

# Market and Analyst Reactions to Earnings News: an Efficiency Comparison

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### Abstract

This study compares the efficiency at which the stock market and financial analysts react to corporate earnings announcements. Results show that the market is more efficient and reacts more rapidly to earnings news than financial analysts. In particular, in pre-announcement quarters (inclusive of announcement day), the market reacts more than analysts, and in the post-announcement quarters, analysts gradually catch up. This result is robust across all measures of analyst earnings forecasts and under alternative specifications. Results further show that prior research reached the opposite conclusion because of two questionable research design choices: 1) limiting the window to the first post-announcement quarter (a window too narrow to capture market or analysts' complete reactions); 2) consideration of just one-quarter ahead earnings forecasts (an approach that ignores forecasts at other horizons).

## 1. Introduction

This study compares the efficiency at which the stock market and financial analysts react to corporate earnings announcements. A primary motivation for this comparison is that analysts are important information intermediaries in the stock market, implying that understanding of financial analysts' behavior is a crucial component in the understanding of the price formation process. We choose corporate earnings announcements as the setting for comparison because earnings announcements are among the most significant recurring public information releases by corporations.

Financial analysts are important players in the stock market. They collect, process and aggregate information from diverse sources, communicate it to investors in concise forms such as earnings forecasts and stock recommendations. It has long been argued that financial analysts are not perfect information intermediaries because they tend to be too optimistic, over-react to some information, and under-react to other information. Suggested causes of these imperfections include conflict of financial interest due to analysts' dual roles in investment banking and equity research, inexperience and cognitive biases, and herding behavior.<sup>1</sup> Analysts' role in the recent stock market bubble and high profile corporate scandals further reinforces the notion that analyst earnings forecasts and stock recommendations do not efficiently reflect value relevant information.<sup>2</sup>

The stock market, on the other hand, is generally believed to be quite efficient with respect to public information. Many scholars of financial markets regard the *efficient*

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<sup>1</sup> See Brown (1993) and Schipper (1991) for comprehensive reviews.

<sup>2</sup> The Wall Street Journal reports that regulators reached a \$1.4 billion settlement with Wall Street firms, which includes close to \$1 billion in fines and \$400 million to finance the distribution of independent research to small investors.

*markets hypothesis* as a cornerstone in modern financial economics. Despite the large volume of literature that documents empirical regularities in stock prices that seem to violate semi-strong form market efficiency,<sup>3</sup> most are convinced that market inefficiencies are the exception, rather than the rule. Even documented market anomalies are often shown difficult to exploit in reality once transactions costs and risk factors are fully considered.

Given the above considerations, one might intuitively conjecture that in the reaction to earnings news, the market would likely show higher efficiency or greater speed than analysts. Further supporting this conjecture is the prospect that market participants have their own money on the line while analysts are only indirectly affected by how they react to new information through complex compensation structures. However, to date, the literature does not support this conjecture. In their study of post-earnings-announcement drift, Abarbanell and Bernard (1992) found under-reaction to earnings announcements by both analysts and the market, but concluded that the market under-react more than analysts because analyst under-reaction cannot fully account for post-announcement price drift. Alford and Berger (1997), and Brous and Shane (2001) found similar evidence, though the latter paper concluded that Abarbanell and Bernard had under-estimated the amount of post-announcement drift that can be accounted for by analyst under-reaction.

These counter-intuitive prior research findings warrant further investigation. Two issues prove to be crucial in the inferences drawn from the comparison of market and analysts' reactions to earnings announcement. One is the choice of the first post-

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<sup>3</sup> In accounting literature, for example, the post earnings-announcement drift (e.g., Ball and Brown, 1968, Bernard and Thomas, 1990)

announcement quarter as the proper window for a complete assessment of the reactions by the market and analysts. As this study will demonstrate, the one-quarter window employed in prior research is too narrow as evidenced by continued predictable drifts in both market and analysts' reactions well after the first quarter, especially on the part of analysts. The second major issue is the assumption that one-quarter-ahead earnings forecasts capture analysts' full information set. This assumption is implausible given that analysts make forecasts at multiple horizons and one-quarter ahead earnings forecasts constitute only a small portion of analysts' information set. Brous and Shane (2001) also recognized this point, but only went one step further by including two-quarter ahead earnings forecasts in their regressions analysis. Among the excluded forecasts, some, especially long-term forecasts, are shown to be crucial in setting stock prices (e.g., Abarbanell and Bushee 1997, Abarbanell and Bernard 2000, Frankel and Lee 1998, Liu and Thomas 2000), and omitting them significantly biases results.

The research design in this paper addresses these issues. First, analysts' forecasts at all horizons are considered. Since four quarterly earnings forecasts sum up to one annual forecast, the analysts' information set can be parsimoniously summarized in three measures: one-year out and two-year out annual earnings forecasts, and long-term growth forecast.<sup>4</sup> Accordingly, revisions in these long-term earnings forecasts are compared with market returns to discern the relative efficiencies of analysts and the market. Second, instead of focusing just on the first post-announcement quarter, the window is extended to five quarters before earnings announcement and four quarters after. This window is empirically shown to be long enough to fully capture reactions by

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<sup>4</sup> Three, four and five year out forecasts are available for a very small fraction of firms. We ignore them because of their scant availability.

the market and analysts with respect to the earnings announcements. While the post-announcement quarters are used to study market and analysts' differential under-reactions to earnings news, the pre-announcement quarters are essential because the cause of post-announcement drift is under-reaction in the pronouncement period (inclusive of the announcement day). The idea is that, under the weak assumption that all inefficiencies eventually are resolved, the total amount of reaction to information by all market participants should be the same over time, with the difference coming only from the speed at which they react. Therefore, if market participant A reacts less efficiently than participant B, then in the pre-announcement period (inclusive of the announcement day), we should find A reacts less than B to the earnings news, as a result, in the post-announcement period, A should exhibit more post-announcement drift than B.<sup>5</sup>

Supporting the notion that analysts should have less incentive than the market in processing information efficiently, we find analysts react more sluggishly than the market to earnings announcements. In particular, analysts exhibit smaller amount of reactions in the pre-announcement quarters, and they gradually catch up in the post-announcement quarters. This result is robust across all measures of analyst earnings forecasts and alternative specifications.

The rest of the paper is organized as follows: section 2 reviews the related literature, section 3 discusses research design issues, section 4 describes the sample and presents the results, Section 5 concludes.

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<sup>5</sup> As will be fully described in section 3, the distribution of the market reactions relative to that of analysts' reactions can be usefully portrayed as a first-order stochastic dominance shift.

## **2. Related Literature**

This study is closely related to the literature on post-earnings-announcement drift and the literature on analyst forecasts. Ball and Brown (1968) were the first to document the post-earnings-announcement drift, where the market appears to under-react to earnings news because the post-announcement returns can be predicted by earnings surprises. The returns of good news firms continue to drift up and those of bad news firms drift down. It is to date one of the most robust market “anomalies” in the stock market (Fama, 1998).

Because the market’s earnings expectations are not observable, researchers have turned to various proxies of earnings expectations in constructing tests of the under-reaction hypothesis. One stream of research looks at mechanical time-series models. Bernard and Thomas (1989, 1990) and Bartov (1992) show that the market behaves as if quarterly earnings follow a seasonal random walk model, and consistently underestimates the autoregressive component exhibited by most firms. A number of later studies on post-announcement drift, e.g., Ball and Bartov [1996], Lys and Soffer [1998], Rangan and Sloan [1998], also focus on the time series earnings expectation model. While this line of research provides consistent evidence supporting the under-reaction explanation for the observed drifts, the notion that the stock market follows a simple mechanical earnings expectation model, without reference to other available information, is disturbing to many.

Another stream of research looks at analyst earnings forecasts due to their superiority over mechanical models as a measure of earnings expectations.<sup>6</sup> Because analysts are also found to under-react to earnings news (Mendenhall, 1991), it is natural to see whether analyst under-reaction can explain the market under-reaction. Abarbanell and Bernard [1992] compare market and analyst reactions to earnings news to determine how much of market reactions can be accounted for by analyst reactions. They concluded that analysts are more efficient than the market; and analyst under-reaction to earnings can only partially explain the market under-reaction. In particular, they find that in the first quarter following the earnings announcement, the magnitude of the drift is larger than what would have been expected based on the serial autocorrelations of analyst forecast errors. A view of the stock market consistent with their findings is that while analysts under-react to earnings information, the market under-reacts to analyst forecasts.

Two later studies, Alford and Berger (1997) and Brous and Shane (2001), questioned Abarbanell and Bernard's conclusion, but found qualitatively similar evidence. Like this study, Brous and Shane (2001) also identified Abarbanell and Bernard's questionable assumption that one-quarter-ahead earnings forecasts capture analysts' full information set. They showed that once two-quarter ahead earnings forecasts are also considered, the amount of post-announcement drift that can be explained by analyst forecasts is substantially increased.

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<sup>6</sup> Numerous studies investigate properties of analyst earnings forecasts; see for example, Fried and Givoly [1982], Brown, Griffin, Hagerman and Zmijewski [1987a,b], O'Brien [1988]. In addition to optimism, analysts are found to under-react to past earnings information (Mendenhall 1991, Abarbanell and Bernard 1992), under-react to past stock price changes (Abarbanell 1991), over-react to past annual earnings (DeBondt and Thaler 1990), inefficiently react to information in accruals (Bradshaw, Richardson and Sloan 2002), inefficiently react to information in price-to-book ratios and past sales growth (Frankel and Lee 1998). Although research that offers rational explanations of "anomalous" analyst behavior starts to emerge (e.g., Abarbanell and Lehavy 2002, Gu and Wu 2002, Keane and Runkle 1998), evidence consistent with analyst inefficiencies remains dominant.

### 3. Research Design Issues

All three studies that compare the efficiency at which the market and analysts react to earnings news essentially use the same research design originated by Abarbanell and Bernard (1991). Here we review a version suggested by Brous and Shane (2001). The null hypothesis is that the market earnings surprise is the same as the analysts' earnings surprise, i.e.,

$$UE_{t+1} = UE_{t+1}^a,$$

where  $UE_{t+1}$  is the true market earnings surprise for the first quarter following the quarter  $t$  earnings announcement, and  $UE_{t+1}^a$  is analysts' earnings surprise. The following linear relationship between the market earnings surprise and stock price movements is then assumed:

$$CAR_{t+1} = \alpha + \beta UE_{t+1} + e_{t+1}, \quad (1)$$

where  $CAR_{t+1}$  is the first post-announcement quarter cumulative abnormal returns. To keep the notation simple, firm subscripts are omitted.

Under the null hypothesis, analysts' surprise can be substituted for the market surprise, and equation (1) becomes

$$CAR_{t+1} = \alpha + \beta UE_{t+1}^a + e_{t+1}. \quad (2)$$

To examine the drift effect, the earnings surprise in the lagged period  $t$ ,  $UE_t^a$ , is then added to equation (2). The regression model becomes

$$CAR_{t+1} = \alpha + \gamma UE_t^a + \beta UE_{t+1}^a + e_{t+1}. \quad (3)$$

Therefore, under the assumptions that quarterly earnings surprises drive stock prices (equation 1), if the null is true, then the regression coefficient on  $UE_t^a$  ( $\gamma$ ) should be zero.

Since all three studies found  $\gamma$  to be significantly different from zero, they conclude analyst under-reaction cannot fully explain the market under-reaction.<sup>7</sup>

Keys to the above research design are the assumption that the first post-earnings-announcement quarter is the appropriate window for comparison and the assumption that analysts' one-quarter ahead earnings forecasts capture analysts' full information set. Both assumptions are questionable. Moreover, because the research design can only address the question whether the market earnings surprise is identical to the analysts' surprise, an alternative research design is needed to judge who is more or less efficient when the null is rejected.

### The window

First, since prior research has shown under-reactions to earnings announcement by both analysts and the market continue for at several quarters, especially on the part of analysts, the first post-announcement quarter is likely to be too narrow to capture the complete reactions by analysts and the market. As illustrated in Figure 1, market participant A is more efficient than B because A reacts to earnings news at an overall higher speed. Most of A's under-reaction, captured by predictable reactions in the post-announcement period, shows up in the first quarter. But it takes B several quarters to fully adjust for the initial under-reaction, therefore B's first-quarter predictable reaction

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<sup>7</sup> Strictly speaking, this approach only verifies whether the relationship between analyst and market earnings surprises is linear. To see this, suppose  $UE_{t+1} = \theta + \omega UE_{t+1}^a$ , where  $\theta$  and  $\omega$  are constants. Substitute analyst surprise for market surprise in equation (1), repeat the arguments from equation (2) to equation (3), we get  $CAR_{t+1} = (\alpha + \beta\theta) + \gamma UE_t^a + \beta\omega UE_{t+1}^a + e_{t+1}$ . In this regression equation, the regression coefficient on  $UE_t^a$  will be zero under  $UE_{t+1} = \theta + \omega UE_{t+1}^a$ , which is a more general form than  $UE_{t+1} = UE_{t+1}^a$ .

will only be a small portion of its total predictable reactions. This implies that a comparison based only on the first quarter would upwardly bias the measure of B's efficiency. A more appropriate window of investigation should be long enough to capture all predictable reactions by the market and analysts.

*Insert Figure 1 about here*

Figure 1 also suggests an alternative approach to compare the information efficiencies of A and B. Under the weak assumption that no inefficiency can last forever, although market participants react to news at different speeds, their total reactions over a sufficiently long time should be the same. This observation suggests that both the pre-announcement period and the post-announcement period should be examined. If A reacts to information more efficiently than B, A's distribution of reactions would first-order stochastically dominate B's distribution, i.e., A would exhibit larger amount of reaction in the pre-announcement period, and smaller amount of reaction in the post-announcement period. Thus, a complete comparison of reactions should encompass a window that extends over both periods to fully capture market and analysts reactions to earnings announcement.

#### Analysts' information set

Second, it seems implausible that one-quarter ahead earnings forecasts would fully capture analysts' information set. Figure 2 plots distributions of earnings forecast horizons based on 2002 version of IBES detailed forecast file. The first distribution is about revision frequency and is calculated as the total number of forecasts and revisions at a certain forecast horizon divided by the total number of forecasts and revisions in the

IBES universe. A striking feature of this distribution is that analysts make forecasts at multiple horizons. In addition to four quarterly forecasts, analysts make annual forecasts up to five years out, and frequently, a long-term growth forecast (LTG) is available. One-quarter ahead earnings forecasts (QTR1) only make up 17% of analysts' total revisions. Dominant in the revision frequency distributions are one-year out (FY1) and two-year out (FY2) forecasts, which combined account for roughly 50% of all earnings revisions. Because four quarterly earnings forecasts sum up to one annual earnings forecast, long term earnings forecasts in FY1, FY2 and LTG are likely to summarize most of the value relevant information in analysts' forecasts.<sup>8</sup>

Given the likelihood that forecasts at certain horizons might be revised more often than others, a second distribution is calculated based on availability frequency. This frequency is the total number of available forecasts at a certain horizon divided by the total number of available forecasts in each month.<sup>9</sup> Compared with the distribution based on revision frequency, a notable feature of the availability distribution is that LTG forecasts make up a much larger percentage, moving from 5% in the revision distribution to 15% in the availability distribution. This confirms that LTG forecasts are widely available, but revised infrequently.

In sum, Figure 2 shows that exclusive focus on one-quarter-ahead earnings forecasts ignores a large portion of analyst information, and, since analyst forecasts are

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<sup>8</sup> In principle FY3, FY4 and FY5 should also be considered, but unfortunately their availability is highly limited.

<sup>9</sup> A forecast is considered available if there is an outstanding forecast made within three months of the calculation date.

correlated, the omission of correlated variables is going to bias the regression coefficients.<sup>10</sup>

*(Figure 2 about here)*

### Research design

In order to address issues discussed above, we design an alternative methodology to compare the relative efficiencies of the market and analyst in their reactions to earnings announcements. We measure market reactions using cumulative abnormal returns (CAR) and measure analyst reactions using revisions in earnings forecasts (REV). We divide the window into pre-announcement and post-announcement periods. For each quarter in these periods, we regress CAR and REV on quarter t earnings surprise ( $UE_t$ ) to estimate a regression coefficient that captures market and analyst reaction with respect to  $UE_t$ :

$$CAR_{t+\tau} = \alpha^m + \beta_{t+\tau}^m UE_t + e, \quad (4)$$

$$REV_{t+\tau} = \alpha^a + \beta_{t+\tau}^a UE_t + \varepsilon \quad (5)$$

where  $\tau$  takes positive (post-announcement period) or non-positive (pre-announcement period) integer values; superscript  $m$  and  $a$  refer to market and analysts, respectively; and  $\beta_{t+\tau}^m$  and  $\beta_{t+\tau}^a$ , respectively measure market and analyst reactions to  $UE_t$  in quarter  $t+\tau$ . We empirically determine how many quarters should be included in the window by extending the window and conducting regressions for each additional quarter until the regression coefficients become economically or statistically insignificant.

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<sup>10</sup> We discuss correlations between forecasts in the next section.

To compare market reactions with analysts, we sum up the cumulative reactions in the pre-announcement and post announcement periods:  $\beta_{pre}^i = \sum_{\tau \leq 0} \beta_{t+\tau}^i$ ,  $\beta_{post}^i = \sum_{\tau > 0} \beta_{t+\tau}^i$ , where  $i = m, a$ . We also sum up the betas for the two sub-periods to derive the total reactions to earnings news:  $\beta_{total}^i = \beta_{pre}^i + \beta_{post}^i$ . Under the weak assumption that no inefficiency can last forever, the total amount of reactions to the earnings news by the market and analysts should be the same.<sup>11</sup> Adding the simplifying assumption that market value can be obtained using a multiple of forward earnings, we have

$$\beta_{total}^m = k \beta_{total}^a \quad (6)$$

where  $k$  is the multiple on forward earnings.<sup>12</sup> Equation (6) suggests that the multiple can be estimated as  $\hat{k} = \beta_{total}^m / \beta_{total}^a$ , which can then be applied to betas estimated in each period to compare the speed of reaction of the market and analysts. Because we conjecture the market is more efficient than the analysts, we expect to find the market lead the analysts in the pre-announcement period (inclusive of earnings announcement) and analysts will catch up in the post-announcement period:

$$\beta_{pre}^m - \hat{k} \beta_{pre}^a > 0 \text{ and } \beta_{post}^m - \hat{k} \beta_{post}^a < 0 \quad (7)$$

Substitute in the expression for earnings multiple  $\hat{k} = \beta_{total}^m / \beta_{total}^a$ , we arrive at an alternative expression for the comparison:

$$\frac{\beta_{pre}^m}{\beta_{total}^m} > \frac{\beta_{pre}^a}{\beta_{total}^a} \text{ and } \frac{\beta_{post}^m}{\beta_{total}^m} < \frac{\beta_{post}^a}{\beta_{total}^a}. \quad (8)$$

<sup>11</sup> Aboody, Hughes and Liu (2002) also assume that all market inefficiencies eventually get resolved.

<sup>12</sup> See Alford (1991), Liu, Nissim and Thomas (2002) for studies of equity valuation using multiples. The latter study found forward earnings multiples perform the best in equity valuation, even in comparison with generic versions of the discount residual income valuation.

Therefore, percentage wise, the market is expected to react more in the pre-announcement period and less in the post-announcement period. Of course, if the market and analysts are equally efficient with respect to earnings news, we will have

$$\beta_{pre}^m - \hat{k}\beta_{pre}^a = 0 \text{ and } \beta_{post}^m - \hat{k}\beta_{post}^a = 0. \quad (9)$$

Since four quarterly earnings forecasts sum up to one-year ahead earnings forecasts, we parsimoniously summarize analysts' information set in three measures: one-year out (FY1) and two-year out (FY2) annual earnings forecasts, and a long-term growth forecast (LTG). Because LTG is a growth measure and cannot be directly compared with market prices, we create a three-year out earnings forecast based on FY2 and LTG:  $FY3^* = FY2 * (1 + LTG)$ . All three measures of earnings forecasts are compared with market returns using methodology developed above. As a robustness check, we also use the residual income model to aggregate the three measures into one "pseudo-price" measure and find similar results.<sup>13</sup>

#### 4. Sample and results

##### Sample selection

We obtain earnings announcement dates from COMPUSTAT industrial, full coverage, and research tapes. Earnings per share (EPS) actuals and forecasts are obtained from IBES detailed history tape. We only retain firms with FY1, FY2 and LTG forecasts. All per share variables are retroactively adjusted for stock splits and stock dividends

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<sup>13</sup> Because all three measures yield qualitatively similar results, the results using residual income model become somewhat predictable due to the fact that earnings forecasts are the drivers of that model. See Liu (1999) for detailed results using that measure.

using the I/B/E/S adjustment factors. If a company is followed on a fully diluted basis, we use I/B/E/S dilution factors to convert earnings per share numbers to a primary basis. Stock prices and size-adjusted returns are from the CRSP daily tape. Our final sample includes 3717 firms, and spans the time period from 1983:4 to 2001:4.

There is some debate as to which statistic, derived from the distribution of analyst forecasts available at each point in time, best reflects the current analyst expectations. Various studies show that consensus forecasts are more accurate than individual forecasts, consistent with the notion that idiosyncratic errors are minimized when sample means are used.<sup>14</sup> However I/B/E/S summary (consensus) numbers suffer from the problem that many forecasts are stale, sometimes as much as six months old (see O'Brien [1988]). Therefore using I/B/E/S consensus forecasts would artificially induce autocorrelation in forecast revisions. For this reason, at each point in time, we take the latest forecast in the IBES universe to represent analyst expectations. We also conduct robustness checks by creating a consensus forecast using the average of the last three forecasts and find similar results.

### Descriptive statistics

Table 1 presents the descriptive statistics for the sample. Panel A reports the univariate distributions for the variables used in this study, which include size-adjusted abnormal returns (CAR), earnings surprise (UE), revisions in two, three and four quarter out quarterly earnings forecasts (RQTR2, RQTR3 and RQTR4), revision in long-term growth forecasts (RLTG), and revisions in one, two and three year out annual earnings forecasts (RFY1, RFY2 and RFY3\*). All forecast revisions are deflated by stock price at

the beginning of the measurement period. The measurement window for returns and forecasts revisions are from the third trading day after quarter t-1 earnings announcement to the third trading day after quarter t earnings announcement. Consistent with prior research, the mean earnings surprise and mean earnings revisions during the quarter are all negative, implying analysts' optimism. However, the medians are all zero, suggesting the distributions are skewed.

*(Table 1 about here)*

We made an argument in the section 3 that prior literature missed a large set of information in analyst forecasts because one-quarter-ahead earnings forecasts only constitute a small percentage of all analyst forecasts and revisions. This criticism would be invalid if all forecast revisions are perfectly correlated. Panel B presents the correlation matrix. We note CAR is positively correlated all measures of forecasts revisions, and all forecasts revisions are positively correlated amongst themselves, judging from rank correlations, in which case outliers and non-linearities do not pose a serious problem. However, the correlations are, in general, quite small. The largest correlations are separately found among revisions in quarterly forecasts and between revisions in FY1 and FY2 forecasts, with magnitudes hovering around 50%. Correlations between revisions in quarterly forecasts and revisions in annual forecasts are weaker. Revisions in LTG forecasts are only marginally correlated with revisions at other horizons. The correlation structure suggests that analysts' earnings forecasts capture three distinct aspects of firms' value relevant information: the short term (quarterly forecasts), the near-term (FY1 and FY2 forecasts) and the long term (LTG). In addition, since four quarterly forecasts sum up to one annual forecast, we conclude that analysts' information

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<sup>14</sup> See, for example, Ashton and Ashton [1985], Winkler and Makridakis [1983].

set can be parsimoniously summarized in FY1, FY2 and LTG forecasts. Focusing on QTR1 forecasts is likely to omit a large set of correlated information.

To obtain some preliminary understanding of analyst behavior with respect to their reactions to earnings announcements, we document analysts' earnings revision activities centered around earnings announcement days. Figure 3 plots the frequency of analysts' revisions, which is measured as the total number of earnings revisions/forecasts on a particular trading day divided by the total revisions/forecasts contained in the IBES detailed tape. Slightly less than 1% of the revisions/forecasts happen on a typical trading day not close to earnings announcement. We observe a small decrease in revision activities in the week just before the earnings announcements as analysts wait for the upcoming earnings news. At the day of earnings announcement, revision activities increase by about 150%, and the activities peak on the second day after earnings announcement with its intensity eight times that of a typical trading day. After the peak, the analysts' activities start to decrease, dramatically in the beginning and gradually later on. By 10 trading days (two calendar weeks) after the earnings announcement, analysts' revision activities come very close to their typical levels. In analyses that follow, we count the first and second trading days after quarter t earnings announcement as market and analyst reactions in quarter t. This is to accommodate the intense revision activities by analysts during those two days, notwithstanding that it slightly biases our results against finding market to be more efficient in the reaction to news.

*(Figure 3 about here)*

## Reconciliation with prior literature: the role of forecasts other than QTR1

Table 2 presents results that reconcile with prior research and show that Abarbarnell and Bernard's implicit assumption that one-quarter-ahead earnings forecasts (QTR1) fully capture analyst information induces biases in regression coefficient estimates. The basic technique is to regress quarter  $t$  size-adjusted cumulative abnormal returns (CAR) on quarter  $t$  forecast revisions and quarter  $t-1$  earnings surprise ( $UE_{t-1}$ ). Because of concerns that the relationship between stock returns and earnings surprise is non-linear (Cheng, Hopwood and Mckewn, 1992), we rank transform unexpected earnings into percentiles. The resulting  $UE$  has a value between zero and one.<sup>15</sup> To control for cross-sectional correlation in errors, we use Fama-MacBeth (1973) technique to calculate regression coefficients and associated  $t$ -statistics. In particular, in each calendar quarter we run cross-sectional regressions and obtain coefficient estimates, we then report the mean of the coefficient estimates and the  $t$ -statistics associated with the mean.

*(Table 2 about here)*

When we regress  $CAR_t$  on  $UE_{t-1}$ , we obtain a coefficient of 0.070 and  $t$  value of 7.161. This result is a replication of the post-earnings-announcement drift phenomenon, implying future abnormal stock returns can be predicted by current earnings surprises. The magnitude of this coefficient is higher than that in Abarbanell and Bernard (1992), but is broadly consistent with the literature on post-earnings-announcement drift.<sup>16</sup> When we add quarter  $t$  earnings surprise to the regression equation, the coefficient on  $UE_{t-1}$

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<sup>15</sup> Fama and MacBeth (1973) point out that these regression coefficients could be thought of as returns on zero investment portfolios.

decreases by 45% to 0.039. The magnitude of the percentage decrease is similar to those reported in the prior literature, suggesting the robustness of the phenomenon. Prior literature interprets this decrease as saying 45% of the drift can be explained by analyst earnings forecasting behavior. We then follow Brous and Shane (2001) and add revisions in two-quarter out earnings forecasts to the right-hand-side. The coefficient on  $UE_{t-1}$  decreases further by 7% to 0.027. Therefore, by considering quarter t earnings surprise and revisions of two-quarter out earnings forecasts simultaneously, using the language of prior research, 52% of the market drift can be explained by analysts' under-reaction to earnings announcements.

To demonstrate that analysts' information set is not fully captured even when QTR1 and QTR2 forecasts are simultaneously considered, we replace the revision in QTR2 by revisions in FY1, FY2 and LTG. When these revisions are considered individually, all are shown to be able to reduce the coefficient estimate on  $UE_{t-1}$  by substantial amounts. However, when they are considered simultaneously, the coefficient exhibits the largest decrease, by 73%, to 0.019 (barely significant in the statistical sense with a t value of 2.004).

The results in Table 2 convincingly demonstrate that more complete inclusion of analysts' information set can substantially alter results based on research designs employed by prior papers. We caution, however, conclusions should not be drawn based on results in Table 2 because the first post-earnings-announcement quarter is too narrow to fully capture either the market's or analysts' reactions the earnings announcement, and

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<sup>16</sup> Differences are expected since Abarbanell and Bernard used Value Line analyst forecasts and their sample is from an earlier period (1977 to 1986). Wu (2000) used a similar sample as in this paper and found similar magnitudes.

the regression methodology does not suffice to compare the relative efficiencies of the market and analysts. We address these issues in the next sub-section.

### Long window analysis

We measure market reactions using size-adjusted abnormal returns (CAR) and analysts' reactions using revisions in FY1 and FY2 annual earnings forecasts (labeled RFY1 and RFY2). In order to incorporate LTG forecasts to the analysis, we also consider a three-year out EPS forecast by combining FY2 and LTG forecasts,  $FY3^* = FY2 \cdot (1 + LTG)$ . The revision in this measure is labeled RFY3\*. In each quarter, we regress analyst earnings revisions and CAR's on quarter t earnings surprise. Regression coefficients and t-statistics are calculated using the Fama-McBeth (1973) technique. We extend the window in two directions, moving farther way from quarter t earnings announcement, until the regression coefficients become negligible in magnitude or statistically insignificant from zero. We report results for five quarters before quarter t earnings announcement and four quarters after. Results beyond this window are minimal in magnitude and significance. The regression coefficients obtained in quarters before quarter t earnings announcement measure the market and analysts' anticipation of the forthcoming news; the coefficient in quarter t primarily measures their reactions to earnings announcement; and the coefficients in quarters after quarter t earnings announcement measure their delayed reactions. We present the results in Table 3, Panel A.

*(Table 3 about here)*

A notable feature of this panel is that the market and analysts' reactions to earnings announcement are far slower processes than what the Efficient Market Hypothesis or analyst rationality would suggest. Both the market and analysts exhibit predictable reactions in the four quarters after quarter  $t$  earnings announcement, suggesting that prior research's focus on the first post-announcement quarter is too narrow to fully capture the reactions by the market and analysts. We also note that the market drift mostly happen in the first post-announcement quarter and attenuate rapidly afterwards (0.0674 in quarter  $t+1$  and 0.0189 in quarter  $t+2$ ), but analysts' predictable earnings revisions show less decline in magnitude from the first quarter to the second (take RFY2 for example, 0.0137 in quarter  $t+1$  and 0.0048 in quarter  $t+2$ ), suggesting that analysts take a longer time to fully react to quarter  $t$  earnings announcement.

Inspecting the pre-announcement quarters, we find similar indications that the market reacts more rapidly than analysts to earnings announcement. For example, market starts to anticipate quarter  $t$  earnings news at as far as five quarter before the actual announcement, but analysts only start to do so two quarters after the market has begun.

In order to compare the market and analyst reactions directly, we calculate reactions by the market and analysts in each quarter as a percentage of total reactions over the nine-quarter window, according to expression (8). We then calculate cumulative reactions by summing up percentage reactions up to each quarter. Numerical results are presented in Panel B of Table 3, and plotted in Figure 4.

*(Figure 4 about here)*

It is evident from Figure 4 that the market reacts more rapidly than analysts in the pre-announcement quarters (inclusive of announcement day), and analysts play catch-up in

the post-announcement quarters. By the time of actual earnings announcement, the market has already completed 82.2% its total reactions with respect to the news, while the analysts have only completed from 59.6% to 74.1% of their total reactions, depending on earnings forecasts considered. Analysts gradually catch up in the post-announcement quarters. While it takes only one quarter for FY1 forecasts to catch up with the market, it takes four quarters for FY2 and FY3\* to fully catch up.

Although results presented in Figure 4 are indicative of the relative efficiency at which the market and analysts react to earnings announcements, they do not constitute direct evidence of statistical significance. In order to calculate appropriate t-statistics, we estimate price-to-forward earnings multiples using equation (6), and then apply the estimated multiple to earnings forecasts to convert them to measures comparable to market prices. We then evaluate the relative efficiencies of the market and analysts by using expression (7). Specifically, we divide the whole window into a pre-announcement period and a post-announcement period. In each quarter of the pre-announcement period, we calculate the cumulative difference between the market reaction and analysts' reaction,  $\sum_{\tau \leq 0} CAR_{t+\tau} - \hat{k} \sum_{\tau \leq 0} REV_{t+\tau}$ , and regress it on the quarter t earnings surprise,  $UE_t$ .

The regression coefficients measure the difference in reactions by the market and analysts. In each quarter of the post-announcement window, we do similar analysis as in the pre-announcement window, with the exception that the accumulation starts from the first post-announcement quarter. If the market reacts more rapidly than the analysts, in the pre-announcement period, we should see statistically significant positive regression coefficients, and in the post-announcement window, we should see statistically significant negative coefficients. Results presented in Table 4 provide compelling

confirmation for this prediction. In particular, in the pre-announcement quarters, the market out-performs analysts in the statistically sense starting in quarter  $t-2$ , and persists to quarter  $t$ . In the post-announcement quarter, analysts exhibit statistically significant larger drifts in the first two quarters, but the significance is eventually lost to noise in data as the window is extended.

*(Table 4 about here)*

## **6. Conclusion**

In this study, we find that the market is more efficient than analysts in its reaction to earnings news. In particular, the market reacts more rapidly than analysts in periods before and immediately following quarterly earnings announcements, and analysts gradually catch up in the post-announcement periods. This finding is opposite to those available in the literature and is obtained by considering factors omitted in prior research. Moreover, it is consistent with the intuition that the market participants have more incentive than financial analysts to react efficiently to news.

The fact that both analysts and the market under-react to earnings announcement is suggestive of a link between the two. In contrast with prior research, our results paint a more realistic picture of the stock market; one in which analysts analyze and communicate information to investors, and investors, although having some reliance on analysts' information output, also use other more timely sources of information in making their trading decisions. If as a consequence of reforms, the market relies more on analysts' information output in the future than in the past, then stock price movements could be expected to correspond more closely with analysts' earnings revisions and stock

recommendations. Beyond this study, it would seem that a similar research design could be employed to assess the effectiveness of future reforms intended to improve market efficiency.

## References

- Aboody, D., J. Hughes and J. Liu. "Measuring value relevance in a (possibly) inefficient market." *Journal of Accounting Research* 40 (2002): 965-986.
- Abarbanell, J. "Do analysts' earnings forecasts incorporate information in prior stock price changes?" *Journal of Accounting and Economics* 14 (1991): 147-165.
- Abarbanell, J., and V. Bernard. "Test of Analysts' Overreaction/Underreaction to Earnings Information as an Explanation for Anomalous Stock Price Behavior." *Journal of Finance* 47 (1992): 1181-1207.
- Abarbanell, J., and V. Bernard. "Is the US stock market Myopic? " *Journal of Accounting Research* 38 (2000): 221-242.
- Abarbanell, J., and R. Lehavy. "Biased forecasts or biased earnings? The role of reported earnings in explaining apparent bias and over/under-reaction in analysts' earnings forecasts." Working paper, University of North Carolina at Chapel Hill and University of Michigan, 2002.
- Alford, A. and P. Berger. "The Association Between Analysts' Underreaction to Earnings and Post-Earnings-Announcement Drift." Working paper, the Wharton School, University of Pennsylvania (Philadelphia, PA), 1997.
- Ashton, A and R. Ashton. "Aggregating subjective forecasts: some empirical results." *Management Science* 31 (1985): 1499-1508.
- Ball, R. and P. Brown. "An empirical evaluation of accounting income numbers." *Journal of Accounting Research* (1968): 159-178.
- Ball, R. and E. Bartov. "How naive is the stock market's use of earnings information?" *Journal of Accounting and Economics* 21 (1996): 319-337.
- Bandyopadhyay, S., L. Brown and G. Richardson. "Analysts' use of earnings forecasts in predicting stock returns: Forecast horizon effects." *International Journal of forecasting* 11 (1995): 429-445.
- Bartov, E. "Patterns in Unexpected Earnings as Explanation for Post-Announcement Drift." *The Accounting Review*, Vol. 67, No. 3 (July 1992).
- Bernard, V. and J. Thomas. "Post-earnings-announcement drift: Delayed price response or risk premium?" *Journal of Accounting Research* Supplement (1989): 1-36.
- Bernard, V. and J. Thomas. "Evidence that stock prices do not fully reflect the implications of current earnings for future earnings." *Journal of Accounting and Economics* 13 (1990): 305-341.

- Brown, L. "Forecast selection when all forecasts are not equally recent," *International Journal of Forecasting* 7 (1991): 349-356.
- Brown, L. D., P.A. Griffin, R.L. Hagerman and M.E. Zmijewski. "Security analyst superiority relative to univariate time-series models in forecasting quarterly earnings." *Journal of Accounting and Economics* 9 (1987a): 61-87.
- Brown, L. D., P.A. Griffin, R.L. Hagerman and M.E. Zmijewski. "An evaluation of alternative proxies for the market's expectation of earnings." *Journal of Accounting and Economics* 9 (1987b): 159-193.
- Brous, P. and P. Shane. "Investor and (Value Line) analyst underreaction to information about future earnings: the corrective role of non-earnings-surprise information." *Journal of Accounting Research* 39 (2001): 387-404.
- Cheng, C., W. Hopwood and J. McKeown. "A Specification Analysis of the Unexpected Earnings Response Regression Model." *The Accounting Review* 67 (1992): 579-98.
- DeBondt, W. and R. Thaler. "Do security analysts overreact?" *The American Economic Review* 80 (2): 52-57.
- Fama, E. and J. MacBeth. "Risk, return and equilibrium: empirical tests." *Journal of Political Economy* 38 (1973): 607-636.
- Fama, G. "Market efficiency, long-term returns, and behavioral finance." *The Journal of Financial Economics*, Vol 49, Issue 3 (1998).
- Foster, G., C. Olsen and T., Shevlin. "Earnings releases, anomalies, and the behavior of security returns." *The Accounting Review* 58 (1984): 574-603.
- Frankel, R. and C. Lee. "Accounting Valuation, Market Expectation and Cross-sectional stock returns." *Journal of Accounting and Economics* 25(3) (1998): 283-319.
- Fried, D. and D. Givoly. "Financial analysts' forecasts of earnings: a better surrogate for market expectations." *Journal of Accounting and Economics* (1982): 85-107.
- Liu, J. "Post-earnings-announcement drift and analysts' forecasts." Dissertation, Columbia University, New York, NY (1999).
- Liu, J. and J. Thomas. "Stock Returns and Accounting Earnings." *Journal of Accounting Research* 38(2000): 71-101.
- Liu, J., D. Nissim and J. Thomas. "Equity valuation using multiples." *Journal of Accounting Research* 40(2002): 135-172.

- Lys, T. and L. Soffer. "A closer look at post earnings announcement drift: the role of the dissemination of predictable information." Working paper, Northwestern University, 1998.
- Mendenhall, R. "Evidence of possible under weighting of earnings-related information." *Journal of Accounting Research* 29(2) (1991): 397-417.
- O'Brien, P., "Analysts' forecasts as earnings expectations." *Journal of Accounting and Economics* 10 (1988): 53-83.
- Rangan, S. and R. Sloan. "Implications of the Integral Approach to Quarterly Reporting for the Post-Earnings-Announcement Drift." *The Accounting Review*, Vol. 73, No. 3 (July 1998).
- Schipper, C., "Commentary on analysts' forecasts." *Accounting Horizons* 5, (December 1991): 105-121.
- Winkler, R. and S. Makridakis. "The combination of forecasts." *Journal of the Royal Statistical Society* 2: 150-157.
- Wu, S. "Financial analysts' understanding of the seasonal patterns in quarterly earnings and its implications for market efficiency." Working paper, University of Rochester, NY, 2000.

**Table 1**

Descriptive statistics. Variables are defined as follows: CAR is size-adjusted abnormal return; UE is earnings surprise, measured as the difference between actual earnings and earnings forecast at one trading day before announcement;  $\Delta QTR2$ ,  $\Delta QTR3$ , and  $\Delta QTR4$  are revisions in two, three and four quarter out earnings forecasts; RLTG is the revision in long-term growth forecasts; RFY1, RFY2 are revisions in one and two year out earnings forecasts; RFY3\* is the revision in  $FY3^* = FY2 (1+LTG)$ . Returns and revisions are measured from the third trading day after quarter t-1 earnings announcement to the third trading day after quarter t earnings announcement. All forecasts revisions, except RLTG, are deflated by stock price at the beginning of the measurement period.

Panel A: Univariate Distribution

	# obs	1%	25%	Median	Mean	75%	99%
CAR	66186	-0.663	-0.155	-0.021	0.004	0.115	1.020
UE	118122	-0.048	0.000	0.000	-0.008	0.000	0.032
RQTR2	69934	-0.070	-0.002	0.000	-0.003	0.000	0.027
RQTR3	53389	-0.055	-0.002	0.000	-0.002	0.000	0.026
RQTR4	23382	-0.047	-0.001	0.000	-0.002	0.001	0.026
RLTG	78707	-0.230	0.000	0.000	-0.001	0.000	0.246
REPS1	89868	-0.413	-0.010	0.000	-0.012	0.009	0.201
REPS2	47090	-0.208	-0.004	0.000	-0.003	0.010	0.159
REPS3	59034	-3.448	0.000	0.000	-0.051	0.000	2.618

Panel B: Correlation matrix (Spearman above diagonal and Pearson below diagonal)

	CAR	UE	RQTR2	RQTR3	RQTR4	RLTG	REPS1	REPS2	REPS3*
CAR		0.274	0.235	0.213	0.221	0.069	0.173	0.189	0.070
UE	0.023		0.218	0.177	0.190	0.034	0.195	0.169	0.036
RQTR2	0.055	-0.057		0.511	0.432	0.047	0.361	0.312	0.046
RQTR3	0.050	-0.215	0.835		0.547	0.045	0.340	0.321	0.042
RQTR4	0.067	0.295	0.878	0.939		0.041	0.368	0.377	0.039
RLTG	0.047	0.000	-0.015	-0.010	-0.010		0.020	0.032	0.997
REPS1	0.034	-0.028	0.881	0.567	0.723	-0.019		0.560	0.017
REPS2	0.009	0.314	0.575	0.364	0.700	0.000	-0.240		0.033
REPS3*	0.031	-0.016	-0.115	-0.044	-0.174	0.434	-0.105	0.022	

**Table 2**

Regression analysis. Dependent variable is first post-announcement quarter size-adjusted cumulative returns. Independent variables are defined as follows:  $UE_{t-1}$  is earnings surprise at t-1,  $UE_t$  is earnings surprise at t, RQTR2 is revision in two quarter out earnings forecasts, RFY1 is revision in one year out earnings forecasts, RFY2 is revision in two year out earnings forecasts, RLTG is the revision in long-term growth forecasts. The measurement window for stock returns and earnings forecast revisions is from the third trading day after quarter t earnings announcement to the third trading day after quarter t+1 earnings announcement. All forecasts revisions, except RLTG, are deflated by stock price at the beginning of the measurement period. Regression statistics are calculated using the Fama-MacBeth (1973) technique: regression coefficients and adjusted  $R^2$  are time series means of quarterly cross-sectional regression estimates, t-stat (in parenthesis) is then calculated using the time series of the estimated coefficients.

$UE_{t-1}$	$UE_t$	RQTR2	RFY1	RFY2	RLTG	Adj. $R^2$
0.070 (7.161)						0.011
0.039 (4.042)	15.193 (10.245)					0.046
0.027 (2.774)	12.357 (9.503)	3.782 (9.326)				0.063
0.027 (2.889)	12.319 (8.861)		1.154 (9.330)			0.074
0.027 (2.849)	13.775 (10.292)			1.136 (9.774)		0.069
0.038 (4.064)	15.248 (10.377)				0.002 (4.130)	0.053
0.019 (2.004)	11.504 (8.814)	2.279 (5.905)	0.670 (5.940)	0.764 (7.263)	0.002 (4.320)	0.099

**Table 3**

A comparison of market and analyst reactions to earnings announcement. Market returns and analyst earnings forecast revisions are regressed on quarter t earnings surprise to obtain a coefficient estimate on quarter t earnings surprise that represent market or analyst reaction with respect to quarter t earnings surprise. Quarter  $\tau$  market return and earnings forecast revisions are measured from the third trading day after quarter  $\tau-1$  earnings announcement to the third trading day after quarter t earnings announcement. Panel A reports regression coefficients and associated t statistics (in parenthesis) based on quarterly cross-sectional regressions using the Fama-MacBeth (1973) technique. Panel B reports the cumulative reactions up to each quarter as a percentage of the total reactions (measured as the sum of each row of coefficients in Panel A). Market reactions are represented by size-adjusted abnormal stock returns (CAR), analyst reactions are captured by three measures of revisions: RFY1 and RFY2 are revisions of one year out and two year out earnings forecasts; RFY3\* is the revision in FY3\* = FY2 (1+LTG). Earnings revisions are deflated by stock price at one trading day before quarter t earnings announcement.

Panel A: Market and analyst reactions in each quarter

Quarter	t-4	t-3	t-2	t-1	t	t+1	t+2	t+3	t+4
RFY1	0.0055 (2.67)	0.0004 (0.23)	0.0108 (5.25)	0.0135 (7.12)	0.0279 (8.02)	0.0159 (7.69)	0.0019 (1.07)	0.0019 (1.11)	0.0007 (0.48)
RFY2	0.0022 (0.86)	0.0005 (0.21)	0.0062 (2.70)	0.0076 (3.28)	0.0182 (6.57)	0.0137 (6.80)	0.0048 (3.07)	0.0016 (1.11)	0.0034 (2.24)
RFY3*	0.0027 (0.92)	0.0017 (0.67)	0.0085 (3.62)	0.0124 (5.76)	0.0238 (7.92)	0.0159 (7.73)	0.0060 (3.70)	0.0018 (1.03)	0.0043 (2.64)
CAR	0.0317 (3.82)	0.0408 (5.56)	0.0738 (12.94)	0.1213 (14.88)	0.2240 (23.21)	0.0674 (8.02)	0.0189 (2.59)	0.0173 (2.36)	0.0026 (0.39)

Panel B: Cumulative market and analyst reactions

Quarter	t-4	t-3	t-2	t-1	t	t+1	t+2	t+3	t+4
RFY1	7.0%	7.6%	21.3%	38.5%	74.1%	94.3%	96.7%	99.1%	100.0%
RFY2	3.7%	4.5%	15.3%	28.4%	59.6%	83.2%	91.4%	94.2%	100.0%
RFY3*	3.5%	5.7%	16.7%	32.8%	63.7%	84.3%	92.1%	94.4%	100.0%
CAR	5.3%	12.1%	24.5%	44.8%	82.2%	93.5%	96.7%	99.6%	100.0%

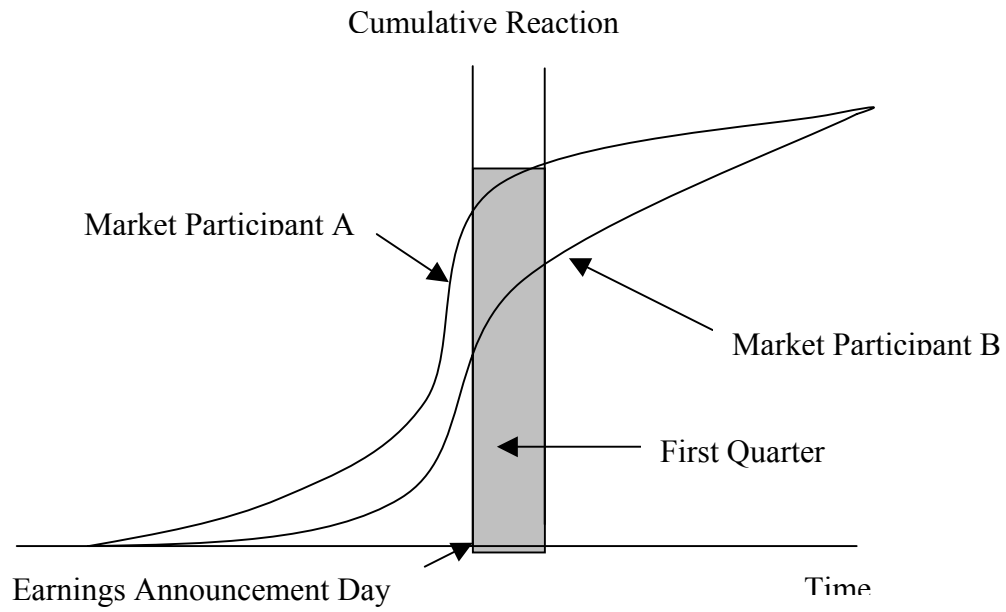
**Table 4**

A comparison of market and analyst reactions to earnings announcements. Cumulative differences between market returns and analyst earnings forecast revisions are regressed on quarter  $t$  earnings surprise to obtain a coefficient estimate that represent the differential cumulative reactions of the market relative to analysts respect to quarter  $t$  earnings surprise. Market returns are size-adjusted. Analysts forecast revisions are multiplied by a price-to-earnings multiple measured as total market reactions to the earnings surprise divided by the total analyst revisions with respect to the earnings surprise during the nine quarter window as reported in table 3. CD1 and CD2 refer to the cumulative differences based on one year out and two year out analyst forecasts. CD3 is based on the revision in  $FY3^* = FY2 (1+LTG)$ . Regression coefficients and associated  $t$  statistics (in parenthesis) are based on quarterly cross-sectional regressions using the Fama-MacBeth (1973) technique. Each quarter  $\tau$  market return and earnings forecast revisions are measured from the third trading day after quarter  $\tau-1$  earnings announcement to the third trading days after quarter  $t$  earnings announcement. For quarters before quarter  $t$  earnings announcement ( $t-4$  to  $t$ ), accumulation starts from quarter  $t-4$  and ends in quarter  $t$ . For quarters after quarter  $t$  earnings announcement, accumulation starts from quarter  $t+1$  and ends in quarter  $t+4$ .

Quarter	Before quarter $t$ earnings announcement					After quarter $t$ earnings announcement			
	t-4	t-3	t-2	t-1	t	t+1	t+2	t+3	t+4
CD1	-0.0098 (-0.62)	0.0270 (1.09)	0.0823 (3.22)	0.1565 (5.28)	0.1536 (4.87)	-0.0543 (-3.75)	-0.0496 (-2.29)	-0.0097 (-0.31)	-0.0116 (-0.32)
CD2	0.0123 (0.50)	0.0449 (1.47)	0.0920 (2.84)	0.1541 (4.33)	0.1672 (5.25)	-0.0680 (-3.43)	-0.0687 (-2.74)	-0.0613 (-1.69)	-0.0613 (-1.59)
CD3*	0.0085 (0.39)	0.0400 (1.43)	0.0950 (3.04)	0.1648 (5.05)	0.1776 (6.14)	-0.0584 (-3.58)	-0.0620 (-2.73)	-0.0453 (-1.53)	-0.0519 (-1.37)

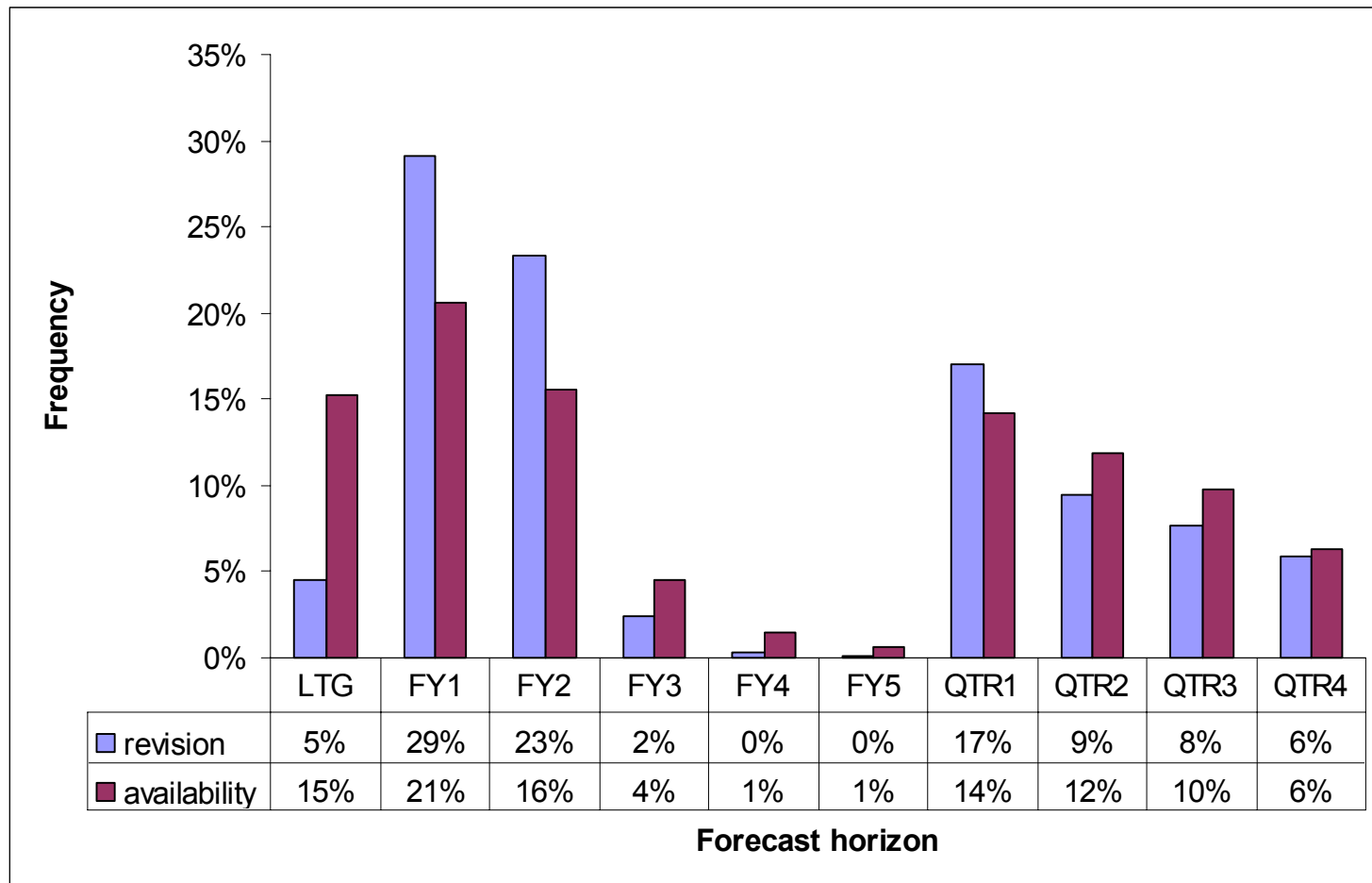
**Figure 1**

A comparison of two market participants' reactions to earnings announcement. The X-axis represents the time line; the Y-axis represents market participants' cumulative reactions (e.g., stock returns or analysts earnings revisions) with respect to earnings news.



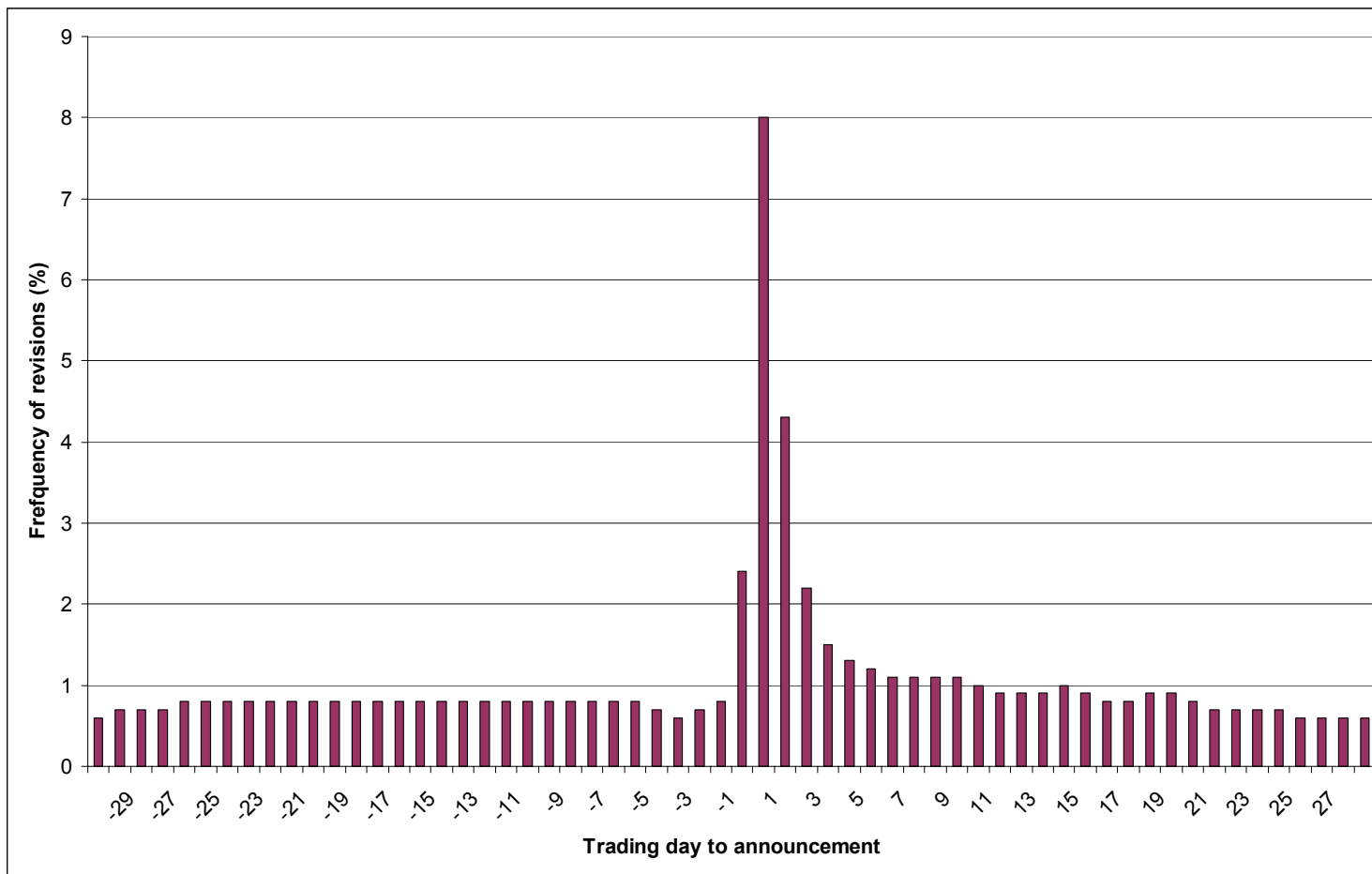
**Figure 2**

Analyst earnings forecasts availability and revision activities. Distribution statistics are derived from 2002 universe of IBES detailed forecast tape. Revision frequency is calculated as the total forecasts and revisions at a certain forecast horizon as a percentage of total number of forecast and revisions in the IBES detailed forecast tape. Availability frequency is calculated as the total number of available forecast at a certain forecast horizon as the percentage of total number of available forecasts in each month. Availability is measured at the beginning of each month, a forecast is deemed available if there is an outstanding individual forecast made within one calendar quarter. Forecast horizons are defined as follows: FY1-FY5 are one to five year out annual earnings forecasts, QTR1-QTR4 are one to four quarter out quarterly earnings forecasts, LTG refers to long-term growth forecast.



**Figure 3**

Timing of analyst earnings forecast revisions. Distribution statistics are derived from 2002 universe of IBES detailed earnings forecast tape. Frequency of revision is calculated as the total number of earnings forecasts and revisions on each trading day as a percentage of total number of forecasts and revisions in the IBES detailed forecast tape. The X-axis represents trading days relative to earnings announcement day. Earnings forecasts are classified as “before” earnings announcement (i.e., negative trading days in the figure) if they are made within 30 trading days before earnings announcement; they are classified as “after” (i.e., positive trading days in the figure) if they are made within 30 trading days after earnings announcement but not within 30 trading days before the next earnings announcement. Other forecasts are omitted from the figure.



**Figure 4**

A comparison of market and analyst reactions to earnings announcement. Market returns and analyst earnings forecast revisions are regressed on quarter t earnings surprise to obtain a coefficient estimate on quarter t earnings surprise that represent market or analyst reaction with respect to quarter t earnings surprise. Quarter t market return and earnings forecast revisions are measured from two trading days after quarter t-1 earnings announcement to two trading days after quarter t earnings announcement. Market reactions are represented by size-adjusted abnormal stock returns (CAR), analyst reactions are captured by three measures of revisions: RFY1 and RFY2 are revisions of one year out and two year out earnings forecasts; RFY3\* is the revision in  $FY3^* = FY2(1+LTG)$ . Earnings revisions are deflated by stock price at one trading day before quarter t earnings announcement. The Y-axis plots the cumulative market and analyst reactions as a percentage of total reactions from quarter t-4 to quarter t+4.

