit	Natural logarithm of 1 plus *Industry Total AD Unit*.	Ad$pender
Industry Broad AD MUSD	Advertising expenditure spent in all the media outlets with broad target audience in each industry excluding the firm in question in the current month, the amount is in millions USD. Media outlets with broad target audience include cable TV, magazines, national newspaper, national spot radio, network radio, network TV, spot TV and syndication.	Ad$pender

Variables	Definition	Data Source
Ln Industry Broad AD MUSD	Natural logarithm of 1 plus *Industry Broad AD MUSD*.	Ad$pender
Industry Broad AD Unit	Number of units of advertising made in all the media outlets with broad target audience in each industry excluding the firm in question in the current month. Media outlets with broad target audience include cable TV, magazines, national newspaper, national spot radio, network radio, network TV, spot TV and syndication.	Ad$pender
Ln Industry Broad AD Unit	Natural logarithm of 1 plus *Industry Broad AD Unit*.	Ad$pender
Industry Specific AD MUSD	Advertising expenditure spent in all the media outlets with narrow and specific target audience in each industry excluding the firm in question in the current month, the amount is in millions USD. Media outlets with narrow and specific target audience include business-to-business, Internet display, local newspaper, outdoor and Sunday magazines.	Ad$pender
Ln Industry Specific AD MUSD	Natural logarithm of 1 plus *Industry Specific AD MUSD*.	Ad$pender
Industry Specific AD Unit	Number of units of advertising made in all the media outlets with narrow and specific target audience in each industry excluding the firm in question in the current month. Media outlets with narrow and specific target audience include business-to-business, Internet display, local newspaper, outdoor and Sunday magazines.	Ad$pender
Ln Industry Specific AD Unit	Natural logarithm of 1 plus *Industry Specific AD Unit*.	Ad$pender
Industry B-to-C MUSD	Average advertising expenditure spent through business-to-consumer media outlets in each industry excluding the firm in question in the current month, the amount is in millions USD. Business-to-consumer media outlets include cable TV, magazines, national newspaper, national spot radio, network radio, network TV, spot TV, syndication, local newspaper, outdoor, internet display and Sunday magazines.	Ad$pender
Ln Industry B-to-C MUSD	Natural logarithm of 1 *Industry B-to-C MUSD*.	Ad$pender
Industry B-to-C Unit	Average number of advertising made through Business-to-Consumer media outlets in each industry excluding the firm in question in the current month. Business-to-consumer media outlets include cable TV, magazines, national newspaper, national spot radio, network radio, network TV, spot TV, syndication, local newspaper, outdoor, internet display and Sunday magazines.	Ad$pender
Ln Industry B-to-C Unit	Natural logarithm of 1 plus *Industry B-to-C Unit*.	Ad$pender
Industry B-to-B MUSD	Average advertising expenditure spent through business-to-business media outlets in each industry excluding the firm in question in the current month, the amount is in millions USD.	Ad$pender
Ln Industry B-to-B MUSD	Natural logarithm of 1 plus *Industry B-to-B MUSD*.	Ad$pender
Industry B-to-B Unit	Average number of advertising made through Business-to-Business media outlets in each industry excluding the firm in question in the current month.	Ad$pender
Ln Industry B-to-B Unit	Natural logarithm of 1 plus *Industry B-to-B Unit*.	Ad$pender
Ln Internet AD MUSD	Natural logarithm of 1 plus the advertising expenditure of a firm spent on the Internet in the current month.	Ad$pender
Ln Internet AD Unit	Natural logarithm of number of units of advertising made by a firm on the Internet in the current month.	Ad$pender
Cross-Sectional Indicators – "Attraction"		
Individual	Binary variable equal to 1 if institutional investor ownership in the lagged firm-quarter is in the lowest quartile of the entire sample, and 0 otherwise.	I/B/E/S
Retail	Binary variable equal to 1 if a firm is in retail industry based on Fama-French 5-industry classification code, and 0 otherwise.	Compustat Fundamentals Quarterly
Young	Binary variable equal to 1 if a firm's first coverage in CRSP is after 1995, and 0 otherwise.	CRSP

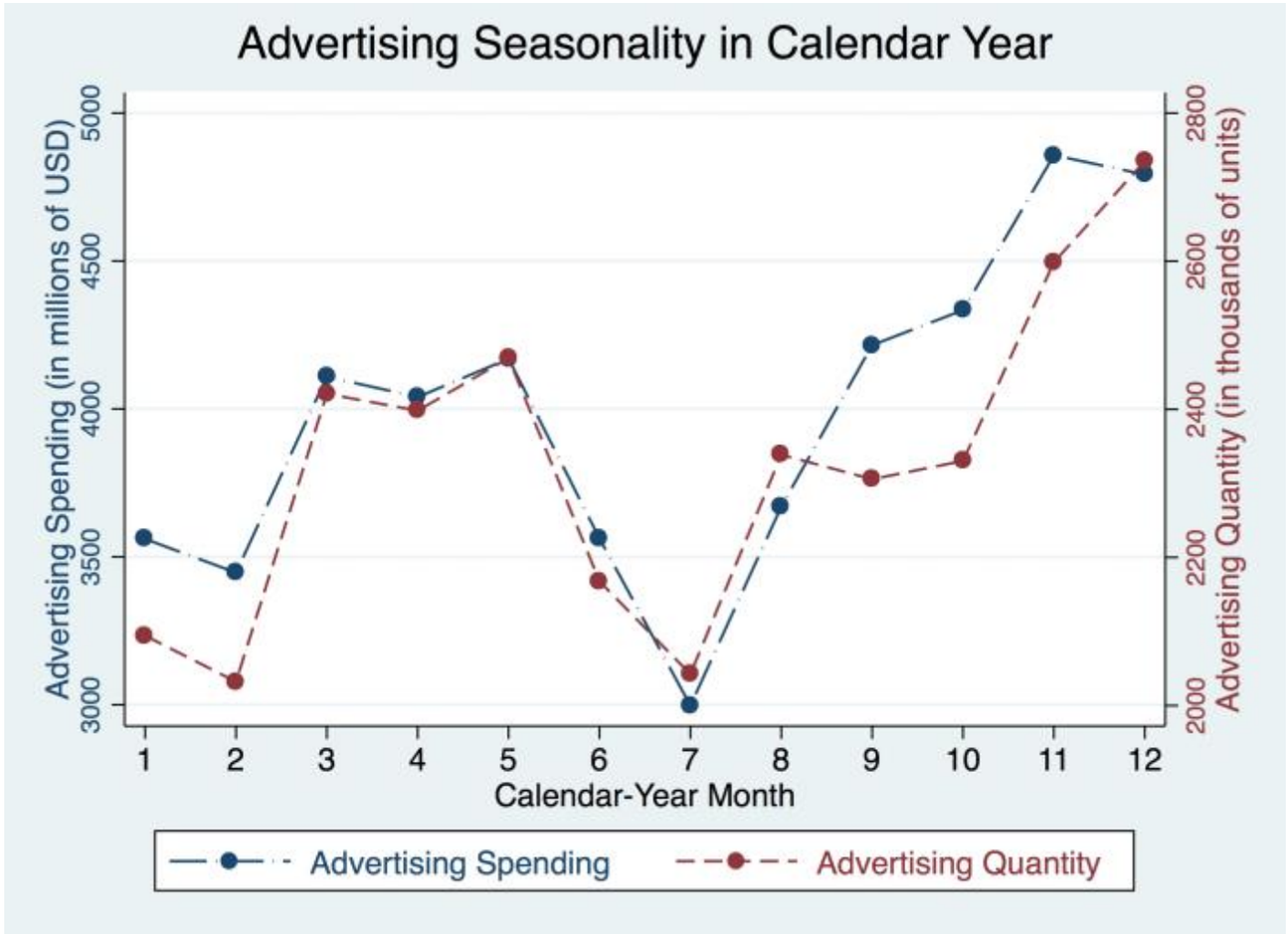
Variables	Definition	Data Source
Market Liquidity Test Variables		
Spread 100	Daily average of bid-ask spread in the current month.	CRSP
Trade Volume	Daily average of trading value of a firm's stock in the current month scaled by its market value of equity in the lagged fiscal quarter.	CRSP
Trade Share	Daily average of number of trading shares of a firm's stock in the current month scaled by its number of shares outstanding in the lagged fiscal quarter.	CRSP
Quarterly Stock Return	Cumulative daily stock return over the lagged fiscal quarter.	CRSP
Stock Return Volatility	Standard deviation of stock return over the lagged fiscal quarter.	CRSP
Special Items	Special items of the lagged fiscal quarter scaled by lagged total assets.	Compustat Fundamentals Quarterly

Figure 1. Difference-in-Difference Design



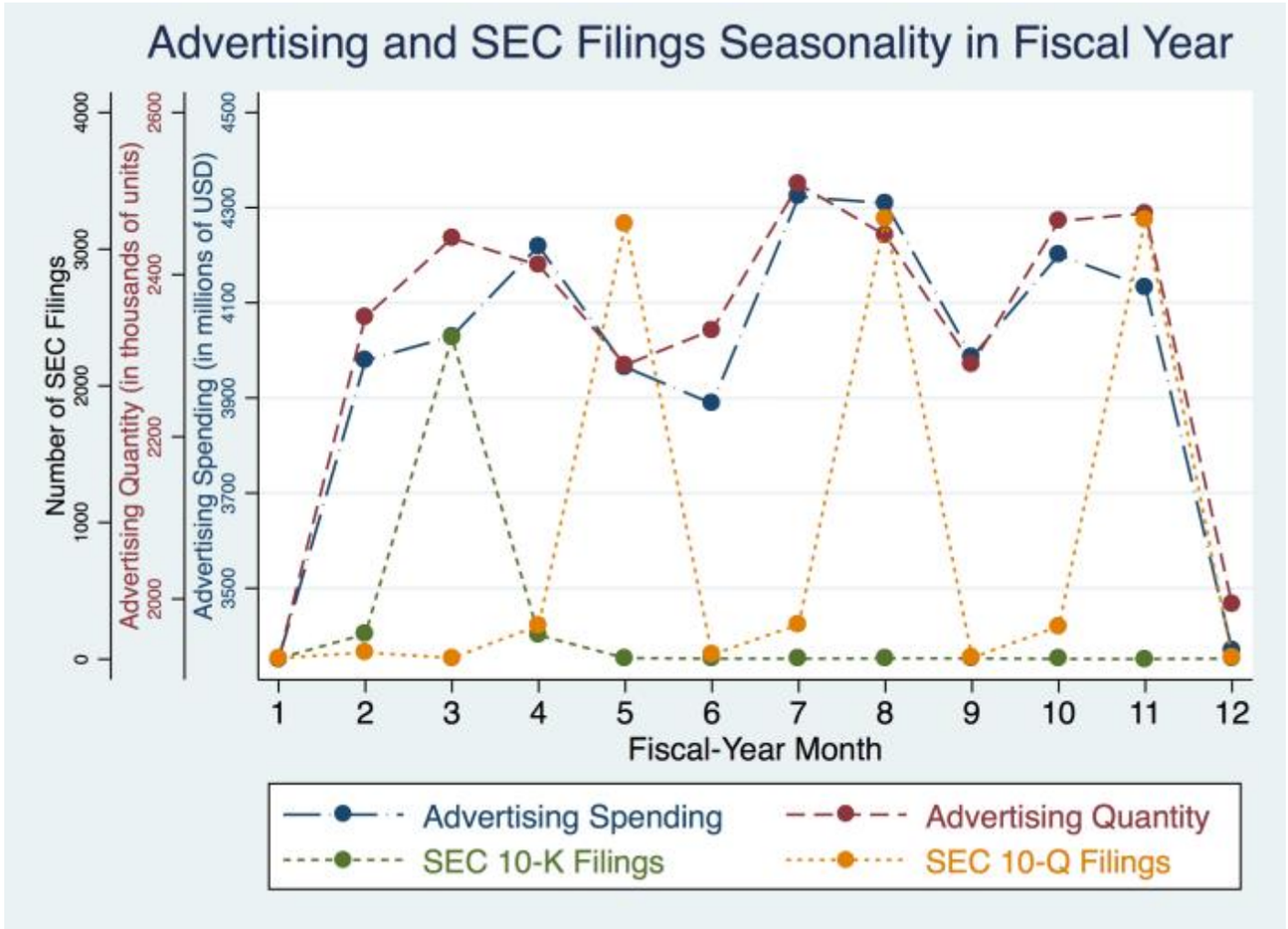
To capture the timing change of advertising expenditures due to the change of timing in 10-K filing, I run two separate tests: difference-in-difference test and falsification test. Taking an example for treatment firm with December as fiscal year end, if this firm had March to file its 10-K filing before regulation change in 2002, and after the regulation change new policy requires the firm to file 30 days earlier than originally. Then firm would submit its 10-K filing at least in February after the regulation change in 2003. Using monthly data of advertising spending, I can identify the monthly change of advertising spending in February as opposed to March due to this acceleration policy, this is what arrow 1 shows in the figure. My research design is to check whether there is any significant change of advertising spending in March 2003 after regulation change (regular would-have-been disclosure month if there were not regulation change), compared with March 2002 before regulation change (real disclosure month before regulation change) as opposed to control firms. This is shown as arrow 2. Based on my previous findings, given that a firm increases its advertising spending in the SEC filing month, I should observe a decrease in March 2003 after the adoption of acceleration compared to March 2002 before the adoption, as opposed to the non-timing-change control group, because the filing month for treatment firms moves to February after adoption and no longer in March 2003. In addition, the falsification test is to check whether the advertising spending increase moves to February 2003 in the treatment group, compared to control group. If the advertising spending increase does also move to February 2003, then I should not observe any change in February 2003 after adoption of acceleration compared to March 2002 before adoption. This is shown as arrow 3 in the figure.

Figure 2. Advertising Seasonality by Month in Calendar Year



The *calendar-year* seasonality of advertising follows variation in the economy. The peak of advertising in November and December arises due to Black Friday, Thanksgiving, and Christmas, while the trough in July results from the summer holiday season. Advertising spending in both value and quantity confirm this pattern, suggesting that advertising expenditures follow an unsystematic and non-repetitive pattern in a calendar year.

Figure 3. Advertising and Disclosure Seasonality by Month in Fiscal Year



The *fiscal-year* seasonality demonstrates a pattern with more structural and persistent fixed trends by fiscal quarter over the fiscal year, and those trends are regular and repetitive, matching the fiscal quarter financial reporting cycle by quarter with peaks in the months when firms make SEC filings.

Table 1. Sample Selection

Sample selection procedure	N# of observations		N# of firms	
Compustat U.S. firms by month for 1996-2005		1 048 740		14 329
Exclude firm-month observations that do not have advertising data in Ad$pender	-607 503	441 237	-9 097	5 232
Exclude firms that never advertise during the sample period	-70 563	370 674	-1 108	4 124
Exclude firms whose average total assets are under 10M USD	-26 283	344 391	-350	3 774
Exclude observations with missing values of return volatility	-81 078	263 313	-589	3 185
Exclude firms with missing values for all the variables used in the regression models	-87 042	176 271	-916	2 269
Exclude investment companies (financial - trading in Fama-French 48 industries)	-7 611	168 660	-101	2 168
Exclude firm-month observations that are after end of fiscal year 2005	-3 909	164 751	-11	2 157
Final sample		**164 751**		**2 157**

This table presents my sample selection process.

Table 2. Sample Composition

Fiscal Year	*N*# of observations	*N*# of Firms	*N*# of Industries (Fama-French 48-industry classification)	Average *N*# of Firms per Industry	Average Advertising Frequency	Average Monthly Advertising Spending (in million USD)	Average *N*# of Advertising Units	Average *N*# of Advertising Media Outlets
1996	15 792	1 390	46	30.217	26.94%	0.521	270.971	0.654
1997	17 085	1 488	47	31.660	27.27%	0.526	271.505	0.648
1998	17 544	1 543	47	32.830	44.72%	0.603	276.185	0.945
1999	17 238	1 545	46	33.587	52.93%	0.754	314.127	1.283
2000	17 451	1 569	45	34.867	54.88%	0.825	327.531	1.376
2001	16 683	1 466	45	32.578	54.42%	0.815	538.550	1.391
2002	16 107	1 394	45	30.978	53.67%	0.848	643.152	1.396
2003	15 708	1 344	45	29.867	53.28%	0.982	692.351	1.430
2004	15 537	1 340	46	29.130	54.55%	1.076	730.475	1.540
2005	15 606	1 343	47	28.574	54.29%	1.131	810.296	1.590
Total/Average	**164 751**	**1 442.200**	**45.900**	**31.429**	**47.65%**	**0.803**	**480.168**	**1.220**

This table presents sample composition and main descriptive statistics by fiscal year 1996-2005.

Table 3. Descriptive Statistics of Key Variables

Variables	*N* = 164 751				
	Mean	**SD**	**p25**	**p50**	**p75**
Advertising Variables					
AD	0.476	0.499	0.000	0.000	1.000
Total AD MUSD (raw number in millions USD)	0.803	4.078	0.000	0.000	0.038
Ln Total AD MUSD	0.183	0.571	0.000	0.000	0.037
Total AD Unit (raw number)	480.200	2 330.000	0.000	0.000	7.000
Ln Total AD Unit	1.553	2.479	0.000	0.000	2.079
No. Media Outlets (raw number)	1.220	2.133	0.000	0.000	1.000
Ln No. Media Outlets	0.526	0.661	0.000	0.000	0.693
Disclosure Variables					
SEC 10-K	0.046	0.209	0.000	0.000	0.000
SEC 10-K GN	0.022	0.146	0.000	0.000	0.000
SEC 10-K BN	0.024	0.153	0.000	0.000	0.000
SEC 10-Q	0.174	0.379	0.000	0.000	0.000
SEC 10-Q GN	0.081	0.272	0.000	0.000	0.000
SEC 10-Q BN	0.094	0.292	0.000	0.000	0.000
SEC 8-K	0.178	0.382	0.000	0.000	0.000
SEC 8-K GN	0.099	0.299	0.000	0.000	0.000
SEC 8-K BN	0.105	0.306	0.000	0.000	0.000
EA	0.327	0.469	0.000	0.000	1.000
EA GN	0.166	0.372	0.000	0.000	0.000
EA BN	0.160	0.367	0.000	0.000	0.000
MEF	0.028	0.172	0.000	0.000	0.000
MEF GN	0.012	0.111	0.000	0.000	0.000
MEF BN	0.016	0.128	0.000	0.000	0.000
Firm-Level Control Variables					
					152.80
Sales (raw number in millions USD)	420.000	1 483.000	14.730	47.430	0
Ln Sales	4.017	1.798	2.756	3.880	5.036
	3 034.00	12 587.00		239.80	756.40
Market Cap (raw number in millions USD)	0	0	71.270	0	0
Ln Market Cap	5.602	1.911	4.280	5.484	6.630
Book-to-Market	0.687	0.330	0.423	0.696	0.926
Book Leverage	0.182	0.195	0.009	0.123	0.297
Firm Age (raw number)	13.000	13.710	4.000	8.000	17.000
Ln Firm Age	2.229	0.933	1.609	2.197	2.890
ROA	-0.003	0.054	-0.003	0.007	0.020
Loss	0.269	0.443	0.000	0.000	1.000
Analyst Following (raw number)	3.468	5.048	0.000	1.000	5.000
Ln Analyst Following	0.996	0.971	0.000	0.693	1.792
Institutional Ownership	0.280	0.289	0.000	0.189	0.502
Suspect	0.025	0.157	0.000	0.000	0.000
Suspect X Month3	0.008	0.092	0.000	0.000	0.000
Industry-Level Control Variables					
Industry Sales Normalized HHI	0.132	0.093	0.076	0.104	0.149
Industry Total AD Normalized HHI	0.261	0.178	0.143	0.213	0.314
Industry Total AD MUSD (raw number in millions USD)	1.209	2.297	0.145	0.431	0.876
Ln Industry Total AD MUSD	0.543	0.597	0.136	0.359	0.629
				171.10	755.90
Industry Total AD Unit (raw number)	721.000	1 406.000	35.280	0	0
Ln Industry Total AD Unit	4.988	2.104	3.591	5.148	6.629
Cross-Sectional Indicators – "Attraction"					
Individual	0.304	0.460	0.000	0.000	1.000
Retail	0.189	0.391	0.000	0.000	0.000
Young	0.361	0.480	0.000	0.000	1.000
Market Liquidity Test Variables					
Spread 100	2.238	2.627	0.492	1.362	2.937
Trade Volume	0.142	0.197	0.030	0.071	0.164
Trade Share	0.136	0.174	0.031	0.072	0.165
Quarterly Stock Return	0.047	0.313	-0.124	0.019	0.171
Stock Return Volatility	0.038	0.022	0.021	0.032	0.048
Special Items	-0.004	0.018	0.000	0.000	0.000

This table presents descriptive statistics for the variables used in the analysis for a sample of 2,157 U.S. firms in all the industries excluding investment companies for the 1996-2005 period. The entire sample consists of 164,751firm-month observations. I collect monthly advertising data from Ad$pender database obtained through Kantar Media. I match advertising data by company name with Compustat and CRSP to get financial data. See Appendix A3 for variable definitions. All the variables excluding indicator variables are winsorized at the 1% level.

Table 4. Correlation Matrix

	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)	***AD***	1.0000											
(2)	***Ln Total AD MUSD***	0.3365***	1.0000										
		(0.000)											
(3)	***Ln Total AD Unit***	0.6457***	0.7533***	1.0000									
		(0.000)	(0.000)										
(4)	***Ln No. Media Outlets***	0.8331***	0.6953***	0.8763***	1.0000								
		(0.000)	(0.000)	(0.000)									
(5)	***Spread 100***	-0.2078***	-0.1690***	-0.2297***	-0.2438***	1.0000							
		(0.000)	(0.000)	(0.000)	(0.000)								
(6)	***Trade Volume***	0.0342***	0.0159***	0.0382***	0.0313***	-0.2653***	1.0000						
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)							
(7)	***Trade Share***	0.0475***	0.0278***	0.0529***	0.0477***	-0.2834***	0.9345***	1.0000					
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)						
(8)	***SEC 10-K***	0.0121***	-0.0025	0.0079***	0.0079***	-0.0286***	0.0133***	0.0126***	1.0000				
		(0.000)	(0.316)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)					
(9)	***SEC 10-Q***	0.0228***	-0.0044*	0.0083***	0.0126***	-0.0517***	0.0029	0.0025	-0.0969***	1.0000			
		(0.000)	(0.071)	(0.001)	(0.000)	(0.000)	(0.232)	(0.312)	(0.000)				
(10)	***SEC 8-K***	0.0760***	0.0602***	0.0986***	0.0991***	-0.2037***	0.0808***	0.0936***	0.0434***	0.1052***	1.0000		
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)			
(11)	***EA***	0.0046*	0.0030	0.0039	0.0051**	-0.0117***	0.0352***	0.0447***	-0.0639***	-0.0088***	0.1625***	1.0000	
		(0.061)	(0.225)	(0.110)	(0.037)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
(12)	***MEF***	-0.0087***	-0.0284***	-0.0207***	-0.0225***	-0.0583***	0.0860***	0.1115***	-0.0072***	-0.0199***	0.0981***	0.1197***	1.0000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)	(0.000)	(0.000)	(0.000)	

This table is a correlation matrix for the dependent variables and variables of interest used in the main analysis for a sample of 2,157 U.S. firms in all the industries excluding investment companies from 1996 to 2005. The entire sample consists of 164,751firm-month observations. I collect monthly advertising data from Ad$pender database obtained through Kantar Media. I match advertising data by company name with Compustat and CRSP to get financial data. Please refer to Appendix A3 for variable definitions. All the variables excluding indicator variables are winsorized at the 1% level. *p*-values are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 5. Effect of a Firm's Disclosures on its Advertising

Panel A: Effect of a Firm's Disclosures on its Advertising Spending

Variables	*Ln Total AD MUSD*					
	(1)	(2)	(3)	(4)	(5)	(6)
SEC 10-K	**0.0059*** **					**0.0062*** **
	(3.30)					(3.45)
SEC 10-Q		**0.0023*** **				**0.0024*** **
		(2.95)				(3.07)
SEC 8-K			**0.0017**			**0.0016**
			(1.15)			(1.04)
EA				**0.0004**		**0.0005**
				(0.69)		(0.82)
MEF					**-0.0023**	**-0.0024**
					(-1.15)	(-1.18)
Ln Sales	0.0311***	0.0311***	0.0310***	0.0311***	0.0311***	0.0311***
	(10.83)	(10.83)	(10.82)	(10.83)	(10.83)	(10.83)
Ln Market Cap	0.0255***	0.0255***	0.0255***	0.0255***	0.0255***	0.0256***
	(12.61)	(12.62)	(12.60)	(12.60)	(12.61)	(12.64)
Book-to-Market	0.0356***	0.0356***	0.0356***	0.0356***	0.0356***	0.0357***
	(7.42)	(7.42)	(7.42)	(7.41)	(7.42)	(7.43)
Book Leverage	-0.0268***	-0.0268***	-0.0269***	-0.0268***	-0.0268***	-0.0268***
	(-3.49)	(-3.49)	(-3.49)	(-3.49)	(-3.49)	(-3.49)
Ln Firm Age	-0.0174***	-0.0175***	-0.0174***	-0.0174***	-0.0174***	-0.0175***
	(-5.09)	(-5.13)	(-5.09)	(-5.10)	(-5.09)	(-5.12)
ROA	-0.0908***	-0.0903***	-0.0901***	-0.0904***	-0.0903***	-0.0906***
	(-5.18)	(-5.15)	(-5.14)	(-5.16)	(-5.16)	(-5.17)
Loss	-0.0019	-0.0018	-0.0019	-0.0018	-0.0018	-0.0019
	(-0.91)	(-0.90)	(-0.91)	(-0.90)	(-0.90)	(-0.91)
Ln Analyst Following	0.0070***	0.0070***	0.0070***	0.0070***	0.0070***	0.0069***
	(3.81)	(3.81)	(3.82)	(3.83)	(3.84)	(3.79)
Institutional Ownership	-0.0331***	-0.0331***	-0.0332***	-0.0329***	-0.0328***	-0.0336***
	(-4.86)	(-4.87)	(-4.89)	(-4.83)	(-4.82)	(-4.95)
Suspect	0.0029	0.0024	0.0026	0.0026	0.0026	0.0026
	(0.70)	(0.60)	(0.64)	(0.63)	(0.65)	(0.63)
Suspect X Month3	-0.0021	-0.0008	-0.0013	-0.0012	-0.0014	-0.0012
	(-0.60)	(-0.22)	(-0.36)	(-0.35)	(-0.40)	(-0.34)
Industry Sales Normalized HHI	0.0076	0.0077	0.0077	0.0076	0.0076	0.0079
	(0.32)	(0.33)	(0.33)	(0.32)	(0.32)	(0.34)
Industry Total AD Normalized HHI	-0.0108	-0.0109	-0.0109	-0.0109	-0.0109	-0.0108
	(-1.54)	(-1.55)	(-1.55)	(-1.55)	(-1.55)	(-1.54)
Ln Industry Total AD MUSD	0.1292***	0.1294***	0.1295***	0.1295***	0.1295***	0.1292***
	(22.00)	(22.06)	(22.08)	(22.07)	(22.08)	(21.98)
Observations	164 751	164 751	164 751	164 751	164 751	164 751
Adjusted R-squared	0.9074	0.9074	0.9074	0.9074	0.9074	0.9074
Year-Quarter FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
Model	OLS	OLS	OLS	OLS	OLS	OLS

This table presents regression results that pertain to the effect of a firm's disclosures in the current month on its advertising expenditures. The full sample consists of 164,751firm-month observations for 2,157 U.S. firms. See Appendix A3 for variable definitions. All the variables except for indicator variables are winsorized at the 1% level. Robust *t*-statistics are shown in parentheses. Standard errors are clustered at the firm-quarter level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 5. Effect of a Firm's Disclosures on its Advertising

Panel B: Effect of a Firm's Disclosures on its Advertising Quantity

Variables	*Ln Total AD Unit*					
	(1)	(2)	(3)	(4)	(5)	(6)
SEC 10-K	**0.0454*** **					**0.0453*** **
	(4.04)					(4.02)
SEC 10-Q		**0.0100** **				**0.0103** **
		(2.14)				(2.20)
SEC 8-K			**0.0022**			**0.0040**
			(0.25)			(0.44)
EA				**-0.0045**		**-0.0018**
				(-1.34)		(-0.50)
MEF					**-0.0439*** **	**-0.0420** **
					(-2.63)	(-2.47)
Ln Sales	0.1872***	0.1872***	0.1872***	0.1872***	0.1877***	0.1877***
	(11.67)	(11.67)	(11.67)	(11.67)	(11.70)	(11.70)
Ln Market Cap	0.1285***	0.1284***	0.1283***	0.1283***	0.1286***	0.1288***
	(10.10)	(10.10)	(10.09)	(10.09)	(10.11)	(10.13)
Book-to-Market	0.2161***	0.2161***	0.2160***	0.2160***	0.2161***	0.2165***
	(6.44)	(6.44)	(6.44)	(6.44)	(6.44)	(6.45)
Book Leverage	-0.1548***	-0.1547***	-0.1548***	-0.1548***	-0.1549***	-0.1548***
	(-2.89)	(-2.89)	(-2.89)	(-2.89)	(-2.89)	(-2.89)
Ln Firm Age	0.0578***	0.0572***	0.0578***	0.0578***	0.0584***	0.0580***
	(2.82)	(2.80)	(2.82)	(2.82)	(2.85)	(2.83)
ROA	-0.4828***	-0.4792***	-0.4791***	-0.4790***	-0.4790***	-0.4816***
	(-3.58)	(-3.56)	(-3.55)	(-3.55)	(-3.55)	(-3.57)
Loss	-0.0002	-0.0000	-0.0000	-0.0000	0.0000	-0.0001
	(-0.01)	(-0.00)	(-0.00)	(-0.00)	(0.00)	(-0.01)
Ln Analyst Following	0.0764***	0.0765***	0.0766***	0.0767***	0.0770***	0.0765***
	(7.15)	(7.16)	(7.18)	(7.18)	(7.21)	(7.16)
Institutional Ownership	-0.1495***	-0.1493***	-0.1486***	-0.1482***	-0.1467***	-0.1501***
	(-3.45)	(-3.44)	(-3.43)	(-3.42)	(-3.38)	(-3.47)
Suspect	-0.0257	-0.0284	-0.0276	-0.0269	-0.0274	-0.0263
	(-0.91)	(-1.00)	(-0.97)	(-0.95)	(-0.97)	(-0.93)
Suspect X Month3	0.0409	0.0488*	0.0464*	0.0445	0.0458*	0.0426
	(1.47)	(1.76)	(1.67)	(1.60)	(1.65)	(1.53)
Industry Sales Normalized HHI	-0.2706*	-0.2700*	-0.2704*	-0.2707*	-0.2689*	-0.2682*
	(-1.91)	(-1.91)	(-1.91)	(-1.91)	(-1.90)	(-1.90)
Industry Total AD Normalized HHI	-0.2417***	-0.2420***	-0.2419***	-0.2419***	-0.2419***	-0.2418***
	(-6.08)	(-6.09)	(-6.09)	(-6.09)	(-6.09)	(-6.09)
Ln Industry Total AD Unit	0.0768***	0.0771***	0.0771***	0.0771***	0.0772***	0.0769***
	(14.20)	(14.25)	(14.26)	(14.26)	(14.28)	(14.20)
Observations	164 751	164 751	164 751	164 751	164 751	164 751
Adjusted R-squared	0.8148	0.8148	0.8148	0.8148	0.8148	0.8148
Year-Quarter FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
Model	OLS	OLS	OLS	OLS	OLS	OLS

This table presents regression results that pertain to the effect of a firm's disclosures in the current month on its advertising quantity. The full sample consists of 164,751firm-month observations for 2,157 US firms. Please refer to Appendix A3 for variable definitions. All the variables except for indicator variables are winsorized at the 1% level. Robust t-statistics are shown in parentheses. Standard errors are clustered at the firm-quarter level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 6. Effect of Good and Bad News in a Firm's Disclosures on its Advertising

Variables	*Ln Total AD MUSD*				*Ln Total AD Unit*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SEC 10-K				0.0022				0.0411***
				(0.86)				(2.58)
SEC 10-K GN	**0.0102*** **		**0.0106*** **	**0.0084** **	**0.0455*** **		**0.0497*** **	**0.0088**
	(3.68)		(3.87)	(2.18)	(2.63)		(2.91)	(0.36)
SEC 10-K BN		**0.0008**	**0.0020**			**0.0364** **	**0.0409** **	
		(0.33)	(0.78)			(2.26)	(2.56)	
SEC 10-Q				0.0007				0.0016
				(0.56)				(0.22)
SEC 10-Q GN	**0.0042*** **		**0.0044*** **	**0.0037***	**0.0198** **		**0.0204** **	**0.0187**
	(2.85)		(3.15)	(1.77)	(2.23)		(2.42)	(1.46)
SEC 10-Q BN		**-0.0002**	**0.0005**			**-0.0007**	**0.0021**	
		(-0.19)	(0.40)			(-0.09)	(0.29)	
SEC 8-K				0.0004				-0.0065
				(0.22)				(-0.55)
SEC 8-K GN	**0.0024**		**0.0024**	**0.0021**	**0.0144**		**0.0145**	**0.0194**
	(1.33)		(1.31)	(0.89)	(1.32)		(1.32)	(1.38)
SEC 8-K BN		**0.0029**	**0.0029**			**-0.0043**	**-0.0043**	
		(1.61)	(1.61)			(-0.40)	(-0.40)	
EA				0.0019*				0.0022
				(1.91)				(0.37)
EA GN	**-0.0013**		**-0.0009**	**-0.0028***	**-0.0067**		**-0.0058**	**-0.0079**
	(-1.21)		(-0.87)	(-1.78)	(-1.06)		(-0.97)	(-0.84)
EA BN		**0.0015**	**0.0016**			**0.0019**	**0.0021**	
		(1.40)	(1.64)			(0.31)	(0.35)	
MEF				-0.0039				-0.0187
				(-1.43)				(-0.84)
MEF GN	**-0.0002**		**-0.0003**	**0.0035**	**-0.0734*** **		**-0.0737*** **	**-0.0550**
	(-0.07)		(-0.11)	(0.86)	(-2.79)		(-2.80)	(-1.60)
MEF BN		**-0.0050***	**-0.0046***			**-0.0185**	**-0.0191**	
		(-1.82)	(-1.70)			(-0.83)	(-0.86)	
Ln Sales	0.0310***	0.0311***	0.0311***	0.0311***	0.1874***	0.1874***	0.1876***	0.1876***
	(10.81)	(10.84)	(10.83)	(10.83)	(11.68)	(11.68)	(11.69)	(11.69)
Ln Market Cap	0.0256***	0.0255***	0.0255***	0.0255***	0.1286***	0.1284***	0.1287***	0.1287***
	(12.63)	(12.59)	(12.62)	(12.62)	(10.11)	(10.09)	(10.12)	(10.12)
Book-to-Market	0.0355***	0.0357***	0.0357***	0.0356***	0.2159***	0.2160***	0.2160***	0.2160***
	(7.40)	(7.44)	(7.43)	(7.41)	(6.44)	(6.44)	(6.44)	(6.44)
Book Leverage	-0.0269***	-0.0269***	-0.0270***	-0.0269***	-0.1554***	-0.1546***	-0.1552***	-0.1552***

	(-3.50)	(-3.51)	(-3.51)	(-3.50)	(-2.90)	(-2.89)	(-2.90)	(-2.90)
Ln Firm Age	-0.0174***	-0.0174***	-0.0174***	-0.0174***	0.0583***	0.0578***	0.0582***	0.0583***
	(-5.10)	(-5.09)	(-5.11)	(-5.11)	(2.85)	(2.82)	(2.85)	(2.85)
ROA	-0.0902***	-0.0901***	-0.0901***	-0.0903***	-0.4772***	-0.4809***	-0.4792***	-0.4793***
	(-5.15)	(-5.14)	(-5.14)	(-5.15)	(-3.54)	(-3.57)	(-3.55)	(-3.56)
Loss	-0.0019	-0.0019	-0.0019	-0.0019	-0.0003	0.0000	-0.0002	-0.0003
	(-0.91)	(-0.93)	(-0.94)	(-0.93)	(-0.02)	(0.00)	(-0.02)	(-0.02)
Ln Analyst Following	0.0069***	0.0070***	0.0069***	0.0069***	0.0764***	0.0767***	0.0764***	0.0764***
	(3.78)	(3.83)	(3.77)	(3.78)	(7.15)	(7.18)	(7.15)	(7.15)
Institutional Ownership	-0.0335***	-0.0332***	-0.0339***	-0.0336***	-0.1506***	-0.1477***	-0.1504***	-0.1502***
	(-4.93)	(-4.88)	(-5.00)	(-4.94)	(-3.48)	(-3.41)	(-3.47)	(-3.47)
Suspect	0.0027	0.0025	0.0025	0.0025	-0.0271	-0.0269	-0.0265	-0.0265
	(0.66)	(0.62)	(0.62)	(0.62)	(-0.96)	(-0.95)	(-0.94)	(-0.93)
Suspect X Month3	-0.0016	-0.0011	-0.0012	-0.0012	0.0446	0.0442	0.0427	0.0425
	(-0.46)	(-0.31)	(-0.33)	(-0.34)	(1.60)	(1.59)	(1.53)	(1.53)
Industry Sales Normalized HHI	0.0077	0.0078	0.0079	0.0079	-0.2688*	-0.2693*	-0.2674*	-0.2675*
	(0.33)	(0.33)	(0.34)	(0.34)	(-1.90)	(-1.90)	(-1.89)	(-1.89)
Industry Total AD Normalized HHI	-0.0108	-0.0109	-0.0107	-0.0107	-0.2417***	-0.2419***	-0.2417***	-0.2417***
	(-1.53)	(-1.55)	(-1.53)	(-1.53)	(-6.08)	(-6.09)	(-6.09)	(-6.08)
Ln Industry Total AD MUSD	0.1292***	0.1295***	0.1291***	0.1291***				
	(22.01)	(22.06)	(21.98)	(21.98)				
Ln Industry Total AD Unit					0.0770***	0.0770***	0.0769***	0.0769***
					(14.24)	(14.23)	(14.20)	(14.20)
Observations	164 751	164 751	164 751	164 751	164 751	164 751	164 751	164 751
Adjusted R-squared	0.9074	0.9074	0.9074	0.9074	0.8148	0.8148	0.8148	0.8148
Year-Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Model	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
F-test (SEC 10-K GN - SEC 10-K BN = 0)			**0.0086****				**0.0089**	
f-statistics			(4.93)				(0.13)	
F-test (SEC 10-Q GN - SEC 10-Q BN = 0)			**0.0039***				**0.0182**	
f-statistics			(3.45)				(2.02)	
F-test (SEC 8-K GN - SEC 8-K BN = 0)			**-0.0005**				**0.0187**	
f-statistics			(0.05)				(1.57)	
F-test (EA GN - EA BN = 0)			**-0.0025**				**-0.0078**	
f-statistics			(2.63)				(0.69)	
F-test (MEF GN - MEF BN = 0)			**0.0043**				**-0.0546**	
f-statistics			(1.09)				(2.52)	

This table presents regression results that pertain to the effect of good or bad news in a firm's disclosures in the current month on advertising spending and quantity. Please refer to Appendix A3 for variable definitions. All the variables except for indicator variables are winsorized at the 1% level. Robust *t*-statistics or f-statistics are shown in parentheses. Standard errors are clustered at the firm-quarter level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 7. Cross-Sectional Tests of Effect of a Firm's Disclosures on its Advertising

Variables	*Attraction = Individual*		*Attraction = Retail*		*Attraction = Young*	
	(1)	(2)	(3)	(4)	(5)	(6)
	Ln Total AD MUSD	***Ln Total AD Unit***	***Ln Total AD MUSD***	***Ln Total AD Unit***	***Ln Total AD MUSD***	***Ln Total AD Unit***
Attraction	-0.0051	0.0526*	Omitted due to Firm FE		Omitted due to Firm FE	
	(-1.46)	(1.88)				
SEC 10-K	0.0052***	0.0475***	0.0024	0.0351***	0.0031	0.0324**
	(2.73)	(3.89)	(1.28)	(2.88)	(1.31)	(2.28)
Attraction X SEC 10-K	**0.0042**	**-0.0134**	**0.0188*** **	**0.0493**	**0.0088** **	**0.0374**
	(0.66)	(-0.39)	(3.24)	(1.52)	(2.40)	(1.51)
SEC 10-Q	0.0002	0.0061	-0.0002	0.0005	0.0025**	0.0144**
	(0.29)	(1.24)	(-0.32)	(0.11)	(2.32)	(2.41)
Attraction X SEC 10-Q	**0.0124*** **	**0.0268***	**0.0131*** **	**0.0474*** **	**-0.0002**	**-0.0117**
	(3.96)	(1.71)	(4.47)	(3.18)	(-0.15)	(-1.08)
SEC 8-K	0.0009	-0.0048	-0.0016	-0.0067	-0.0023	0.0177
	(0.60)	(-0.50)	(-1.04)	(-0.68)	(-1.12)	(1.52)
Attraction X SEC 8-K	**0.0061**	**0.0643** **	**0.0164*** **	**0.0562** **	**0.0105*** **	**-0.0361***
	(1.11)	(2.25)	(3.28)	(2.21)	(3.64)	(-1.88)
EA	-0.0016**	-0.0066	0.0003	-0.0031	0.0013	-0.0031
	(-2.39)	(-1.60)	(0.41)	(-0.83)	(1.54)	(-0.70)
Attraction X EA	**0.0064*** **	**0.0155***	**0.0006**	**0.0051**	**-0.0024** **	**0.0039**
	(4.24)	(1.91)	(0.27)	(0.47)	(-2.03)	(0.52)
MEF	-0.0006	-0.0526***	-0.0003	-0.0464**	-0.0100***	-0.0609**
	(-0.28)	(-2.66)	(-0.17)	(-2.53)	(-3.50)	(-2.46)
Attraction X MEF	**-0.0065**	**0.0384**	**-0.0108***	**0.0226**	**0.0139*** **	**0.0348**
	(-1.12)	(0.97)	(-1.67)	(0.48)	(3.47)	(1.02)
Ln Sales	0.0312***	0.1866***	0.0310***	0.1875***	0.0311***	0.1876***
	(10.85)	(11.63)	(10.82)	(11.69)	(10.83)	(11.69)
Ln Market Cap	0.0257***	0.1239***	0.0255***	0.1287***	0.0256***	0.1286***
	(12.52)	(9.61)	(12.63)	(10.12)	(12.66)	(10.11)
Book-to-Market	0.0359***	0.2107***	0.0357***	0.2167***	0.0358***	0.2158***
	(7.40)	(6.26)	(7.44)	(6.46)	(7.46)	(6.44)
Book Leverage	-0.0269***	-0.1549***	-0.0259***	-0.1512***	-0.0270***	-0.1540***
	(-3.50)	(-2.89)	(-3.36)	(-2.82)	(-3.52)	(-2.88)
Ln Firm Age	-0.0172***	0.0602***	-0.0172***	0.0587***	-0.0202***	0.0644***
	(-5.05)	(2.94)	(-5.04)	(2.87)	(-5.83)	(3.10)

ROA	-0.0907***	-0.4752***	-0.0902***	-0.4797***	-0.0915***	-0.4784***
	(-5.17)	(-3.52)	(-5.15)	(-3.56)	(-5.22)	(-3.55)
Loss	-0.0019	-0.0005	-0.0019	-0.0001	-0.0018	-0.0000
	(-0.91)	(-0.04)	(-0.91)	(-0.00)	(-0.89)	(-0.00)
Ln Analyst Following	0.0066***	0.0805***	0.0070***	0.0767***	0.0070***	0.0764***
	(3.63)	(7.37)	(3.84)	(7.18)	(3.83)	(7.16)
Institutional Ownership	-0.0339***	-0.1049**	-0.0331***	-0.1480***	-0.0340***	-0.1486***
	(-4.98)	(-2.33)	(-4.88)	(-3.42)	(-5.02)	(-3.43)
Suspect	0.0026	-0.0261	0.0026	-0.0262	0.0026	-0.0263
	(0.65)	(-0.92)	(0.63)	(-0.93)	(0.64)	(-0.93)
Suspect X Month3	-0.0014	0.0421	-0.0014	0.0419	-0.0012	0.0427
	(-0.41)	(1.51)	(-0.40)	(1.50)	(-0.35)	(1.53)
Industry Sales Normalized HHI	0.0091	-0.2763*	0.0061	-0.2752*	0.0070	-0.2673*
	(0.38)	(-1.95)	(0.26)	(-1.94)	(0.30)	(-1.89)
Industry Total AD Normalized HHI	-0.0107	-0.2438***	-0.0109	-0.2426***	-0.0106	-0.2416***
	(-1.53)	(-6.14)	(-1.54)	(-6.11)	(-1.51)	(-6.08)
Ln Industry Total AD MUSD	0.1288***		0.1272***		0.1293***	
	(21.98)		(21.79)		(22.00)	
Ln Industry Total AD Unit		0.0765***		0.0774***		0.0770***
		(14.14)		(14.31)		(14.22)
Observations	164 751	164 751	164 751	164 751	164 751	164 751
Adjusted R-squared	0.9074	0.8149	0.9074	0.8149	0.9074	0.8148
Year-Quarter FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
Model	OLS	OLS	OLS	OLS	OLS	OLS

This table presents cross-sectional regression results for firm-month with high individual investor ownership, for firms in retail industry and for young firms that pertain to the effect of a firm's disclosures in the current month on its advertising spending and quantity. The full sample consists of 164,751firm-month observations for 2,157 U.S. firms. Please refer to Appendix A3 for variable definitions. All the variables except for indicator variables are winsorized at the 1% level. Robust *t*-statistics are shown in parentheses. Standard errors are clustered at the firm-quarter level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 8. Effect of a Firm's Disclosures on its Advertising in Different Media Outlets

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ln Broad AD MUSD	***Ln Broad AD Unit***	***Ln Specific AD MUSD***	***Ln Specific AD Unit***	***Ln B-to-C MUSD***	***Ln B-to-C Unit***	***Ln B-to-B MUSD***	***Ln B-to-B Unit***
SEC 10-K	**0.0080*** **	**0.0463*** **	**-0.0017**	**-0.0041**	**0.0065*** **	**0.0378*** **	**-0.0009** **	**-0.0053**
	(4.70)	(4.72)	(-1.28)	(-0.38)	(3.66)	(3.35)	(-1.97)	(-1.05)
SEC 10-Q	**0.0028*** **	**0.0139*** **	**0.0001**	**-0.0063**	**0.0029*** **	**0.0142*** **	**-0.0008*** **	**-0.0094*** **
	(3.53)	(3.26)	(0.11)	(-1.55)	(3.61)	(3.06)	(-4.59)	(-4.51)
SEC 8-K	**-0.0013**	**-0.0024**	**0.0038*** **	**0.0333*** **	**0.0014**	**0.0085**	**0.0002**	**-0.0009**
	(-0.92)	(-0.31)	(3.26)	(3.54)	(0.97)	(0.91)	(0.42)	(-0.23)
EA	**0.0009**	**0.0042**	**-0.0012*** **	**-0.0117*** **	**0.0010**	**0.0016**	**-0.0005*** **	**-0.0050*** **
	(1.47)	(1.27)	(-3.60)	(-4.19)	(1.55)	(0.46)	(-4.29)	(-3.37)
MEF	**-0.0002**	**-0.0326** **	**-0.0060*** **	**-0.0721*** **	**-0.0028**	**-0.0473*** **	**-0.0004**	**-0.0141** **
	(-0.11)	(-2.38)	(-5.06)	(-4.76)	(-1.46)	(-2.74)	(-0.69)	(-2.07)
Ln Sales	0.0183***	0.0590***	0.0209***	0.2299***	0.0295***	0.1814***	0.0037***	0.0483***
	(7.05)	(4.58)	(11.48)	(14.88)	(10.46)	(11.22)	(6.15)	(7.76)
Ln Market Cap	0.0230***	0.1020***	0.0065***	0.0603***	0.0220***	0.0974***	0.0040***	0.0405***
	(12.15)	(9.76)	(5.00)	(4.81)	(11.18)	(7.58)	(8.04)	(8.00)
Book-to-Market	0.0318***	0.0992***	0.0051*	0.0953***	0.0337***	0.1809***	0.0011	0.0007
	(7.16)	(3.76)	(1.71)	(3.00)	(7.17)	(5.36)	(1.01)	(0.06)
Book Leverage	-0.0182***	-0.0580	-0.0304***	-0.3137***	-0.0191**	-0.1474***	-0.0115***	-0.1234***
	(-2.76)	(-1.34)	(-5.41)	(-6.04)	(-2.52)	(-2.72)	(-6.43)	(-5.89)
Ln Firm Age	0.0040	0.0786***	-0.0563***	-0.4945***	-0.0113***	0.0965***	-0.0159***	-0.1852***
	(1.32)	(4.69)	(-19.02)	(-21.26)	(-3.38)	(4.70)	(-15.56)	(-18.15)
ROA	-0.0727***	-0.1633*	-0.0385***	-0.4603***	-0.0782***	-0.3026**	-0.0189***	-0.2543***
	(-4.67)	(-1.67)	(-3.42)	(-3.60)	(-4.59)	(-2.22)	(-4.29)	(-4.74)
Loss	-0.0026	0.0139	0.0003	-0.0108	-0.0025	0.0030	-0.0000	-0.0012
	(-1.34)	(1.21)	(0.18)	(-0.74)	(-1.25)	(0.21)	(-0.07)	(-0.19)
Ln Analyst Following	0.0013	0.0231***	0.0122***	0.1236***	0.0057***	0.0698***	0.0031***	0.0404***
	(0.79)	(2.63)	(7.20)	(10.51)	(3.15)	(6.45)	(6.20)	(7.90)
Institutional Ownership	-0.0270***	-0.0402	-0.0291***	-0.2302***	-0.0319***	-0.1974***	-0.0060***	0.0195
	(-4.53)	(-1.22)	(-5.25)	(-5.03)	(-4.77)	(-4.47)	(-3.69)	(1.06)
Suspect	-0.0001	0.0062	0.0048	-0.0430	0.0016	-0.0472*	0.0020**	0.0281**
	(-0.03)	(0.26)	(1.47)	(-1.54)	(0.40)	(-1.65)	(2.23)	(2.52)
Suspect X Month3	0.0010	0.0253	-0.0020	0.0178	-0.0003	0.0464	-0.0008	-0.0098
	(0.29)	(0.97)	(-1.25)	(0.97)	(-0.07)	(1.64)	(-1.28)	(-1.30)
Industry Sales Normalized HHI	-0.0078	0.1125	0.0249	0.2700	0.0523**	-0.0305	-0.0408***	-0.1688**

	(-0.40)	(1.03)	(1.05)	(1.63)	(2.34)	(-0.21)	(-4.43)	(-2.06)
Industry Total AD Normalized HHI	-0.0145**	-0.2829***	0.0291***	0.0549	-0.0117*	-0.2660***	0.0048***	-0.0035
	(-2.30)	(-8.52)	(5.20)	(1.44)	(-1.66)	(-6.79)	(2.87)	(-0.17)
Ln Industry Broad AD MUSD	0.0913***							
	(15.94)							
Ln Industry Broad AD Unit		0.0201***						
		(4.51)						
Ln Industry Specific AD MUSD			0.1487***					
			(21.27)					
Ln Industry Specific AD Unit				0.2000***				
				(40.01)				
Ln Industry B-to-C MUSD					0.1294***			
					(22.04)			
Ln Industry B-to-C Unit						0.0530***		
						(10.15)		
Ln Industry B-to-B MUSD							0.2657***	
							(23.37)	
Ln Industry B-to-B Unit								0.2949***
								(37.81)
Observations	164 751	164 751	164 751	164 751	164 751	164 751	164 751	164 751
Adjusted R-squared	0.8994	0.8392	0.7531	0.6678	0.9064	0.8157	0.6859	0.6669
Year-Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Model	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS

This table presents regression results that pertain to the effect of a firm's disclosures in the current month on its advertising spending in different media outlets. Media outlets with broad target audience include cable TV, magazines, national newspaper, national spot radio, network radio, network TV, spot TV and syndication. Media outlets with specific target audience include business-to-business, Internet display, local newspaper, outdoor and Sunday magazines. Business-to-consumer media outlets include cable TV, magazines, national newspaper, national spot radio, network radio, network TV, spot TV, syndication, local newspaper, outdoor, internet display and Sunday magazines. The full sample consists of 164,751firm-month observations for 2,157 US firms. Please refer to Appendix A3 for variable definitions. All the variables except for indicator variables are winsorized at the 1% level. Robust *t*-statistics are shown in parentheses. Standard errors are clustered at the firm-quarter level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 9. Identification Strategy – Event Study: SEC Acceleration Filing Rule

Panel A: Univariate Analysis of Treatment Group and Control Group in the Last SEC 10-K Filing Disclosure Month before Regulation Change

	(1) Treatment group 148 firm observations 29.84%	(2) Control group 348 firm observations 70.16%	(1) - (2) Difference of Means in two groups
Variables	**Mean**	**Mean**	***T*-test significance**
Ln Total AD MUSD	0.301	0.301	0.000
Ln Total AD Unit	2.446	2.621	-0.175
SEC 10-K GN	0.439	0.477	-0.038
Ln Sales	4.706	5.046	-0.340**
Ln Market Cap	6.618	6.893	-0.275*
Book-to-Market	0.640	0.606	0.034
Book Leverage	0.170	0.176	-0.006
Ln Firm Age	2.540	2.619	-0.079
ROA	-0.003	0.005	-0.008**
Loss	0.318	0.239	0.079*
Ln Analyst Following	1.692	1.769	-0.077
Institutional Ownership	0.424	0.472	-0.048
Suspect	0.014	0.020	-0.007
Suspect X Month3	0.007	0.020	-0.013
Industry Sales Normalized HHI	0.115	0.132	-0.017**
Industry Total AD Normalized HHI	0.231	0.239	-0.008
Ln Industry Total AD MUSD	0.582	0.616	-0.035
Ln Industry Total AD Unit	5.763	5.789	-0.025

This table presents univariate comparison in means of dependent variables and all the control variables between treatment group and control group. Please refer to Appendix A3 for variable definitions. All the variables except for indicator variables are winsorized at the 1% level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 9. Identification Strategy – Event Study: SEC Acceleration Filing Rule

Panel B: Difference-in-Difference Test Results and Parallel Trend Analysis

Variables	*Ln Total AD MUSD*				*Ln Total AD Unit*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	0.0186		0.0211		-0.3625***		-0.3791***	
	(0.83)		(0.94)		(-2.60)		(-2.71)	
Treat X Post	**-0.0657****		**-0.0617****		**0.0889**		**0.0623**	
	(-2.19)		(-2.07)		(0.61)		(0.43)	
Pre FY1		0.0407		0.0388		0.3623*		0.3751**
		(0.80)		(0.76)		(1.91)		(1.96)
Post FY1		0.0742		0.0735		0.3896		0.3945
		(0.69)		(0.69)		(0.92)		(0.92)
Post FY2		0.1220		0.1216		0.8736		0.8758
		(0.75)		(0.75)		(1.34)		(1.34)
Treat X Pre FY1		**-0.0541**		**-0.0539**		**-0.0445**		**-0.0460**
		(-1.51)		(-1.50)		(-0.25)		(-0.26)
Treat X Post FY1		**-0.0921****		**-0.0871****		**0.0779**		**0.0432**
		(-2.16)		(-2.04)		(0.39)		(0.22)
Treat X Post FY2		**-0.1196****		**-0.1164****		**-0.0139**		**-0.0360**
		(-2.06)		(-2.01)		(-0.05)		(-0.12)
SEC 10-K GN			0.0130	0.0132			-0.0882	-0.0907
			(1.43)	(1.45)			(-1.52)	(-1.56)
Ln Sales	0.0441*	0.0478**	0.0443*	0.0480**	0.2809**	0.3059**	0.2797**	0.3050**
	(1.94)	(2.09)	(1.94)	(2.10)	(2.32)	(2.54)	(2.32)	(2.54)
Ln Market Cap	0.0534***	0.0500***	0.0539***	0.0505***	0.1941	0.1809	0.1901	0.1771
	(3.15)	(2.97)	(3.17)	(2.99)	(1.41)	(1.31)	(1.38)	(1.28)
Book-to-Market	0.0595*	0.0585*	0.0596*	0.0587*	0.1762	0.1595	0.1759	0.1585
	(1.80)	(1.77)	(1.79)	(1.76)	(0.47)	(0.44)	(0.47)	(0.44)
Book Leverage	-0.0564	-0.0531	-0.0579	-0.0550	-0.0473	-0.0170	-0.0372	-0.0047
	(-0.81)	(-0.76)	(-0.83)	(-0.78)	(-0.10)	(-0.04)	(-0.08)	(-0.01)
Ln Firm Age	0.0273	0.0319	0.0249	0.0290	0.0635	0.1094	0.0798	0.1297
	(0.46)	(0.52)	(0.42)	(0.47)	(0.17)	(0.29)	(0.21)	(0.34)
ROA	-0.0403	-0.0278	-0.0469	-0.0348	0.1557	0.1965	0.2007	0.2452
	(-0.31)	(-0.22)	(-0.37)	(-0.27)	(0.14)	(0.18)	(0.18)	(0.22)
Loss	0.0101	0.0092	0.0095	0.0085	-0.0220	-0.0244	-0.0173	-0.0190
	(0.70)	(0.64)	(0.65)	(0.58)	(-0.19)	(-0.21)	(-0.15)	(-0.16)

Ln Analyst Following	-0.0175	-0.0180	-0.0174	-0.0179	0.1162	0.1117	0.1153	0.1109
	(-1.59)	(-1.63)	(-1.57)	(-1.62)	(1.41)	(1.37)	(1.40)	(1.36)
Institutional Ownership	-0.0716	-0.0677	-0.0679	-0.0634	-1.3417***	-1.3317***	-1.3672***	-1.3610***
	(-1.40)	(-1.32)	(-1.33)	(-1.24)	(-3.31)	(-3.27)	(-3.38)	(-3.34)
Suspect	-0.0327	-0.0245	-0.0327	-0.0241	-0.2000	-0.1767	-0.1998	-0.1795
	(-0.90)	(-0.65)	(-0.88)	(-0.63)	(-0.64)	(-0.55)	(-0.62)	(-0.54)
Suspect X Month3	0.0712	0.0619	0.0699	0.0601	0.1850	0.1618	0.1936	0.1741
	(1.55)	(1.33)	(1.51)	(1.28)	(0.46)	(0.40)	(0.48)	(0.43)
Industry Sales Normalized HHI	-0.0468	-0.0596	-0.0535	-0.0656	1.5040	1.4229	1.5496	1.4636
	(-0.17)	(-0.21)	(-0.19)	(-0.23)	(0.97)	(0.92)	(1.01)	(0.95)
Industry Total AD Normalized HHI	0.1234	0.1247	0.1198	0.1210	-0.1035	-0.0853	-0.0802	-0.0603
	(0.72)	(0.73)	(0.70)	(0.70)	(-0.25)	(-0.20)	(-0.19)	(-0.14)
Ln Industry Total AD MUSD	0.0498	0.0460	0.0504	0.0465				
	(1.12)	(1.03)	(1.14)	(1.03)				
Ln Industry Total AD Unit					0.0228	0.0238	0.0223	0.0232
					(0.54)	(0.56)	(0.53)	(0.54)
Observations	1 841	1 841	1 841	1 841	1 841	1 841	1 841	1 841
Adjusted R-squared	0.9364	0.9365	0.9365	0.9365	0.8886	0.8887	0.8887	0.8888
Year-Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Model	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Subsample	Accelerated filers	Accelerated filers	Accelerated filers	Accelerated filers	Accelerated filers	Accelerated filers	Accelerated filers	Accelerated filers

This table presents regression results that pertain to the difference-in-difference analysis of advertising spending change before and after SEC acceleration filing rules in 10-K filings in treatment group as opposed to control group. Treatment group includes accelerated filers that accelerate their 10-K filings for over a month after the SEC rule change. Control group includes accelerated filers that don't accelerate their 10-K filings for over a month. Please refer to Appendix A3 for variable definitions. All the variables except for indicator variables are winsorized at the 1% level. Robust *t*-statistics are shown in parentheses. Standard errors are clustered at the firm-quarter level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 10. Interaction Decision of a Firm's Advertising and its Disclosure with Respect to Market Liquidity

Variables	*Spread 100*		*Trade Volume*		*Trade Share*	
	(1)	(2)	(3)	(4)	(5)	(6)
AD	-0.0330**	-0.0988***	0.0004	0.0009	0.0002	0.0009
	(-2.48)	(-6.63)	(0.32)	(0.61)	(0.21)	(0.79)
SEC 10-K	-0.0262*	-0.0708***	0.0051***	0.0083***	0.0051***	0.0077***
	(-1.76)	(-2.98)	(3.04)	(3.21)	(3.88)	(3.93)
SEC 10-K X AD		**0.0919*** **		**-0.0063***		**-0.0052****
		(3.07)		(-1.82)		(-1.97)
SEC 10-Q	-0.0558***	-0.1027***	-0.0048***	-0.0052***	-0.0061***	-0.0060***
	(-9.87)	(-10.37)	(-7.09)	(-4.86)	(-10.73)	(-6.84)
SEC 10-Q X AD		**0.0977*** **		**0.0009**		**-0.0001**
		(6.84)		(0.57)		(-0.09)
SEC 8-K	0.0370***	-0.1298***	0.0199***	0.0240***	0.0187***	0.0233***
	(3.68)	(-8.67)	(16.01)	(13.14)	(18.31)	(15.66)
SEC 8-K X AD		**0.3118*** **		**-0.0077*** **		**-0.0087*** **
		(16.96)		(-3.45)		(-4.57)
EA	0.0094**	0.0308***	0.0096***	0.0081***	0.0109***	0.0095***
	(2.07)	(4.10)	(16.86)	(9.49)	(23.43)	(13.86)
EA X AD		**-0.0412*** **		**0.0030****		**0.0028*** **
		(-3.92)		(2.50)		(2.77)
MEF	-0.0429**	-0.0899***	0.0325***	0.0327***	0.0477***	0.0454***
	(-2.52)	(-3.86)	(11.32)	(8.00)	(17.61)	(12.14)
MEF X AD		**0.1156*** **		**-0.0006**		**0.0047**
		(3.55)		(-0.11)		(0.88)
Ln Market Cap	-0.7917***	-0.7926***	0.0244***	0.0244***	0.0480***	0.0480***
	(-48.75)	(-48.83)	(13.56)	(13.58)	(32.29)	(32.32)
Book-to-Market	0.5722***	0.5701***	-0.0447***	-0.0446***	-0.0409***	-0.0408***
	(11.30)	(11.27)	(-8.90)	(-8.88)	(-10.39)	(-10.38)
Book Leverage	0.7197***	0.7290***	0.0176**	0.0174**	0.0307***	0.0305***
	(9.79)	(9.94)	(2.40)	(2.37)	(5.41)	(5.37)
ROA	-1.6363***	-1.6447***	0.2372***	0.2375***	0.1537***	0.1539***
	(-6.52)	(-6.56)	(7.94)	(7.95)	(6.84)	(6.86)
Loss	0.1353***	0.1366***	-0.0191***	-0.0191***	-0.0090***	-0.0090***
	(6.13)	(6.19)	(-9.62)	(-9.63)	(-5.76)	(-5.77)
Ln Analyst Following	0.0094	0.0050	0.0082***	0.0083***	0.0053***	0.0054***
	(0.76)	(0.41)	(6.11)	(6.18)	(4.68)	(4.77)
Institutional Ownership	0.6692***	0.6732***	0.0468***	0.0467***	0.0612***	0.0610***
	(12.99)	(13.09)	(7.85)	(7.84)	(12.20)	(12.18)
Quarterly Stock Return	-0.3684***	-0.3675***	0.0158***	0.0158***	0.0100***	0.0099***
	(-17.64)	(-17.61)	(5.76)	(5.75)	(4.65)	(4.63)
Stock Return Volatility	19.3047***	19.2495***	1.4489***	1.4499***	1.3705***	1.3715***
	(31.42)	(31.35)	(25.38)	(25.39)	(30.81)	(30.83)
Special Items	2.0881***	2.1058***	-0.3076***	-0.3080***	-0.2104***	-0.2110***
	(4.27)	(4.31)	(-5.67)	(-5.68)	(-5.18)	(-5.19)
Observations	164 751	164 751	164 751	164 751	164 751	164 751
Adjusted R-squared	0.7202	0.7207	0.483	0.483	0.5734	0.5735
Year-Quarter FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
Model	OLS	OLS	OLS	OLS	OLS	OLS
F-test (AD + SEC 10-K X AD = 0)		**-0.0070**		**-0.0054**		**-0.0043**
f-statistics		(0.05)		(2.29)		(2.50)
F-test (SEC 10-K + SEC 10-K X AD = 0)		**0.0211**		**0.0020**		**0.0024**
f-statistics		(1.35)		(0.81)		(1.90)
F-test (AD + SEC 10-Q X AD = 0)		**-0.0012**		**0.0018**		**0.0008**
f-statistics		(0.00)		(0.90)		(0.29)
F-test (SEC 10-Q + SEC 10-Q X AD = 0)		**-0.0050**		**-0.0043*** **		**-0.0061*** **
f-statistics		(0.37)		(19.21)		(55.78)
F-test (AD + SEC 8-K X AD = 0)		**0.2130*** **		**-0.0068*** **		**-0.0077*** **
f-statistics		(107.70)		(7.72)		(14.24)
F-test (SEC 8-K+ SEC 8-K X AD = 0)		**0.1820*** **		**0.0163*** **		**0.0146*** **
f-statistics		(217.03)		(113.76)		(125.60)
F-test (AD + EA X AD = 0)		**-0.1400*** **		**0.0040****		**0.0037*** **
f-statistics		(73.91)		(5.66)		(7.10)
F-test (EA + EA X AD = 0)		**-0.0104***		**0.0112*** **		**0.0123*** **
f-statistics		(2.72)		(190.83)		(331.67)
F-test (AD + MEF X AD = 0)		**0.0168**		**0.0003**		**0.0056**
f-statistics		(0.24)		(0.00)		(1.08)
F-test (MEF + MEF X AD = 0)		**0.0258**		**0.0321*** **		**0.0501*** **
f-statistics		(1.18)		(69.77)		(173.45)

This table presents regression results that pertain to the interaction effect of a firm's advertising decision and its disclosure decision on market liquidity in the same month. Please refer to Appendix A3 for variable definitions. All the variables except for indicator variables are winsorized at the 1% level. Robust *t*-statistics or *f*-statistics are shown in parentheses. Standard errors are clustered at the firm-quarter level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 11. Effect of a Firm's Disclosures on its Advertising Decision and Expenditure in Out-of-Sample Period from 2006 to 2015

Variables	(1) *Ln Total AD MUSD*	(2) *Ln Total AD Unit*	(3) *Ln Total AD MUSD*[(a)]	(4) *Ln Total AD Unit*[(b)]
SEC 10-K	**-0.0027***	**0.0408*****	**-0.0018**	**0.0203*****
	(-1.70)	(3.46)	(-1.13)	(2.63)
SEC 10-Q	**0.0061*****	**0.0460*****	**0.0052*****	**0.0236*****
	(6.74)	(7.37)	(5.79)	(5.48)
SEC 8-K	**-0.0020**	**-0.0077**	**-0.0012**	**-0.0012**
	(-1.64)	(-0.82)	(-1.01)	(-0.20)
EA	**-0.0000**	**-0.0193*****	**0.0006**	**-0.0053**
	(-0.03)	(-3.30)	(0.67)	(-1.32)
MEF	**-0.0023**	**-0.0370**	**-0.0028**	**-0.0292****
	(-1.01)	(-1.42)	(-1.31)	(-2.17)
Ln Sales	0.0221***	0.1737***	0.0187***	0.0738***
	(9.47)	(8.66)	(8.25)	(6.45)
Ln Market Cap	0.0195***	0.2113***	0.0162***	0.0803***
	(9.87)	(12.52)	(8.68)	(8.29)
Book-to-Market	0.0108**	0.1814***	0.0085*	0.0475*
	(2.11)	(4.08)	(1.75)	(1.85)
Book Leverage	-0.0091	0.1121	-0.0079	0.0357
	(-1.03)	(1.55)	(-0.91)	(0.86)
Ln Firm Age	0.0237***	0.0344	0.0265***	0.0915***
	(5.79)	(1.17)	(6.84)	(4.74)
ROA	-0.0898***	-0.4912***	-0.0874***	-0.3627***
	(-4.18)	(-2.72)	(-4.47)	(-3.51)
Loss	0.0111***	0.0175	0.0105***	0.0175
	(5.21)	(0.96)	(5.05)	(1.50)
Ln Analyst Following	0.0037	0.0213	0.0009	0.0092
	(1.63)	(1.30)	(0.39)	(0.89)
Institutional Ownership	-0.0245***	-0.0503	-0.0185***	0.0127
	(-3.48)	(-0.94)	(-2.71)	(0.40)
Suspect	0.0013	-0.0056	-0.0010	-0.0339
	(0.47)	(-0.18)	(-0.37)	(-1.61)
Suspect X Month3	0.0008	0.0644***	0.0018	0.0310*
	(0.30)	(2.62)	(0.71)	(1.80)
Industry Sales Normalized HHI	0.0677	-0.5917**	0.0691*	0.3496**
	(1.51)	(-2.13)	(1.72)	(2.05)
Industry Total AD Normalized HHI	-0.0455***	-0.0631	-0.0367***	-0.1979***
	(-6.47)	(-1.19)	(-5.72)	(-6.79)
Ln Industry Total AD MUSD	0.0652***		0.0629***	
	(12.90)		(12.50)	
Ln Industry Total AD Unit		0.0251***		0.0255***
		(3.17)		(4.82)
Ln Internet AD MUSD			0.3922***	
			(19.42)	
Ln Internet AD Unit				0.0814***
				(30.81)
Observations	170 730	170 730	170 730	170 730
Adjusted R-squared	0.9169	0.8074	0.9144	0.8650
Year-Quarter FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES
Model	OLS	OLS	OLS	OLS

This table presents regression results that pertain to the effect of a firm's disclosures in the current month on its decision of whether to advertise in the same month, and if advertise how much to spend on advertising expenditure, how many units of advertising to make and how many media outlets to advertise. This sample consists of 170,730 firm-month observations for 2,036 US firms from 2006 to 2015. Please refer to Appendix A3 for variable definitions. All the variables except for indicator variables are winsorized at the 1% level. Robust *t*-statistics are in parentheses. Standard errors are clustered at the firm-quarter level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

(a) Excluding Internet advertising in millions USD.
(b) Excluding Internet advertising in number of units.