Information Interpretation or Information Discovery: Which Role of Analysts Do Investors Value More?

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Abstract

This study provides evidence that a significant percentage of analyst forecast revisions are issued promptly after a broad set of corporate public disclosures and that investors perceive these prompt revisions as more valuable than non-prompt revisions. These results hold for all revisions, non-earnings announcement triggered revisions, or revisions in weeks preceding earnings announcements, and are also robust to various sensitivity tests. Investors particularly value analysts' prompt interpretation of earnings announcements or 8-K filings. To the extent that prompt revisions are more likely to reflect analysts' information interpretation role, our results suggest that investors value more highly analysts' ability to interpret public disclosure, especially less structured or non-financial disclosures. Unlike Ivkovic and Jegadeesh (2004) and Chen et al. (2010) which reach the opposite conclusion, we analyze analysts' interpretation role with respect to a broader range of significant corporate disclosures than earnings announcements alone. We also provide evidence that analyst revisions made on the day of preliminary earnings announcements or the next day are significantly associated with excess returns, even after controlling for earnings and revenue surprises and accruals available in the announcements.

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1. Introduction

Financial analysts are an integral and important part of the capital market. For example, greater analyst coverage has been found to be associated with less market inefficiency (Hong et al. 2000) or lower cost of raising capital (Bowen et al. 2008). In providing their services, analysts play two possible roles in the capital market: information interpretation or information discovery (e.g., see Ramnath et al. 2008; Chen et al. 2010).

Despite the large volume of empirical research on financial analysts, relatively little research has examined which one of these two roles of analysts are more valued by the capital market. For the limited research that has been done on this topic, the evidence is mixed and sometimes contradictory. For example, Francis et al. (2002) and Frankel et al. (2006) show that analyst research and earnings announcements are complements of each other, implying analysts' information interpretation role. On the other hand, Ivkovic and Jegadeesh (2004) and Chen et al. (2010) examine analyst forecast revisions between quarterly earnings announcements. Ivkovic and Jegadeesh (2004) show that revisions before earnings announcements are more accurate and associated with significantly stronger market reactions than revisions after these announcements. Chen et al. (2010) show that analyst research pre-empts the information content of earnings announcements. Both studies interpret their results as suggesting that the value of analysts' earnings forecasts stems more from their information discovery role than from their information interpretation role.

However, both Ivkovic and Jegadeesh (2004) and Chen et al. (2010) focus on earnings announcements as the only significant corporate public information releases and implicitly

assume that analysts' information interpretation role is only relative to the information contained in earnings announcements. In practice, however, firms release other significant corporate disclosures such as 10-Q or 8-K filings between earnings announcements. Analysts provide valuable assistance to investors in interpreting these disclosures. The possibility that analysts provide interpretation for significant corporate disclosures between earnings announcements casts doubt on the validity of the assumption in Ivkovic and Jegadeesh (2004) that forecast revisions just prior to earnings announcements reflect analysts' information discovery role, as well as the assumption in Chen et al. (2010) that pre-emption of subsequent earnings announcements reflects analysts' information discovery role. Further, while both studies recognize analysts' role in interpreting earnings announcements, their research design actually excludes prompt revisions on and/or immediately after the earnings announcements dates[1], when the interpretation role of analysts is likely the most important.

Our study seeks to shed new light on the two roles of financial analysts by utilizing a richer dataset of corporate public disclosures and taking into account analysts' interpretation of these disclosures. Unlike prior studies that focus on the timing of analyst forecast revisions relative to earnings announcements only, we focus on the promptness of analyst forecast revisions relative to a broader range of corporate public disclosures. We argue that this promptness serves as a better proxy for investors' interpretation of the specific role played by analysts. While most analyst forecast revisions are likely to be a combination of both information discovery and information interpretation roles (Chen et al. 2010), analyst forecast revisions that promptly follow corporate public disclosures ("prompt revisions") are either more likely to reflect analysts' information interpretation role or more likely to be interpreted by investors as

[1] For example, Ivkovic and Jegadeesh (2004) excludes revisions on day 0 and day 1 relative the earnings announcements and Chen et al. define the first week after the earnings announcements from day 1 instead of day 0.

such. On the other hand, analyst forecast revisions that do not promptly follow corporate public disclosures ("non-prompt revisions") are either more likely to reflect analysts' information discovery role or more likely to be interpreted by investors as such. We thus examine how the market reacts differently to these two types of analyst forecast revisions.

Our corporate public disclosures include earnings announcements, 10-K or 10-Q filings and 8-K filings filed with the SEC during 1996-2008. We find that about 60% of analyst forecast revisions occur within three days of these disclosures ("prompt revisions"). The fact that a majority of analysts issue forecast revisions promptly after corporate public disclosures points out analysts' own emphasis on their role of interpreting public information in a timely manner. Furthermore, our empirical analyses suggest that, on average, investors react more strongly (43% higher) to prompt revisions than to non-prompt revisions, and especially so to prompt revisions immediately after earnings announcements or 8-K filings. These greater market reactions are evident even after controlling for market reactions surrounding the most recent corporate public disclosure prior to the analyst revisions or for other firm-specific, analyst-specific, or revision-specific variables that may affect investor reactions to analyst forecast revisions.

Our results are robust after we exclude analyst forecast revisions that are prompt relative to earnings announcements (Ivkovic and Jegadeesh 2004) or when we examine revisions by week during the six weeks preceding earnings announcements (Chen et al. 2010). In additional analyses, we also re-define our promptness variable after incorporating information events in the Key Developments database compiled by Capital IQ which is arguably the most comprehensive dataset for corporate public information. About 80% of revisions are promptly issued after this broader set of public information during 2002-2008. Further, our results not only continue to hold qualitatively but also get stronger quantitatively.

Finally, we focus on prompt analyst forecast revisions after the earnings announcements, which are not examined specifically in Ivkovic and Jegadeesh (2004) or Chen et al. (2010). We directly control for news in these announcements and show that investor responses to analyst forecast revisions remain statistically and economically significant. In fact, investors appear to respond more strongly to analyst revisions than to news in the earnings announcements, and this response is even stronger if the firm includes a balance sheet in the announcement. These results suggest that analysts do play significant interpretation role at the time of earnings announcements and the results also alleviate the concern that the stronger market reactions to prompt revisions than to non-prompt revisions are driven by market reactions to news in the corporate public disclosures itself.

Our study contributes to the financial analyst literature by providing several new insights regarding the roles analysts play in the capital market. First, our study responds to Ramnath et al.'s (2008) call for more research on the distinction between the two roles played by analysts. The literature has mixed evidence in terms of which of these two roles dominate. Our results show not only a majority of analyst forecast revisions are made promptly after corporate public disclosures, but also that the market attaches greater value to these revisions. To the extent that prompt revisions are interpreted by investors as reflecting analysts' interpretation of the preceding corporate public disclosures, our results suggest that investors value analysts' information interpretation role more than their information discovery role.

We note that our results are not necessarily inconsistent with the results in Ivkovic and Jegadeesh (2004) that analyst forecast revisions immediately before earnings announcements are more accurate and get stronger market reactions or the results in Chen et al. (2010) that these revisions tend to pre-empt the forthcoming earnings announcements. However, we differ from

these studies in terms of interpretation of the results and hence the inferences drawn. These two studies assume revisions in the weeks prior to the earnings announcements are homogenous in terms of reflecting analysts' role of information interpretation or discovery. We, on the other hand, argue that, depending on the timing of the revisions relative to other corporate disclosures, these revisions in the weeks prior to earnings announcements can reflect either analysts' information interpretation or discovery role. By examining a broader set of corporate public disclosures, we are able to better differentiate these two roles of analysts. Our results imply that the stronger market reactions to revisions preceding earnings announcements in Ivkovic and Jegadeesh (2004) or the pre-emption effects of these revisions in Chen et al. (2010) are actually more salient when these revisions reflect analysts' interpretation of corporate public disclosures than when they reflect analysts' own information discovery.

Second, our study highlights an important attribute of analyst forecast revisions that has not received much attention in prior literature: the timing of revisions relative to public disclosures by the covered firms. While a large number of studies examine different properties of analyst forecast revisions such as accuracy and bias, only a handful focus on the timing of the revisions (e.g., Stickel 1989; Zhang 2008) and they generally do not examine how the market reacts to the revisions conditional on their timing. Our results suggest that investors use the timing of analyst forecast revisions relative to important corporate disclosures to infer the informativeness of these revisions and react accordingly.

Third, our data incorporates a broad range of corporate public disclosures, and provides insights about when investors value analysts' interpretation of public information the most. Prior research has mostly focused on analyst forecast revisions in response to earnings announcements (e.g., Barron et al. 2002; Zhang 2008), although they generally do not examine how investors

respond to these revisions directly. Some studies have examined analyst revisions after 10-Q or 10-K filings (e.g., Li and Ramesh 2009). Little research has examined analyst activities in response to 8-K filings. Our results are consistent with prior studies in documenting that analysts are more likely to revise after earnings announcements whereas their revision activities are generally muted after 10-Q filings. In particular, we document significant investor reactions to analyst forecast revisions promptly after earnings announcements, which are largely ignored in Ivkovic and Jegadeesh (2004) and Chen et al. (2010). Such reactions are especially strong when firms also include a balance sheet in the preliminary earnings announcements. Further, we for the first time show that revisions after 8-K filings are quite common, and that the capital market values analyst revisions that promptly follow 8-K filings or certain non-SEC filings included in the Key Developments database more than other prompt revisions.

These results suggest that among prompt revisions, investors place greater value on analysts' interpretation of more complex or non-financial disclosures or disclosures that do not have pre-determined structure, content, or timing, and hence are more difficult to interpret. This evidence is consistent with Chen et al. (2010) about the effects of information complexity on the value of analysts' information interpretation role. However, Chen et al. (2010) focus on complexity based on firm characteristics, while our evidence sheds light on complexity based on different types of corporate disclosures.

Our study also has implications for practitioners (e.g. institutional investors) who incorporate analysts' forecast revisions in identifying buy or sell signals, as our results suggest when analyst forecast revisions are more likely to trigger greater market reactions. Our results also provide useful information to analysts regarding how investors value their revisions. With the Global Settlement of 2003 and the currently ongoing financial crisis, there is less supply of

sell-side financial analysts, yet potentially greater demand by investors for analysts' services given the uncertainty of the market. Our results provide some implications as to how analysts might best utilize their limited time and resources as information intermediaries.

The remainder of the paper proceeds as follows. Section 2 motivates our research question and reviews related literature. Section 3 presents our sample and research design. Section 4 discusses our empirical results. Concluding remarks are offered in Section 5.

2. Research question and related literature

We examine how investors value analysts' two roles as information intermediaries. In providing their experience and expertise to the capital market, analysts play two different and important roles. In information interpretation role, analysts receive public information at the same time as the market and employ their financial knowledge and expertise to promptly analyze and interpret the information. Their analyses and interpretation are then transformed into analyst forecasts, recommendations, or reports and provided to the capital market, further helping investors understand and react to the public information. In information discovery role, analysts search different channels for both public and private information related to the underlying firm, for example, store traffic or financial soundness of major customers and suppliers. Prior to the enactment of Regulation Fair Disclosure (Reg FD), this also included direct access to corporate management for private information. The analysts then further process such private information and incorporate it into their forecasts, recommendations, or reports.

While it is difficult, if not impossible, to clearly identify a specific analyst forecast revision as being triggered by analysts' interpretation of corporate public information or their own information discovery, we posit that prompt revisions after public disclosures are more

likely to reflect analysts' information interpretation role. This is because analysts have incentives to compete for trading volume (e.g., Cooper et al. 2001). Thus, when analysts receive public disclosures from the firm, they have incentives to process the information and issue revisions as soon as possible, as opposed to delaying it, in order to have greater influence on market trading. Consistent with this projection, Stickel (1989), Ivkovic and Jegadeesh (2004), and Zhang (2008) find that a significant percentage of analysts revise their forecasts within days of corporate earnings announcements.[2] Analysts may also use the promptness of their revisions to signal their superior ability to interpret public information.

We do recognize that most analyst forecast revisions are likely to reflect a combination of both roles (Chen et al. 2010). A prompt revision may contain the analyst's own private information together with his/her interpretation of the firm's public disclosure, just as a non-prompt revision may belatedly reflect only the analyst's interpretation of the previously disclosed public information. However, the revisions issued immediately after public disclosures are more likely to reflect analysts' interpretations of the public information, while revisions issued without recent public disclosures are more likely to reflect analysts' information discovery, as assumed by Ivkovic and Jegadeesh (2004) and Chen et al. (2010).

Under this maintained assumption, this paper seeks to examine which role of financial analysts is more important to investors by examining market reactions to analysts' revisions conditional on the revisions' promptness relative to corporate public disclosures. Investors could potentially value both roles of analysts. With respect to analysts' role of information interpretation, while investors could interpret the public information on their own, prior research

[2] Even if as pointed out by Mozes (2003), competition to revise forecasts quickly after public information releases comes at the cost of lower forecast accuracy, analysts may strategically manage these costs and benefits by releasing a forecast quickly in response to new information (Ramneth et al. 2008) and following up with a more thoroughly analyzed revision subsequently.

has consistently documented that investors' response to corporate public disclosures are inefficient (e.g., Ball and Brown 1968) and that analysts' forecasts help mitigate market inefficiency therein (e.g., Hong et al. 2000). Further, for such information as 10-Q or 8-K filings, there could be complex financial information that retail investors have difficulties to understand and interpret, or there could be non-financial information that requires familiarity with other companies and business practices to properly interpret. For example, entry into supply contracts (which may be reported in Form 8-K) should be assessed relative to activities of the firm's competitors. Upon the resignation of a board member (also reported in Form 8-K), investors need to understand the role that this board member played, and whether the resignation should be considered a positive or a negative signal. Analysts, who have financial expertise and institutional knowledge, can play important roles in helping investors interpret such information.

On the other hand, analysts' ability for information discovery could also be very valuable to investors. There is a large information asymmetry between investors and firms. Investors typically lack the knowledge, resources and connections to access or obtain private or hard-to-collect public information. The role of analysts for information discovery helps mitigate the information asymmetry. In fact, investors may place greater value on analyst revisions reflecting analysts' information discovery than revisions reflecting only analysts' information interpretation because of two factors. First, investors may be overconfident (e.g., Daniel et al. 1998) about their own interpretation of public information and hence discount or ignore analysts' interpretations. Second, if investors believe analysts posses private information that they do not have, they may react to such revisions more strongly to capitalize on analysts' information advantage (e.g., Kross et al. 1990).

We first examine three types of major corporate disclosures: (preliminary) earnings announcements, 10Q or 10-K filings, and 8-K filings. Earnings announcements are regular, recurring, and extensively scrutinized by investors. On the other hand, 10-Q and 10-K filings contain comprehensive financial information about firms' financial position and operations, whereas 8-K filings contain "current" reports that firms must file to announce material corporate events in a timely fashion. These SEC filings are also subject to SEC monitoring. While there are other corporate disclosures including press releases, earnings guidance or FDA approvals, these are not subject to SEC monitoring unless accompanied by 8-K filings. Further, some of these alternative disclosures could have substantial overlap with the disclosures that we examine. For example, material corporate events such as FDA approvals are likely to be filed in an 8-K form with the SEC in a timely fashion; a relatively large percentage of earnings guidance is issued concurrently with earnings announcements (e.g., Atiase et al. 2005). Given the ready availability of the information on the timing of earnings announcements, 10-Q/10-K and 8-K filings for a large sample as well as their relative importance, we choose to focus on these three types of corporate disclosures. In supplementary analyses, we also employ a more comprehensive dataset of corporate disclosures, namely, the Key Developments database compiled by Capital IQ.

A large body of research examines how analysts react to corporate earnings announcements. For example, Barron et al. (2002) document how common information and individual information in analyst forecasts change around earnings announcements. Stickel (1989), Ivkovic and Jegadeesh (2004), and Zhang (2008) examine the timing of analyst revisions relative to earnings announcements. However, few studies examine market reactions to analyst revisions immediately after the earnings announcements, probably due to the difficulties in disentangling the information content of earnings announcements from that of analyst revisions.

Ivkovic and Jegadeesh (2004) and Chen et al. (2010) examine market reactions to analyst forecast revisions between earnings announcements. However, as discussed in the previous section, their conclusions are subject to the limitations in the public disclosures examined in their studies. Both studies focus on earnings announcements as the only source of public information that requires analysts' interpretation. However, firms only announce earnings once every quarter, while they may have more frequent communications with the public via 8-K filings or provide more comprehensive financial information to the public via 10-K or 10-Q filings. Such information is often non-structured or more complex, and hence investors may particularly need analysts' assistance in interpreting this information. Therefore, we consider all three types of corporate public disclosures and examine how investors value prompt revisions after each of the three types of disclosures differently relative to non-prompt revisions.

Francis et al. (2002) and Frankel et al. (2006) also examine the information content of analyst research relative to the information content of earnings announcements. Both studies find that these two sources of information complement each other. To the extent the complementary nature of these two sources of information is consistent with analysts' role of information interpretation, their results suggest that overall the interpretation role dominates the information discovery role. However, neither of these studies examines analyst revisions that reflect the interpretation role and the discovery role separately or how investors value these different revisions differently.

Cooper et al. (2001) also focus on how the market reacts to analyst revisions conditional on the relative timeliness of the revisions. However, in measuring timeliness, Cooper et al. (2001) use the timing of forecast revisions by an analyst relative to other analysts' revisions to infer leader analysts versus follower analysts. In contrast, we use the timing of revisions relative to

corporate public disclosures to infer analysts' role of information interpretation versus information discovery. Thus, our research question is different in substance.

Prior research on investor reactions to SEC filings is relatively limited, and even more limited on analyst reactions to these filings. Griffin (2003) documents significant market reactions to 10-K and 10-Q filings in terms of absolute value of excess returns. Callen et al. (2006) assess the relative value relevance of cash flow, accruals (earnings) and expected return news on SEC and preliminary earnings filing dates, as measured by their contribution to the volatility of unexpected returns. Li and Ramesh (2009) find some evidence of intra-industry information transfer at calendar quarter-ends when many firms file their 10-K reports. They also find that equity analyst reactions are muted around periodic filings, with no evidence that they contribute to quarter-end information transfer. Carter and Soo (1999) investigate the timeliness of and stock price reactions to a sample of 8-K filings and find that timeliness is the single most consistent determinant of market reactions to 8-K filings. Lerman and Livnat (2009) examine the market reactions to 8-K reports filed under new SEC rules that require broader and timelier disclosures, and investigate whether periodic reports (10-K/Qs) became less informative under the new 8-K disclosure rules. We are aware of no research that examines analyst forecast revisions around 8-K filings.

3. Sample description and research design

We obtain analyst forecast revisions from I/B/E/S detail dataset for years after 1995[3], stock return information from CRSP and other financial information from Compustat. We only focus on revisions of annual forecasts for the next annual earnings announcements with horizons

[3] We use revisions after 1995 because SEC filings are available for all publicly listed firms in the SEC EDGAR database after 1995.

no longer than 365 calendar days until the end of the forecast period. This procedure leads to 1,236,097 individual analyst forecast revisions over 1996-2008 with available returns and financial statement data in our sample. As discussed above, we focus on the promptness of these revisions relative to three types of corporate public disclosures: preliminary earnings announcements, 10-Q filings (including 10-K filings), and 8-K filings. We obtain the dates of these three types of public disclosures from the Quarterly Compustat file and the S&P Filing Dates database which is available in WRDS.

For each analyst forecast revision, if any one of the three types of public disclosures occurred within three trading days prior to the forecast revision date, we consider it a prompt revision (PROMPT=1), likely reflecting more strongly the analysts' ability to interpret public information than to discover information on their own. Otherwise, we consider the revision a non-prompt one (PROMPT=0), likely reflecting more strongly the analysts' ability for information discovery. We also use three separate indicator variables to indicate revisions that are within three trading days of earnings announcements (PROMPT_ER), 10-Q filings (PROMPT_10Q), and 8-K filings (PROMPT_8K), respectively.

We report the promptness of our sample revisions in Table 1. As shown in the table, about 60% of the forecast revisions are promptly issued within three trading days after at least one of the three types of corporate public disclosures that we consider. As to specific types of corporate disclosures, 48% of the sample revisions are issued promptly after earnings announcements, 8% after 10-Q filings, and 37% after 8-K filings. There is substantial overlap among the corporate disclosures, which explains why the percentages of prompt revisions after each type of corporate disclosures add up to more than 60%. We therefore also examine prompt revisions that are preceded by only one type of information event. 19% of the revisions are

preceded by preliminary earnings announcements only, 2% are preceded by 10-Q filings only, and 9% are preceded by 8-K filings only. Thus, about 30% of the revisions are preceded by at least two types of corporate disclosures.

We should note a few interesting observations from the above frequency of prompt forecast revisions after the three types of corporate disclosures. First, analysts have substantially higher propensity to revise their forecasts immediately after the releases of public information, consistent with results in Stickel (1989) and Zhang (2008). This fact itself suggests analysts' own emphasis on their interpretation role of public information. Second, among the three different types of corporate disclosures, earnings announcements are most likely to trigger prompt revisions by analysts, while 10-Q filings are least likely to trigger prompt revisions. This is not surprising given that prior research has found that earnings announcements typically trigger most market reactions. On the other hand, 10-Q forms tend to be filed over a short time period by a large number of firms. In addition, 10-Q forms contain a substantially greater amount of information. These factors imply that analysts may have limited time and resources to update their forecasts immediately after 10-Q forms. Finally, Form 8-K filings, which have not been studied extensively in prior literature, trigger a non-trivial percentage of analyst forecast revisions, suggesting the important information content of these filings.

We estimate the following models to test our research question regarding market reactions to analyst forecast revisions conditional on their promptness following corporate public disclosures.

$$XRET = f\,[RREV,\ RREV \times PROMPT,\ RREV \times (SIZE,\ BM,\ EXP,\ NUMFIRM,\ BROKER,\ HORIZON,\ INNOVATIVE,\ RRETP)] \quad (1)$$

$$XRET = f\,[RREV,\ RREV \times (PROMPT\_ER,\ PROMPT\_10Q,\ PROMPT\_8K),\ RREV \times (SIZE,\ BM,\ EXP,\ NUMFIRM,\ BROKER,\ HORIZON,\ INNOVATIVE,\ RRETP)] \quad (2)$$

The dependent variable is the excess buy-and-hold return over three trading days (day -1, 0, and 1) centered on the forecast revision day (XRET). The excess return is measured relative to matched size, book-to-market, and momentum portfolios.[4] For each analyst forecast revision, we calculate its magnitude as the revised forecast minus the same analyst's previous forecast for the same forecast period deflated by stock price as of the end of the month prior to the forecast revision.[5] In our empirical tests, following prior research (e.g., Elgers et al. 2001), to prevent undue effects by outliers, we rank this scaled revision variable into 10 equal sized deciles by calendar month and then divide the ranks by nine and subtract by 0.5. We use this transformed rank variable, RREV, in our empirical tests. Thus, the coefficient of RREV can be interpreted as a return on a hedge portfolio that is long on the most positive decile of forecast revisions and short on the decile with the most negative revisions. Based on prior research (e.g., Stickel 1991; Clement and Tse 2003), we expect the coefficient on RREV to be greater than zero, indicating a positive association between market reactions and revision direction and magnitude.

We then interact the revision variable, RREV, with its promptness dummy indicator, PROMPT. If the coefficient on the interaction between RREV and the promptness indicators (PROMPT in Model 1, PROMPT_ER, PROMPT_8K, and PROMPT_10Q in Model 2) is positive (negative), it suggests that the market considers public information prompted revisions to be more (less) informative than non-public information prompted revisions, hence that investors value more analysts' role of information interpretation (information discovery).

We also include the effects of a number of control variables on market reactions to analyst revisions. Specifically, we include firm-specific, analyst-specific (including

[4] The portfolios are based on 2 size, 3 book-to-market, and 3 momentum portfolios.

[5] To mitigate the effects by small scalers, we delete observations with stock price less than $1.

characteristics of the employing broker), and revision-specific control variables.[6] For firm-specific variables, we control for the effects of firm market value of equity at month-end prior to the revision (SIZE,) and book-to-market ratio as of month-end prior to the revision (BM, where book value is from the Point-In-Time Quarterly Compustat database). We also control for the following analyst-specific variables: experience as an analyst in terms of the number of days since the analyst's first EPS forecast on IBES (EXP), number of firms the analyst covers at month-end prior to the revision (NUMFIRM), the size (i.e., number of individual analysts) of the employing brokerage house at month-end prior to the revision (BORKER). We also control for revision-specific control variables including the horizon (HORIZON) and the innovativeness of forecast revision (INNOVATIVE). Horizon is the number of days from the revision until the corresponding forecast period end.[7] Innovativeness captures how innovative the analyst's revision is relative to other analysts. We measure innovativeness following Gleason and Lee (2003). Specifically, if the analyst's revision moves away (relative to his/her previous forecast) from the consensus[8], we consider it an innovative forecast; otherwise we consider it a non-innovative forecast.

Finally, to alleviate the concern that any association between analyst forecast revisions and the excess market returns around the revisions is due to analysts' and investors' separate reactions to the common public information (as opposed to investors' reactions to analyst revisions), we control for market reactions to the most recent public disclosures (i.e., earnings announcements, 10-Q, 10-K or 8-K filings) within the last 120 days. Specifically, we identify the

[6] The control variables that we include in the model largely follow Clement and Tse (2003).

[7] Note this variable can be negative if the revision is issued after the period end, but before the corresponding earnings announcements. In this case, we assign a value of 1 to the horizon variable.

[8] Consensus is the mean EPS forecast for the same period by all analysts in the 365 calendar days prior to the revision announcement. Only the most recent analyst forecast by each analyst is used in forming the consensus.

most recent corporate public disclosure prior to the forecast revision and calculate the excess return around the three trading days (-1, 0, 1) centered on the public disclosure day. Similar to our measure of the magnitude of analyst forecast revisions, we rank the excess return into deciles by calendar month, deflate the decile rank by 9 and subtract by -0.5 to obtain the variable used in the regression model, RRETP.

In light of prior literature, we expect that market reactions to analyst revisions are negatively correlated with firm size, book-to-market ratio, number of firms the analyst covers, forecast horizon, and positively correlated with analyst experience, broker size, and forecast innovativeness. We do not make a directional prediction on the effects of market reaction to the most recent public disclosure (RRETP). On the one hand, market reactions to corporate news could capture underlying firm characteristics such as information environment, which would also affect market reactions to analyst forecast revisions. In this case, RRETP is expected to be positively associated with the market reactions to the forecast revisions. On the other hand, if investors are able to interpret specific corporate public news and react to it prior to the forecast revision, they may rely less on analysts' interpretations and hence react less strongly to subsequent analyst forecast revisions. Alternatively, if investors have difficulties interpreting the news, they may underreact to the news until analysts update their forecasts, causing RRETP to be negatively associated with the market reactions to the forecast revisions.

Table 2 presents descriptive statistics for the variables used in this study. The mean of the deflated revision (SREV) is -0.014, consistent with prior research that analysts are more likely to "walk down" their forecasts as they approach fiscal period end (Richardson et al. 2004). The median is also negative, although with a much smaller magnitude (-0.0002). The corresponding three day stock excess return has a mean of -0.003 and median of -0.001. The average market

value is 11,413 million whereas the median is 2,047 million, suggesting that its distribution is highly skewed. The mean and median book-to-market ratios are 0.425 and 0.378 respectively. [9,10] As to analyst characteristics, the average analyst has experience of 2,537 days, which is about 7 years, and the median is about 5.5 years. The employing broker has on average 72 analysts and a median of about 50. On average, an analyst covers about 17 firms with a median of about 15 firms. Finally, as to the revision characteristics, the average horizon of the revisions is about 173 days; 43% of the revisions are classified as innovative, i.e., moving away from the consensus. The mean and median three-day market reactions to the most recent public corporate disclosures within the previous 120 days are -0.001 and -0.001 respectively.

We also examine (but do not tabulate) the correlations among our control variables. In general, while most of the correlations are significant, they are small in magnitude with the following exceptions. Firm size is positively correlated with broker size (0.21), experience is positively correlated with number of firms that the analyst follows (0.46), and the book to market ratio is negatively correlated with size (-0.33).

To reduce the influence of outliers in our regression models, we take logs of the following variables: SIZE, EXP, HORIZON, NUMFIRM and BROKER. Further, given the high correlation among some of the independent variables over time, we estimate Model (1) and Model (2) cross-sectionally by calendar month and report the Fama-MacBeth (1973) coefficients and significance levels.

[9] For book-to-market ratios that have absolute values greater than 1, we assign a value of -1 or 1 to the observation to avoid undue influence by outliers.

[10] We also check analyst coverage as an additional firm-specific variable. On average, our sample firms are covered by 17 analysts, and the median is about 11 analysts. We do not include analyst coverage as a control variable in our regressions because of its high correlation with firm size (the correlation coefficient is 0.68). In unreported analyses we add this as one additional control variable in our models and our inferences are unchanged.

4. Empirical results

4.1. Univariate test

Table 3 presents univariate statistics of market reactions to analyst forecast revisions conditional on the magnitude of the forecast revisions (SREV). Specifically, we sort the analyst forecast revisions into deciles by calendar month and report average XRET for non-prompt revisions, all prompt revisions, and prompt revisions after preliminary earnings announcements, 10-Q filings, and 8-K filings separately. To examine the unique effects of each type of corporate disclosures, we focus on prompt revisions that are preceded by only one type of corporate disclosures.

For prompt revisions in the lowest and highest deciles, the three-day excess returns are -5.1% and 3.6%, respectively, while for non-prompt revisions in the same deciles, the excess returns are -3.1% and 1.2% respectively. This suggests that the market reacts more strongly to extreme prompt revisions than extreme non-prompt revisions. The same pattern also largely applies to prompt revisions after earnings announcements and 8-K filings, as shown in Panel B, although there is some evidence that the larger reactions of prompt revisions are concentrated on negative news after 8-K filings and positive news after earnings announcements. As to the revisions following 10-Q filings, the pattern is inconsistent with the other types of disclosures. The market reactions are weaker to revisions issued promptly after 10-Q filings than non-prompt revisions.

Overall, the univariate tests provide preliminary evidence that investors react more strongly to revisions that are issued promptly after corporate disclosures than to non-prompt revisions. However, there is some evidence that investors treat prompt revisions after different types of corporate disclosures differently.

4.2. Main regression analyses

Table 4 reports the Fama-Macbeth coefficients of regression estimates for Model (1) and Model (2). In Panel A, we include all analyst forecast revisions in our sample and examine the average incremental information content of prompt revisions relative to non-prompt revisions. Consistent with univariate results presented in Table 3, this panel shows that the market reacts significantly more strongly to prompt revisions than to non-prompt revisions even after controlling for various variables that may affect market reactions to revisions. Specifically, for Model (1), the coefficient on RREV, the rank measure of the revision, is significantly positive at 0.075, suggesting that analyst revisions do convey important information to the market in general. The coefficient on the interaction term between RREV and PROMPT is significantly positive at 0.032, suggesting that prompt revisions trigger a 43% (0.032/0.075) larger market reaction than non-prompt revisions.

For Model (2) in Panel A, the coefficient on RREV is 0.082 and statistically significant. Consistent with evidence in Table 3, the interaction terms of PROMPT_ER and PROMPT_8K with RREV are significantly positive, with the magnitude being 0.017 (21%) and 0.023 (28%) respectively. These results suggest that investors value analysts' ability to interpret earnings announcements and particularly 8-K filings. On the other hand, also consistent with univariate analysis, the interaction term for PROMPT_10Q is significantly negative at -0.014 (-17%), suggesting that investors seem to discount prompt revisions after 10-Q filings. While this result is different from the results for prompt revisions after earnings announcements or 8-K filings, there are a few possible explanations for this result. First, 10-Q and 10-K forms tend to be clustered in filing time, often within days of the statutory filing deadline (e.g. Li and Ramesh 2009). Further, 10-Q and 10-K forms contain a large amount of information, which may require

substantial amount of time and resources to analyze and interpret. The fact that there are significantly less prompt analyst revisions after 10-Q filings is also consistent with these observations.[11] For these reasons, investors may question the quality of prompt revisions after 10-Q filings and hence do not react as strongly as they do for other revisions.

The effects of the control variables are generally consistent with expectations and prior research. Smaller firms and high growth firms tend to have larger market reactions, which can be attributed to the larger information asymmetry and weaker information environment of these firms. Revisions by more experienced analysts or analysts employed by larger brokers have larger market reactions while revisions by analysts who cover more firms have smaller market reactions. More innovative revisions and revisions with shorter horizons are associated with larger market reactions. Finally, the interaction term between RREV and RRETP is significantly negative. This suggests that when corporate disclosures are considered informative by the investors as judged by market reactions to the initial corporate disclosure, their subsequent reactions to the analyst revisions are weaker; when corporate disclosures are considered less informative or more difficult to interpret, investors react more strongly to analyst revisions. This result is consistent with investors' preference for analysts' ability to interpret hard-to-understand public disclosures.

In our analyses so far, we have included all analyst forecast revisions to document the average effects of prompt revisions relative to non-prompt revisions. In contrast, Ivkovic and Jegadeesh (2004) exclude all analyst revisions on day 0 and 1 relative to the earnings announcements in order to avoid the confounding effects of market reactions to news in the earnings announcements itself. In Panel B we follow this research design and exclude all analyst

[11] Recall that as shown in Table 1, only 2% of the sample revisions are issued within three trading days after 10-Q filings that are not clustered with other corporate disclosures.

forecast revisions on day 0 and 1 relative to the earnings announcements.[12] The coefficient on RREV is 0.071 and statistically significant. The coefficient on the interactions between PROMPT and RREV, although smaller than the corresponding coefficient in Panel A for the full sample, is 0.019 and statistically significant. This represents an incremental increase of 27%. When we examine the effects of 10-Q and 8-K separately in Model (2), the non-prompt revisions have a coefficient of 0.072. Prompt revisions after 8-K continue to have a significantly positive effect (0.029 or 40%), higher than that in Panel A (0.023 or 28%). Prompt revisions after 10-Q remain significantly negative (-0.012), smaller in magnitude than that in Panel A (-0.014), although the incremental effects in terms of percentage are similar (both 17%).

Thus, the results in Panel B suggest that even after excluding analyst revisions that follow immediately after the earnings announcements, on average, prompt revisions relative to other significant SEC filings continue to trigger greater market reactions than non-prompt revisions. This effect is driven by prompt revisions after 8-K filings, suggesting investors particularly value analysts' interpretation of information in 8-K filings.

To summarize, in this subsection we provide empirical evidence that, on average, investors view prompt forecast revisions after corporate disclosures as more informative than other revisions, implying that investors place greater value on analysts' ability for prompt information interpretation than their ability for information discovery. These results are largely driven by prompt revisions after 8-K filings, whose effects are both statistically and economically significant. Given the nature of the information contained in 8-K filings, this result suggests that investors particularly value analysts' interpretation of public information that is non-structured and/or qualitative.

[12] Similar results are obtained when we exclude all prompt revisions after the preliminary earnings announcements (i.e., PROMPT_ER=1) rather than just day 0 and 1.

4.3. Revisions in weeks prior to earnings announcements

Ivković and Jegadeesh (2004) find that investors react more strongly to analyst revisions immediately prior to quarterly earnings announcements. Chen et al. (2010) find that revisions in the six weeks prior to quarterly earnings announcements pre-empt the subsequent earnings announcements. Both studies treat all revisions during this period the same without incorporating the fact that firms often release public information during this period (e.g., earnings guidance or write-down information in 8-K filings) and analysts may play important roles in helping investors interpret such information. Accordingly, in this subsection, we focus on the time frame examined in these studies and examine whether investors respond to prompt and non-prompt revisions differently during this period.

Panel A of Table 5 reports the frequencies as well as market reactions for upward and downward revisions separately for each of the six weeks prior to earnings announcements, conditional on whether the revisions are issued promptly after 8-K filings or 10-Q filings. For the first week before earnings announcements (Week -1), about 15% of upward or downward revisions are issued promptly after at least one of the corporate public disclosure that we consider. For the five weeks prior to this week, between 21 to 26% of revisions are issued promptly after these disclosures. These numbers suggest that a non-trivial percentage of the revisions issued prior to earnings announcements may actually reflect analysts' interpretation of public information, as opposed to their information discovery which is assumed in Ivkovic and Jegadeesh (2004) and Chen et al. (2010).

Further, it is evident from Panel A that market reactions are stronger for prompt revisions than for non-prompt revisions in the weeks immediately prior to the earnings announcements. For example, in Week -1, the average market reactions to downward revisions are -0.9% for non-

prompt revisions but -2.3% for prompt revisions. Similarly, the average market reactions to upward revisions are 1.2% for non-prompt revisions but 1.7% for prompt revisions. Weeks -6 through -2 show similar patterns. All differences between prompt and non-prompt revisions are statistically significant. These results should be mainly driven by 8-K reports filed during this period, as 10-Q or 10-K filings in the six weeks prior to earnings announcements are infrequent.

In addition to the univariate tests, we also re-estimate Model (1) for Week -6 through Week -1 relative to the earnings announcements. The results are presented in Panel B of Table 5. For Week -1, neither RREV nor its interaction with PROMPT is statistically significant. One possible explanation for the lack of significance is the small number of revisions issued in the week immediately before earnings management. The coefficients on RREV are significantly positive for Week -6 through Week -2. The coefficients on the interaction between RREV and PROMPT are significantly positive for all these five weeks except for Week -3. The incremental effects in terms of percentage range between 15% and 29%. Overall, the results presented in Table 5 suggest that even in the weeks leading up to earnings announcements, investors still value analysts' ability to interpret public information such as 8-K filings over their ability for information discovery.

4.4. Additional tests

An even broader set of corporate public disclosures

Even though our main analyses incorporate a broader set of corporate public disclosures than earnings announcements alone, arguably these SEC filings (10-K, 10-Q, or 8-K) are still only a subset of corporate public disclosures issued between earnings announcements. To address this concern, we employ the Key Developments database compiled by Capital IQ to re-

define our promptness variable. This database is available from 2002 onwards and covers corporate information on SEC inquiries, expansions, reorganizations, client announcements, corporate governance, dividends, earnings, M&A transactions, executive/board changes, litigations, labor relations, product announcements, investor relations, and strategic alliances. Thus, this database provides a substantially more comprehensive set of corporate public information.

We re-define our PROMPT variable and re-estimate Model (1) using this Key Developments dataset. Similar to our main analyses, we define PROMPT1 equals to 1 if there is any Key Developments event, an earnings announcement, Form 8-K, Form 10-K or Form 10-Q filing in the three days prior to the revision and 0 otherwise. The sample period covered by this analysis is 2002 through 2008. We have 80% of revisions with PROMPT1=1, substantially higher than revisions with PROMPT=1 (60%). This is expected as we now incorporate substantially more information events in defining the promptness of analyst revisions.[13]

Results are presented in Table 6. The coefficient on RREV is 0.092 and statistically significant. The coefficient on the interaction between RREV and PROMPT1 is statistically significant at 0.064, a 70% incremental effect. To the extent that this substantially higher effect than those shown in Table 4 is attributable to the higher frequency of 8-K filings in this sample period[14] and the events covered in the Key Developments database, the result implies that investors attach even higher value to prompt revisions after non-structured or non-financial

[13] We do caution that as we include more information events in our sample, there is an increased likelihood that certain revisions with PROMPT1=1 may reflect analysts' information discovery role as well. This reflects a trade-off between Type I and Type II errors in identifying revisions that reflect the information interpretation role of analysts.

[14] Note that we use in this sub-section the revisions that occur in years 2002 onwards. Due to the new SEC requirements regarding Form 8-K disclosures, the number of Form 8-K filings has increased substantially after August 2004 (see Lerman and Livnat 2010). This may also contribute to the higher percentage of prompt revisions in this analysis.

corporate information such as M&A announcements or product announcements than other prompt revisions.

Long-term market reactions

Prior research has suggested that investors tend to under-react to analyst forecast revisions, inducing post-revision drift (e.g., Elgers et al. 2001; Gleason and Lee 2003). To the extent that the magnitude of the underreaction is different for analysts' prompt revisions and non-prompt revisions, our results may not be due to the difference in the informativeness or value of analyst forecast revisions, but rather due to the difference in inefficient reactions by the investors. To address this possibility, we also test for longer-term stock returns subsequent to analyst forecast revisions. Specifically, we replace the dependent variable in Models (1) and (2) with excess returns from one trading day prior to the revision through one trading day after 90th calendar day after the revision and re-estimate the models. These regressions thus examine total market reactions to the analyst forecast revisions, over both the immediate short window and the drift window.

Our (non-tabulated) results are similar to those reported in Panel A of Table 4. Prompt revisions have long-term market reactions that are about 21% stronger than non-prompt revisions, further supporting our earlier results that investors value analysts' ability to promptly interpret public information. When examining different filings separately, the results show that the effects of prompt revisions after earnings announcements and 10-Q filings are insignificant, suggesting that that results in Table 4 for these two types of prompt revisions are largely due to immediate differential inefficiency in investors' reactions to these revisions relative to non-prompt revisions. In contrast, the effect of prompt revisions after 8-K filings remains significantly positive. The

coefficient suggests that the incremental informativeness is about 25% greater than non-prompt revisions, which appears economically significant as well.

Prompt and non-prompt revisions issued by the same analysts

Our analyses are performed at the individual revision level. It is possible that prompt revisions and non-prompt revisions are systematically issued by different analysts. For example, certain analysts could be better at interpreting public information while others at information discovery. To the extent that these two types of analysts have different quality and the market reacts to the different quality, our results can be driven by analyst characteristics as opposed to analysts' role of interpreting public information versus their role of information discovery.

Therefore, we perform additional analyses that control for underlying analyst characteristics. Specifically, for each month, we retain only those analysts that have both prompt and non-prompt revisions. We keep the first prompt revision and the first non-prompt revision by each analyst in that month. We then re-estimate Model (1) with these revisions only. Untabulated results show that the coefficient on RREV is 0.075 and the coefficient on the interaction between RREV and PROMPT is 0.019 (25%), both significant at better than 0.01 levels. Thus, even for the same analyst, our results show that the market reacts more significantly to revisions promptly following public disclosures than to non-prompt revisions, suggesting investors' emphasis of analysts' ability to interpret public information.

Effects of Regulation Fair Disclosure

We also examine how our results may differ for periods before and after the enactment of Regulation Fair Disclosure (Reg FD). Reg FD, which became effective on October 23, 2000,

seeks to eliminate superior trading opportunities for beneficiaries of firms' selective disclosures. Specifically, Reg FD requires that corporations not disclose material information to select investors or securities market professionals. Financial analysts were among the "select" securities market professionals who benefited from private communications with corporate management prior to Reg FD (e.g., Hutton 2005). To the extent that analysts' non-prompt revisions pre-FD reflected private information conveyed directly by corporate managers, investors may view non-prompt revisions pre-FD as of higher quality than non-prompt revisions post-FD.

We re-estimate Model (1) for months before and after the effective date of Reg FD separately. The implications for both periods are similar to the implications from our main results. Specifically, in both pre- and post-FD periods, market reactions to prompt revisions are significantly stronger than non-prompt revisions and we do not find any noticeable differences between these two periods. Given our main results that investors prefer the role of analysts as interpreters of public information, it is not surprising that Reg FD, which mainly affects analysts' role as developers and researchers of private information, did not have a significant impact on our results.

4.5. Prompt analyst forecast revisions after earnings announcements

Both Ivkovic and Jegadeesh (2004) and Chen et al. (2010) exclude prompt analyst forecast revisions on and/or immediately after earnings announcement dates when they analyze the information interpretation versus discovery role of analysts. This research design is motivated by the difficulties in disentangling the information content of the earnings announcement itself from that of the forecast revision. However, it is important to recognize that

given the significance of earnings announcements, analysts' prompt revisions after these announcements are probably the most valued by investors in terms of analysts' information interpretation role. Further, a large proportion of all analyst revisions occur immediately after earnings announcements, as shown by Ivkovic and Jegadeesh (2004) and us; ignoring these revisions completely leads to a substantially reduced and potentially biased sample.

Therefore, in our final analyses, we attempt to focus on prompt revisions immediately after earnings announcements and directly control for news in these announcements by utilizing the Charter Oak Point-In-Time database, which includes information on financial information disclosed in the preliminary earnings releases. Specifically, most firms include in their preliminary earnings announcements not only information about earnings, but also information about revenues (Jegadeesh and Livnat 2006). About 40% of the firms include a condensed balance sheet, and about 10-20% include some cash flow information in their preliminary earnings releases. Most firms include some additional statements by company officials that may explain their past performance and some provide future guidance as well.

Prior research documents that market participants react not only to earnings surprises but also to revenue surprises (Ertimur et al. 2003). Also, Sloan (1996) and others showed the importance of accruals information on prices of stocks. Thus, to document any incremental value of an analyst revision, we need to control for the preliminary earnings surprise, the preliminary revenue surprise, and for any accruals information released in the preliminary earnings announcement. If we find that an analyst revision has information content beyond earnings and revenue surprises, as well as estimated accruals, then investors may either react to the analyst revision because it interprets other information in the preliminary earnings announcement and/or to the analyst's private information. Accordingly, we regress the short-window excess returns

around the preliminary earnings announcements on earnings and revenue surprises, accruals, and analyst revisions that occurred on the preliminary earnings announcement date and the next day.

We present our regression results in Table 7. In Panel A, we first report correlations among excess return around the preliminary earnings announcements (XRET_ER), and rank variables for key financial information disclosed at the preliminary earnings announcements. We define these variables in more details in Appendix A. As expected, the excess returns are positively correlated with earnings surprises (RSUPR; correlation of 0.30) or sales surprises (RSURP_REV; 0.22) [15]. The correlation between XRET_ER and analyst forecast revision (RREV) is even higher at 0.34. The correlations among these three information measures are also relatively high. On the other hand, change in net operating assets (RNOA) or operating cash flows (ROCF) have negative correlations with XRET_ER, although the magnitudes are relatively small (-0.02 and -0.04 respectively). While these two variables have high correlations with each other, they generally have low correlations with the other three information measures.

Panel B reports regression analyses of excess returns around the earnings announcements on analyst forecast revisions. We estimate two different specifications where we control for (i) earnings surprises (RSUPR), (ii) sales surprises (RSURP_REV), and (iii) change in net operating assets (RNOA) or operating cash flows (ROCF). [16] In both specifications, the coefficients on RREV are significantly positive (0.122 and 0.262). In fact, they are substantially higher than those on earnings surprises (0.043 and 0.046) or sales surprises (0.033 and 0.034). The coefficient on the change in net operating assets or operating cash flows is significantly negative, albeit with small magnitude (-0.006 and -0.009). These results are consistent with correlation

[15] Our earnings and revenue surprise variables are transformed to scaled decile ranks as in RREV. The surprises are measured based on analyst forecasts. Results do not change if we measure surprises based on time-series forecasts.

[16] Since certain information (such as operating cash flows) is not available in all earnings announcements, the number of months reported in Table 7 is generally smaller than earlier tables.

statistics in Panel A and indicate that market participants seem to find value in analyst forecast revisions immediately following earnings announcements, even if these revisions do little beyond interpretation of other information in the preliminary earnings release.[17]

Finally, in Panel C, we examine whether the disclosure of a balance sheet or a statement of cash flows affects how investors respond to analyst forecast revisions issued immediately after the earnings announcements. In addition to including measures for earnings surprises and sales surprises, we also include interaction terms of RREV with two indicator variables for whether the firm discloses a balance sheet (DBS) or a statement of cash flows (DSCF) in the earnings announcement. The coefficient on RREV, as always, is significantly positive. More interesting, we find that the coefficient on RREV*DBS is significantly positive (0.023). This suggests that investors value analyst revisions promptly after earnings announcements to a greater extent if the firm reports a balance sheet in the announcement, as if they have difficulties in understanding the implications of information on balance sheets for future earnings or cash flows. The interaction term of RREV and DSCF, on the other hand, is not significant.

Overall, the results in Table 7 highlights the importance of analysts' interpretation of earnings announcements as reflected in their revisions issued promptly after the announcements. Further, these results suggest that the stronger market reactions to prompt revisions relative to non-prompt revisions documented earlier are unlikely to be driven by market reactions to contemporaneous news in corporate disclosures itself.

[17] Note that these regressions may have more than one analyst revision for the same preliminary earnings announcement, causing the dependent variable and some of the independent variables to be the same across all analyst revisions released immediately after the earnings announcement for that firm-quarter. To ensure that our results are not driven by this phenomenon, we repeat our analysis after randomly selecting only one revision following each firm-quarter preliminary earnings release. The results are qualitatively very similar to those reported in Table 7.

5. Concluding remarks

This study uses the timing of analyst forecast revisions relative to a broad set of corporate public disclosures to infer the analysts' role of information interpretation or information discovery. We find that a majority of analyst forecast revisions are issued promptly after these corporate public disclosures and that, on average, investors react more significantly to revisions issued promptly after corporate public disclosures than to other revisions. This effect is even stronger for prompt revisions after corporate 8-K filings or certain other information events included in the Key Developments database. Thus, this study sheds light on the relative importance of the two different roles analysts play. To the extent that prompt revisions are more likely to reflect analysts' information interpretation role, our results suggest that investors view analysts' ability to interpret public information, especially 8-K filings that is less-structured and less-quantitative, as more important than their ability for information discovery.

References

Atiase, R., H. Li, S. Supattarakul, S. Tse. 2005. Market reaction to multiple contemporaneous earnings signals: Earnings announcements and future earnings guidance. Review of Accounting Studies 10(4): 497.

Ball, R. and P.Brown. 1968. An empirical evaluation of accounting income members. Journal of Accounting Research 6(2): 159-178.

Barron, O.E., D Byard and O. Kim. 2002. Changes in analysts' information around earnings announcements. The Accounting Review 77(4): 821-847.

Bowen, B., X. Chen, and Q. Cheng. 2008. Analyst coverage and the cost of raising equity capital: Evidence from underpricing of seasoned equity offerings. Contemporary Accounting Research 25(3): 657-699.

Callen, J., J. Livnat and D. Segal. 2006. Information content of SEC filings and information environment: A variance decomposition analysis. The Accounting Review 81(5): 1017-1043.

Carter, M. E., and B. S. Soo. 1999. The relevance of form 8-K reports. Journal of Accounting Research 37(1): 119-132.

Chen, X., Q. Cheng, K. Lo. 2010. On the relationship between analyst reports and corporate disclosures: Exploring the roles of information discovery and interpretation. Journal of Accounting and Economics: forthcoming.

Clement, M. and S. Tse 2003. Do investors respond to analysts' forecast revisions as if forecast accuracy is all that matters? The Accounting Review 78(1): 227-249.

Cooper, R.A., T.E. Day and C.M. Lewis. 2001. Following the leader: A study of individual analysts' earnings forecasts. Journal of Financial Economics 61(3): 383-416.

Daniel, K., D. Hirshleifer and A. Subrahmanyam. 1998. Investor psychology and security market under – and overreactions. Journal of Finance 53(6): 1839-1885.

Elgers, P., M. Lo, and R. Pfeiffer, Jr. 2001. Delayed security price adjustments to financial analysts' forecasts of annual earnings. The Accounting Review 76(4): 613-632.

Ertimur Y., J. Livnat, M. Martikainen. 2003. Differential market reactions to revenue and expense surprises. Review of Accounting Studies 8(2-3): 185-211.

Fama, E.F., and J. Macbeth, 1973, Risk, return, and equilibrium: Empirical tests, Journal of Political Economy 81(3), 607-636.

Francis, J., Schipper, K., Vincent, L., 2002. Earnings announcements and competing information. Journal of Accounting and Economics 33 (3), 313–342.

Frankel,R., Kothari,S.P., Weber,J.P., 2006. Determinants of the informativeness of analyst research. Journal of Accounting and Economics 41(1–2), 29–54.

Gleason, C.A., and C. M. C. Lee. 2003. Analyst forecast revisions and market price discovery. The Accounting Review 78(1): 193-225.

Griffin, P.A. 2003. Got information? Investor response to form 10-K and form 10-Q EDGAR filings. Review of Accounting Studies 8(4): 433-460.

Hong, H., T. Lim, and J.C. Stein, 2000. Bad news travels slowly: Size, analyst coverage, and the profitability of momentum strategies. Journal of Finance 55(1): 265-295.

Hutton, A. 2005. Determinants of managerial earnings guidance prior to regulation fair disclosure and bias in analysts' earnings forecast. Contemporary Accounting Research 22(4): 867-914.

Ivković, Z., and N. Jegadeesh, 2004. The timing and value of forecast and recommendation revisions. Journal of Financial Economics 73(3): 433-463.

Jegadeesh N., J. Livnat. 2006. Revenue surprises and stock returns. Journal of Accounting and Economics 41: 147-171.

Kross, W., B. Ro and D. Schroeder. 1990. Earnings expectations: The analysts' information advantage. The Accounting Review 65(2): 461-476.

Lerman A. and J. Livnat. 2009. The new form 8-K disclosures. Review of Accounting Studies: Forthcoming.

Li, E. X., and K. Ramesh. 2009. Market reaction surrounding the filing of periodic SEC reports. The Accounting Review: forthcoming.

Mozes, H. 2003. Accuracy, usefulness and the evaluation of analysts' forecasts. International Journal of Forecasting 19(3): 417−434.

Ramnath S., S. Rock and P. Shane. 2008. Financial analyst forecasting literature: A taxonomy with trends and suggestions for further research. International Journal of Forecasting 24(1): 34-75.

Richardson, S., S.H. Teoh and P.D. Wysocki. 2004. The walk-down to beatable analyst forecasts: The role of equity issuance and insider trading incentives. Contemporary Accounting Research 21(4): 885-924.

Sloan, R. 1996. Do stock prices fully reflect information in accruals and cash flows about future earnings? The Accounting Review 71: 289-315.

Stickel, S.E. 1989. The timing of and incentives for annual earnings forecasts near interim earnings announcements. Journal of Accounting & Economics 11(2-3): 275-292.

Stickel, S.E. 1991. Common stock returns surrounding earnings forecast revisions: More puzzling evidence. The Accounting Review 66(2): 402-416.

Zhang, Y. 2008. Analysts' responsiveness and the post earnings announcement drift. Journal of Accounting & Economics 46(1): 201-215.

Appendix A: Variable Definitions

Variable Name	Definition
PROMPT	1 if there is at least one public corporate disclosure (preliminary earnings announcements, 10-Q filings, or 8-K finings) within three trading days prior to the revision, and 0 otherwise.
PROMPT_ER (PROMPT_10Q, PROMPT_8K)	1 if there is at least one preliminary earnings announcement (10-Q filing or 8-K filing respectively) within three trading days prior to the revision, and 0 otherwise.
PROMPT_ER0 (PROMPT_10Q0, PROMPT_8K0)	1 if preliminary earnings announcements (10-Q filings or 8-K finings respectively) are the only public corporate disclosures (among the three types) within three trading days prior to the revision, and 0 otherwise.
PROMPT1	1 if there is at least one public corporate disclosure included in the Key Developments database within three trading days prior to the revision, and 0 otherwise.
SREV	Scaled analyst forecast revision calculated as the revised forecast minus the same analyst's previous forecast for the same forecast period deflated by stock price as of the end of the month prior to the forecast revision.
RREV	Decile rank of SREV by calendar month deflated by 9 minus 0.5.
XRET	Buy-and-hold excess return over the three trading days (-1, 0, 1) centered on the analyst forecast revision (day 0). Excess returns are measured over matched size, book-to-market, and momentum portfolios.
XRET_ER	Buy-and-hold excess return over the three trading days (-1, 0, 1) centered on the preliminary earnings announcement date (day 0). Excess returns are measured over matched size, book-to-market, and momentum portfolios.
SIZE	Market value of the firm equity in millions, measured as of the end of the month prior to the revision.
BM	Book-to-market ratio as of the end of the month prior to the revision. Book value is from the Point-In-Time Quarterly Compustat database.
EXP	Analyst experience in terms of number of days since the analyst's first EPS forecast on IBES.
NUMFIRM	Number of firms the analyst covers as of the end of the month prior to the revision.
BROKER	Size of the employing brokerage house measured as the number of individual analysts as of the end of the month prior to the revision.

HORIZON	Number of days from the revision until the corresponding forecast period end.
INNOVATIVE	1 if the analyst's revision moves away (relative to his/her previous forecast) from the consensus, and 0 otherwise. Consensus is the mean analyst forecast over the prior 365 days, where only the most recent forecast is retained for each analyst.
RETP	Buy-and-hold excess return over three trading days (-1, 0, 1) centered on the most recent public corporate disclosure (preliminary earnings announcements, 10-Q, or 8-K) within 120 days prior to the analyst revision. Excess returns are measured over matched size, book-to-market, and momentum portfolios.
RRETP	Decile rank of RETP by calendar month deflated by 9 and minus 0.5.
RSURP	The earnings surprise is estimated using analyst forecasts (SUEAF) or forecasts based on time series (SUE) alternatively. SUEAF is the IBES actual EPS minus mean IBES forecast in the 90-day period prior to the preliminary earnings announcement, scaled by price at quarter-end. SUE is net income before extraordinary items and discontinued operations for the quarter minus net income four quarters ago, scaled by market value at quarter-end. SUEA and SUE are ranked across firms each month and each firm is assigned its decile rank, scaled by 9, minus 0.5.
RSURP_REV	The revenue surprise is estimated using analyst forecasts (SURGEAF) or time series forecasts (SURGE) alternatively. SURGEAF is the IBES actual revenue minus the mean revenue forecast by analysts in the 90-day period prior to the preliminary earnings announcement, scaled by market value at quarter-end. SURGE is revenue for the quarter minus revenue four quarters ago, scaled by market value at quarter-end. The revenue surprises are transformed into scaled decile ranks as in RSURP.
RNOA	Change in net operating assets (NOA) from the prior quarter, scaled by total assets at quarter-end. NOA is total debt plus total equity plus minority interest minus cash. This variable is available if all the items used to calculate it appeared in the preliminary earnings release. The variable is transformed into its scaled decile rank as in RSURP.
ROCF	Accruals based on preliminary net operating cash flow. Preliminary net income minus preliminary net operating cash flow scaled by total assets at quarter-end. The variable is transformed into its scaled decile rank as in RSURP.
DBS	1 if the firm includes a balance sheet in the earnings announcements, and 0 otherwise.
DSCF	1 if the firm includes a statement of cash flows in the earnings announcements, and 0 otherwise.

Table 1: Frequency of Prompt Analyst Forecast Revisions

Variable	% Variable = 1
PROMPT	59.6%
PROMPT_ER	48.0%
PROMPT_10Q	7.5%
PROMPT_8K	37.2%
PROMPT_ER0	19.3%
PROMPT_10Q0	2.2%
PROMPT_8K0	9.0%

This table presents the percentage of analyst forecast revisions that are classified as prompt (within three trading days) following different corporate public disclosures. The sample includes 1,236,097 individual analyst forecast revisions for the next annual earnings over 1996-2008. See Appendix A for variable definitions. PROMPT_ER (10Q, 8K) are those revisions that occur within three trading days after preliminary earnings announcements (10-Q, 8-K filings). PROMPT_ER0 (10Q0, 8K0) are those revisions that occur after public disclosures but without any other types of public disclosures.

Table 2: Descriptive Statistics

Variable	N	Mean	Median	Std	P25	P75
SREV	1236126	-0.014	-0.000	3.347	-0.004	0.002
XRET	1236126	-0.003	-0.001	0.082	-0.034	0.031
SIZE	1236126	11413	2047	31887	619	7843
BM	1023462	0.425	0.378	0.278	0.224	0.588
EXP	1236126	2537	2007	2000	945	3683
NUMFIRM	1236126	17	15	11	11	20
BROKER	1236126	72	50	69	21	110
HORIZON	1236126	173	163	102	75	254
INNOVATIVE	1236126	0.431	0.000	0.495	0.000	1.000
RETP	1224541	-0.001	-0.001	0.080	-0.032	0.032

This table presents descriptive statistics of variables employed in the study. The sample includes 1,236,097 individual analyst forecast revisions for the next annual earnings announcements over 1996-2008. See Appendix A for variable definitions.

Table 3: Average Market Reactions to Analyst Forecast Revisions Conditional on Revision Promptness

Decile	All	PROMPT =0	PROMPT =1	PROMPT_ER0 =1	PROMPT_10Q0 =1	PROMPT_8K0 =1
0	-0.043	-0.031	-0.051	-0.045	-0.029	-0.067
1	-0.031	-0.024	-0.036	-0.032	-0.021	-0.047
2	-0.022	-0.017	-0.026	-0.024	-0.012	-0.033
3	-0.015	-0.011	-0.017	-0.016	-0.009	-0.021
4	-0.007	-0.006	-0.008	-0.008	-0.006	-0.009
5	0.004	0.000	0.006	0.006	0.001	0.005
6	0.012	0.006	0.016	0.017	0.004	0.013
7	0.018	0.009	0.023	0.023	0.007	0.018
8	0.023	0.012	0.030	0.030	0.006	0.020
9	0.027	0.012	0.036	0.037	0.008	0.022
All	-0.003	-0.006	-0.002	0.002	-0.005	-0.016

This table presents average XRET, the buy and hold excess return over three trading days around the analyst forecast revision, for deciles of the scaled revision SREV by calendar month. The sample includes 1,236,097 individual analyst forecast revisions for the next annual earnings announcements over 1996-2008. See Appendix A for detailed variable definitions.

Table 4: Regression Analyses of Market Reactions to Analyst Forecast Revisions Conditional on Revision Promptness

Panel A: All Revisions

	Model (1)			Model (2)		
Variable	Est.	t-value	p-value	Est.	t-value	p-value
Intercept	-0.005	-9.00	0.00	-0.005	-9	0.00
RREV	0.075	10.93	0.00	0.082	12.01	0.00
RREV*PROMPT	0.032	15.45	0.00			
RREV*PROMPT_ER				0.017	7.35	0.00
RREV*PROMPT_10Q				-0.014	-4.16	0.00
RREV*PROMPT_8K				0.023	8.95	0.00
RREV*SIZE	-0.004	-8.06	0.00	-0.004	-8.05	0.00
RREV*BM	-0.017	-11.85	0.00	-0.017	-11.98	0.00
RREV*EXP	0.001	2.06	0.04	0.001	2.01	0.05
RREV*NUMFIRM	-0.005	-7.75	0.00	-0.005	-7.67	0.00
RREV*BROKER	0.006	13.20	0.00	0.006	13.04	0.00
RREV*HORIZON	-0.002	-2.16	0.03	-0.002	-2.57	0.01
RREV*INNOVATIVE	0.028	23.98	0.00	0.028	24.35	0.00
RREV*RRETP	-0.014	-4.82	0.00	-0.013	-4.72	0.00
Number of Months	153			153		
R^2	0.100	25.14	0.00	0.103	25.72	0.00

Panel B: Excluding Revisions on Day 0 and 1 after Earnings Announcements

	Model (1)			Model (2)		
Variable	Est.	t-value	p-value	Est.	t-value	p-value
Intercept	-0.005	-8.87	0.01	-0.005	-8.77	0.01
RREV	0.071	10.06	0.01	0.072	10.30	0.01
RREV*PROMPT	0.019	8.54	0.01			
RREV*PROMPT_10Q				-0.012	-3.55	0.00
RREV*PROMPT_8K				0.029	10.29	0.01
RREV*SIZE	-0.004	-7.88	0.01	-0.005	-8.54	0.01
RREV*BM	-0.016	-12.31	0.01	-0.016	-12.25	0.01
RREV*EXP	0.000	0.37	0.71	0.000	0.49	0.62
RREV*NUMFIRM	-0.003	-3.85	0.00	-0.003	-4.07	0.01
RREV*BROKER	0.007	15.44	0.01	0.007	15.46	0.01
RREV*HORIZON	-0.002	-2.10	0.04	-0.002	-1.76	0.08
RREV*INNOVATIVE	0.025	20.79	0.01	0.025	20.81	0.01
RREV*RRETP	-0.037	-10.75	0.01	-0.036	-10.40	0.01
Number of Months	153			153		
R^2	0.087	21.07	0.00	0.089	21.41	0.01

This table reports results of monthly Fama-Macbeth regressions of Model (1) and Model (2). Panel A includes all analyst forecast revisions. Panel B includes all analyst forecast revisions except for those issued on Day 0 or Day 1 relative to the earnings announcements. The dependent variable is XRET, the buy and hold excess return over three trading days centered on the revision day. The models are estimated cross-sectionally every calendar month. The sample includes individual analyst forecast revisions for the next annual earnings announcements over 1996-2008. SIZE, EXP, BROKER, NUMFIRM, and HORIZON are logged forms of the raw variables. See Appendix A for variable definitions.

Table 5: Market Reactions to Analyst Forecast Revisions Conditional on Revision Promptness: Revisions in Six Weeks Prior to Earnings Announcements

Panel A: Univariate Tests

Week Prior to Earnings Announcements	Sign of Analyst Revision	Number of Obs.	% PROMPT=1	Mean Excess Return (XRET)		
				All Obs.	PROMPT=0	PROMPT=1
-1	-	19710	16%	-0.012	-0.009	-0.023***
	+	16144	15%	0.013	0.012	0.017***
-2	-	31046	25%	-0.028	-0.022	-0.048***
	+	22525	21%	0.014	0.012	0.023***
-3	-	35074	25%	-0.027	-0.021	-0.046***
	+	22399	22%	0.015	0.012	0.025***
-4	-	33009	25%	-0.03	-0.023	-0.05***
	+	20469	21%	0.013	0.011	0.018***
-5	-	31982	24%	-0.028	-0.024	-0.041***
	+	19390	21%	0.013	0.012	0.019***
-6	-	30692	26%	-0.027	-0.025	-0.035***
	+	20060	24%	0.014	0.014	0.017***

Panel B: Regression Tests

Week	-1	-2	-3	-4	-5	-6
Intercept	0.002*	-0.004***	-0.007***	-0.008***	-0.008***	-0.007***
RREV	0.008	0.175***	0.226***	0.204***	0.162***	0.102***
RREV*PROMPT	0.015	0.051***	0.020	0.034***	0.024**	0.028*
RREV*SIZE	-0.005	-0.015***	-0.014***	-0.012***	-0.011***	-0.009***
RREV*BM	-0.031***	-0.048***	-0.067***	-0.042***	-0.054***	-0.027***
RREV*EXP	0.002	0.001	0.002	-0.004**	0.001	0.000
RREV*NUMFIRM	0.006	-0.003	-0.015***	-0.006**	-0.007*	-0.001
RREV*BROKER	0.009***	0.009***	0.004*	0.006***	0.008***	0.007***
RREV*HORIZON	0.003	-0.001	-0.005	-0.004	-0.003	0.004
RREV*INNOVATIVE	0.020***	0.032***	0.028***	0.027***	0.022***	0.020***
RREV*RRETP	-0.021	-0.039**	-0.063***	-0.076***	-0.060***	-0.033**
Number of Months	113	132	126	124	122	115
R^2	0.183***	0.308***	0.274***	0.249***	0.232***	0.232***

Panel A reports t-tests for prompt and non-prompt revisions for each week in the six weeks prior to the earnings announcement over 1996-2008. Panel B reports results of monthly Fama-Macbeth regressions of Model (1) for each of the six weeks. The dependent variable is XRET, the buy-and-hold excess return over three trading days centered on the revision day. The models are estimated cross-sectionally every calendar month. The table includes statistics only for those months with at least 100 revisions in the weeks before a preliminary earnings announcement. SIZE, EXP, BROKER, NUMFIRM, and HORIZON are logged forms of the raw variables. ***, **, and * indicate two-sided significance levels at 0.01, 0.05, and 0.10 levels respectively. See Appendix A for variable definitions.

Table 6: Regression Analyses of Market Reactions to Analyst Forecast Revisions Conditional on Revision Promptness: A Broader Set of Public Firm Information

	Est.	t-value	p-value
Intercept	-0.003	-4.30	0.01
RREV	0.092	7.63	0.01
RREV*PROMPT1	0.064	27.74	0.01
RREV*SIZE	-0.009	-14.28	0.01
RREV*BM	-0.018	-7.03	0.01
RREV*EXP	0.002	4.02	0.00
RREV*NUMFIRM	-0.005	-4.99	0.01
RREV*BROKER	0.003	6.49	0.01
RREV*HORIZON	-0.002	-1.37	0.17
RREV*INNOVATIVE	0.030	18.53	0.01
RREV*RRETP	-0.022	-4.99	0.01
Number of Months	81		
R^2	0.146	35.22	0.01

This table reports results of monthly Fama-Macbeth regressions of Model (1). The dependent variable is XRET, the buy-and-hold excess return over three trading days centered on the revision day. PROMPT1 is defined relative to the events in Key Developments database as well as earnings announcements, 8-K, 10-K, or 10-Q filings. The models are estimated cross-sectionally every calendar month. The sample includes individual analyst forecast revisions for the next annual earnings announcements over 2002-2008. SIZE, EXP, BROKER, NUMFIRM, and HORIZON are logged forms of the raw variables. See Appendix A for variable definitions.

Table 7: Regression Analyses of Market Reactions to Analyst Forecast Revisions Promptly after Earnings Announcements

Panel A: Correlation Matrix

	XRET_ER	RREV	RSURP	RSURP_REV	RNOA
RREV	0.34				
RSURP	0.30	0.53			
RSURP_REV	0.22	0.26	0.30		
RNOA	-0.02	0.02	-0.01	0.05	
ROCF	-0.04	0.03	0.02	0.00	0.52

Panel B: Regression Tests

	Est.	t-value	p-value	Est.	t-value	p-value
Intercept	0.001	0.42	0.67	0.000	-0.18	0.86
RREV	0.122	2.43	0.02	0.262	4.17	0.01
RSURP	0.043	9.28	0.01	0.046	6.92	0.01
RSURP_REV	0.034	7.73	0.01	0.033	6.72	0.01
RNOA	-0.006	-1.85	0.07			
ROCF				-0.009	-2.29	0.02
RREV*SIZE	-0.001	-0.25	0.80	-0.009	-4.12	0.01
RREV*BM	-0.020	-2.27	0.03	-0.036	-3.35	0.00
RREV*EXP	0.002	1.11	0.27	0.001	0.82	0.41
RREV*NUMFIRM	-0.008	-2.34	0.02	-0.005	-1.54	0.13
RREV*BROKER	0.001	0.70	0.49	0.001	0.93	0.36
RREV*HORIZON	-0.006	-0.90	0.37	-0.017	-1.53	0.13
RREV*INNOVATIVE	0.025	6.46	0.01	0.010	1.74	0.09
Number of Months	116			80		
R^2	0.249	27.46	0.01	0.307	22.71	0.01

Panel C: Regression Tests

	Est.	t-value	p-value
Intercept	0.001	0.70	0.48
RREV	0.114	2.66	0.01
RREV*DBS	0.023	3.77	0.00
RREV*DSCF	-0.006	-0.72	0.47
RSURP	0.045	9.65	0.01
RSURP_REV	0.029	7.52	0.01
RREV*SIZE	-0.004	-1.96	0.05
RREV*BM	-0.026	-4.43	0.01
RREV*EXP	0.002	1.27	0.21
RREV*NUMFIRM	-0.006	-2.46	0.02
RREV*BROKER	0.001	1.00	0.32
RREV*HORIZON	-0.005	-0.67	0.50
RREV*INNOVATIVE	0.023	5.95	0.01
Number of Months	120		
R^2	0.233	25.41	0.01

Panel A reports Pearson correlations among return and information variables at the earnings announcements. All correlations are significant at better than 0.01 levels. Panel B and Panel C report results of monthly Fama-Macbeth regressions. The dependent variable in Panel B and Panel C is XRET_ER, the buy-and-hold excess return over three trading days centered on the preliminary earnings announcement date. The models are estimated cross-sectionally every calendar month. The sample includes individual analyst forecast revisions for the next annual earnings announcements over 1996-2008; only revisions issued on day 0 or 1 relative to the earnings announcements are included. SIZE, EXP, BROKER, NUMFIRM, and HORIZON are logged forms of the raw variables. See Appendix A for variable definitions.