Analyst Responsiveness and the Post-Earnings-Announcement Drift

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Abstract

This study examines the responsiveness of analyst forecasts to current earnings announcements. The results show considerable cross-sectional variation in analyst responsiveness and suggest that this variation is related to the costs and benefits associated with prompt forecast revisions. More importantly, this study finds that with responsive forecast revisions, more of the market reaction takes place in the event window and less in the drift window, suggesting that analyst responsiveness mitigates the post-earnings-announcement drift and facilitates market efficiency.

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1. Introduction

The efficient market hypothesis implies that in a (semi-strong) efficient market, upon receiving new information, investors instantaneously adjust their expectations with respect to future earnings, which in turn are reflected instantaneously in stock prices. However, researchers have documented evidence inconsistent with this implication. One of the most persistent anomalies is the post-earnings-announcement drift, whereby stock prices continue to drift for a long period after earnings announcements. Since this phenomenon was first documented by Ball and Brown (1968), it has survived numerous robustness checks, including extensions to more recent data (e.g., Bernard and Thomas, 1989; Chan et al., 1996). As Fama (1998) puts it, the post-earnings-announcement drift is an anomaly that is "above suspicion."

A number of studies have attempted to explain the post-earnings-announcement drift. Notably, recognizing the importance of analysts as information intermediaries, some studies focus on the role of analysts in either mitigating or contributing to the drift (e.g., Abarbanell and Bernard, 1992). Overall, these studies find that analysts fail to fully incorporate information in earnings announcements and that such underreaction contributes to the post-earnings-announcement drift.

In this paper, I argue that there are at least two aspects of analyst underreaction to earnings announcements—underreaction in magnitude and underreaction in time. The extant literature on analyst underreaction largely focuses on underreaction in magnitude, allowing no specific role for *when* analyst forecasts are made.[1] However, analyst reaction timeliness, and the implications of this timeliness for the post-earnings-announcement drift (and possibly other forms of market underreaction), are also important: if analysts' forecast revisions fully reflect prior earnings news but are only made long after the information becomes available, such revisions are only efficient in magnitude but not in time. In other words, these revisions are still inefficient.[2] Thus, to the extent that analyst forecasts affect the market's expectations of future earnings, one expects to continue observing returns drift after the earnings announcements.

This paper focuses on this relatively unexplored aspect of analyst underreaction by examining the responsiveness of sell-side security analysts' forecast revisions after quarterly earnings announcements (hereafter, "analyst responsiveness") and its effect on the post-earnings-announcement drift. While analysts do not necessarily revise their forecasts each time they receive new information, their forecast revisions tend to cluster to a greater extent after earnings announcements than after other corporate information events (Bagnoli et al., 2005). This is not surprising because of the important valuation implications of earnings and the rich information set frequently accompanying earnings announcements.[3]

Bernard and Thomas (1989) are among the first to attribute the post-earnings-announcement drift directly to the speed of investors' response to new information. Some practitioners further attribute the slow market reactions specifically to analysts' slowness in

[1] For example, in examining analyst underreaction to the previous quarter's earnings announcements, Abarbanell and Bernard (1992) focus on the most recent (i.e., the latest) analyst forecasts prior to current earnings announcements.

[2] Similarly, if forecast revisions are timely but fail to fully incorporate prior information, the revisions are also inefficient. An efficient forecast revision needs to be efficient both in time and in magnitude.

[3] Bagnoli et al. (2005) also suggest that another reason for analysts to be more likely to respond to earnings announcements is that the earnings announcements deliver financial information prepared in accordance with generally accepted accounting principles in a clear and relatively consistent format at predictable times.

revising their earnings forecasts. For example, John Bogle Jr., president of Bogle Investment Management, argues that "[s]hare-price momentum results from earnings-estimate momentum. Analysts are afraid to go out on a limb. That causes estimates to change much more slowly than they should." (Clements, 1999). The literature has provided some theories as to why market participants, including analysts, may be slow in reacting to new information. For instance, Barberis et al. (1998) suggest that market underreaction is consistent with conservatism in the psychology literature, defined as the slow updating of beliefs in the face of new information. Daniel et al. (1998) present a model in which investors overweigh the value of their private signals and underweigh the information content of important public information such as earnings announcements. Finally, Hong and Stein (1999) suggest that market participants may require additional private information to convert the news in earnings announcements into a judgment about future earnings.

I focus on the responsiveness of analysts' first forecast revisions for the next quarter after the current quarterly earnings announcements. This focus follows Bernard and Thomas (1990), who suggest that the post-earnings-announcement drift is caused by investors' failure to promptly recognize the autocorrelation structure of quarterly earnings. I define an analyst as being responsive if she revises her forecast within two trading days after the earnings announcement (i.e., trading days 0 and 1 with respect to the announcement date). Overall, I find that there is significant cross-sectional variation in analyst responsiveness at both the analyst level and the firm level during my sample period of 1996-2002.[4] Depending on the year, about 26-53% of analysts revise their forecasts within the responsive window and about 58-76% of

[4] For brevity, throughout the paper I use "firm level" and "analyst level" to refer to "firm-quarter level" and "analyst-firm-quarter level," respectively.

firms are followed by at least one responsive analyst. Both percentages show an increasing trend during the sample period.

Further tests find that analyst responsiveness is related to the trade-off between the costs and benefits associated with responsiveness. In particular, when the firms are larger, when the earnings announcements are accompanied by conference calls or managerial guidance, or when the earnings announcements are for fourth fiscal quarters, analysts are more likely to be responsive because it is less costly for them to obtain additional information and revise their forecasts promptly. The tests also show that analyst responsiveness is increasing in the size of the employing brokerage house, which is a proxy for the resources and support available to analysts. Finally, analysts are more likely to be responsive when there is higher competition among analysts, suggesting that analyst responsiveness increases with the benefits potentially associated with being responsive.

The main research question of the paper is whether analyst responsiveness affects how the market reacts to earnings announcements. I find that the earnings response coefficient in the event window is significantly higher for firm-quarters with responsive analysts and that the corresponding post-earnings-announcement drift is significantly lower. In other words, the result suggests that with responsive analysts, more of the market reaction takes place in the event window and less in the drift window.[5] The result holds after I control for the determinants of analyst responsiveness. I also investigate the relation between analyst underreaction in magnitude and in time. I find no discernable differences in analyst underreaction in magnitude

[5] Note, however, this study does not intend to claim that as long as analysts revise their forecasts promptly, there will be no post-earnings-announcement drift (nor does prior research on analyst underreaction in magnitude). First, even if analysts are efficient in time, they may not be efficient in magnitude (see Section 5.1). Second, analysts are only information intermediaries; to the extent that investors do not fully incorporate information in analyst forecasts, post-earnings-announcement drift can only be mitigated, not eliminated.

between firm-quarters with and without responsive analysts. This result suggests that underreaction in time and underreaction in magnitude are not necessarily correlated, ruling out underreaction in magnitude as an alternative explanation for the main results of the paper.

This study contributes to the literature by providing evidence consistent with lack of analyst responsiveness as an explanation for the post-earnings-announcement drift or other market underreaction phenomena (Bernard and Thomas, 1989; Clements, 1999). This evidence suggests that the speed at which market participants—specifically, analysts—incorporate new information into their forecasts for future earnings is indeed associated with the extent of market underreaction to earnings announcements.

This study also adds to the literature on the efficiency of analyst forecasts by highlighting the importance of examining analyst forecast timing. As discussed earlier, this literature has largely focused on analyst underreaction in magnitude by examining the serial correlation in analyst forecast errors (e.g., Abarbanell and Bernard, 1992; Easterwood and Nutt, 1999). However, both the timing and the magnitude of analysts' reactions to public information are important because market efficiency hinges on both the instantaneity and the completeness with which stock prices reflect available information.

A few other studies have also examined the timing of analyst forecast revisions around information releases such as earnings announcements. Stickel (1989) shows that analysts avoid revising prior to earnings announcements and more frequently revise immediately after the announcements (see also Ivković and Jegadeesh, 2004; Bagnoli et al., 2005). The current study extends this work, as it not only examines the timing of analyst forecast revisions, but does so with a specific interest in its determinants and its implications for market efficiency. This extension is important because it helps us understand the cross-sectional variation in analyst responsiveness and how analyst responsiveness affects the post-earnings-announcement drift, one of the most robust market inefficiency phenomena.

Finally, this study contributes to the literature that examines the role of analysts as information intermediaries. While empirical evidence regarding this role is ample, unlike the extant literature that tends to focus on different analyst characteristics (e.g., analyst experience or reputation), the current study suggests a specific mechanism through which analysts play their role as information intermediaries. Specifically, the results suggest prompt analyst forecast revisions help market participants process and react promptly to the information contained in earnings announcements and that such revisions significantly mitigate the magnitude of the post-earnings-announcement drift.

The paper proceeds as follows. Section 2 describes the sample and provides descriptive statistics on analyst responsiveness. Section 3 examines the determinants of firm-level analyst responsiveness and Section 4 examines the effects of analyst responsiveness on market reactions to earnings announcements. Section 5 discusses additional analyses. Section 6 concludes.

2. Sample and descriptive statistics

The sample starts with all spilt-unadjusted I/B/E/S individual analyst forecasts for quarterly earnings per share (EPS) with fiscal period ending between 1996 and 2002. I delete observations with zero analyst-specific identification code[6] or missing CUSIP. I also exclude observations with (i) a forecast date on or after the corresponding earnings announcement date or (ii) an earnings announcement date before or more than ninety days after the corresponding fiscal

[6] I/B/E/S assigns a zero identification code if the broker did not provide an analyst name to be associated with the estimate.

period-end, as these observations are potentially subject to data error or other irregularities. For each analyst-firm-quarter, I require that the analyst have at least one forecast for the next quarter issued before the current earnings announcement and at least one after.[7] To ensure that the firm-quarter provides reasonable incentives for analyst coverage, I require that it be followed by at least two such analysts. Only the first forecast revision for the next quarter after the earnings announcement by each analyst is included in the main analyses.

Next, I obtain from CRSP fiscal quarter-end stock price and return information necessary to calculate size-adjusted returns. For each firm-quarter, I calculate the unexpected earnings ($UE_{j,t}$) as the actual EPS minus the latest individual analyst forecast before the earnings announcement, deflated by the stock price at the end of the quarter.[8] I delete observations with extreme 1% unexpected earnings at both tails for each quarter, resulting in a final sample of 200,703 analyst-firm-quarters representing 40,270 firm-quarters.

Figure 1 plots the timeline of various information events and windows. $EA_{j,t}$ is the earnings announcement date of firm j for quarter t. The event window (i.e., the announcement window) follows the convention in the literature and includes trading days [-1, 1] with respect to $EA_{j,t}$. The drift window (i.e., the post-announcement window) starts from trading day 2 with respect to $EA_{j,t}$ and ends on trading day 1 with respect to $EA_{j,t+1}$.[9] Under the efficient market

[7] I need at least one forecast after the earnings announcement to define analyst responsiveness based on the timeliness of the first forecast. The requirement for at least one forecast before the announcement is to eliminate any initiation of analyst coverage for a specific firm or a specific firm-quarter, as the analysts may have different incentives (e.g., Irvine, 2003), and hence different responsiveness, than analysts with continual coverage.

[8] I use the latest individual analyst forecast as opposed to the latest consensus analyst forecast because prior studies suggest that the former is more accurate than the latter and better captures the information available to the market immediately prior to the earnings announcement (e.g., Brown, 1991). The inferences are unchanged, however, if I use the latest analyst consensus forecast as the proxy for market expectations.

[9] I include days around the next earnings announcement because Bernard and Thomas (1990) find that a significant portion of the drift occurs during that period. The inferences are unchanged if I only focus on a 60-trading-day drift window as in Bartov et al. (2000).

hypothesis, the market is expected to incorporate information in the earnings announcement fully and correctly within the event window. However, the post-earnings-announcement drift literature has consistently documented that market reactions to an earnings announcement start in the event window and continue until the next earnings announcement if not beyond. Accordingly, as explained in Section 1, this study seeks to examine whether analyst responsiveness affects market reactions in both the event and drift windows.

Table 1 provides descriptive statistics on analyst responsiveness, with analyst-level data in Panel A and firm-level data in Panel B. As Panel A shows, the number of analyst-firm-quarters increases steadily over the sample period. The average number of trading days from the earnings announcement to the analyst's first subsequent forecast revision for the next quarter (inclusive) decreases steadily from 17 days in 1996 to 9 days in 2002. The decrease in medians is even more salient, from 8 days in 1996 to 2 days in 2002. The percentage of responsive analysts ($RESP_{i,j,t}$=1), defined as analysts who issue a forecast revision within two trading days after the earnings announcements (i.e., trading days 0 and 1), ranges from 26% in 1996 to almost 53% in 2002.[10] This suggests that analysts have become more responsive to earnings announcements over the sample period.[11] Overall, for the sample considered, it takes 12 trading days on average before an analyst revises her earnings forecast for the next quarter, with a median lag of 3 trading

[10] I do not measure responsiveness as the number of days until the first forecast revision for two reasons. First, the effect of responsiveness measured in this way on the magnitude of the drift is very likely non-linear. Lacking theoretical guidance on the exact relation between these two variables, it is more appropriate to focus on the most responsive revisions (i.e., the ones on trading days 0 and 1) to capture the first-order effect. Second, since I am interested in how responsive revisions affect the drift, this choice also makes sense given that prior literature generally measures the drift starting from trading day 2 after the earnings announcement.

[11] This trend is perhaps due to an increasing trend of managers providing additional disclosures such as balance sheet information or holding conference calls along with earnings announcements (Francis et al., 2002; Kimbrough, 2005). Further, other factors such as growing competition among analysts and advancing technology can also contribute to the increasing trend of analyst responsiveness.

days. It appears that the distribution of this lag is highly skewed. The standard deviation, at 17 trading days, suggests considerable variation among analysts in terms of their responsiveness.

Figure 2 plots the distribution of the number of trading days from the earnings announcement to an analyst's first forecast revision, based on the pooled analyst-level sample. The pattern mirrors that of the post-earnings-announcement drift documented in prior studies (e.g., Ball and Brown, 1968). Specifically, a relatively large proportion of the revisions takes place immediately after the earnings announcement, yet revisions continue to occur months after the earnings announcement. In fact, while about 40% of analysts issue a forecast revision within trading days 0 and 1 with respect to the earnings announcement, approximately 20% do not do so until the second month (i.e., after 20 trading days) and beyond.

Descriptive statistics on firm-level analyst responsiveness are presented in Panel B of Table 1. $NRESP_{j,t}$ and $PRESP_{j,t}$ are the number and percentage of responsive analysts following firm j for quarter t, respectively. In general, the results are consistent with those at the analyst level and show a trend for analysts to become more responsive over the sample period. Specifically, the mean (median) $NRESP_{j,t}$ is 1 (1) in 1996 and 3 (2) in 2002, and the mean (median) $PRESP_{j,t}$ is 25% (22%) in 1996 and 49% (50%) in 2002. In 1996, about 42% of the sample firms have no responsive analysts following them at all (i.e., $PRESP_{j,t}=0$), and all analysts are responsive for only 2% of the sample firm-quarters (i.e., $PRESP_{j,t}=1$). These numbers contrast to 24% and 15%, respectively, in 2002.

My primary measure of analyst responsiveness at the firm level is an indicator variable $DRESP_{j,t}$, which equals 1 if at least one analyst following firm j in quarter t is responsive, and 0 otherwise. The last column of Panel B of Table 1 reports the percentage of firm-quarters with $DRESP_{j,t}=1$. In 1996, only 58% of the sample firm-quarters have at least one responsive analyst, compared to 76% in 2002. Overall, about 68% of the sample firm-quarters have at least one responsive analyst.

Table 2 lists the percentage of firm-quarters with $DRESP_{j,t}$=1 by industry-year, where industry classification is based on the 12 categories in Fama and French (1997). In terms of the time-series trend, the statistics are consistent with those reported in Table 1. Across the 12 industries, the business equipment industry has the highest percentage of firm-quarters with $DRESP_{j,t}$=1 (74% over the sample period), followed by the telecommunications industry and the consumer non-durable goods industry (70%), while the utilities industry and the finance industry have the lowest percentages (49% and 63%, respectively). It appears that analysts are more responsive in revising their forecasts for high technology or growing industries, and less responsive for traditional or regulated industries.

In sum, Tables 1 and 2 suggest that while at the beginning of the sample period analysts are slow in updating their forecasts after earnings announcements, they have become more responsive over the sample period. At the same time, the evidence also demonstrates considerable variation in analyst responsiveness at the analyst level, the firm level, and the industry level.

3. Determinants of analyst responsiveness

3.1. Identifying determinants of analyst responsiveness

In this section, I examine the determinants of analyst responsiveness. The analysis is performed at the firm level, because the determinants will be control variables in the market reaction tests, which are necessarily at the firm level. I propose the determinants along the lines of the costs and benefits of revising forecasts promptly.

Costs: firm- or earnings-related factors

I predict that larger firms ($LOGMV_{j,t}$), which are expected to have a richer information environment, are more likely to have responsive analysts. When a firm has a richer information environment, analysts have more information with which to process and interpret the information available in earnings announcements, and therefore it is less costly for them to revise their earnings forecasts promptly. I also predict that firms that have recently been through a merger/acquisition ($MERGE_{j,t}$) or restructuring ($SPECIAL_{j,t}$) have an information environment that is more uncertain, and thus earnings that are more difficult to interpret. Hence, analysts of these firms are less likely to revise their forecasts immediately after earnings announcements.

In addition to the general information environment, the amount of information available regarding a specific earnings announcement may also affect the cost of analyst responsiveness. Bowen et al. (2002) find that conference calls increase analysts' ability to forecast earnings accurately, and Kimbrough (2005) finds that conference calls accompanying earnings announcements decrease both analysts' and the market's underreaction (in magnitude) to the information. Both studies suggest that conference calls ($CALL_{j,t}$) provide analysts with additional information regarding future earnings that may help them revise their forecasts promptly. Similar effects are also expected for managerial earnings guidance ($GUIDE_{j,t}$) concurrent with the earnings announcements because such guidance has direct implications for analysts' revisions for future earnings. I further predict that analysts are more likely to be responsive to earnings announcements for the fourth quarter ($4THQTR_t$) of a fiscal year because Cornell and Landsman (1989) show that the fourth quarter earnings announcements provide more information to analysts and investors than do interim announcements.

The earnings figure that is announced is also expected to affect analyst responsiveness. A higher magnitude of unexpected earnings ($AUE_{j,t}$) suggests that analysts' previous information may be outdated or limited, which provides analysts a stronger incentive to update their information set and revise forecasts promptly (Stickel, 1989). However, a higher magnitude of unexpected earnings also implies that it may be more difficult, and hence more costly, to understand and process the information therein. Accordingly, I do not provide a directional prediction on the effect of the magnitude of unexpected earnings. In addition, I predict that analysts are less likely to be responsive for firms announcing negative earnings surprises ($BNEWS_{j,t}$), as negative earnings surprises are less persistent and it is more costly to assess the implications of this information for future earnings (Hong et al., 2000).

Costs: Analyst-related factors

Mikhail et al. (1997) suggest that analyst forecast accuracy improves as analysts gain firm-specific experience. In addition, Mikhail et al. (2003a, 2003b) find that analysts with longer firm-specific experience underreact (in magnitude) to earnings announcements to a lesser extent, mitigating the post-earnings-announcement drift. These results suggest that as firm-specific experience ($EXP_{j,t}$) increases, analysts gain a better understanding of the implications of current earnings for future earnings, making it less costly for them to revise their forecasts promptly. I also expect that analysts from a larger brokerage house ($BSIZE_{j,t}$) are more likely to be responsive because of better resources and research support.

Benefits

I propose two important benefits-related factors as determinants of analyst responsiveness. The first factor is the extent of competition among analysts, proxied for by the number of analysts following the firm during the quarter ($COV_{j,t}$). Since brokerage firms' profits depend directly on commission revenues, analyst compensation is based, in part, on the trading volume generated by their research (Cooper et al., 2001). Cooper et al. (2001) find that analysts with timely forecasts have a greater impact on stock prices and trading volume than other analysts. Thus, when there is greater competition from other analysts, analysts have a higher incentive to revise promptly after earnings announcements.

Second, O'Brien and Bhushan (1990) describe a customer-supplier relationship between financial institutions and brokerage houses. To the extent that institutional investors ($INST_{j,t}$) demand timely information to make trading decisions, financial analysts have incentives to provide prompt forecast revisions to the financial institutions. Higher institutional ownership therefore is expected to lead to more responsive revisions from analysts.

3.2. Empirical evidence

I use the following variables to measure the proposed determinants of firm-level analyst responsiveness discussed in Section 3.1.[12]

$LOGMV_{j,t}$	=	log of market capitalization of firm j at the end of quarter t;
$MERGE_{j,t}$	=	an indicator variable that equals 1 if firm j experienced a merger or acquisition in quarter t, and 0 otherwise, where mergers or acquisitions are identified by quarterly footnote 1 of AA in Compustat;
$SPECIAL_{j,t}$	=	an indicator variable that equals 1 if firm j reports negative special items in quarter t, and 0 otherwise;
$CALL_{j,t}$	=	an indicator variable that equals 1 if firm j holds a conference call during the event window of quarter t, and 0 otherwise, where conference call information is obtained from FirstCall;

[12] The results in Tables 4, 5, and 6 are qualitatively similar and inferences are unchanged if I use quarterly decile rank of market capitalization to measure firm size, and use maximum instead of median values to measure analyst experience and brokerage house size.

$GUIDE_{j,t}$	=	an indicator variable that equals 1 if firm j provides guidance for future earnings during the event window of quarter t and 0 otherwise, where corporate-issued guidance information is obtained from FirstCall;
$4THQTR_t$	=	an indicator variable that equals 1 if quarter t is the fourth quarter of the fiscal year for firm j, and 0 otherwise;
$AUE_{j,t}$	=	absolute value of the unexpected earnings of firm j in quarter t, where unexpected earnings is calculated as the actual earnings per share minus the latest individual analyst forecast, deflated by the stock price at the end of the quarter;
$BNEWS_{j,t}$	=	an indicator variable that equals 1 if the unexpected earnings of firm j in quarter t is negative, and 0 otherwise;
$EXP_{j,t}$	=	median firm-specific experience of analysts following firm j for quarter t, where experience is measured as the number of quarters for which the analyst has followed the firm by that quarter (Mikhail et al., 2003b);
$BSIZE_{j,t}$	=	median size of the brokerage houses employing analysts following firm j for quarter t , where the brokerage house size is measured as the number of distinct analysts providing forecasts in the brokerage house;
$COV_{j,t}$	=	number of analysts following firm j for quarter t;
$INST_{j,t}$	=	percentage of institutional ownership of firm j for quarter t, where the institutional ownership information is obtained from CDA/Spectrum.

Table 3 presents means and medians of these variables conditional on firm-level analyst responsiveness (i.e., $DRESP_{j,t}$) and the corresponding two-sample tests of the difference. I discuss the results based on means only, as those based on medians yield similar implications. Consistent with expectations, firms that are followed by responsive analysts are significantly larger ($LOGMV_{j,t}$). However, the frequency of mergers and/or acquisitions ($MERGE_{j,t}$) is not significantly different between firms with and without responsive analysts. Further, inconsistent with expectations, firms with responsive analysts are significantly more likely to report negative special items ($SPECIAL_{j,t}$).

The two-sample tests support the prediction that analysts are more likely to be responsive when the earnings announcement is accompanied by conference calls ($CALL_{j,t}$) or managerial guidance ($GUIDE_{j,t}$). Specifically, for firm-quarters with at least one responsive analyst, about 61% (18%) of the firm-quarters have conference calls (managerial guidance) concurrent with the earnings announcements, versus 48% (9%) of their counterparts without responsive analysts. Analyst responsiveness does not seem to differ between the first three fiscal quarters and the fourth ($4THQTR_t$). The results also show that analysts respond to different characteristics of a specific earnings surprise. The absolute magnitude of unexpected earnings ($AUE_{j,t}$) for firms with responsive analysts is significantly lower than that for firms without responsive analysts, suggesting that analysts tend to be less responsive when there is a high volume of unexpected information in the reported earnings. In addition, firms with responsive analysts are significantly less likely to report negative earnings surprises ($BNEWS_{j,t}$), consistent with the notion that bad news delays forecast revisions.

In terms of analyst experience ($EXP_{j,t}$), the univariate statistics are consistent with predictions. The median firm-specific experience for firm-quarters with at least one responsive analyst is 7.4 quarters, in comparison to 6.9 quarters for firm-quarters with no responsive analysts. The analysts are also more likely to be responsive when their brokerage houses ($BSIZE_{j,t}$) are larger. Specifically, the median brokerage house size of firms with at least one responsive analyst is 72, in contrast to 60 for that of firms with no responsive analysts.

Finally, Panel A shows that on average firms with responsive analysts are followed by almost 6 analysts ($COV_{j,t}$) and about 56% of their outstanding stock is held by institutional investors ($INST_{j,t}$). In contrast, firms with no responsive analysts are followed by 3 analysts only, and only about 50% of their stock is held by institutions. Both differences are statistically significant. This suggests that analysts' decision to be responsive depends on the benefits they can gain from being responsive. When there is more analyst coverage and hence higher competition among analysts, or when more institutional investors potentially use their prompt revisions, analysts are more likely to be responsive.

Panel B of Table 3 provides the correlations among $DRESP_{j,t}$ and the determinant variables. The lower-left triangle reports the simple correlation based on the pooled sample. The upper-right triangle reports the partial correlation of the pooled sample when controlling for time trend, since descriptive statistics in Table 1 suggest a trend of increasing analyst responsiveness over the sample period. Consistent with evidence in Panel A, $DRESP_{j,t}$ is significantly correlated with all determinant variables except for $MERGE_{j,t}$ and $4THQTR_t$. Specifically, $DRESP_{j,t}$ is positively correlated with $LOGMV_{j,t}$, $SPECIAL_{j,t}$, $CALL_{j,t}$, $GUIDE_{j,t}$, $EXP_{j,t}$, $BSIZE_{j,t}$, $COV_{j,t}$, and $INST_{j,t}$, and negatively correlated with $AUE_{j,t}$ and $BNEWS_{j,t}$.

I test the hypotheses regarding the determinants of the firm-level analyst responsiveness by estimating the following logit model:

$$\begin{aligned} Prob(DRESP_{j,t}=1) = f\,(&\beta_0+\textstyle\sum_k\alpha_k YearDummy_k+\beta_1 LOGMV_{j,t}+\beta_2 MERGE_{j,t}+\beta_3 SPECIAL_{j,t} \\ &+\beta_4 CALL_{j,t}+\beta_5 GUIDE_{j,t}+\beta_6 4THQTR_t+\beta_7 AUE_{j,t}+\beta_8 BNEWS_{j,t} \\ &+\beta_9 EXP_{j,t}+\beta_{10} BSIZE_{j,t}+\beta_{11} COV_{j,t}+\beta_{12} INST_{j,t}+\varepsilon_{j,t}). \qquad (1) \end{aligned}$$

Since a majority of the sample firms are represented multiple times in the sample and there may be cross-sectional correlations among firms during a given time period, standard logit estimation likely suffers from lack of independence of the observations. To address this problem, I follow the suggestion by Petersen (2007). Specifically, I include year dummies in the model to control for the time effect parametrically and then estimate standard errors clustered by firm. The inclusion of year dummies also effectively controls for the time trend in analyst responsiveness. To avoid undue influences by outliers, I estimate the model after deleting observations with absolute Pearson residuals greater than 2.[13]

The results of the model estimation are presented in Table 4. For brevity, the coefficient estimates on the year dummy variables are not reported. Consistent with expectations related to costs of being responsive, a firm is more likely to have responsive analysts if it is larger ($LOGMV_{j,t}$), if the earnings announcement is accompanied by conference calls ($CALL_{j,t}$) or managerial guidance ($GUIDE_{j,t}$), or if the announcement corresponds to the fourth fiscal quarter ($4THQTR_t$).[14] The likelihood of analyst responsiveness also increases in the size of the brokerage houses that employ the analysts ($BSIZE_{j,t}$) as predicted. Analyst responsiveness is insignificantly related with recent mergers or acquisitions ($MERGE_{j,t}$), restructuring charges ($SPECIAL_{j,t}$), as well as the magnitude ($AUE_{j,t}$) or the sign ($BNEWS_{j,t}$) of earnings surprises. Inconsistent with prediction, analyst responsiveness at the firm level is negatively related with analyst experience ($EXP_{j,t}$).[15] On the other hand, the results support the hypotheses related to the benefits for analysts to be responsive when there is higher competition among analysts ($COV_{j,t}$). The effect of institutional ownership ($INST_{j,t}$), however, is insignificant.

Overall, the results above suggest that analysts' decision to be responsive is associated with the costs of revising forecasts promptly, which are probably lower with the availability of

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[13] About 2.7% of observations are deleted in the estimation. However, the inferences are not sensitive to these deletions.

[14] While $4THQTR_t$ is significant in the regression analysis in Table 4, it is insignificant in the univariate analysis reported in Table 3. Additional analysis shows that this seeming inconsistence is related to the presence of $COV_{j,t}$ and $INST_{j,t}$, When these variables are not included in model (1), the coefficient on $4THQTR_t$ remains insignificant.

[15] Further analysis suggests that the negative relation between $EXP_{j,t}$ and $DRESP_{j,t}$ in the logit regression is completely driven by the presence of $COV_{j,t}$. As long as $COV_{j,t}$ is not included in the model, the coefficient on $EXP_{j,t}$ remains significantly positive.

information and resources. The decision to be responsive also appears to be affected by the potential benefits analysts can gain from responding promptly.

4. Analyst responsiveness and the post-earnings-announcement drift

As explained in Section 1, to the extent that analyst responsiveness facilitates market reactions to earnings announcements, I expect to see lower post-earnings-announcement drift for firms with responsive analysts. While this expectation might seem obvious, there are least two reasons why that might not be the case. First, it is possible that investors overweigh their own interpretation of the earnings announcements relative to analysts' interpretations, even though investors tend to under-react to news more than analysts. Daniel et al. (1998) suggest that investors can be irrational and overconfident with respect to their own interpretation of information. Thus, investors may ignore or discount responsive analysts' forecast revisions. This is less likely to happen with non-responsive analysts' forecast revisions because investors may believe that analysts possess important information when they issue forecast revisions in the absence of major public information releases such as earnings announcements. Second, investors may believe that analysts who issue forecasts quickly have done a less thorough analysis than those who issue forecasts later and thus they may consider responsive forecasts as less informative than the non-responsive ones.

Either of these two reasons could mitigate the accelerating effects, if any, of responsive analysts' revisions on market reactions to the earnings announcements. Thus, *ex ante* it is not directly clear whether responsive analyst forecasts would help investors' interpretation of current earnings announcements and mitigate the post-earnings-announcement drift. This section seeks to examine this empirical question.

While examining market reactions in the drift window alone may speak to the efficiency of market reactions, I examine both the event window and the drift window to rule out the alternative explanation that any documented effects of analyst responsiveness on market reactions in either window alone is due to the cross-sectional variation in the earnings-returns association. For example, analyst responsiveness could capture certain uncontrolled-for or unobservable earnings characteristics that affect the earnings-returns relation. However, if this is the case, analyst responsiveness is expected to affect market reactions in both windows in the same direction. On the other hand, if responsive forecast revisions facilitate market reactions to earnings announcements and in turn market efficiency, I expect more of the market reaction to take place in the event window, resulting in lower post-earnings-announcement drift. That is, the effects of analyst responsiveness on market reactions in the event window and in the drift window should be in opposite directions.

Following prior literature, I use the earnings responsive coefficient (ERC) to measure market reactions to earnings announcements in the event window (e.g., Imhoff and Lobo, 1992), and the post-earnings-announcement drift based on the portfolio test to measure market reactions in the drift window (e.g., Bernard and Thomas, 1990). I discuss the empirical tests and results next.

4.1. Market reactions in the event window

I examine market reactions to the earnings announcements in the event window by employing the following basic model:

$$SAR\_E_{j,t} = \beta_0+\sum_k\alpha_k YearDummy_k+\beta_1 UE_{j,t}+\beta_2 UE_{j,t}\times DRESP_{j,t}+\beta_3 DRESP_{j,t}+\varepsilon_{j,t}, \qquad (2a)$$

where $SAR\_E_{j,t}$ is the size-adjusted returns over the event window as defined in Figure 1, $UE_{j,t}$ is the unexpected earnings, $DRESP_{j,t}$ is the firm-level analyst responsiveness indicator, and

$YearDummy_k$ is indicator variable for year k. The return is adjusted for the equal-weighted returns of the NYSE/AMEX/NASDAQ firm-size decile to which the firm belongs at the beginning of the calendar year. As in the case of model (1), the year dummy variables are included to parametrically address the cross-sectional correlations among observations for a given time period. I then cluster the data by firm and estimate the cluster-adjusted standard errors to account for dependence across years for a given firm (e.g., Gleason and Lee, 2003). To prevent undue influences by outliers, I estimate all regressions after deleting observations with absolute value of studentized residuals greater than 2.[16] These empirical procedures are also applied to all regressions reported in the rest of this paper.

The regression results are reported in Table 5. Again, for brevity, the coefficient estimates on the year dummy variables are not reported. The coefficient on $UE_{j,t}$ is significantly positive at 2.147, confirming the information content of earnings announcements. More importantly, the coefficient on the interaction term between $UE_{j,t}$ and $DRESP_{j,t}$ is significantly positive at 1.282, suggesting that when the firm has at least one responsive analyst, the ERC is almost 60% higher. The main effect of $DRESP_{j,t}$ itself is insignificant.

It is important to note that the earnings response coefficient is affected not only by the efficiency of market reactions (which is the focus of the current study), but also by the overall strength of the earnings-returns association. Thus, to clearly understand the effects of analyst responsiveness on market reactions to earnings announcements in the event window, it is critical to control for other correlated factors that can affect the earnings-returns relation. Toward this

[16] On average, about 5% of observations are deleted in each estimation. However, the inferences are not sensitive to these deletions.

goal, I estimate the following model that includes the determinants of analyst responsiveness discussed in Section 3:[17]

$$SAR\_E_{j,t}=\beta_0+\sum_k\alpha_k YearDummy_k+\beta_1 UE_{j,t}+\beta_2 UE_{j,t}\times DRESP_{j,t}+\beta_3 DRESP_{j,t}+UE_{j,t}\times (\beta_4 LOGMV_{j,t}+\beta_5 MERGE_{j,t}+\beta_6 SPECIAL_{j,t}+\beta_7 CALL_{j,t}+\beta_8 GUIDE_{j,t}+\beta_9 4THQTR_t +\beta_{10} BNEWS_{j,t}+\beta_{11} EXP_{j,t}+\beta_{12} BSIZE_{j,t}+\beta_{13} COV_{j,t}+\beta_{14} INST_{j,t}) +\beta_{15} LOGMV_{j,t} +\beta_{16} MERGE_{j,t}+\beta_{17} SPECIAL_{j,t}+\beta_{18} CALL_{j,t}+\beta_{19} GUIDE_{j,t}+\beta_{20} 4THQTR_t +\beta_{21} BNEWS_{j,t}+\beta_{22} EXP_{j,t}+\beta_{23} BSIZE_{j,t}+\beta_{24} COV_{j,t}+\beta_{25} INST_{j,t}+\varepsilon_{j,t}, \quad (2b)$$

where all variables are as defined previously.[18]

Estimation results of the full model are presented in the last columns of Table 5. After controlling for the effects of the determinant variables on the ERC, the interaction term between $UE_{j,t}$ and $DRESP_{j,t}$ continues to have a coefficient (1.009, $p<0.01$) that is both statistically and economically significant. The effect of $DRESP_{j,t}$ itself is insignificant, as in model (2a).

Regarding the control variables, managerial guidance ($GUIDE_{j,t}$), analyst coverage ($COV_{j,t}$), and institutional ownership ($INST_{j,t}$) have significantly positive effects on the magnitude of ERC, while restructuring charges ($SPECIAL_{j,t}$), negative earnings surprises ($BNEWS_{j,t}$), analyst experience ($EXP_{j,t}$), and brokerage house size ($BSIZE_{j,t}$) have significantly negative effects on the magnitude of ERC. The effects of firm size ($LOGMV_{j,t}$), mergers and acquisitions ($MERGE_{j,t}$), conference calls ($CALL_{j,t}$), and being in the fourth fiscal quarter ($4THQTR_t$) are each insignificantly different from zero.

4.2. Market reactions in the drift window

[17] Including only those variables that have a significant effect on $DRESP_{j,t}$ as shown in Table 4 does not change the inferences.

[18] Note that the absolute value of unexpected earnings ($AUE_{j,t}$) is not included in the model because it is linearly correlated with $UE_{j,t}$ and $BNEWS_{j,t}$.

Unlike in the event window analyses where I focus on the magnitude of the earnings response coefficient, in investigating the effects of analyst responsiveness on the post-earnings-announcement drift I use the portfolio test to be consistent with prior literature (e.g., Bernard and Thomas, 1990; Bartov et al., 2000). Specifically, prior literature has adopted the following regression model to estimate the average abnormal return one can earn from the post-earnings-announcement drift:

$$SAR\_D_{j,t} = \beta_0 + \beta_1 RUE_{j,t} + \varepsilon_{j,t}, \tag{3}$$

where the dependent variable $SAR\_D_{j,t}$ is the size-adjusted return over the drift window, and the independent variable $RUE_{j,t}$ reflects the deciles, as opposed to the raw values, of the unexpected earnings. More precisely, the raw unexpected earnings $UE_{j,t}$ are ranked into ten deciles indexed from 0 to 9 by quarter and then the indices are divided by 9 to get the independent variable $RUE_{j,t}$, which ranges between 0 and 1. Thus, the coefficient on $RUE_{j,t}$ can be readily interpreted as the size-adjusted return one can earn over the drift window with a zero-investment portfolio strategy that takes a long position in the highest decile and a short position in the lowest decile.

I follow this empirical procedure and estimate the following model specifications separately:

$$SAR\_D_{j,t} = \beta_0 + \textstyle\sum_k \alpha_k YearDummy_k + \beta_1 RUE_{j,t} + \beta_2 RUE_{j,t} \times DRESP_{j,t} + \beta_3 DRESP_{j,t} + \varepsilon_{j,t}, \tag{3a}$$

$$\begin{aligned} SAR\_E_{j,t} = {} & \beta_0 + \textstyle\sum_k \alpha_k YearDummy_k + \beta_1 RUE_{j,t} + \beta_2 RUE_{j,t} \times DRESP_{j,t} + \beta_3 DRESP_{j,t} + RUE_{j,t} \times \\ & (\beta_4 LOGMV_{j,t} + \beta_5 MERGE_{j,t} + \beta_6 SPECIAL_{j,t} + \beta_7 CALL_{j,t} + \beta_8 GUIDE_{j,t} + \beta_9 4THQTR_t \\ & + \beta_{10} BNEWS_{j,t} + \beta_{11} EXP_{j,t} + \beta_{12} BSIZE_{j,t} + \beta_{13} COV_{j,t} + \beta_{14} INST_{j,t}) + \beta_{15} LOGMV_{j,t} \\ & + \beta_{16} MERGE_{j,t} + \beta_{17} SPECIAL_{j,t} + \beta_{18} CALL_{j,t} + \beta_{19} GUIDE_{j,t} + \beta_{20} 4THQTR_t \\ & + \beta_{21} BNEWS_{j,t} + \beta_{22} EXP_{j,t} + \beta_{23} BSIZE_{j,t} + \beta_{24} COV_{j,t} + \beta_{25} INST_{j,t} + \varepsilon_{j,t}, \end{aligned} \tag{3b}$$

All variables are as defined previously. As in the tests for market reactions in the event window, model (3b) includes both the main effects and the interaction effects of the determinants of the firm-level analyst responsiveness in order to control for potential problems with correlated omitted variables.

The results are presented in Table 6. In model (3a), on average, one can earn about 5.2% (coefficient on $RUE_{j,t}$) abnormal returns from the post-earnings-announcement drift over the drift window when there is no responsive analyst. This magnitude is similar to that documented in prior research. The interaction term between $RUE_{j,t}$ and $DRESP_{j,t}$ has a significantly negative coefficient of -0.021, making the abnormal return from the drift a mere 3.1% (5.2%-2.1%) for firm-quarters with responsive analysts. This suggests that the drift is significantly mitigated (by 40%) if at least one analyst promptly revises her forecast for the next quarter.

In model (3b), where all determinants of analyst responsiveness are included for both main effects and interaction effects, $DRESP_{j,t}$ continues to have a significant mitigating effect on the magnitude of the drift with a coefficient of -0.016. This result suggests that the effect of analyst responsiveness on the post-earnings-announcement drift is not subsumed by the determinants of analyst responsiveness that also potentially affect the magnitude of the drift.

In terms of the control variables, the post-earnings-announcement drift is larger when the firm has just been through a merger or acquisition ($MERGE_{j,t}$) or when the firm has higher analyst coverage ($COV_{j,t}$). The magnitude of the drift is significantly lower when the firm is larger ($LOGMV_{j,t}$), when the earnings announcement is accompanied by a conference call ($CALL_{j,t}$), when the earnings correspond to the fourth quarter ($4THQTR_t$) of the fiscal year, or when the earnings surprise is negative ($BNEWS_{j,t}$). All other control variables do not appear to have a significant effect on the post-earnings-announcement drift.[19]

[19] The results related to the effects of institutional investors are inconsistent with prior research (Bartov et al., 2000). Further analysis suggests that this is due to the presence of additional variables in model (3b). When only the terms

If lack of analyst responsiveness contributes to the drift, for firms with no responsive analysts, a significant part of the drift may cluster around the first non-responsive analysts' forecast revisions. Accordingly, I conduct additional analysis for firm-quarters with $DRESP_{j,t}=0$ only. Specifically, I estimate model (3) with the dependent variables being size-adjusted returns over the drift window and over the three-trading-day window around the first non-responsive analyst's forecast revision, respectively. The results show that while the abnormal return over the approximately 64-trading-day drift window is about 5.1%, the part over the 3-trading-day window around the first analyst's forecast revision is a considerable 1.5%. This confirms the conjecture that a disproportional part of the drift clusters around the non-responsive forecast revisions.

In sum, the analyses in this section suggest that analyst responsiveness accelerates market reactions to earnings announcements by helping the market interpret the implications of current earnings for future earnings more promptly. Thus, more of the market reaction takes place in the event window as opposed to the drift window, improving market efficiency. These findings underscore the importance of analysts' responsiveness in their role as information intermediaries.

5. Additional analyses

5.1. Underreaction in time and in magnitude

The aspect of analyst underreaction examined in this paper is analyst underreaction in time, which has not been examined in detail in prior research. However, the literature has examined another important aspect, namely, underreaction in magnitude. Specifically, this

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related to institutional investors are included in the model, it has a significantly negative effect on the magnitude of the post-earnings-announcement drift, as documented in prior research.

literature posits that if analysts underreact to the news in an earnings announcement, their forecast errors are expected to be autocorrelated and the extent of such autocorrelation measures the degree of underreaction in magnitude. In this sub-section, I conduct additional analysis to shed light on the relation between these two aspects of analyst underreaction and to rule out the possibility that analyst underreaction in magnitude provides an alternative explanation for the results above.

Prior studies examine analyst underreaction in magnitude in order to understand the implications of analyst underreaction for market underreaction phenomena that are firm- (as opposed to analyst-) specific by nature. Accordingly, these studies perform their analyses at the firm-level only (e.g., Abarbanell and Bernard, 1992; Easterwood and Nutt, 1999). For similar reasons, and to enable comparisons with these studies, the analysis in this sub-section is also performed at the firm level as opposed to the analyst level. If forecast errors for quarter t+1 measured after the earnings announcements of quarter t are correlated with unexpected earnings in quarter t, the extant literature interprets such correlation as evidence of analyst underreaction (in magnitude) to the news in earnings announcements of quarter t. I calculate forecast errors for quarter t+1 at two points in time—at the first forecast revision issued after quarter t earnings announcement and at the last forecast revision issued prior to quarter t+1 earnings announcement. I then compare their respective correlation with the unexpected earnings in quarter t ($UE_{j,t}$) between firms with and without responsive analysts.

Panel A of Table 7 presents results based on the first forecasts after earnings announcements of quarter t. For both firms with $DRESP_{j,t}$=1 and firms with $DRESP_{j,t}$=0, the correlations in analyst forecast errors are significantly positive, consistent with results in prior research that suggest analysts fail to fully incorporate into their forecasts the information in previous earnings announcements. In particular, the results suggest underreaction in magnitude by responsive analysts[20] despite their timely forecast revisions. However, it is important to note that this underreaction in magnitude does not necessarily imply that responsive analysts should have no impact on the post-earnings-announcement drift. Even though they do not use all the information in current earnings, as long as responsive analysts use more information therein and underreact less in magnitude than does the market, their prompt forecast revisions can mitigate the drift. The evidence in Section 4 indeed confirms this expectation.

More importantly, Panel A suggests no discernable difference in analyst underreaction in magnitude between the first forecasts for $DRESP_{j,t}$=1 firms and those for $DRESP_{j,t}$=0 firms. Thus, the timing aspect and the magnitude aspect of analyst underreaction to earnings announcements appear to be two separate, uncorrelated factors.

Panel B presents results based on the last forecasts prior to earnings announcements of quarter t+1. In general, the implications are consistent with those in Panel A. Further, the correlations at the last forecasts are considerably smaller than those at the first forecasts, suggesting analysts gradually incorporate more information in current earnings into their forecasts over the course of the quarter.

Overall, the results in Table 7 suggest that the different magnitude of the post-earnings-announcement drift between firms with and without responsive analysts documented in this paper are not attributable to analysts' different abilities to incorporate earnings information into their forecasts.

5.2. Robustness checks

[20] While the analysis is performed at the firm level, the first forecast revisions for firms with $DRESP_{j,t}$=1 are by definition made by responsive analysts. Similarly, the first forecast revisions for firms with $DRESP_{j,t}$=0 are by definition made by non-responsive analysts.

The primary analyst responsiveness measure used in the analysis, $DRESP_{j,t}$, is defined based on whether there is at least one analyst that issues her forecast revisions on trading day 0 or 1 with respect to the earnings announcements. In this sub-section I test the robustness of the results with the following different definitions of analyst responsiveness. First, instead of an indicator variable $DRESP_{j,t}$, I use the percentage ($PRESP_{j,t}$) of analysts that issue forecast revisions within the event window as my measure of analyst responsiveness and conduct corresponding analyses. The inferences regarding the determinants of analyst responsive are unchanged except that both $BNEWS_{j,t}$ and $INST_{j,t}$ now have significant coefficients of predicted signs. The inferences regarding the effects of analyst responsive on ERC or the magnitude of the post-earnings-announcement drift remain the same.

Second, since technically, any reactions that do not occur instantaneously are considered inefficient, I alternatively define analyst responsiveness more strictly based on whether there is at least one analyst who issues her forecast revision on the earnings announcement date. To be consistent, I measure the post-earnings-announcement drift starting from the day after the earnings announcement date. Again, this analysis yields inferences that are qualitatively similar regarding the effects of analyst responsiveness on the post-earnings-announcement drift.

In additional robustness analysis, I include $SAR\_E_{j,t}$, the abnormal returns over the event window, in model 3(b) and re-estimate the model. $SAR\_E_{j,t}$ potentially captures any uncontrolled-for or unobservable factors of the information content of earnings announcements that affect analyst responsiveness. The inferences remain unchanged. In particular, the coefficient on the interaction term of $RUE_{j,t} \times DRESP_{j,t}$ remains significantly negative. In addition, $SAR\_E_{j,t}$ has a significantly positive coefficient, consistent with the notion that the post-earnings-announcement drift is positively correlated with the information content of earnings announcements as captured by $SAR\_E_{j,t}$.

Finally, for consistence, in all reported regressions I control for the dependence across observations by including year dummies and clustering the data by firm. However, in return tests, since returns are generally assumed to be independent across time for a given firm, the main concern about data clustering is cross-sectional correlation, that is, correlations across firms in a given quarter. Thus, to more precisely address this issue, I re-estimate regressions in Tables 5 and 6 by clustering the data by calendar quarter (without including year or firm dummies). The results are very similar to those reported and yield unchanged inferences.

6. Concluding remarks

A common view of the existing explanations for underreaction anomalies such as the post-earnings-announcement drift proposes that investors are slow in updating their expectations of future earnings upon receiving new information. This study investigates whether analysts, as important information intermediaries, are on average responsive to earnings announcements and whether responsive analysts' prompt forecast revisions can help facilitate market reactions to earnings announcements.

I show that analysts vary significantly in terms of their responsiveness to earnings announcements and that in general analyst responsiveness has increased steadily over the sample period. More importantly, I find that analyst responsiveness significantly increases the earnings response coefficient in the event window and significantly decreases the post-earnings-announcement drift in the drift window. This result cannot be explained by the effects of the determinants of analyst responsiveness or by analyst underreaction in magnitude.

This study complements prior research on analyst underreaction by highlighting a very important aspect of underreaction, namely, underreaction in time. It also provides further evidence on the role of analysts as information intermediaries by suggesting a specific mechanism for analysts to play such a role. Specifically, analysts facilitate market efficiency by helping the market promptly process and interpret significant value-relevant information with their responsive forecast revisions.

Due to the nature of the research question of this study, the analyses are largely performed at the firm level. Future research may focus on individual analysts and investigate economic or behavioral factors that affect their responsiveness, or examine different attributes of the forecasts or recommendations made by responsive analysts versus non-responsive analysts, thereby helping us better understand analysts' decision-making process.

REFERENCES

Abarbanell, Jeffrey, Victor Bernard, 1992. Tests of analysts' overreaction/underreaction to earnings information as an Explanation for anomalous stock price behavior, Journal of Finance 47, 1191-1207.

Bagnoli, Mark, Stanley Levine, and Susan G. Watts, 2005. Analyst estimate revision clusters and corporate events, Part I. Annals of Finance 1, 245-265., Purdue University.

Ball, Ray, and Phillip Brown, 1968. An empirical evaluation of accounting income numbers, Journal of Accounting Research 6, 159-178.

Barberis, Nicholas, Andrei Shleifer, and Robert Vishny, 1998. A model of investor sentiment, Journal of Financial Economics 49, 307-343.

Bartov, Eli, Suresh Radhakrishnan, Itzhak Krinsky, 2000. Investor sophistication and patterns in stock returns after earnings announcements, The Accounting Review 75, 43-63.

Bernard, Victor L., and Jacob K. Thomas, 1989. Post-earnings-announcement drift: Delayed price response or risk premium? Journal of Accounting Research 27, 1-36.

Bernard, Victor L., and Jacob K. Thomas, 1990. Evidence that stock prices do not fully reflect the implications of current earnings for future earnings, Journal of Accounting & Economics 13, 305-340.

Bowen, Robert M., Angela K. Davis, Dawn A. Matsumoto, 2002. Do conference calls affect analysts' forecasts? The Accounting Review 77, 285-316.

Brown, Lawrence D., 1991. Forecast selection when all forecasts are not equally recent, International Journal of Forecasting 7, 349-356.

Chan, Louis K. C., Narasimhan Jegadeesh, and Josef Lakonishok, 1996. Momentum strategies, Journal of Finance 51, 1681-1713.

Clements, Jonathan, 1999. Hot stocks are sizzling on momentum, Wall Street Journal, Eastern edition, Sep 7, C.1., New York, N.Y.

Cooper, Rick A., Theodore E. Day and Craig M. Lewis, 2001. Following the leader: A study of individual analysts' earnings forecasts, Journal of Financial Economics 61, 383-416.

Cornell, Bradford, and Wayne R. Landsman, 1989, Security price response to quarterly earnings announcements and analysts' forecast revisions, The Accounting Review 64, 680-692.

Daniel, Kent, David Hirshleifer and Avanidhar Subrahmanyam, 1998. Investor psychology and security market under- and over-reactions, Journal of Finance 53, 1839-1886.

Easterwood, John C., and Stacey R. Nutt, 1999. Inefficiency in analysts' earnings forecasts: Systematic misreaction or systematic optimism? Journal of Finance 54, 1777-1797.

Fama, Eugene F., 1998. Market efficiency, long-term returns, and behavioral finance, Journal of Financial Economics 49, 283-306.

Fama, Eugene F., and Kenneth French, 1997. Industry costs of equity, Journal of Financial Economics 43, 153-193.

Francis, Jennifer, Katherine Schipper, and Linda Vincent, 2002. Expanded disclosures and the increased usefulness of earnings announcements, The Accounting Review 77, 515-546.

Gleason, Cristi A., and Charles M. C. Lee, 2003. Analyst forecast revisions and market price discovery, The Accounting Review 78, 193-225.

Hong, Harrison, Terence Lim, and Jeremy C. Stein, 2000. Bad news travels slowly: Size, analyst coverage, and the profitability of momentum strategies, Journal of Finance 55, 265-295.

Hong, Harrison, and Jeremy C. Stein, 1999. A unified theory of underreactions, momentum trading and overreaction in asset markets, Journal of Finance 54, 2143-2184.

Imhoff, Eugene A., Jr., Gerald J. Lobo, 1992. The effect of ex ante earnings uncertainty on earnings response coefficients, The Accounting Review 67, 427-439.

Irvine, Paul J., 2003. The incremental impact of analyst initiation of coverage, Journal of Corporate Finance 9, 431-451.

Ivković, Zoran, and Narasimhan Jegadeesh, 2004. The timing and value of forecast and recommendation revisions, Journal of Financial Economics 73, 433-463.

Kimbrough, Michael D., 2005. The effect of conference calls on analyst and market underreaction to earnings announcements, The Accounting Review 80, 189-219.

Mikhail Michael B., Beverly R. Walther, and Richard H. Willis, 1997. Do security analysts improve their performance with experience? Journal of Accounting Research 35, 131-157.

Mikhail Michael B., Beverly R. Walther, and Richard H. Willis, 2003a. The effect of experience on security analyst underreaction, Journal of Accounting & Economics 35, 101-116.

Mikhail Michael B., Beverly R. Walther, and Richard H. Willis, 2003b. Security analyst experience and post-earnings-announcement drift, Journal of Accounting, Auditing & Finance 18, 529-550.

O'Brien, Patricia C., and Ravi Bhushan, 1990. Analyst following and institutional ownership, Journal of Accounting Research 28, 55-76.

Petersen, Mitchell A., 2007. Estimating standard errors in finance panel data sets: Comparing approaches, forthcoming, Review of Financial Studies.

Stickel, Scott E., 1989. The timing of and incentives for annual earnings forecasts near interim earnings announcements, Journal of Accounting & Economics 11, 275-292.

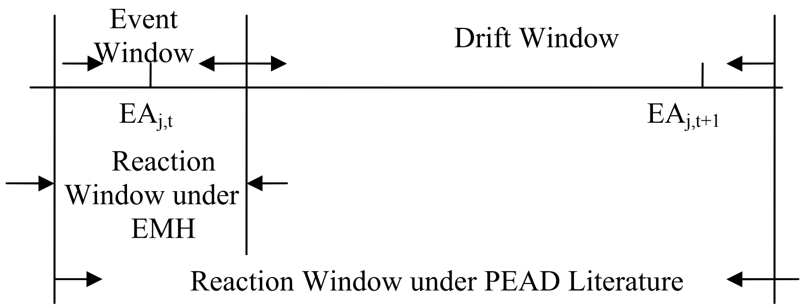

Figure 1. Timeline of Information Events and Windows. $EA_{j,t}$ is the date of earnings announcement by firm j for quarter t. The event window starts on trading day -1 and ends on trading day 1 with respect to $EA_{j,t}$. The drift window starts on trading day 2 with respect to $EA_{j,t}$ and ends on trading day 1 with respect to $E_{j,t+1}$.

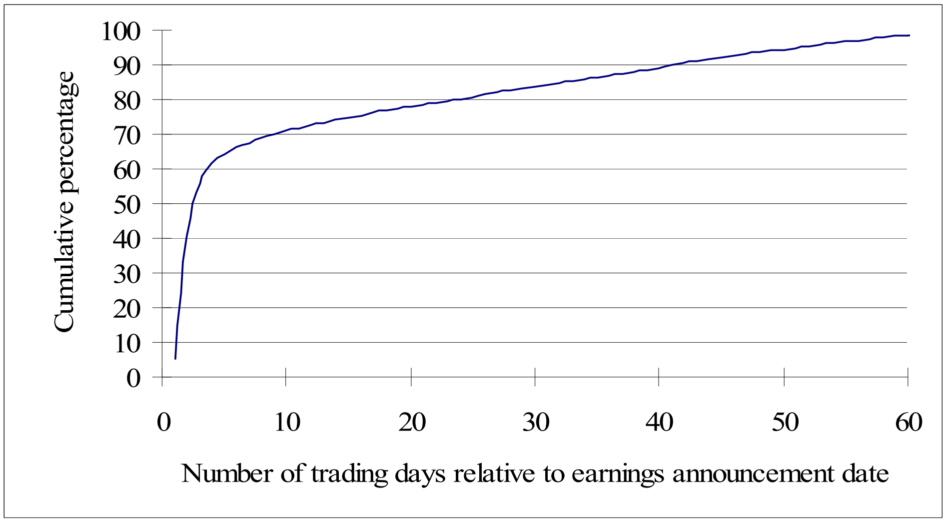

Figure 2. Timing of Individual Analysts' First Forecast Revisions with Respect to Earnings Announcements. The Y-axis represents the cumulative percentage of analysts who have revised their earnings forecasts for quarter t+1. The X-axis represents the number of trading days relative to the earnings announcement date of quarter t. The sample includes 200,703 analyst-firm-quarters with fiscal period ending between 1996 and 2002.

Table 1. Descriptive Statistics of Analyst Responsiveness to Earnings Announcements[a]

Panel A: Analyst-Level Analysis

Year	# analyst-firm-quarters	# of Trading Days between Earnings Announcements and First Subsequent Forecast Revisions					% $RESP_{i,j,t}$=1
		Mean	Median	STD	P25	P75	
1996	18,651	16.80	8	18.24	2	28	26.37%
1997	21,633	16.02	6	18.21	2	27	28.51%
1998	27,608	14.36	4	17.73	2	23	30.55%
1999	29,791	12.44	3	17.25	2	17	41.81%
2000	24,641	11.85	3	16.64	2	15	45.77%
2001	37,136	9.62	3	14.80	2	7	42.72%
2002	41,243	9.00	2	14.91	2	5	52.87%
Overall	200,703	12.19	3	16.79	2	16	40.32%

Panel B: Firm-Level Analysis

Year	# firm-quarters	$NRESP_{j,t}$		$PRESP_{j,t}$		%		%
		Mean	Median	Mean	Median	$PRESP_{j,t}$=0	$PRESP_{j,t}$=1	$DRESP_{j,t}$=1
1996	4,487	1.08	1	24.57	22.22	41.54	2.45	58.46
1997	5,163	1.27	1	26.21	25.00	40.96	3.64	59.04
1998	5,950	1.40	1	29.11	27.27	35.45	4..39	64.55
1999	6,034	2.04	1	38.61	40.00	26.53	7.24	73.47
2000	4,845	2.39	2	41.95	44.44	23.57	9.60	76.43
2001	6,562	2.39	1	40.35	40.00	33.56	12.54	66.44
2002	7,229	2.98	2	48.78	50.00	23.63	15.08	76.37
Over All	40,270	1.98	1	36.56	33.33	31.64	8.38	68.36

[a] The sample includes 200,703 analyst-firm-quarters with fiscal period ending between 1996 and 2002, representing 40,270 firm-quarters. $RESP_{i,j,t}$ equals 1 if analyst i revises her forecast for quarter t+1 of firm j by trading day 1 relative to the earnings announcement of quarter t and 0 otherwise. $NRESP_{j,t}$ ($PRESP_{j,t}$) is the number (percentage) of analysts with $RESP_{i,j,t}$=1 among all analysts following firm j for quarter t. $DRESP_{j,t}$ is an indicator variable that equals 1 if there is at least one analyst with $RESP_{i,j,t}$=1 for firm j quarter t and 0 otherwise.

Table 2. Firm-Level Analyst Responsiveness by Year and Industry [a]

	1996	1997	1998	1999	2000	2001	2002	1996-2002
Business Equipment	63.87%	66.32%	71.29%	80.49%	82.31%	65.86%	82.83%	73.80%
Chemicals and Allied Products	70.00%	59.06%	58.67%	70.42%	75.24%	55.77%	67.25%	64.78%
Consumer Durables	61.02%	51.75%	62.59%	72.85%	75.74%	64.56%	81.36%	67.71%
Consumer Non-Durables	59.02%	62.28%	64.35%	78.14%	76.62%	68.25%	83.64%	70.19%
Energy	47.48%	56.68%	61.17%	76.69%	71.98%	67.58%	76.34%	66.58%
Finance	53.88%	56.32%	61.15%	69.22%	69.54%	65.32%	64.22%	63.32%
Healthcare, Medical Equip., Drugs	59.74%	66.75%	68.57%	74.07%	79.25%	71.30%	68.52%	69.71%
Manufacturing	60.10%	56.75%	67.77%	72.61%	76.76%	63.99%	53.88%	68.04%
Telecommunications	70.83%	60.22%	64.50%	72.58%	75.36%	66.67%	77.66%	70.19%
Utilities	40.00%	37.68%	37.74%	47.10%	51.39%	45.46%	69.18%	49.06%
Wholesale and Retail	54.62%	54.95%	60.87%	69.76%	74.72%	73.91%	83.64%	67.55%
Other	54.68%	51.49%	59.23%	70.84%	74.22%	66.47%	76.12%	65.99%

[a] The sample includes 40,270 firm-quarters during 1996-2002. This table presents the percentage of firm-quarters with $DRESP_{j,t}$=1 by year and the 12-industry classification in Fama and French (1997). See notes to Table 1 for definition of $DRESP_{j,t}$.

Table 3. Descriptive Statistics Conditional on Firm-Level Analyst Responsiveness [a]

Panel A: Descriptive Statistics

	Mean		Median	
	$DRESP_{j,t}$ =0	$DRESP_{j,t}$ =1	$DRESP_{j,t}$ =0	$DRESP_{j,t}$ =1
$LOGMV_{j,t}$	13.29	14.12	13.18	13.99
	-50.00 (<0.01)		-46.54 (<0.01)	
$MERGE_{j,t}$	0.03	0.03	0.00	0.00
	-0.39 (0.69)		-0.39 (0.69)	
$SPECIAL_{j,t}$	0.20	0.24	0.00	0.00
	-10.00 (<0.01)		-9.73 (<0.01)	
$CALL_{j,t}$	0.48	0.61	0.00	1.00
	-24.29 (<0.01)		-24.32 (<0.01)	
$GUIDE_{t}$	0.09	0.18	0.00	0.00
	-25.44 (<0.01)		-22.81 (<0.01)	
$4THQTR_{t}$	0.19	0.19	0.00	0.00
	-0.60 (0.55)		-0.60 (0.55)	
$AUE_{j,t}$x100	0.27	0.23	0.11	0.09
	9.19 (<0.01)		9.22 (<0.01)	
$BNEWS_{j,t}$	0.27	0.24	0.00	0.00
	6.62 (<0.01)		6.71 (<0.01)	
$EXP_{j,t}$	6.86	7.42	5.00	5.50
	-7.89 (<0.01)		-11.16 (<0.01)	
$BSIZE_{j,t}$	59.57	72.27	52.50	66.00
	-31.02 (<0.01)		-35.66 (<0.01)	
$COV_{j,t}$	3.28	5.68	3.00	4.00
	-74.96 (<0.01)		-70.40 (<0.01)	
$INST_{j,t}$	0.50	0.56	0.51	0.58
	-26.27 (<0.01)		-26.16 (<0.01)	

Panel B: Correlation Matrix

	$DRESP_{j,t}$	$LOGMV_{j,t}$	$MERGE_{j,t}$	$SPECIAL_{j,t}$	$CALL_{j,t}$	$GUIDE_{j,t}$	$4THQTR_{t}$	$AUE_{j,t}$	$BNEWS_{j,t}$	$EXP_{j,t}$	$BSIZE_{j,t}$	$COV_{j,t}$	$INST_{j,t}$
$DRESP_{j,t}$		0.23	0.02	0.03	0.08	0.08	-0.00 (0.83)	-0.06	-0.03	0.05	0.13	0.28	0.12
$LOGMV_{j,t}$	0.23		0.07	0.12	0.15	0.14	0.04	-0.30	-0.08	0.28	0.27	0.49	0.30
$MERGE_{j,t}$	0.00 (0.69)	0.06		0.06	0.01 (0.18)	-0.01 (0.09)	-0.01 (0.15)	-0.05	-0.03	-0.05	-0.01 (0.17)	0.04	0.02
$SPECIAL_{j,t}$	0.05	0.12	0.04		0.05	0.05	0.12	0.04	0.02	0.04	0.05	0.10	0.05
$CALL_{j,t}$	0.12	0.15	-0.04	0.10		0.08	0.07	-0.05	-0.04	0.04	0.08	0.15	0.14
$GUIDE_{j,t}$	0.11	0.15	-0.05	0.09	0.20		0.06	-0.06	-0.06	0.07	0.06	0.16	0.16
$4THQTR_{t}$	0.00 (0.55)	0.04	-0.01 (0.02)	0.12	0.07	0.05		0.00 (0.81)	-0.00 (0.87)	-0.03	-0.04	-0.09	0.03
$AUE_{j,t}$	-0.05	-0.29	-0.06	0.05	-0.01 (0.12)	-0.09	0.00 (0.89)		0.22	-0.02	-0.02	-0.11	-0.19
$BNEWS_{j,t}$	-0.03	-0.08	-0.03	0.02	-0.05	-0.04	-0.00 (0.62)	0.22		0.03	-0.02	-0.04	-0.07
$EXP_{j,t}$	0.04	0.28	-0.03	0.02	-0.00 (0.86)	0.03	-0.04	-0.03	0.04		0.15	0.09	0.20
$BSIZE_{j,t}$	0.15	0.28	-0.04	0.08	0.16	0.13	-0.03	-0.00 (0.92)	-0.03	0.12		0.06	0.10
$COV_{j,t}$	0.29	0.49	0.02	0.12	0.19	0.12	-0.08	-0.10	-0.05	0.08	0.09		0.21
$INST_{j,t}$	0.13	0.30	0.00 (0.86)	0.06	0.18	0.12	0.04	0.17	-0.08	0.18	0.12	0.23	

[a] The sample includes 40,270 firm-quarters during 1996-2002. Variable definitions:

$DRESP_{j,t}$	=	an indicator variable that equals 1 if there is at least one analyst with $RESP_{i,j,t}$=1 for firm j quarter t and 0 otherwise;
$LOGMV_{j,t}$	=	log of market capitalization of firm j at the end of quarter t;
$MERGE_{j,t}$	=	an indicator variable that equals 1 if firm j experienced a merger or acquisition in quarter t, and 0 otherwise, where mergers or acquisitions are identified by quarterly footnote 1 of AA in Compustat;
$SPECIAL_{j,t}$	=	an indicator variable that equals 1 if firm j reports negative special items in quarter t, and 0 otherwise;
$CALL_{j,t}$	=	an indicator variable that equals 1 if firm j holds a conference call during the event window of quarter t and 0 otherwise, where conference call information is obtained from FirstCall;
$GUIDE_{j,t}$	=	an indicator variable that equals 1 if firm j provides guidance for future earnings during the event window of quarter t and 0 otherwise, where corporate-issued guidance information is obtained from FirstCall;
$4THQTR_{t}$	=	an indicator variable that equals 1 if quarter t is the fourth quarter of a fiscal year for firm j, and 0 otherwise;
$AUE_{j,t}$	=	absolute value of the unexpected earnings of firm j in quarter t, where the unexpected earnings is calculated as the actual earnings per share minus the latest individual analyst forecast, deflated by the stock price at the end of the quarter;
$BNEWS_{j,t}$	=	an indicator variable that equals 1 if the unexpected earnings of firm j in quarter t is negative and 0 otherwise;
$EXP_{j,t}$	=	median firm-specific experience of analysts following firm j for quarter t, where experience is measured as the number of quarters for which the analyst has followed the firm by that quarter (Mikhail et al., 2003b);
$BSIZE_{j,t}$	=	median size of the brokerage houses employing analysts following firm j for quarter t , where the brokerage house size is measured as the number of distinct analysts providing forecasts in the brokerage house;
$COV_{j,t}$	=	number of analysts following firm j for quarter t;
$INST_{j,t}$	=	percentage of institutional ownership for firm j quarter t, where the institutional ownership information is obtained from CDA/Spectrum.

[b] Panel A presents means and medians of the proposed determinant variables conditional on $DRESP_{j,t}$. The panel also presents t-tests for means and Wilcoxon-tests for medians; numbers in parentheses are the corresponding two-sided p-values.

[c] Panel B presents correlations among $DRESP_{j,t}$ and the proposed determinant variables. The lower-left triangle presents correlations based on the pooled sample; the upper-right triangle presents partial correlations after controlling for time trend. All correlations are significant at better than 0.01 level unless specifically noted in parentheses with two-sided p-values.

Table 4. Logit Regression of Firm-Level Analyst Responsiveness [a]

	Predicted Sign	Coeff. Est.	Z-stat	p-value
		* * * Year Dummies Included * * *		
Intercept	?	-2.585	-16.55	<0.01
$LOGMV_{j,t}$	+	0.083	6.53	<0.01
$MERGE_{j,t}$	-	-0.035	-0.44	0.66
$SPECIAL_{j,t}$	-	-0.031	-0.90	0.37
$CALL_{j,t}$	+	0.072	2.37	0.02
$GUIDE_{j,t}$	+	0.593	11.65	<0.01
$4THQTR_{t}$	+	0.188	5.86	<0.01
$AUE_{j,t}$	?	2.855	0.90	0.37
$BNEWS_{j,t}$	-	-0.005	-0.17	0.87
$EXP_{j,t}$	+	-0.006	-2.81	<0.01[b]
$BSIZE_{j,t}$	+	0.008	18.57	<0.01
$COV_{j,t}$	+	0.534	53.51	<0.01
$INST_{j,t}$	+	0.109	1.45	0.15

[a] Table 4 presents logit regression of firm-level analyst responsiveness based on 40,270 firm-quarters from 1996-2002. The dependent variable is $DRESP_{j,t}$. See notes to Table 3 for variable definitions. Observations with absolute Pearson residuals greater than 2 are deleted. The reported Z-stats and p-values are based on standard errors clustered on the firm dimension.

[b] This indicates a significant coefficient that is of opposite sign to the prediction.

Table 5. Firm-Level Analyst Responsiveness and the Earnings Response Coefficient [a]

	Predicted Sign	Model (2a)			Model (2b)		
		Coeff. Est.	t-stat	p-value	Coeff. Est.	t-stat	p-value
		* Year Dummies Included *			* Year Dummies Included *		
Intercept	?	-0.003	-2.58	<0.01	-0.023	-6.58	<0.01
UE	+	2.147	14.60	<0.01	2.305	2.58	0.01
DRESP*UE	+	1.282	6.73	<0.01	1.009	5.49	<0.01
DRESP	?	0.001	0.31	0.76	-0.001	-0.35	0.72
LOGMV*UE					-0.020	-0.25	0.80
MERGE*UE					0.341	0.36	0.72
SPECIAL*UE					-0.643	-3.10	<0.01
CALL*UE					0.282	1.45	0.15
GUIDE*UE					1.762	5.05	<0.01
4THQTR*UE					-0.258	-1.17	0.24
BNEWS*UE					-1.742	-7.37	<0.01
EXP*UE					-0.070	-5.87	<0.01
BSIZE*UE					-0.013	-5.75	<0.01
COV*UE					0.117	3.60	<0.01
INST*UE					2.608	5.40	<0.01
LOGMV					0.002	6.10	<0.01
MERGE					0.006	2.82	<0.01
SPECIAL					-0.004	-4.22	<0.01
CALL					-0.001	-0.20	0.85
GUIDE					-0.006	-4.85	<0.01
4THQTR					-0.002	-2.02	0.04
BNEWS					-0.022	-21.20	<0.01
EXP					0.001	0.44	0.66
BSIZE					0.001	0.41	0.68
COV					-0.001	-4.00	<0.01
INST					0.011	5.84	<0.01

[a] Table 5 presents regression estimation for models (2a) and (2b) based on 40,270 firm-quarters from 1996-2002. Firm and quarter subscripts are suppressed for notational simplicity. The dependent variable is $SAR\_E_{j,t}$, the size-adjusted returns over the event window as defined in Figure 1. See notes to Table 3 for other variable definitions. Observations with absolute studentized residuals greater than 2 are deleted. The reported t-stats and p-values are based on standard errors clustered by firm.

Table 6. Firm-Level Analyst Responsiveness and the Post-Earnings-Announcement Drift [a]

	Predicted Sign	Model (3a) Coeff. Est.	t-stat	p-value	Model (3b) Coeff. Est.	t-stat	p-value
		* Year Dummies Included *			* Year Dummies Included *		
Intercept	?	-0.046	-11.50	<0.01	-0.278	-14.82	<0.01
RUE	+	0.052	8.82	<0.01	0.198	6.13	<0.01
DRESP*RUE	+	-0.021	-2.86	0.01	-0.016	-2.03	0.04
DRESP	?	0.015	3.51	0.01	0.009	1.98	0.05
LOGMV*RUE					-0.008	-2.97	<0.01
MERGE*RUE					0.053	2.17	0.03
SPECIAL*RUE					-0.013	-1.44	0.15
CALL*RUE					-0.012	-1.64	0.10
GUIDE*RUE					0.002	0.15	0.88
4THQTR*RUE					-0.020	-2.11	0.04
BNEWS*RUE					-0.111	-4.22	<0.01
EXP*RUE					0.001	1.12	0.26
BSIZE*RUE					-0.001	-1.08	0.28
COV*RUE					0.002	1.62	0.11
INST*RUE					-0.014	-0.78	0.43
LOGMV					0.015	10.06	<0.01
MERGE					0.021	2.45	0.01
SPECIAL					-0.006	-1.17	0.24
GUIDE					0.010	1.64	0.10
CALL					-0.004	-0.91	0.36
4THQTR					0.041	7.61	<0.01
BNEWS					0.034	6.61	<0.01
EXP					0.001	1.55	0.12
BSIZE					0.001	0.44	0.66
COV					-0.004	-5.06	<0.01
INST					0.037	3.68	<0.01

[a] Table 6 presents regression estimation for models (3a) and (3b) based on 40,270 firm-quarters from 1996-2002. Firm and quarter subscripts are suppressed for notational simplicity. The dependent variable is $SAR\_D_{j,t}$, the size-adjusted returns over the drift window as defined in Figure 1. See notes to Table 3 for other variable definitions. Observations with absolute studentized residuals greater than 2 are deleted. The reported t-stats and p-values are based on standard errors clustered by firm.

Table 7: Underreaction in Time and in Magnitude [a]

Panel A: First Forecasts after Earnings Announcements of Quarter t

	Predicted Sign	DRESP=0 Coeff. Est.	DRESP=0 t-stat	DRESP=0 p-value	DRESP=1 Coeff. Est.	DRESP=1 t-stat	DRESP=1 p-value	Pooled Coeff. Est.	Pooled t-stat	Pooled p-value
		* Year Dummies Included *			* Year Dummies Included *			* Year Dummies Included *		
Intercept	?	-0.001	-2.63	<0.01	-0.001	-3.60	<0.01	-0.001	-1.83	<0.07
UE	+	0.275	11.45	<0.01	0.330	12.73	<0.01	0.274	11.42	<0.01
UE*DRESP	?							0.059	1.59	0.11
DRESP	?							-0.000	-3.46	<0.01

Panel B: Last Forecasts before Earnings Announcements of Quarter t+1

	Predicted Sign	DRESP=0 Coeff. Est.	DRESP=0 t-stat	DRESP=0 p-value	DRESP=1 Coeff. Est.	DRESP=1 t-stat	DRESP=1 p-value	Pooled Coeff. Est.	Pooled t-stat	Pooled p-value
		* Year Dummies Included *			* Year Dummies Included *			* Year Dummies Included *		
Intercept	?	0.001	3.24	<0.01	0.001	6.37	<0.01	0.001	6.42	<0.01
UE	+	0.197	9.93	<0.01	0.213	10.28	<0.01	0.196	9.90	<0.01
UE*DRESP	?							0.017	0.61	0.54
DRESP	?							-0.001	-0.33	0.88

[a] Table 7 presents analysis of the relation between analyst underreaction in time and in magnitude. Firm and quarter subscripts are suppressed for notational simplicity. Dependent variables in the two panels are analyst forecast errors for quarter t+1 measured at the corresponding point of time, where forecast errors are measured as the difference between actual earnings per share and the analyst forecast, deflated by the stock price at the end of quarter t. $UE_{j,t}$ is the unexpected earnings for quarter t, calculated as the actual earnings per share minus the latest individual analyst forecast, deflated by the stock price at the end of quarter t. $DRESP_{j,t}$ is as defined in Table 1. Observations with absolute studentized residuals greater than 2 are deleted. The reported t-stats and p-values are based on standard errors clustered by firm.