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Working on the weekend: Do analysts strategically time the release of their recommendation revisions?

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ABSTRACT

We examine whether financial analysts strategically time the announcement of their recommendation revisions consistent with their incentives to maintain relations with management. We provide evidence that investor and media attention to recommendation revisions is reduced on weekends, which analysts can exploit to strategically time the release of their revisions. We find that downgrades are a higher proportion of weekend revisions than weekday revisions and that analysts with characteristics that suggest they possess the strongest incentives to maintain favor with management are more likely to downgrade on the weekend. In contrast, analysts absent these characteristics are more likely to release downgrades during the week, consistent with these analysts being driven primarily by other incentives, such as the timely release of their recommendation and garnering media attention. We also present evidence suggesting that strategic disclosure of recommendation downgrades is associated with greater access to management on public earnings conference calls.

1. Introduction

Sell-side financial analysts are motivated to generate and disseminate high-quality, timely information because doing so enhances their reputation and places them in good standing with their investing clients (Mikhail et al., 1999; Hong and Kubik, 2003; Groysberg et al., 2011). Having access to company management is critical to achieving these objectives, and prior research suggests maintaining a positive relationship with management is a priority for analysts (Johnson, 2005; Brown et al., 2015; He et al., 2016). In this study, we investigate whether analysts strategically time the release of their stock recommendation revisions in a manner consistent with this incentive. We rely on the strategic timing hypothesis (hereafter STH) to form our predictions, which posits that individuals purposefully disclose information at a time that maximizes their utility. Our study is among the first that applies the STH to analyst disclosures. While academic research provides a great deal of evidence about the value of analysts' outputs and how their personal incentives can influence those outputs, we know little about the extent to which analysts engage in the strategic release of their outputs.

Understanding whether analysts strategically time their recommendation revisions is important because financial analysts play an important role in interpreting and disseminating financial information in capital markets (Brown, 1993; Ramnath et al., 2008). Recommendation revisions move stock prices, which directly impacts the wealth of company management and the investment positions of analysts' clients.[1] In addition, management is likely to care about analysts' recommendation revisions because

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[1] See, for example, Womack (1996), Barber et al. (2001), Asquith et al. (2005), Sorescu and Subrahmanyam (2006), and Li et al. (2015).

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management turnover and compensation packages are associated with stock price performance (e.g., Coughlan and Schmidt, 1985; Gilson, 1989).

Researchers have provided empirical evidence of analysts' strong incentives to maintain positive relations with company management in various settings. For example, He et al. (2016) find that analysts adjust their near-term earnings forecasts downward to help takeover bidders in stock-for-stock mergers achieve positive earnings surprises, which helps bidders save on acquisition costs due to higher market valuations. He et al. (2016) also provide evidence that analysts' conflicts of interest and their desires to curry favor with management explain this observed behavior. Similarly, analysts are likely to be aware that a recommendation downgrade could affect their relationship with management, which could negatively impact their careers (Chen and Matsumoto, 2006; Brown et al., 2015). In Brown et al. (2015), analysts indicate that losing access to management teams results in a loss of revenue and a loss of a valuable information source for determining earnings forecasts. In addition, investing clients value analysts' views more when they have direct contact with management (Brown et al., 2015), indicating that analysts' relationships with their clients are indirectly affected by their access to management. These institutional investing clients influence analysts' careers through their brokerage business and by casting votes in the *Institutional Investor* (*II*) survey that determines All-America Research Team (hereafter, Allstar) status. The repercussions of losing access to management provide financial analysts with incentives to strategically control the timing of their reports in order to maintain positive relationships with management and better serve their investing clients.

Based on a model of investor limited attention that predicts a smaller market reaction to information disclosed during periods when the information is less likely to be widely disseminated (Hirshleifer and Teoh, 2003; Twedt, 2016), we consider recommendation downgrades released on a weekend (i.e., after trading hours on Friday or anytime on Saturday and Sunday) to be a manifestation of analysts' strategic announcements of company-specific news. All else equal, we expect most recommendation revisions to occur on weekdays because most of the financial news upon which analysts base their recommendations is released during the week. However, the STH predicts that analysts will use to their advantage the differential attention paid by the market to revisions released on the weekend.

We test the STH by comparing the proportion of recommendation upgrades and downgrades announced on the weekend versus on weekdays. We predict that analysts will attempt to maintain favor with management by mitigating the effects of bad news, which is manifest by a disproportionate number of recommendation downgrades relative to upgrades released on the weekend when the market is not open for trading and investor and media attention are reduced (DellaVigna and Pollet, 2009). However, analysts face other incentives that provide significant tension to our prediction and even support a competing prediction. For example, analysts desire to issue timely information and they are motivated to be first to the market (Cooper et al., 2001; Mayew et al., 2013), which suggests they may avoid weekend revisions that forgo timeliness. In addition, analysts benefit from media coverage and are likely to view recommendation revisions as an opportunity to garner media attention (Bonner et al., 2007; Groysberg, 2010; Rees et al., 2015), which will lead to a preference of issuing revisions on a weekday. This preference should be greater for downgrades because analysts who are pessimistic in their forecasts or have unfavorable stock recommendations are more likely to receive press coverage (Bonner et al., 2007; Rees et al., 2015). Given the competing predictions based on different analyst incentives, whether analysts are more likely to issue recommendation downgrades on the weekend becomes an empirical question.

To more effectively disentangle the effects of analysts' different incentives on the strategic timing of their recommendation revisions, we identify analyst and broker characteristics that likely enhance the importance to analysts of maintaining positive relations with management. Specifically, we use employment at a brokerage house that provides underwriting services, Allstar status, and employment at a large brokerage house as characteristics that are likely associated with analysts having stronger incentives to maintain favor with management of the companies they follow. Thus, we conjecture that we are more likely to find results consistent with our first hypothesis for analysts with these characteristics. Brown et al. (2015) find that investment banking services are more profitable than analysts' research activities, and that analysts employed by the largest brokerage houses indicate private communication with management is a more useful input to their stock recommendations than do other analysts. Thus, analysts at large brokerage houses and brokerage houses that provide underwriting services should prioritize their relationships with management of covered firms. Analysts also receive career benefits from obtaining Allstar status, which is achieved via their reputations with institutional clients. To preserve this reputation, Allstar analysts likely face greater pressure than non-Allstars face to deliver access to management, one of the most important determinants of *II* Allstar votes (Brown et al., 2016).

In our empirical analyses, we first provide evidence consistent with our underlying premise that media and investor attention to recommendation revisions is reduced on weekends. We document that the volume of Google searches for stock market information is lower during weekends, and we find that business press coverage of analyst recommendation revisions is less common when analysts revise on the weekend. We also find that the market reaction to the announcement of recommendation revisions on weekends is less pronounced than the reaction to revisions made on weekdays.

In testing our hypotheses on strategic timing, we control for factors that might induce analysts to revise their recommendations on weekends for non-strategic reasons (e.g., timeliness). In univariate tests, we find that analysts are about 75% (20%) more likely to issue a downgrade than an upgrade on a weekend (weekday), and that downgrades are a significantly higher proportion of weekend revisions than weekday revisions. In a multiple regression framework, we find evidence that weekend recommendation revisions are more likely to be downgrades relative to upgrades, even after controlling for other nonstrategic factors that could initiate a weekend revision. These results are consistent with our first prediction that analysts attempt to maintain favor with management by mitigating the effects of bad news through releasing downgrades during periods of reduced investor attention.

When we use analyst and broker characteristics that likely capture the strength of different analyst incentives, we find strong results consistent with the STH. Specifically, our results provide evidence that analysts employed at firms that provide underwriting services, Allstar analysts, and analysts employed at large brokerage houses are all more likely to announce recommendation downgrades on

weekends than their counterparts. These results are consistent with these analysts being highly motivated to maintain positive relationships with management. In contrast, analysts without these characteristics are motivated by other incentives, and we find that they are more likely to release downgrades during the week when they can garner more media attention, consistent with our competing prediction.

Finally, we provide evidence that the strategic timing of recommendation revisions is associated with analyst career benefits. Specifically, we find that on the earnings conference call that follows an analyst recommendation downgrade, those analysts who issued the downgrade on the weekend are significantly more likely to be allowed by management to ask questions during the Q&A session of the call than analysts who downgraded during the week. One caveat to this result is that analysts who downgrade on the weekend are likely to have been currying favor with management even before the strategic downgrade; therefore, we do not claim a causal relation. Nevertheless, our analysis shows that among analysts who downgrade a company's stock, those who do so on the weekend appear to pay less of a price in terms of their loss of access to management.

This study contributes to prior literature in several meaningful ways, which should interest financial analysts, corporate managers, investors, and academic researchers. First, we provide empirical evidence that the market reaction to recommendation downgrades announced on the weekend is significantly less negative than the reaction to downgrades announced on weekdays, which provides a setting that analysts can exploit to strategically time the announcements of value relevant information. Next, we extend the investigation of the STH to financial analysts. While evidence supporting managers' strategic timing of disclosures has been mixed, analysts provide an important setting for testing the STH in light of significant efforts by regulators to increase research analysts' independence and reduce their conflicts of interest. Our findings provide new insights into how analysts' incentives influence their choices about how and when to convey value-relevant information to the market. Also, we document greater access to management for analysts who engage in the strategic disclosure of their recommendations, which represents a significant career benefit for these analysts.

This paper is organized in multiple sections. Section 2 provides the motivation and hypotheses development of our research question, while Section 3 discusses our data and methodology for testing the hypotheses. Section 4 discusses our empirical findings, and Section 5 concludes.

2. Motivation and hypotheses

2.1. Proportion of recommendation downgrades on the weekend

Financial analysts play an important role in capital markets by acting as information intermediaries between corporate managers and market participants. They disseminate information via reports that contain stock recommendations, earnings forecasts, and other items that are relevant to investors' capital-allocation decisions. Prior literature indicates that analyst compensation and turnover are associated with factors related to the quality of the information they produce. For example, Groysberg et al. (2011) find that analyst compensation is positively associated with Allstar recognition and identification as a top stock picker by *The Wall Street Journal*. Groysberg et al. (2011) also find that Allstar recognition proxies for buy-side client votes for analyst research quality. In addition, several studies find a significant association between earnings forecast accuracy and career prospects (Groysberg et al., 2011; Hong and Kubik, 2003; Mikhail et al., 1999). Thus, analysts have incentives to generate and disseminate high-quality information, which enhances their reputation and places them in good standing with their investing clients.

Information from company management is important to analysts because it facilitates their production of high-quality information. Analysts interact closely with management to obtain insights on firm activities and prospects, which become critical inputs to their earnings forecasts and stock recommendations. Loss of access to management can hinder analysts' ability to produce high-quality information and harm their relationships with investing clients. Institutional investors rank management access as one of the most important determinants of Allstar status (Johnson, 2005). Analysts surveyed and interviewed by Brown et al. (2015) state that investors expect analysts to provide access to management teams, and the demand for analyst reports can be significantly affected by the loss of management access. Thus, analysts consider maintaining access to management as an important factor in effectively serving their clients.

An analyst recommendation downgrade can cause a decline in stock price (Asquith et al., 2005; Li et al., 2015), and prior research documents that management compensation and turnover are significantly associated with stock price performance (Coughlan and Schmidt, 1985; Gilson, 1989). Thus, managers care about outputs produced by analysts. Prior studies indicate that corporate managers penalize analysts with isolation after they issue unfavorable reports. Mayew (2008) and Mayew et al. (2013) provide evidence that analysts who issue unfavorable recommendations are less likely to be selected to ask questions to management during earnings conference calls. Management teams are also less likely to attend conferences hosted by the analyst's brokerage firm after the analyst downgrades a stock (Brown et al., 2015).

We conjecture that analysts consider the impact that a recommendation downgrade will have on their access to management. When compelled to issue a downgrade for a firm, analysts can potentially mitigate its effect by strategically timing its release, consistent with the strategic timing hypothesis (STH). Specifically, we hypothesize that analysts will exhibit strategic behavior by announcing recommendation downgrades on the weekend, when investor and media attention are low, with greater relative frequency.

Researchers have applied the STH to managers within various financial reporting contexts, such as earnings announcements and management earnings guidance, but this research has produced mixed results.[2] Most closely related to our study is a stream of

[2] For example, studies have examined whether managers appear to make strategic disclosures around the timing of equity grants (e.g., Aboody and Kasznik, 2000; Efendi et al., 2007; McAnally et al., 2008). Graham et al. (2005) find that CFOs admit to delaying bad news disclosures with the hope that conditions will improve to make the disclosure unnecessary. Kothari et al. (2009) provide evidence that managers withhold bad news up to a certain threshold, but immediately disclose good news to investors.

research that examines whether managers strategically issue bad news during non-trading hours. Patell and Wolfson (1982) find that managers are more likely to disclose non-positive income or dividend changes after trading hours. Damodaran (1989) finds that earnings and dividend announcements occurring on Fridays are more likely to contain bad news than announcements on any other business day. Additionally, DellaVigna and Pollet (2009) find lower trading volume and a significantly smaller and slower market response to news disclosed on Friday compared to other days. Doyle and Magilke (2009) refine previous studies by defining strategic disclosure as a *change* in the timing of firms' disclosures from before or during trading hours to after the market closes. In contrast to prior studies, Doyle and Magilke (2009) do not find evidence of strategic timing in management disclosures using their refined definition of strategically timed disclosure.

The STH evidence for managers should not be extrapolated to analysts because these parties have different incentives and market forces that influence their behaviors. Managers will always have incentives to cast themselves and the firms they run in the best possible light. However, analysts are not employed by the firms they follow; therefore, their incentives are only indirectly related to the firm. Thus, we wouldn't necessarily expect to observe the same types of behavior by managers and analysts. Our study is among the first of which we are aware to apply the STH to analysts' outputs.

We predict a weekend revision may help mitigate management's negative reaction to recommendation downgrades because the market will react less negatively to bad news announced during periods of investor inattention when the information is not widely disseminated (Hirshleifer and Teoh, 2003; Twedt, 2016). Conversely, analysts should be less likely to issue recommendation upgrades on the weekend when investor inattention may limit the market's positive response. We formally state our first hypothesis as follows:

Hypothesis 1. *Analysts who revise their recommendations on the weekend are more likely to downgrade than upgrade a stock relative to analysts who revise their recommendations on weekdays.*

We rely on analysts' incentive to maintain relations with management to develop Hypothesis 1, but analysts have other incentives that either reinforce or provide tension to this hypothesis. The prospect of losing a client's brokerage business likely influences analyst behavior. For example, Firth et al. (2013) find that analysts are less likely to downgrade stocks that are owned by their firm's institutional clients when covered stocks announce bad news. They also find that the optimism in analysts' recommendations increases with the weight of the stock in institutional clients' portfolios and with the commission revenue generated by institutional clients. These results suggest that analysts consider the effects of downgrades on client portfolios and reinforce the prediction in Hypothesis 1 that when analysts are compelled to issue a downgrade, they will do so on the weekend when low investor attention is likely to reduce the negative impact of the downgrade on the value of the client's investment.[3]

Other analyst incentives encourage them to issue recommendation revisions (and particularly downgrades) on weekdays, which provide tension to the prediction in Hypothesis 1. Analysts are motivated to generate trading commissions for their firm, which can hinge on the timeliness of their report. Cooper et al. (2001) present evidence suggesting that analysts have incentives to release information before other analysts. Mayew et al. (2013) also present evidence consistent with analysts facing pressure to issue timely disclosures. In their desire to be first to the market, analysts may avoid weekend revisions. In addition, analysts benefit from media coverage because investors respond more to their outputs when the analysts have “celebrity” status and because analysts cited in the business press are more likely to receive Allstar status (Bonner et al., 2007; Groysberg, 2010; Rees et al., 2015). Thus, some analysts are likely to view recommendation revisions as an opportunity to garner press coverage and will prefer to release their revisions during the week when they are more likely to be noticed. This preference should be greater for downgrades because analysts who are pessimistic in their forecasts or have unfavorable stock recommendations are more likely to receive press coverage (Bonner et al., 2007; Rees et al., 2015).

Taken together, timeliness and media coverage provide competing predictions and introduce significant tension to our research question. Faced with multiple incentives that encourage different behaviors, whether analysts disproportionately issue downgrades on the weekend becomes an empirical question, which we examine in this study.

2.2. Analyst and broker characteristics that influence incentives

Our first hypothesis unconditionally predicts that analysts, on average, exhibit strategic timing in the release of their recommendation revisions. As previously discussed, analysts possess competing incentives to maintain positive relations with their constituents, to provide timely information, and to garner media attention. To better distinguish between competing predictions that derive from analysts' different incentives, we identify analyst and broker characteristics that enhance the relative importance of maintaining positive relations with management and thus, are more likely to be associated with a weekend revision.

Analysts employed by brokerage firms with the ability to perform underwriting services may behave strategically to position their employer for future underwriting business. Prior studies find that underwriting services can induce a conflict of interest for analysts employed at a firm with an underwriting department (e.g., Francis and Philbrick, 1993; Dugar and Nathan, 1995; Lin and McNichols, 1998; Dechow et al., 2000; Irvine, 2004). Underwriting fees provide investment banks with a significant source of revenue, and

[3] Analysts can eliminate any negative impact a downgrade would have on a client's portfolio by communicating the downgrade to the client prior to when it is issued publicly (i.e., tipping). Irvine et al. (2007) find evidence consistent with analysts tipping favored clients about the contents of their reports. If tipping serves as a substitute for weekend revisions, then we would not expect that client relations are a direct factor in determining weekend revisions. However, tipping is explicitly prohibited as part of FINRA's trading standards (FINRA Rule 5280); thus, at least some analysts would probably choose weekend revisions instead of tipping as a mechanism to protect their clients.

analysts working for firms that provide underwriting services tend to issue more optimistic earnings forecasts and stock recommendations (Dugar and Nathan, 1995; Lin and McNichols, 1998; Dechow et al., 2000; Hong and Kubik, 2003). These analysts are also slower to downgrade their recommendations relative to analysts working at brokerages unaffiliated with an underwriting department (O'Brien et al., 2005), and stocks recommended by affiliated analysts perform more poorly than stocks recommended by unaffiliated analysts (Michaely and Womack, 1999). Moreover, Lin and McNichols (1998) find that investor reactions to unfavorable recommendation revisions from affiliated analysts are significantly more negative relative to those from unaffiliated analysts. The above results suggest that analysts employed by underwriting brokerage houses have greater incentives to be more strategic in their behavior to maintain positive relations with management.

Analysts with strong personal reputations are likely driven to protect their own status. We use Allstar status as a proxy for analysts' personal reputations. Prior research is mixed regarding whether these analysts are likely to act strategically in order to maintain positive relationships with management. Mayew (2008) finds that management is more likely to allow analysts with Allstar status to ask questions during earnings conference calls regardless of their current stock recommendation level, consistent with Allstar analysts receiving preferential access to management. However, analysts with strong reputations also tend to behave in a strategic manner to protect their reputation (Graham, 1999). Analyst rankings are a significant determinant of analyst compensation (Stickel, 1992; Brown et al., 2015), and the increased compensation associated with analyst awards is likely to motivate analysts to act in a way that preserves their award status. Allstar analysts are likely to face significant pressure to maintain and provide access to management, given that access to management is one of the key determinants of *II* Allstar status (Brown et al., 2016). In addition, institutional clients, whose votes determine Allstar status, could discontinue using the analyst's firm for brokerage services if a recommendation downgrade hurts the analyst's ability to maintain relations with management. In summary, the evidence suggests Allstar status will motivate analysts to strategically release their recommendation downgrades on the weekend.

Finally, analysts employed by brokerage firms with strong reputations may face additional pressures to maintain relations with management of the companies they follow. Prior research uses brokerage firm size as a proxy for brokerage resources or reputation and examines whether analysts employed at large brokerage firms behave differently than analysts at smaller brokerage firms (e.g., Clement, 1999; Lim, 2001). Brown et al. (2015) report that analysts who work for large brokerage houses are more likely than other analysts to state that private communication with management is an important input to their stock recommendations. Further, analysts at large brokerage houses are more likely to state that analyst rankings and other votes by institutional clients are important to their compensation (Brown et al., 2015). These results suggest that analysts who work for large brokerage houses have significant incentives to maintain positive relationships with management of the companies they follow to better serve investing clients who determine their Allstar status.

We formally state our hypotheses related to analyst and broker characteristics below, stated in the alternative form.

Hypothesis 2a. *Analysts employed at a brokerage that provides underwriting services are more likely than analysts employed at a brokerage that does not provide underwriting services to release downgrades on the weekend.*

Hypothesis 2b. *Allstar analysts are more likely than non-Allstar analysts to release downgrades on the weekend.*

Hypothesis 2c. *Analysts employed at large brokerage houses are more likely than analysts employed at small brokerage houses to release downgrades on the weekend.*

3. Sample and research design

3.1. Data sources

We obtain analyst recommendations from the I/B/E/S database for the years 2002 through 2010. Because Regulation Fair Disclosure (Reg FD) significantly altered the dynamics of the relationship between analysts and managers, our sample period begins in 2002 to keep our sample within the post-Reg FD enforcement period. Table 1, Panel A describes the effects of our data filters on our final sample. Our study compares stock recommendation revisions (i.e., downgrades against upgrades); therefore, we remove recommendations that represent an analyst's initial coverage of a firm or recommendations in which the analyst reiterates his or her previous recommendation level.[4] In order to calculate meaningful relative measures for our empirical tests, we follow prior research (e.g., Mayew et al., 2013) and require sample firms to be followed by at least three analysts. We use Compustat and CRSP to obtain financial statement and stock return variables, respectively, for the covered firms in our sample and omit firms without the requisite data.[5] We also require a prior earnings announcement date to calculate a control variable in our model, which results in the elimination of 46 observations. The resulting dataset contains 113,073 analyst recommendation revisions.

We incorporate Allstar rankings into our analyst dataset, and we also require information about a brokerage firm's ability to underwrite debt and equity issuances. We obtain a list of historical debt and equity issuances during the years 1998 to 2010 from the

[4] We focus on recommendation revisions because we can unambiguously classify them as good or bad news for the firm. A recommendation reiteration is likely neutral in most cases, and whether an initial recommendation is good or bad news is contextual. In support of this conjecture, we find that the mean one-day abnormal stock price response for all recommendation reiterations is economically trivial at only 0.05%. Further, across all reiteration levels (strong buy, buy, hold, sell, and strong sell), the absolute magnitude of the mean return is never >0.6%. Thus, we remove reiterations from our sample because including these largely neutral observations in our analyses would reduce the magnitude of the effect that we are examining and lower the power of our tests.

[5] We require each covered firm to have total assets and income before extraordinary items for the prior fiscal year, as well as cash flow from operations for at least the prior three fiscal years in order to calculate cash flow volatility. For any covered firm with missing segment information in Compustat, we assume the firm has only one segment.

Table 1
Descriptive statistics.

Panel A: Sample construction

	Observations
Analyst recommendations in I/B/E/S database from 2002 to 2010	282,041
Less:	
Initial coverage recommendations	(88,963)
Reiterations	(45,082)
Followed by fewer than three analysts	(13,188)
Missing Compustat data	(17,560)
Missing CRSP data	(4,129)
No previous earnings announcement	(46)
Final sample	113,073

Panel B: Descriptive statistics

Variable	N	Mean	Median	Lower quartile	Upper quartile	Std. dev.
Recommendation characteristics						
WEEKEND	113,073	0.05	0.00	0.00	0.00	0.21
DOWN	113,073	0.55	1.00	0.00	1.00	0.50
Analyst and brokerage characteristics						
UNDERWRITER	113,073	0.80	1.00	1.00	1.00	0.40
ALLSTAR	113,073	0.10	0.00	0.00	0.00	0.29
BROKER_SIZE_RANK	113,073	48.35	50.00	20.00	75.00	33.16
EXPER_GEN_RANK	113,073	55.49	55.56	30.77	83.33	31.57
EXPER_FIRM_RANK	113,073	65.08	66.67	46.15	88.89	27.14
FIRMS_FOLLOW_RANK	113,073	55.05	57.14	28.57	83.33	32.16
REC_FREQ_RANK	113,073	39.73	35.00	0.00	67.86	33.55
PREV_WKND	113,073	0.05	0.00	0.00	0.00	0.22
IND_EXP	113,073	0.49	0.00	0.00	1.00	0.50
Covered firm characteristics						
ABRET_FRI	113,073	0.00	0.00	−0.01	0.01	0.05
WEEKEND_NEWS	113,073	0.14	0.00	0.00	0.00	0.35
DAYS_EA	113,073	39.04	37.00	4.00	65.00	33.57
IB	113,073	383.89	64.00	6.28	293.40	1043.83
LN_AT	113,073	7.68	7.61	6.31	8.94	1.91
σCFO	113,073	0.05	0.04	0.02	0.06	0.06
N_SEG	113,073	0.53	0.00	0.00	1.10	0.68

See Appendix for variable definitions.

Thomson One Banker database. This list includes details of the issuance, including the issuance date, the proceeds amount, and the underwriting firms. From this list, we identify financial institutions that participated as underwriters. We consider any financial institution reported as an underwriter on any debt or equity issuance from 1998 to 2010 as a brokerage firm that provides underwriting services (Bradshaw et al., 2014). We then merge information about a brokerage's ability to perform underwriting services with the recommendation information obtained from I/B/E/S.[6]

3.2. Research design

We first test our hypothesis of strategic timing of recommendation revisions (Hypothesis 1) by determining the proportion of recommendation downgrades announced during various days and times of the week. We define weekend announcements as recommendation revisions announced on Saturday or Sunday, or on Friday after 4:00 p.m. Eastern Time. In order to directly test Hypothesis 1, we calculate the proportion of recommendation upgrades and downgrades for recommendations announced during the week and during the weekend. A higher proportion of recommendation downgrades on the weekend compared to weekdays

[6] The I/B/E/S recommendation detail file provides abbreviated brokerage names, a brokerage identification code, and the name of the analyst issuing the recommendation. We utilize the most recent I/B/E/S Translation File from 2005 to obtain the full name of the brokerage firm based on the brokerage identification code listed in the Translation File and detail file. For brokerage firms not listed in the translation file, we hand collect the full name of the firm from Thomson One. To do this, we identify analysts employed by the brokerage from the "analyst" variable in the I/B/E/S recommendation detail file. We then search for the analysts' names in Thomson One, which contains a search tool to find institutional contacts. The search results yield a list of analysts with the specified search name and a link to review the individual's employment history. We match an I/B/E/S abbreviated brokerage name with a brokerage name in Thomson One when an analyst's employment history in Thomson One aligns with the analyst's recommendation history in I/B/E/S. Once we identify the full name of the brokerage, we identify I/B/E/S firms participating as underwriters in debt and equity issuances.

is consistent with the predictions of Hypothesis 1 that financial analysts will strategically use weekends to announce recommendation downgrades.[7]

When performing tests of Hypothesis 1, we use different comparison groups. First, we compare the weekend downgrade announcements against downgrades announced on all weekdays. We then compare weekend downgrades to downgrades made on only Monday and Friday before the market closes. This latter comparison is a potentially stronger test of the STH because it requires less manipulation of the timing of the announcement by the analyst. Prior literature suggests that the market values timely analyst information (Cooper et al., 2001; Mozes, 2003). Therefore, when an analyst has information that justifies a downgrade on Tuesday through Thursday, the incentive to report timely information might override any incentive to delay. Accordingly, we remove announcements made on Tuesday, Wednesday, and Thursday to construct a Monday and Friday control sample that consists of recommendation revisions that presumably could have more easily been released on the weekend but were instead released when the market would give full attention to the information.

We also consider the research design used by Doyle and Magilke (2009) by removing observations for analysts who consistently announce stock recommendations either during trading days or on the weekend. The resulting sample contains revision announcements where the analyst *changes* between a weekend announcement and a weekday announcement. We utilize this procedure in our tests comparing weekend announcements to all trading day announcements, as well as in our comparison of weekend announcements against Monday and Friday announcements.

Lastly, we estimate the following logistic regression model, using the sample of recommendation upgrades and downgrades and clustering standard errors by analyst with year fixed effects, to determine the likelihood of a weekend revision announcement when an analyst announces a recommendation downgrade:

$$\begin{aligned} Pr\left(WEEKEND_{i,j,k}\right) = {} & \beta_0 + \beta_1 DOWN_{i,j,k} + \beta_2 UNDERWRITER_{k,l} + \beta_3 ALLSTAR_{i,k} + \beta_4 BROKER\_SIZE\_RANK_{k,l} \\ & + \beta_5 EXPER\_GEN\_RANK_{i,k} + \beta_6 EXPER\_FIRM\_RANK_{i,j,k} + \beta_7 FIRMS\_FOLLOW\_RANK_{i,k} \\ & + \beta_8 REC\_FREQ\_RANK_{i,j,k} + \beta_9 PREV\_WKND_{i,j,k} + \beta_{10} IND\_EXP_{i,k} + \beta_{11} ABRET\_FRI_{i,j,k} \\ & + \beta_{12} WEEKEND\_NEWS_{i,j,k} + \beta_{13} DAYS\_EA_{i,j,k} + \beta_{14} IB_{j,k} + \beta_{15} LNTA_{j,k} + \beta_{16} \sigma CFO_{j,k} + \beta_{17} N\_SEG_{j,k} \\ & + GICS\ Sector\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon_{i,j,k,l} \end{aligned} \quad (1)$$

where:

i refers to the specific analyst;

j refers to the firm associated with the recommendation made by analyst *i*;

k refers to the revised stock recommendation by analyst *i* for covered firm *j*; and

l refers to the brokerage firm employing analyst *i* at the time of the announcement of the revised stock recommendation *k*.

The dependent variable in Eq. (1) is *WEEKEND*, which is an indicator variable equal to 1 if the analyst releases the stock recommendation on a Saturday or Sunday, or after trading hours (4 p.m. Eastern) on a Friday. We utilize the announcement time variable in I/B/E/S to determine the timing of recommendation announcements.

The primary independent variable of interest in Eq. (1) is *DOWN*, which is set equal to 1 if the recommendation level is a downgrade from the previous recommendation made by the same analyst covering the firm, and zero otherwise. The coefficient β_1 captures the association between a recommendation downgrade and its announcement on the weekend. Hypothesis 1 predicts that β_1 will be positive when the analyst is compelled to issue a recommendation downgrade because the analyst is motivated to mitigate the effects of the downgrade on stock price to maintain positive relations with management. In contrast, the competing prediction is that β_1 will be negative because the analyst will want to take advantage of the media attention that can potentially come from a recommendation downgrade released during the week. In addition, analysts' incentive to issue timely information adds tension to our prediction because analysts might not be willing to delay a recommendation revision to the weekend.

Eq. (1) includes several control variables that capture various analyst, brokerage, and firm characteristics that can influence the timing of analyst recommendation revisions for non-strategic reasons. Following prior research in the analyst literature (e.g., Ke and Yu, 2006; Mayew et al., 2013), *BROKER_SIZE_RANK*, *EXPER_GEN_RANK*, *EXPER_FIRM_RANK*, *FIRMS_FOLLOW_RANK*, and *REC_FREQ_RANK* are variables with ranked values relative to other analysts covering the same firm in the same calendar year; the values range from 0 to 100. *BROKER_SIZE_RANK* is determined based on the number of analysts issuing recommendations at the analyst's brokerage firm in a given year. *EXPER_GEN_RANK* (*EXPER_FIRM_RANK*) is based on the analyst's number of years of experience covering the firm at the time the recommendation is issued. *FIRMS_FOLLOW_RANK* is based on the number of total firms covered by the analyst in the prior 12-month period. *REC_FREQ_RANK* is based on the number of recommendations issued by the analyst for the firm in the prior 12-month period. The values of the ranked variables are set such that higher ranks are associated with larger brokerage firms, more experience, larger firm following, and higher recommendation frequency relative to other analysts covering the firm.

We also create the variables *UNDERWRITER*, which is an indicator variable equal to 1 if the analyst was employed by a brokerage firm with an underwriting services department at the time the recommendation was announced, and *ALLSTAR*, which is an indicator

[7] Prior research on management strategic disclosure has typically classified disclosures made after trading hours on any weekday as potentially strategic. We categorize weekday (except Friday) after-hour recommendation revisions as nonstrategic under the premise that, as weekday revisions, they receive significant attention by the market even though they occur after trading hours. In support of this premise, Li et al. (2015) find that after-hours recommendation revisions are associated with significantly *greater* price reactions than revisions during trading hours, and attribute this result to greater institutional investor attention after trading hours on weekdays. This result suggests analysts cannot exploit investor inattention by issuing recommendation revisions after hours during the week. Nevertheless, in a robustness test, we eliminate weekday after-hours observations from our analyses and find that all inferences remain qualitatively identical to our main analyses.

variable equal to 1 if the analyst issuing a revised recommendation received *Institutional Investor* recognition in the prior calendar year.

We control for the analysts' announcement behavior by creating the variable *PREV_WKND*, which is an indicator variable equal to 1 if the analyst's previous recommendation for the covered firm was announced on the weekend. We expect an analyst who announces a recommendation on the weekend to have a higher propensity to announce his or her next recommendation on the weekend.

Research suggests analysts have a macro-level advantage compared to corporate managers, who have a micro-level advantage over analysts (Hutton et al., 2012). Therefore, corporate managers might need analysts with industry expertise in order to extract important industry-level information. Thus, industry expertise could mitigate the need for analysts to strategically time recommendation announcements to maintain access to management. We control for analyst industry expertise by the variable *IND_EXP*, which is an indicator variable equal to 1 if the analyst issuing the recommendation follows firms in only one Global Industry Classification Standard (GICS) sector.[8]

Analysts are concerned with the timeliness of their forecasts and recommendations (Cooper et al., 2001; Clement and Tse, 2003; Mozes, 2003); therefore, analysts might quickly revise their recommendations on the weekend in reaction to firm events or news that occur on Friday or on the weekend. To capture this effect, we control for firm-specific events or news released on the Friday of or the Friday prior to the recommendation revision with the variable *ABRET_FRI*. *ABRET_FRI* is the abnormal return on the Friday of the recommendation revision if the revision is issued on a Friday, or the prior Friday if the recommendation is issued during any day other than Friday. We also control for firm-specific news released during the weekend. *WEEKEND_NEWS* is an indicator equal to one if the firm has any news story published after trading hours on Friday or on Saturday or Sunday, and 0 otherwise. We obtain media coverage information from RavenPack News Analytics.

We also include as a control the natural log of the number of days between the recommendation revision and the most recent prior earnings announcement (*DAYS_EA*). Earnings announcements garner significant media and investor attention, and we expect analysts to be less likely to revise on the weekend when their revision is prompted by an earnings announcement; that is, timeliness will likely supersede other analyst incentives following earnings announcements. Thus, we expect a positive coefficient on this variable, which indicates that analysts are more likely to issue weekend revisions as more time passes from the earnings announcement.

Finally, we control for covered-firm characteristics using financial statement and complexity variables used by Doyle and Magilke (2009). We use the annual financial statement and segment values for the fiscal year preceding the recommendation announcement. *IB* is the firm's income before extraordinary items in the fiscal year prior to the announcement of the recommendation, winsorized at the 1% level. *LNAT* is equal to the covered firm's natural log of total assets in the fiscal year prior to the announcement of the recommendation. σCFO is equal to the standard deviation of annual cash flows from operations for the previous five years for the firm associated with the revised recommendation made by the analyst.[9] *N_SEG* is equal to the natural log of the number of segments of the covered firm in the fiscal year prior to the announcement of the recommendation, as reported in Compustat. We include industry fixed effects for the covered firm using GICS sector codes, and we use year fixed effects to capture the macro-economic conditions in the year of the recommendation announcement.

Our second hypothesis (Hypotheses 2a, 2b and 2c) conjectures that certain analyst and brokerage characteristics are associated with stronger incentives for analysts to maintain relations with management. We modify Eq. (1) to include three variables representing the interactions of *UNDERWRITER*, *ALLSTAR*, and *BROKER_SIZE_RANK* with *DOWN* to determine if brokerages with underwriting services, analysts with Allstar status, and large brokerages are associated with the strategic timing of recommendation downgrades. The three interaction variables are the basis for our tests of Hypotheses 2a, 2b, and 2c, respectively.

4. Results

4.1. Descriptive statistics

Table 1, Panel B presents descriptive statistics for the variables used in our hypotheses tests (see Appendix 1 for the variable definitions). Our dataset contains mostly recommendation downgrades (*DOWN*): about 55% of recommendation revisions in our sample are downgrades. We isolate weekend announcements as potentially strategically timed recommendations, which represent about 5% of the recommendations in our dataset. While the overall percentage of weekend revisions is low relative to weekday revisions, many interesting phenomena examined in the literature occur infrequently (e.g., fraud, restatements), and weekend revisions represent unusual observations that potentially provide unique insights into analysts' behavior. Our percentage of weekend revisions is similar to the 5.7% of earnings announcements that are announced on Fridays, which is the phenomenon examined in DellaVigna and Pollet (2009).

Of the recommendation revisions, 80% are made by analysts employed by firms with an underwriting department and approximately 10% are made by analysts recognized as Allstars. We rank analyst characteristics relative to all other analysts following the firm in the calendar year. The average and median *BROKER_SIZE_RANK* is 48.35 and 50.00, respectively, which suggests that the average (median) analyst issuing a recommendation revision is employed at a brokerage firm in the 48.35 (50.00) size percentile relative to other brokerages covering the firm. Approximately 49% of the revisions are issued by analysts that cover firms in only one industry.

[8] We use the GICS code because it is considered an analyst-based industry classification code (Ramnath, 2002; Bhojraj et al., 2003; and Hui and Yeung, 2013)

[9] We require at least three years of cash flow from operations information. For years with three (four) years of cash flow information, σCFO is calculated by the standard deviation of cash flows from operations for the previous three (four) year period.

The average firm covered by the analysts in our dataset has an annual average income before extraordinary items of approximately $384 million and average total assets of approximately $2.2 billion.

Upon examining the Pearson and Spearman correlations between variables in Table 1 (untabulated), we note that analyst recommendation announcements on the weekend are positively correlated with recommendation downgrades, underwriter employment, Allstar status, and broker size at the 0.01 level. Employment at a brokerage with an underwriting department, Allstar status, and broker size are all positively correlated with recommendation downgrades. None of the correlations across the variables suggest that multicollinearity is a significant concern in our regression analyses.

4.2. Reduced investor attention on weekends

The underlying premise of our hypotheses is that recommendation revisions made on the weekends receive less attention from investors and the media than revisions made during the week. If this premise is valid, it provides the setting that analysts could exploit to strategically time the release of the revisions. Before we present the results from our hypotheses tests, we report results from three separate tests that examine the validity of the premise of reduced attention on the weekends.

In our first test, we examine differences in the volume of Google searches for the term "NYSE" on weekends versus weekdays. Consistent with Omer et al. (2012), we use Google NYSE searches to represent general searches for market-related information. Table 2, Panel A, presents the results from this test. We use the Google Trends database to compare the average Google Search Volume Index (GSVI) for "NYSE" on weekends versus weekdays. The GSVI represents how often a particular search term is entered into Google, relative to total number of searches globally. Consistent with reduced investor and media attention to weekend recommendation revisions, we find that the GSVI for NYSE is significantly lower on weekends (0.42) than on weekdays (0.62). This result suggests search volume for general market-related information is 47.6% lower on weekends compared to during the week relative to total searches globally.

In our second test, we examine news coverage in the period immediately following the recommendation revision through the end of the next trading day for the firm that received the revision. Specifically, we use news coverage that references analyst actions to measure the press attention given to recommendation revisions. For example, if an analyst revises her recommendation for firm *j* on Tuesday at 3:00 pm, we examine whether that firm received media coverage in the form of a newswire or a published article from 3:00 pm on Tuesday (the time of the revision) through trading hours on Wednesday (assuming Wednesday was not a holiday and the markets were open). If a revision is released on the weekend, (e.g., Saturday), we identify any news content through the end of trading hours on Monday. Note that the window for news coverage following weekend revisions will typically be longer compared to weekday revisions; thus, this test biases against finding reduced media attention on the weekends.

In Panel B of Table 2, we present the percentage of recommendation revisions on weekends and weekdays that received news coverage. We use RavenPack to identify newswire reports and full articles that refer to analyst actions and label a revision as having received news coverage if it is followed by one or more of these articles by the end of the next trading day. The results support our premise that weekend revisions receive significantly less media coverage than weekday revisions. A newswire report or a full article about analysts' actions followed approximately 54.5% of weekday revisions. In contrast, news coverage followed only 25.2% of weekend revisions. This difference is statistically significant ($p < 0.01$). We find similar results when we restrict our analysis to downgrades only.

Table 2
Investor and business press inattention.

Panel A: Google trends search volume for 'NYSE' (2004–2010)		
	Observations	Mean search volume
Weekend days in sample period	730	0.42
Weekdays in sample period	1,827	0.62
Difference		0.20***
Panel B: News stories following analyst recommendation revision		
	Observations	% with news
Full sample		
Weekend revisions	5,171	25.22%
Weekday revision	107,907	54.52%
Difference		29.30%***
Downgrades only		
Weekend downgrades	3,290	19.45%
Weekday downgrades	58,662	53.86%
Difference		34.41%***

Panel A tests the difference between the Google Trends search volume for the term 'NYSE' on weekends compared to the search volume on weekdays. The Google Trends search volume value is equal to the total number of Google searches that include the specified term, scaled by a factor determined by Google. Panel B tests the differences in the percentage of analyst recommendation revisions that are followed by an analyst related news story on the day of or the trading day following the recommendation revisions issued on weekends and weekdays. *** indicates significance at the 0.01 level.

Perhaps our most important test of reduced attention is whether the market reaction to recommendation revisions is less pronounced following weekend revisions than weekday revisions. The basis of our hypotheses is that analysts engage in the strategic timing of recommendation revisions because management cares about the stock price response to the revision. While prior research has found an attenuated market response to strategically timed earnings announcements (DellaVigna and Pollet, 2009), our test is important to establish a similar result for analyst recommendation revisions announced after trading hours on Fridays or on Saturday or Sunday.

For revisions issued on trading days before the market closes, we obtain the CRSP daily returns for the day the revision is announced. For revisions announced subsequent to the close of trading hours or on the weekend, we obtain the daily returns for the next available trading day.[10] We also remove recommendations in which multiple analysts announce revisions for a firm on the same day to control for the cumulative effect of multiple revisions. We use two different measures of returns (value-weighted adjusted and equal-weighted adjusted returns), and we compare the average returns for weekday announcements against weekend announcements. We present results for both downgrades and upgrades separately in Table 3, Panel A. We find that the average returns for both downgraded and upgraded recommendations issued on the weekends are significantly less pronounced than recommendations issued during trading days.[11]

We consider the possibility that recommendation revisions for a particular firm are always announced during trading days or always announced on the weekend. Therefore, we compare the market returns after the release of revisions for covered firms in which at least one revision was released on a weekend and at least one revision was released on a weekday during the time period of this study. Thus, in this test, the same firms are represented in both the weekend and weekday samples. We report the results of these tests in Table 3, Panel B. Again, we find the average market reaction for both downgrades and upgrades issued on weekends is significantly less pronounced than revisions issued during trading days.

In Panel C of Table 3, we again require each company to have at least one revision released on the weekend and one revision released on a weekday after removing recommendation revisions announced on Tuesdays, Wednesdays, and Thursdays in order to compare market responses to revisions announced on weekends compared to revisions that could have been easily announced on weekends, but were not. As we report in Table 3, Panel C, we find returns are less pronounced for weekend revisions than for revisions announced on Mondays and before trading closes on Fridays. Our results are robust using value-weighted adjusted and equal-weighted adjusted returns.

Finally, we consider the effect of other firm news on the stock returns around recommendation revisions. Our results in Table 3 could overstate the market reaction to weekday revisions if other news is driving the response. To control for this effect, we eliminate recommendation revisions for companies with press coverage on the first trading day following the recommendation revision announcement. This ensures that the market returns are a reaction to the analyst recommendation revision and they are not confounded by other firm news. As we report in Table 3, Panel D, we continue to find that returns are less pronounced for weekend revisions than revisions announced on weekdays for both upgrades and downgrades.

An alternative explanation for our results in Table 3 is the possibility that weekend revisions are less timely than revisions from other analysts that occur within the previous trading week (i.e., weekend revisions could be a result of recommendation herding). In untabulated tests, we reexamine the market response to revisions issued on the weekend versus revisions issued during trading days, while restricting our sample to only weekend revisions with no other revisions in the previous five trading days to ensure that our weekend sample are not revisions that are simply mimicking more timely revisions. Our inferences are the same as in Table 3; the market reaction to weekend revisions is less pronounced than the reaction to revisions on weekdays ($p < 0.01$). This evidence suggests it is unlikely that recommendation herding explains the results in Table 3.

Together, the results in Tables 2 and 3 support the underlying premise in this study that weekend recommendation revisions receive reduced investor and media attention relative to revisions released during the week. This evidence provides a mechanism that analysts can exploit to strategically time the release of their outputs.

4.3. Testing the strategic timing hypothesis

Our first hypothesis (Hypothesis 1) examines whether analyst weekend recommendation revisions are more likely to be downgrades or upgrades. We calculate the proportion of weekend downgrades as a percentage of all recommendation revisions announced on the weekend and the proportion of weekday downgrades as a percentage of all recommendation revisions announced on weekdays. Table 4, Panel A presents the results for the full sample. Of all recommendation revisions made on weekdays, 54.4% are downgrades. In comparison, 63.6% of weekend announcements are downgrades and only 36.4% are upgrades. Thus, downgrades are 75% more likely to be issued than upgrades on weekends, whereas downgrades are only approximately 20% more likely to be released than upgrades on weekdays. The difference in the likelihood of issuing a downgrade on the weekend relative to a weekday (63.6% and 54.6%) is significant with a t-statistic of 13.09 (p-value < 0.01), which suggests that downgrades are a larger proportion of

[10] In additional analyses, we measure the market reaction on the trading day prior to a weekend revision to determine whether analysts issuing revisions on the weekend leak the information to investors on the previous trading day. We find that average returns for the trading day prior to a weekend revision are not significantly different from zero, consistent with no leakage occurring ahead of the revision announcement.

[11] Loh and Stulz (2011) label as influential only about 12% of recommendation revisions based on the revision's impact on stock price. They find that influential revisions are associated with several analyst, firm, and announcement characteristics. Our evidence suggests that another factor not examined by Loh and Stulz (2011) that determines a revision's influence is whether it was released on the weekend.

Table 3
Market reaction to stock recommendations on weekdays versus weekends.

Panel A: All revisions

	Weekend	Observations	Value-weighted Ret.	Equal-weighted Ret.
Recommendation	Yes	2,986	−0.86%	−0.68%
Downgrades	No	53,551	−2.76%	−2.67%
Difference			1.90%***	1.99%***
Recommendation	Yes	1,862	1.25%	1.20%
Upgrades	No	47,049	2.57%	2.39%
Difference			1.32%***	1.19%***

Panel B: Removing revisions for firms in which analysts issue downgrades/upgrades only on weekends or only on weekdays.

	Weekend	Observations	Value-weighted Ret.	Equal-weighted Ret.
Recommendation	Yes	2,961	−0.83%	−0.65%
Downgrades	No	36,558	−2.26%	−2.18%
Difference			1.43%***	1.53%***
Recommendation	Yes	1,841	1.22%	1.17%
Upgrades	No	24,005	2.08%	1.90%
Difference			0.86%***	0.73%***

Panel C: Removing revisions for firms in which analysts issue downgrades/upgrades only on weekends or only on weekdays (weekend vs. Mon/Fri)

	Weekend	Observations	Value-weighted Ret.	Equal-weighted Ret.
Recommendation	Yes	2,961	−0.83%	−0.65%
Downgrades	No	13,126	−2.01%	−2.01%
Difference			1.18%***	1.36%***
Recommendation	Yes	1,841	1.22%	1.17%
Upgrades	No	9,573	2.10%	1.97%
Difference			0.88%***	0.80%***

Panel D: Removing revisions for firms in which analysts issue downgrades/upgrades only on weekends or only on weekdays (weekend vs. Mon/Fri) and the business press did not publish firm news on the revision date or the next available trading day.

	Weekend	Observations	Value-weighted Ret.	Equal-weighted Ret.
Recommendation	Yes	2,471	−0.63%	−0.34%
Downgrades	No	4,950	−1.23%	−1.31%
Difference			−0.60%***	0.97%***
Recommendation	Yes	1,246	1.17%	1.18%
Upgrades	No	2,669	1.46%	1.42%
Difference			0.29%**	0.24%**

We test the differences between the mean stock market reactions to stock recommendations announced on weekends compared to downgrades announced during trading hours. For weekend revisions, stock returns are measured for the next available trading day. For weekday revisions, stock returns are measured the day of the announcement when the announcement is before trades close; otherwise, they are measured the next day. ***, ** indicate significance at the 0.01 and .05 levels, respectively.

weekend revisions than weekday revisions. This result supports Hypothesis 1, and it provides evidence that analysts strategically time recommendation announcements to maintain positive relations with company management.

We further examine the proportion of recommendation upgrades to downgrades by comparing weekend announcements to those issued in close proximity to the weekend. Table 4, Panel B provides the comparison of the recommendation upgrade to downgrade on weekends against Mondays and Fridays. Approximately 55.2% of recommendation revisions announced on Mondays or Fridays are downgrades compared to 63.6% downgrades on the weekend. Similar to the test of percentages using all weekday announcements, downgrades are a higher proportion of weekend revisions than revisions on Mondays and Fridays (t-statistic = 11.59; p-value < 0.01).

We consider the definition of strategic timing behavior used by Doyle and Magilke (2009), and we remove recommendations where the analyst's current, previous, and subsequent recommendations for the covered firm were consistently released on the weekday or the weekend. The results are reported in Table 4, Panels C and D. Implementing this filter reduces the number of weekday and weekend observations to 8,528 and 4,921, respectively. The resulting percentages of downgrades are 55.5% for weekday announcements and 64.5% for weekend announcements. The difference between these percentages is significant (t-statistic of 10.26, p-value < 0.01). We also restrict the sample to include recommendations from analysts changing from a Monday/Friday announcement to a weekend announcement, or vice versa, and compare weekend recommendation announcements against announcements made on Mondays and Fridays. There are 2,823 Monday/Friday and 2,115 weekend announcements that meet these restricted requirements. The percentage of downgrade revisions for Mondays/Fridays is 58.9% and 65.2% for weekends. The difference is statistically different with a t-statistic of 4.47 (p-value < 0.01). In all four tests of strategic timing of recommendation announcements, we find evidence supporting Hypothesis 1 that downgrades are a greater proportion of weekend revisions than weekday revisions.

In the univariate tests presented in Table 4, we do not control for other factors that might result in a weekend revision that are unrelated to analysts' incentives to maintain relations with management. For example, deHaan et al. (2015) find that news released

Table 4
Strategic timing - financial analyst stock recommendation.

Panel A: Full sample results

	N	%Downgrade		%Upgrade
Weekday	107,907	54.4		45.6
Weekend	5,171	63.6		36.4
Difference			9.2	
t-Statistic			13.09***	

Panel B: Differences between Monday/Friday and weekend announcements

	N	%Downgrade		%Upgrade
Monday and Friday	41,198	55.2		44.8
Weekend	5,171	63.6		36.4
Difference			8.4	
t-Statistic			11.59***	

Panel C: Differences between weekday and weekends for analysts who change timing

	N	%Downgrade		%Upgrade
Weekday	8528	55.5		44.5
Weekend	4921	64.5		35.5
Difference			9.0	
t-Statistic			10.26***	

Panel D: Differences between Monday/Friday and weekends for analysts who change timing

	N	%Downgrade		%Upgrade
Monday and Friday	2823	58.9		41.1
Weekend	2115	65.2		34.8
Difference			6.3	
t-Statistic			4.47***	

This table provides a test of Hypothesis 1. We report the stock recommendation revisions by weekend and weekday as defined within I/B/E/S. We determine a stock recommendation upgrade or downgrade relative to the analyst's previous recommendation for the identical firm. We define weekend recommendations revisions as those announced on Saturday, Sunday, or after-trading-hours on Friday. All other revision announcements are defined as weekday revisions. *** indicates significance at the 0.01 level for a two-tailed *t*-test of means.

Table 5
Logistic regression of the decision of analysts to announce recommendations on the weekend.

		Column 1		Column 2	
Variables	Expected sign	Coeff	*p*-Value	Coeff	*p*-Value
DOWN	+	**0.189*** **	**<0.01**	**0.136*** **	**<0.01**
Analyst characteristics					
UNDERWRITER	?	−0.468***	<0.01	−0.446***	<0.01
ALLSTAR	?	0.577***	<0.01	0.503***	<0.01
BROKER_SIZE_RANK	?	0.019***	<0.01	0.019***	<0.01
EXPER_GEN_RANK	?	0.000	0.83	0.000	0.93
EXPER_FIRM_RANK	?	−0.002**	0.03	−0.002**	0.03
FIRMS_FOLLOW_RANK	?	0.005***	<0.01	0.004***	<0.01
REC_FREQ_RANK	?	−0.005***	<0.01	−0.004***	<0.01
PREV_WKND	+	0.405***	<0.01	0.566***	<0.01
IND_EXP	?	−0.155**	0.01	−0.169***	<0.01
Covered firm characteristics					
ABRET_FRI	?	1.062***	<0.01	1.276***	<0.01
WEEKEND_NEWS	+	0.037	0.42	−0.040	0.79
DAYS_EA	?	0.004***	<0.01	0.003***	<0.01
IB	?	0.000	0.19	0.000	0.27
LNAT	?	0.094***	<0.01	0.091***	<0.01
σCFO	?	0.367	0.33	0.450	0.26
N_SEG	?	0.025	0.35	0.027	0.34
Constant		−3.705***	<0.01	−2.918***	<0.01
Area under the ROC		0.754		0.755	
Observations		113,073		46,367	

The dependent variable is *WEEKEND*, which is equal to 1 if the recommendation is announced on a Saturday, Sunday, or after-trading-hours on Friday. Column 1 (2) estimates Eq. (1) using recommendations announced on all days of the week (Monday, Friday, Saturday, and Sunday). *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels or better, respectively. One-tailed *p*-values are used for variables with predicted directions. Year and Industry fixed effects are included in the regression but not presented in the table for brevity. Standard errors are clustered by analyst. Variables are defined in the Appendix.

on Friday afternoons by corporate managers tends to be disproportionately negative, which could naturally lead to a weekend downgrade. To control for other factors that can influence analysts' timing of recommendation revisions, we test Hypothesis 1 in a multiple regression framework by estimating Eq. (1). Table 5 presents these results. In column 1, we present results from estimating Eq. (1) using recommendation revisions announced throughout the week. We control for analyst, brokerage, and covered firm characteristics, as well as news released during trading hours on the Friday of or prior to the revision (measured by the stock return on that day) and news released during the weekend (measured as an indicator variable for whether an article about the firm was published in the business press).

We find a positive and significant coefficient for *DOWN* (p-value < 0.01), which suggests that analysts are more likely to announce recommendation downgrades on the weekend than on weekdays, consistent with Hypothesis 1, after controlling for other factors that could explain a weekend revision. In column 2, we present results from estimating Eq. (1) after restricting our sample to those revisions released on the weekend or on Mondays and Fridays.[12] The coefficient for *DOWN* remains positive and significant (p-value < 0.01) in this alternative sample. Thus, results from the regression analyses suggest analysts are more likely to announce recommendation downgrades on weekends relative to weekdays. In the next section, we attempt to disentangle the effects of different incentives that analysts face.

4.4. Analyst incentives and strategic timing

Our Hypotheses 2a through 2c predict that underwriting services provided by an analyst's employer, Allstar status, and brokerage house size will accentuate analysts' incentives to maintain positive relations with management and their investing clients. We modify Eq. (1) to include the interaction terms *UNDERWRITER* ∗ *DOWN*, *ALLSTAR* ∗ *DOWN*, and *BROKER_SIZE_RANK* ∗ *DOWN*, which allow us to determine if analyst incentives affect the likelihood of the analyst announcing downgrades on the weekend.

We present the results of estimating this model in Table 6, using the full sample of 113,073 recommendation announcements, and the reduced sample that omits revisions made on Tuesday through Thursday. The area under the ROC curve for both estimations is approximately 0.75, indicating adequate predictive ability of our model.

The coefficient on the interaction term *UNDERWRITER* ∗ *DOWN* is positive and significant in both estimations. The estimated coefficient suggests that the odds of analysts employed by brokers with underwriter services are approximately 22% more likely than other analysts to issue a downgrade on the weekend, ceteris paribus.[13] This result supports Hypothesis 2a. We also find in both models a positive and significant association between Allstar status and downgrade announcements on the weekend, as indicated by the significantly positive coefficient on *ALLSTAR* ∗ *DOWN*, suggesting that Allstar analysts are more likely than non-Allstars to strategically time the release of their revisions. Using the full sample, the estimated coefficient suggests that the odds of Allstar analysts releasing downgrade revisions on the weekends are approximately 47% higher than for non-Allstar analysts, ceteris paribus. We also find results consistent with Hypothesis 2c, in that the coefficient for *BROKER_SIZE_RANK* ∗ *DOWN* is significant and positive in both estimations. Using the estimated coefficients from the full sample, the odds of an analyst employed at the largest brokerage firm releasing downgrade revisions on the weekend are approximately 49% higher relative to an analyst employed at the smallest brokerage firm.[14]

Notably, when we include the three interactions in the model, we find a significantly negative coefficient on the *DOWN* main effect. This result is consistent with our discussion on competing analyst incentives. Specifically, analysts who do not face the same pressures to maintain positive relations with management as do analysts employed by brokers with underwriting services, Allstar analysts, and analysts employed by large brokers are less willing to release their recommendation downgrade on the weekend because they are motivated to provide timely information and garner media attention. By effectively capturing the incentives related to management relations with our interaction variables, the *DOWN* main effect captures the effects of other incentives unrelated to these relationships.

A potential concern with our analyses is that weekend revisions are simply driven by analysts responding to information disclosed on Friday. While we attempt to control for this competing explanation in our regression framework, as a robustness test, we repeat the analyses presented in Tables 5 and 6 after removing all observations with significantly negative firm-specific abnormal returns on the Friday immediately before the weekend. Specifically, we remove all firm-year observations for which the value of ABRET_FRI is in the bottom quartile of the sample distribution. As mentioned previously, deHaan et al. (2015) find that news released on Friday afternoons by corporate managers tends to be disproportionately negative, which could lead to a weekend downgrade. By removing firm-year observations with significantly negative returns on Friday, we reduce the likelihood that the weekend downgrades we observe in our sample were triggered by negative firm news disclosed on Fridays. We present the results of these analyses in Tables 7 and 8, respectively. After removing the firms with large negative returns on Friday, we find qualitatively similar results for all of our tests, suggesting that companies releasing bad news on Friday does not explain analysts' decisions to release their recommendation downgrades on the weekend.

[12] The area under the ROC curve for both equations is >0.75, indicating adequate fit for the models.

[13] The coefficient of a logistic regression is stated in log odds. The difference in log odds related to *UNDERWRITER* ∗ *DOWN* for analysts employed by a firm with an underwriting department compared to those employed by a firm without an underwriting department is equal to 0.198 (using the reduced sample), and the difference in odds is equal to 1.22 ($e^{0.198}$).

[14] Due to methodological concerns associated with interaction terms in non-linear models (Ai and Norton, 2003), recent studies have used OLS to estimate models with interactions even when the dependent variable is dichotomous (e.g., Cornelli et al., 2013; Becker and Milbourn, 2011). When we use OLS to estimate our interactive model, we find results that are generally consistent with those reported for the logistic regressions, with one exception. Specifically, we continue to find significantly positive coefficients for *ALLSTAR* ∗ *DOWN* and *BROKER_SIZE_RANK* ∗ *DOWN*. However, while *UNDERWRITER* ∗ *DOWN* is positive in both estimations, it is only marginally significant in the model with the reduced sample (p-value < 0.10).

Table 6
Logistic regression of the decision of analysts to announce recommendations on the weekend.

		Column 1		Column 2	
Variables	Expected sign	Coeff	*p*-Value	Coeff	*p*-Value
DOWN	?	−0.292**	0.01	−0.390***	<0.01
UNDERWRITER	?	−0.569***	<0.01	−0.584***	<0.01
UNDERWRITER * DOWN	+	**0.198****	**0.04**	**0.269****	**0.02**
ALLSTAR	?	0.318***	<0.01	0.309**	0.01
ALLSTAR * DOWN	?	**0.388*****	<**0.01**	**0.293****	**0.03**
BROKER_SIZE_RANK	?	0.017***	<0.01	0.017***	<0.01
BROKER_SIZE_RANK * DOWN	+	**0.004****	**0.01**	**0.004*****	<**0.01**
EXPER_GEN_RANK	?	0.000	0.84	0.000	0.92
EXPER_FIRM_RANK	?	−0.002*	0.03	−0.002**	0.03
FIRMS_FOLLOW_RANK	?	0.005***	<0.01	0.004***	<0.01
REC_FREQ_RANK	?	−0.005***	<0.01	−0.004***	<0.01
PREV_WKND	+	0.416***	<0.01	0.579***	<0.01
IND_EXP	?	−0.155**	0.01	−0.168**	0.01
ABRET_FRIDAY	?	1.050***	<0.01	1.277***	<0.01
WEEKEND_NEWS	+	0.039	0.40	−0.037	0.78
DAYS_EA	+	0.004***	<0.01	0.003***	<0.01
IB	?	0.000	0.18	0.000	0.25
LNAT	?	0.096***	<0.01	0.093***	<0.01
σCFO	?	0.378	0.31	0.459	0.25
N_SEG	?	0.025	0.35	0.028	0.33
Constant	?	−3.464***	<0.01	−2.675***	<0.01
Area under the ROC		0.754		0.755	
Observations		113,073		46,367	

The dependent variable is *WEEKEND*, which is equal to 1 if the recommendation is announced on a Saturday, Sunday, or after-trading-hours on Friday. Column 1 (2) estimates Eq. (1) using recommendations announced on all days of the week (Monday, Friday, Saturday, and Sunday). *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels or better, respectively. One-tailed *p*-values are used for variables with predicted directions. Year and Industry fixed effects are included in the regression but not presented in the table for brevity. We cluster standard errors by analyst. Variables are defined in the Appendix.

Overall, our results are consistent with the notion that analysts will engage in strategically timing the release of their recommendation revisions according to their personal incentives. Our results indicate that incentives can differ across analysts, which influences the timing of their outputs.

Table 7
Logistic regression of the decision of analysts to announce recommendations on the weekend – omitting significantly negative *ABRET_FRI* observations (bottom quartile).

		Column 1		Column 2	
Variables	Expected sign	Coeff	*p*-Value	Coeff	*p*-Value
DOWN	+	**0.164*****	<**0.01**	**0.225*****	<**0.01**
Analyst characteristics					
UNDERWRITER	?	−0.456***	<0.01	−0.385***	<0.01
ALLSTAR	?	0.561***	<0.01	0.483***	<0.01
BROKER_SIZE_RANK	?	0.020***	<0.01	0.020***	<0.01
EXPER_GEN_RANK	?	−0.001	0.56	0.000	0.93
EXPER_FIRM_RANK	?	−0.001	0.25	−0.001	0.23
FIRMS_FOLLOW_RANK	?	0.006***	<0.01	0.005***	<0.01
REC_FREQ_RANK	?	−0.005***	<0.01	−0.004***	<0.01
PREV_WKND	+	0.412***	<0.01	0.555***	<0.01
IND_EXP	?	−0.157**	0.02	−0.178**	0.01
Covered firm characteristics					
ABRET_FRI	?	0.829*	0.05	−3.208***	<0.01
WEEKEND_NEWS	+	0.004	0.47	−0.042	0.76
DAYS_EA	?	0.004***	<0.01	0.003***	<0.01
IB	?	−0.000*	0.07	−0.000*	0.05
LNAT	?	0.102***	<0.01	0.086***	<0.01
σCFO	?	0.322	0.46	0.529	0.29
N_SEG	?	0.025	0.39	0.032	0.30
Constant		−3.686***	<0.01	−2.815***	<0.01
Area under the ROC		0.762		0.761	
Observations		84,805		34,776	

The dependent variable is *WEEKEND*, which is equal to 1 if the recommendation is announced on a Saturday, Sunday, or after-trading-hours on Friday. Column 1 (2) estimates Eq. (1) using recommendations announced on all days of the week (Monday, Friday, Saturday, and Sunday). *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels or better, respectively. One-tailed *p*-values are used for variables with predicted directions. Year and Industry fixed effects are included in the regression but not presented in the table for brevity. Standard errors are clustered by analyst. Variables are defined in the Appendix.

Table 8
Logistic Regression of the decision of analysts to announce recommendations on the weekend omitting significantly negative *ABRET_FRI* observations (bottom quartile).

		Column 1		Column 2	
Variables	Expected sign	Coeff	*p*-Value	Coeff	*p*-Value
DOWN	?	−0.438**	0.01	−0.453***	<0.01
UNDERWRITER	?	−0.597***	<0.01	−0.562***	<0.01
UNDERWRITER * DOWN	+	**0.285****	**0.01**	**0.363*****	<**0.01**
ALLSTAR	?	0.318***	<0.01	0.306**	0.02
ALLSTAR * DOWN	?	**0.375*****	<**0.01**	**0.283****	**0.03**
BROKER_SIZE_RANK	?	0.017***	<0.01	0.017***	<0.01
BROKER_SIZE_RANK * DOWN	+	**0.004*****	<**0.01**	**0.005*****	<**0.01**
EXPER_GEN_RANK	?	−0.001	0.57	0.000	0.94
EXPER_FIRM_RANK	?	−0.001	0.24	−0.001	0.22
FIRMS_FOLLOW_RANK	?	0.006***	<0.01	0.005***	<0.01
REC_FREQ_RANK	?	−0.005***	<0.01	−0.004***	<0.01
PREV_WKND	+	0.425**	<0.01	0.572***	<0.01
IND_EXP	?	−0.158**	0.01	−0.177**	0.01
ABRET_FRIDAY	?	0.848**	0.02	−3.140***	<0.01
WEEKEND_NEWS	+	0.005	0.92	−0.041	0.76
DAYS_EA	+	0.004***	<0.01	0.003***	<0.01
IB	?	-0.000*	0.06	−0.000*	0.05
LNAT	?	0.104***	<0.01	0.088***	<0.01
σCFO	?	0.335	0.44	0.539	0.28
N_SEG	?	0.026	0.38	0.034	0.28
Constant	?	−3.405***	<0.01	−2.522***	<0.01
Area under the ROC		0.763		0.762	
Observations		84,805		34,776	

The dependent variable is *WEEKEND*, which is equal to 1 if the recommendation is announced on a Saturday, Sunday, or after-trading-hours on Friday. Column 1 (2) estimates Eq. (1) using recommendations announced on all days of the week (Monday, Friday, Saturday, and Sunday). *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels or better, respectively. One-tailed *p*-values are used for variables with predicted directions. Year and Industry fixed effects are included in the regression but not presented in the table for brevity. We cluster standard errors by analyst. Variables are defined in the Appendix.

4.5. Effects of strategic timing of recommendation revisions on access to management

Given the above results suggesting that analysts strategically time the release of their recommendation revisions, we now explore whether analysts appear to realize benefits from this behavior. We examine the extent to which management allows analysts to ask questions during the Q&A session of public earnings conference calls as a measure of analysts' access to management. Management has discretion in determining which analysts they permit to ask questions on earnings calls, and evidence suggests that they use this discretion to reward or punish analysts based on their actions. Mayew (2008) and Mayew et al. (2013) find that analysts who issue unfavorable stock recommendations are less likely to be selected by management to ask questions. We examine whether issuing a downgrade on the weekend mitigates this negative consequence for analysts.[15]

To conduct our analysis, we obtain conference call participation data derived from earnings conference call transcripts for the period July 2001 to March 2005 (Mayew et al., 2013). We merge this database with recommendation revisions data from IBES that begin in 2002 by firm, analyst, and fiscal year. From this merged database, we determine the number of recommendation revisions each analyst issues during the fiscal year for each firm they follow. We eliminate observations where an analyst issued only recommendation upgrades, reiterations, or zero recommendations for the firm during the fiscal year and classify the remaining analyst/firm/year observations into two groups: 1) analysts who issued a weekday downgrade for the firm during the fiscal year but did not downgrade on the weekend, and 2) analysts who issued a weekend downgrade for the firm during the fiscal year. To control for overall differences in analyst participation across firms, we require that all firm-year observations have at least one analyst in each group. Thus, each firm serves as its own control when we compare the effects of weekend downgrades to weekday downgrades on analysts' access to company management. We then compute the proportion of analysts within each group who participate on the annual earnings conference call and test for a difference in participation rates between the two groups.

The sample for this test is comprised of 3,643 analysts who downgrade during the week (weekday downgraders) and 1,298 analysts who downgrade at least once on the weekend for the same firm in the same fiscal year (weekend downgraders). In untabulated results, we find that 34.4% of weekday downgraders are allowed to participate during the annual conference call, while 41.7% of weekend downgraders are allowed to participate. The difference in participation rates between the two groups is statistically significant (p-value < 0.01). This result provides direct evidence that analysts who strategically time the release of their downgrade on weekends enjoy greater access to management, consistent with our theory. One caveat for this result is that analysts who downgrade on the

[15] In a concurrent study, Dong and Hu (2016) examine whether analysts who issue recommendation downgrades on the weekend have more accurate future earnings forecasts relative to analysts who downgrade during the week. The authors interpret their evidence as being consistent with analysts who downgrade on the weekend having greater access to private information from management. We believe our examination of conference call data offers more direct evidence on analyst access to management. In addition, our study differs from Dong and Hu (2016) in that they focus on the impact of NASD Rule 2711 and NYSE Rule 472 on analysts' strategic timing behavior.

weekend may have been currying favor with management in other ways before and after the weekend downgrade. Thus, we cannot claim a causal relation between weekend downgrades and access to management. Nevertheless, among analysts who downgrade a company's stock, our evidence demonstrates that analysts who downgrade on the weekend have superior access to management following the downgrade.

5. Conclusion

This study seeks to determine whether or not analysts behave strategically in releasing revised stock recommendations. We use the strategic timing hypothesis to form predictions about analysts' strategic disclosure behavior. We provide evidence that investor and media attention paid to recommendation revisions is significantly reduced on the weekend, which analysts can potentially exploit in strategically timing the release of their recommendation revisions. We predict that analysts are more likely to release downgrades on the weekend (compared to upgrades) to maintain positive relations with management of the affected firms.

Consistent with our prediction, we find a higher proportion of downgrades on the weekend relative to upgrades. Further, to disentangle the effects of different analyst incentives on the timing of recommendation revisions, we identify analyst and broker characteristics that are likely associated with analysts having stronger incentives to maintain relations with management and investing clients. We show that analysts with the strongest incentives to maintain relations with management are more likely to issue recommendation downgrades on the weekend. In addition, we find evidence consistent with the notion that other incentives, such as timely release of information and garnering media attention, likely influence analysts to issue downgrades during the week. These results are consistent with the strategic timing hypothesis in that they suggest analysts time the release of their outputs according to their personal incentives. We show that negative company news released on Fridays does not explain the weekend downgrades we observe. We also present evidence that corroborates our theory that analysts strategically time the release of their recommendations to maintain access to management. Specifically, we find that management is more likely to allow analysts who downgrade a firm on the weekend to ask questions on earnings conference calls relative to analysts who downgrade during the week.

While prior studies provide evidence of optimistic behavior by analysts, our study is the first to use the strategic timing hypothesis to show that analysts strategically time the disclosure of their recommendation revisions. Future research could consider whether investors with fewer monitoring resources or higher monitoring costs bear a disproportionate share of the impact of analysts' strategic behavior.

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Appendix 1. Variable definitions

Variable Name	Definition
σCFO	Standard deviation of annual cash flows from operations for the previous 5 years for the firm associated with the revised recommendation made by the analyst. If 5 (4) years of cash flows is not available, we use the standard deviation of cash flows from the previous 4 (3) years.
ABRET_FRI	The absolute value of the value weighted abnormal return on the Friday of or prior to the recommendation revision.
ALLSTAR	Equal to 1 if the analyst issuing a revised recommendation received *Institutional Investor* recognition in the prior calendar year, and 0 otherwise.
BROKER_SIZE_RANK	Rank variable based on the number of analysts issuing recommendations at the analyst's brokerage firm in a given year relative to other analysts covering the firm.
DAYS_EA	Natural log of the number of days between the recommendation revision and the previous earnings announcement made by the firm.
DOWN	Equal to 1 if the recommendation level is lower than the previous recommendation made by the analyst covering the firm, and 0 otherwise.
EXPER_GEN_RANK	Rank variable based on the analyst's number of years of experience as an analyst at the time of the recommendation issued relative to other analysts covering the firm.
EXPER_FIRM_RANK	Rank variable based on the analyst's number of years of experience covering the firm at the time of the recommendation issued relative to other analysts covering the firm.
FIRMS_FOLLOW_RANK	Rank variable based on the number of total firms covered by then analyst in the prior 12-month period relative to other analysts covering the firm.
IB	The covered firm's income before extraordinary items in the fiscal year prior to the announcement of the recommendation. This variable is winsorized at the 0.01 level.
IND_EXP	Equal to 1 if the analyst issuing the recommendation only follows firms in one GICS-sector code, and 0 otherwise.
LN_AT	Equal to the covered firm's natural log of total assets in the fiscal year prior to the announcement of the recommendation.
N_SEG	Natural log of segments of the covered firm in the fiscal year prior to the announcement of the recommendation, as reported in Compustat.
PREV_WKND	Equal to 1 if the analyst's previous recommendation for the covered firm was announced on the weekend, and 0 otherwise.

(continued on next page)

Appendix A (*continued*)

Variable Name	Definition
REC_COUNT	Natural log of the sum of all recommendations issued by the analyst in the 12-month period for all firms covered by the analysts.
REC_FREQ_RANK	Rank variable based on the number of recommendations issued by the analyst covering the firm in the prior 12-month period relative to other analysts covering the firm.
UNDERWRITER	Equal to 1 if the analyst was employed by a brokerage firm with an underwriting services department at the time the recommendation was announced, and 0 otherwise.
WEEKEND	Equal to 1 if the recommendation is announced on Saturday, Sunday, or after-trading-hours on Friday, and 0 otherwise.
WEEKEND_NEWS	Equal to 1 if a firm-specific news story appeared in the business press on Friday after-trading hours or on the weekend prior to the recommendation revision, and 0 otherwise.

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