



Overreaction to Intra-industry Information Transfers?

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ABSTRACT

Prior research has documented that earnings announcements provide information not only about the announcing firm but also about other firms in the same industry. We document a stock market anomaly associated with this phenomenon of intra-industry information transfers by showing that the stock price movements of late announcers in response to earnings reported by early announcers are negatively related to subsequent price responses of late announcers to their own earnings reports. Apparently, the stock market overestimates the intra-industry implications of early announcers' earnings for late announcers' earnings, and that overestimation is corrected when late announcers disclose their earnings.

1. Introduction

Beginning with Foster [1981], prior research has shown that earnings announcements provide information about peer firms in the same industry (other related research includes Han, Wild, and Ramesh [1989], Han and Wild [1990], Freeman and Tse [1992], and Ramnath [2002]) and that stock prices of nonannouncing peers reflect such intra-industry information transfers. In this paper, we investigate whether stock prices of firms

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that have not yet announced (late announcers) respond appropriately to earnings reports of early-announcing peers. Specifically, if the information transfers implied by the early announcer's earnings reports are properly incorporated into the stock prices of late announcers, there should be no predictable price movements when those late announcers subsequently report their earnings. That is, we check for zero correlation between the late announcer's price responses at the two earnings announcements.

Our results reveal a strong negative correlation between the two price responses, which suggests that stock prices for the late announcers overreact to the information transfer from the early announcer's earnings and that overreaction is corrected when the late announcer's earnings are revealed. These results are surprising not only because they suggest systematic mispricing, but also because we show that all other pairs of noncontemporaneous returns are *positively* related (including the early announcer's price responses at the two dates and the returns for the late announcer before and after the two dates). In effect, we identify an island of overreaction amidst a sea of underreaction.¹

We do not seek to show that this apparent pricing anomaly represents a profitable trading strategy that can be implemented. To do that we would not only need to document profits earned by a strategy that does not presume knowledge of the late announcer's earnings release date (e.g., take positions based on expected announcement dates, and then hold that position until the announcement actually occurs), but also show that the results from that strategy exceed transactions costs.² Our objective here is limited to pointing out that stock prices for late announcers appear to overreact to implications of news released by early-announcing industry peers and that prices are subsequently corrected when the late announcer's earnings are released.

Whereas a newly documented stock market anomaly naturally gives rise to plausible "irrational investor" explanations, it is appropriate to first consider carefully other competing explanations that do not involve investor irrationality. The complex nature of this anomaly (one instance of overreaction surrounded by many instances of underreaction) suggests that we

¹ Our evidence of a negative correlation differs from the positive correlation observed in Ramnath [2002]. There are, however, a number of differences between the two studies. Ramnath [2002] focuses only on first announcers, requires a minimum of five analysts and 20 quarters of prior earnings, investigates a limited sample period (from the first quarter of 1995 to the third quarter of 1997), and forms industry groups based on analyst following, rather than industry classification codes. While we do not attempt to reconcile differences in results, we find overreaction is weaker for first announcers (the first difference between the studies noted above).

² Our results are, however, relevant for the *timing* of the purchase/sale of these late announcers for investors intending to buy or sell these stocks for other reasons. Investors intending to buy firm *i* should do so after (before) firm *i*'s earnings announcement if the industry news is good (bad) and follow the opposite strategy if they intend to sell firm *i*. And if our results survive an effort to implement a strategy that does not presume knowledge of firm *i*'s announcement date, this mispricing could be relevant to investors who are able to trade at low transactions costs.

investigate even more diligently these other competing explanations. The first such explanation is suggested by the price reversals documented in the finance literature (e.g., Jegadeesh [1990], Lehmann [1990], Jegadeesh and Titman [1995a], Subrahmanyam [2005]) for very short windows (e.g., one week or one month).³ That literature has recognized the potential for these reversals to be due partially to market microstructure effects (e.g., Lehmann [1990], Subrahmanyam [2005]). Market microstructure effects include biases in measured returns because they are based systematically on bid or ask prices as well as temporary deviations of quoted prices from equilibrium values due to liquidity shocks. In addition to controlling explicitly for three known market microstructure effects—market capitalization, liquidity, and turnover—we provide a general control for potential effects that are not yet known by incorporating the overreaction observed for pseudo events during nonannouncement periods; that is, we conservatively require that the overreaction observed here exceeds that documented in the price reversal literature.

The second such competing explanation we investigate carefully is whether our results could be due to systematic changes in risk that remain uncontrolled for.⁴ Given the short windows over which we measure returns, however, we believe mismeasured risk is unlikely to be an explanation (the risk changes necessary to explain our results would be unreasonably large). Additionally, given the complex pattern of abnormal returns that is observed, it is hard to justify why a similarly complex pattern of risk changes would occur in this case.⁵

If our conclusion of market overreaction in this particular instance withstands further scrutiny, it presents a new challenge for extant investor irrationality theories because they are designed to explain the more prevalent underreaction observed over the short term (e.g., Barberis, Shleifer, and Vishny [1998], Daniel, Hirshleifer, and Subrahmanyam [1998, 2001], Hong and Stein [1999]). Similarly, mispricing explanations based on investors underestimating the magnitude of earnings information spillovers across quarters for the same firm (e.g., post-earnings announcement drift and

³ Prior literature documents overreaction for very short horizons (weekly and monthly), underreaction at short horizons (3 to 12 months), and overreaction at long horizons (3 to 5 years). There is disagreement about whether the very short-term return reversal anomaly should be interpreted as evidence of the market's overreaction to firm-specific news (e.g., Jegadeesh and Titman [1995b], Conrad, Gultekin, and Kaul [1997]).

⁴ We include explicit controls for known potential risk factors, such as book-to-market ratio, size, and price momentum.

⁵ We also confirm that our anomaly is not driven by the positive lead/lag cross-correlations across firms suggested by Lo and MacKinlay [1990] (also see Badrinath, Kale, and Noe [1995], Chordia and Swaminathan [2000]). That is, the negative correlation between returns during the two windows for late-announcing firms observed in *cross-sectional* regressions could be due entirely to the positive correlation between returns for early announcers during the first window and returns for late announcers during the second window. We confirm that this is not the case here by documenting a negative correlation between returns for late announcers during the two windows in time-series regressions (results available upon request).

post-analyst revision drift) do not appear to fit here, since in this case the market apparently overestimates the magnitude of spillovers.

We propose the following explanation for overreaction to intra-industry information transfers that is based on investors not appreciating fully the positive correlation in earnings disclosed by industry peers. Consider how a stock market estimates the prospects for a late-announcing firm as each early announcer reports earnings that are positively correlated with the earnings disclosed by firms that have announced even earlier. Consistent with the representativeness heuristic bias discussed in behavioral finance (e.g., Tversky and Kahneman [1974], Barberis, Shleifer, and Vishny [1998], Chan, Frankel, and Kothari [2004]), the stock price of the late-announcing firm adjusts via a series of price movements that are on average positively related and potentially cause the late announcer's price to overshoot the price that reflects the earnings report it eventually discloses. If so, the degree of overreaction increases with each subsequent early announcer, and that overreaction is corrected when the late announcer reports its earnings.

Extending this explanation for the observed overreaction to develop a more comprehensive explanation that also incorporates underreaction is not easy. We make some progress by considering and rejecting potential extensions that are based on biases suggested in the behavioral finance literature as well as the correlation structure of earnings surprises (both over time and across firms). Also, we are able to fashion one extension to our overreaction explanation that is consistent with the evidence presented here. That extension is based on (1) earnings information consisting of two components, one that has spillover effects for future quarters and another that does not, and (2) intra-industry information transfers from early announcers to late announcers consisting mainly of the second component. We recognize, however, that considerable progress remains to be made along this dimension.

The rest of this paper is organized as follows. Section 2 describes the sample and variables analyzed, and section 3 contains our main results, which show that overreaction exists and is unlikely to be due to microstructure effects or mismeasured risk. In section 4 we investigate the validity of the explanation we offer for the observed overreaction, and section 5 provides the results of robustness tests. Section 6 discusses the results of our efforts to explain why stock prices could overreact to intra-industry information transfers and yet underreact to all other earnings information, and section 7 concludes.

2. Sample Selection, Key Variables, and Descriptive Statistics

Sample data are obtained from three sources: (1) firms' quarterly earnings and announcement dates are from quarterly Compustat files, (2) stock return data are from the Center for Research in Security Prices (CRSP) daily return files, and (3) the book-to-market ratio, accruals, and other financial variables are from annual Compustat files. Consistent with prior research

(e.g., Freeman and Tse [1992]), we focus on firms with December fiscal year-ends to ensure that a firm and its peers (firms from the same four-digit Standard Industrial Classification industry) report results for the same fiscal quarter.⁶ Although earnings announcement dates are available on Compustat from the third quarter of 1971 our sample period begins in 1973 when CRSP coverage was expanded to include NASDAQ firms. Our final sample spans a 132-quarter period from 1973:I to 2005:IV and includes 245,742 firm-quarter observations.

For each late-announcing firm i , we measure two sets of excess returns, one for firm i and one for its peers. Each set contains two three-day returns, one in response to that firm's own earnings announcement and one in response to the other firm's earnings announcement. All excess returns are computed as raw returns minus value-weighted market returns and the three-day windows cover the $[-1, 1]$ period, where day 0 is the earnings announcement date.⁷ The first variable for firm i is the excess return around its own earnings announcement ($ARET$). The other variable for firm i is its return over a similar three-day window in response to the earnings announcements of other peer firms in the industry that have already announced ($RESP$). To ensure that $ARET$ and $RESP$ do not overlap and to mitigate potential problems with bid-ask bounce, we require that the peer's earnings announcement date precede firm i 's earnings announcement date by at least five calendar days. Since there is typically more than one peer firm that announces its earnings earlier, the average value of $RESP$ across those peers' announcements is used to measure firm i 's response to industry peers' earnings announcements.

Turning to the second set of returns—for peer firms—we measure similar event returns on the same two dates for those peers that announce earnings before firm i . That is, we calculate the returns over three-day windows for each of these peers at their own earnings announcement dates and at the earnings announcement date for the late-announcing firm i . We use the averages of these two returns across all eligible peers and refer to them as early peers' announcement return ($ERLYPRARET$) and early peers' response to the earnings announcement for firm i ($ERLYPRRESP$), respectively.

To illustrate how we measure $RESP$, $ERLYPRARET$, and $ERLYPRRESP$, consider the following example (see figure below). Assume that an industry has four firms (a , b , c , and i) that announce their first quarter earnings on April 16, 19, 24, and 27, respectively. Firm i 's early-announcing peers include firms a and b , but not firm c because firm c 's earnings announcement date

⁶ December fiscal year-end firms account for about 63% of U.S. firms covered by quarterly Compustat from 1973 to 2005.

⁷ As argued in Fama [1998], the choice of the return expectation model is less important in short-window return studies, since daily expected returns are close to zero. In this paper, we use excess returns and abnormal returns interchangeably. We skip nontrading days when measuring returns over earnings announcement windows. For example, the three-day return period is from Monday to Wednesday if a firm announces its earnings on Tuesday, but the return period is from last Friday to Tuesday if the firm announces its earnings on Monday.

is within five days of firm i 's earnings announcement date. Firm i 's $RESP$ is then the average of firm i 's three-day excess returns around April 16 and 19. The early peers' announcement return, $ERLYPRARET$, is the average of the three-day excess returns of firm a around April 16 and firm b around April 19. Finally, the early peers' response, $ERLYPRRESP$, is the average of the three-day excess returns for firms a and b around April 27, the date that firm i announces its earnings. Two additional variables we consider for control purposes are the number of early peers ($NPEER$) and the average time lag between the announcement dates for early peer firms and the announcement date for firm i ($TIME$). In this example, $NPEER$ equals 2 and $TIME$ equals 9.5 (average of 11 and 8).

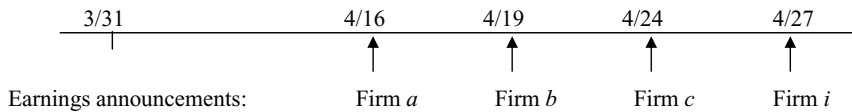


Table 1 provides descriptive statistics for the variables of interest. To mitigate the impact of outliers, each quarter we Winsorize all variables at 1% and 99% of the respective quarterly distributions, except for $NPEER$ and $TIME$.⁸ As shown in panel A, the mean earnings announcement return ($ARET$) is close to zero, in contrast to a positive mean return documented in the literature (Ball and Kothari [1991]). There are two potential reasons for this difference. First, Winsorization shifts the mean return downward, because the return distribution is right-skewed (the average $ARET$ before Winsorization is 0.08%). Second, we exclude the first announcers in each industry from our sample (such as firm a in our example above) because they do not have peers announcing earnings before them. The average $ERLYPRARET$ of 0.49% reported in panel A suggests that early announcers tend to have higher announcement returns than late announcers (see, e.g., Givoly and Palmon [1982]).

Since early-announcing peers are likely to be systematically different from the late announcers in our sample, we provide, in the bottom four rows of panel A, distributional statistics for early announcers for ACC , MV , BM , and $RET6$. Comparing those rows with the corresponding rows above for late announcers suggests that early announcers are larger (higher MV), have lower book-to-market ratios (lower BM), and have experienced more good news in the recent past (higher $RET6$). Whereas the mean and median level of accruals (ACC) are similar across the two groups of firms, late announcers exhibit greater dispersion in ACC .

⁸ To mitigate concerns about the impact of Winsorization on the dependent variable, $ARET$, we follow the finance literature and report results of portfolio analyses, where $ARET$ is not Winsorized when calculating portfolio means. Even though we report results based on Winsorized $ARET$ in the regression analyses, we find similar results when we use $ARET$ values that have not been Winsorized.

TABLE 1
Descriptive Statistics

Panel A: Descriptive statistics		Mean	St. Dev.	Min.	Q1	Median	Q3	Max.
Variable ^a	N ^b							
ARET	245,742	0.01%	7.78%	-40.50%	-3.25%	-0.14%	3.01%	49.38%
ERLYPRARET	245,742	0.49%	3.85%	-18.89%	-1.22%	0.31%	1.94%	26.41%
RESP	245,511	0.08%	3.97%	-23.68%	-1.72%	-0.13%	1.54%	34.75%
ERLYPRRESP	245,709	0.03%	2.75%	-17.52%	-1.35%	-0.03%	1.31%	20.95%
ARET _{t-1}	228,772	0.06%	7.69%	-39.20%	-3.22%	-0.11%	3.06%	45.48%
ACC	174,928	-0.036	0.111	-0.583	-0.085	-0.038	0.008	0.471
MV	228,817	929.42	3,080.76	0.83	32.96	121.65	517.31	38,831.83
BM	228,717	0.793	0.738	-2.739	0.350	0.631	1.036	8.431
RET6	239,766	0.071	0.416	-0.893	-0.147	0.036	0.220	6.015
TIME	245,742	13.68	9.73	5	7.50	10.37	16.33	89
NPEER	245,742	24.07	50.64	1	2	6	21	438
Data for early announcing peers (provided for comparison purposes)								
ACC	192,652	-0.038	0.063	-0.592	-0.072	-0.038	-0.010	0.341
MV	245,742	2521.80	6,088.74	2.54	271.61	815.78	2,184.63	106,563.6
BM	245,742	0.681	0.447	-2.583	0.383	0.598	0.853	5.640
RET6	245,742	0.105	0.268	-0.763	-0.043	0.084	0.216	2.450

(Continued)

T A B L E 1 — *Continued*

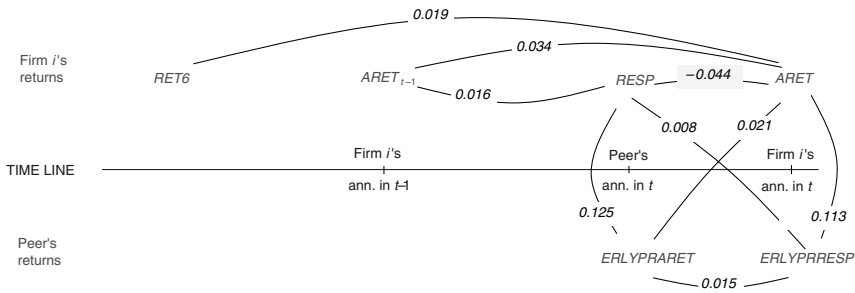
Panel B: Correlation matrix (Pearson correlations are shown above the diagonal and Spearman correlations are shown below)

	<i>ARET</i>	<i>ERLYPRARET</i>	<i>RESP</i>	<i>ERLYPRESP</i>	<i>ARET_{t-1}</i>	<i>ACC</i>	<i>MV</i>	<i>BM</i>	<i>RET6</i>
<i>ARET</i>	1	0.021	-0.044	0.113	0.034	-0.013	0.003	0.027	0.019
<i>ERLYPRARET</i>	0.018	1	0.125	0.015	0.002	-0.006	0.008	-0.003	0.024
<i>RESP</i>	-0.041	0.137	1	0.008	0.016	-0.007	-0.002	0.009	0.110
<i>ERLYPRESP</i>	0.138	0.025	0.008	1	-0.001	0.002	0.003	0.007	0.002
<i>ARET_{t-1}</i>	0.035	0.004	0.021	0.002	1	-0.011	0.002	0.029	0.197
<i>ACC</i>	-0.008	-0.001	-0.005	0.003	-0.008	1	-0.033	-0.027	-0.018
<i>MV</i>	0.022	0.000	0.001	0.004	0.020	-0.011	1	-0.132	-0.016
<i>BM</i>	0.033	-0.001	0.014	0.015	0.032	-0.018	-0.315	1	0.070
<i>RET6</i>	0.028	0.023	0.126	0.009	0.190	-0.017	0.025	0.116	1

^aVariable definitions (data# refers to Compustat data item numbers):

- ARET* Firm *i*'s three-day earnings announcement excess returns (raw returns - value-weighted market returns) over the three-day [-1, 1] period, where day 0 is the earnings announcement date.
- ERLYPRARET* The average of early peers' three-day earnings announcement excess returns (raw returns - value-weighted market returns) in the same quarter, where the peers' earnings announcement dates are at least five days prior to firm *i*'s earnings announcement date.
- RESP* The average of firm *i*'s three-day excess returns (raw returns - value-weighted market returns) around its peers' earnings announcements, where the earnings announcement dates are at least five days prior to firm *i*'s earnings announcement date.
- ERLYPRESP* The average of early peers' three-day excess returns (raw returns - value-weighted market returns) around firm *i*'s earnings announcements.
- ACC* Accruals measured as the change in noncash working capital minus depreciation expense (data14) scaled by average total assets (data6), where the change in noncash working capital is equal to the change in noncash current assets (data4 - data1) minus the change in current liabilities (data5) less short-term debt (data34).
- MV* Market value at the end of the prior fiscal year (data199 * data25).
- BM* Book-to-market ratio measured as the book value of equity (data60) divided by its market value at the end of prior fiscal year.
- RET6* The buy-and-hold six-month stock returns up to one week before firm *i*'s earnings announcement date.
- TIME* The average number of days between firm *i*'s and its peers' earnings announcement dates.
- NPEER* The number of peers that announce earnings at least five days prior to firm *i*'s earnings announcement date.

^bThe sample includes all December fiscal year-end firms with nonmissing earnings announcement returns from firm *i* and its peers. There are 245,742 firm-quarter observations with available data from 1973:1 to 2005:IV. All variables are Winsorized at 1% and 99%, except for *TIME* and *NPEER*.



Variables:

RET6: The buy-and-hold six-month stock returns up to one week before firm *i*'s earnings announcement date.

RESP: The average of firm *i*'s three-day excess returns (raw returns – value-weighted market returns) around its peers' earnings announcements, where the earnings announcement dates are at least five days prior to firm *i*'s earnings announcement date.

ARET_{t-1}: Firm *i*'s three-day earnings announcement excess returns (raw returns – value-weighted market returns) around the earnings announcement date in quarter *t*-1

ARET: Firm *i*'s three-day earnings announcement excess returns (raw returns – value-weighted market returns) around the earnings announcement date in quarter *t*.

ERLYPRARET: The average of peers' three-day excess returns (raw returns – value-weighted market returns) around earnings announcement in quarter *t*, where the announcement dates are at least five days prior to firm *i*'s earnings announcement date.

ERLYPRRESP: The average of peers' three-day excess returns (raw returns – value-weighted market returns) around firm *i*'s earnings announcements.

FIG. 1.—Pearson correlations among returns for late-announcing firm *i* and early-announcing peers at key points.

Table 1, panel B provides Pearson and Spearman correlations among the different variables, and figure 1 provides a visual representation of the key Pearson correlations. Of a total of six possible correlations among the first four variables that capture the announcement returns and responses to others' announcements, only the correlation between *ARET* and *RESP* is negative. That is, not only do we observe positive correlations for contemporaneous combinations (*ARET* and *ERLYPRARET*, and *RESP* and *ERLYPRARET*), which is consistent with intra-industry information transfers being positive on average, we also observe positive correlations for the three other pairs of returns that are separated in time (*ARET* and *ERLYPRARET*, *ERLYPRARET* and *ERLYPRRESP*, and *RESP* and *ERLYPRRESP*).⁹ Observing a positive correlation between abnormal returns that are separated in time is consistent with the underreaction results documented in the momentum literature.

Further confirmation of the presence of momentum or own-firm underreaction is provided by the positive correlations between *ARET* and *ARET_{t-1}*, *RESP* and *ARET_{t-1}*, *ARET* and *RET6*, and *RESP* and *RET6*, where *ARET_{t-1}* and *RET6* are the returns for firm *i* over the prior quarter's earnings announcement window and over the prior six months leading up to one week before firm *i*'s earnings announcement date, respectively.¹⁰

⁹ The positive correlation between *ARET* and *ERLYPRARET* is consistent with the lead-lag effect from large to small firms (Hou [2007]), as early announcers tend to be larger firms.

¹⁰ Subsequent results (e.g., table 7) show how the correlations between various pairs of returns for the late announcer remain positive as we include periods subsequent to the late announcer's earnings report. That is, evidence of underreaction or momentum continues past the earnings announcement.

Our main finding is that even though *ARET* and *RESP* are positively correlated with all other variables (*ERLYPRARET*, *ERLYPRRESP*, *ARET*_{*t*-1}, and *RET6*) that are separated in time, which is consistent with stock market underreaction to the information contained in the earlier price response in each pair, these two returns for late announcers (firm *i*) are negatively correlated with each other. This negative correlation suggests that the stock price for firm *i* overreacts to the information transferred from the earnings released by early announcers and is subsequently corrected when firm *i* announces its earnings. Note the important distinction between the news in early peers' earnings announcements (*ERLYPRARET*) and the intra-industry information transferred to the late announcer (included in *RESP*): Even though the two are positively correlated, *ARET* is positively related to the former but negatively related to the latter.

3. Main Results

3.1 EVIDENCE OF OVERREACTION AND CROSS-SECTIONAL VARIATION IN OVERREACTION

Table 2 provides more details on the apparent overreaction described earlier (negative correlation between *ARET* and *RESP*) by sorting the sample into ten deciles based on *RESP*. The results in table 2 indicate evidence of substantial price reversal. As *RESP* increases from D1 to D10, *ARET* exhibits a steady decrease from 0.68% in D1 to -0.48% in D10. A hedge portfolio (D1–D10) with a long position in D1 stocks and a short position in D10

TABLE 2
*Deciles Based on Firm *i*'s Reaction to Early Peers' Earnings Announcements (*RESP*)*

	<i>RESP</i>	<i>ARET</i>	<i>ERLYPRARET</i>	<i>ERLYPRRESP</i>	<i>SIZERANK</i>	<i>BMRANK</i>
D1 (Low)	-5.96%	0.68%	-0.07%	-0.01%	4.72	5.25
D2	-2.84%	0.19%	0.06%	0.00%	5.43	5.29
D3	-1.72%	0.22%	0.10%	0.02%	5.66	5.53
D4	-0.99%	0.14%	0.22%	0.03%	5.76	5.57
D5	-0.41%	0.13%	0.34%	0.04%	5.82	5.69
D6	0.14%	0.13%	0.50%	0.06%	5.85	5.68
D7	0.75%	0.10%	0.57%	0.03%	5.84	5.60
D8	1.56%	0.05%	0.68%	0.06%	5.76	5.55
D9	2.88%	-0.18%	0.84%	0.08%	5.51	5.43
D10 (high)	7.10%	-0.48%	1.04%	0.03%	4.65	5.39
D1–D10	-13.06%	1.16%	-1.11%	-0.04%		
	(40.62)	(10.12)	(-12.29)	(-0.92)		

ARET is firm *i*'s three-day earnings announcement excess returns; *RESP* is the average of firm *i*'s three-day excess returns around its peers' earnings announcements; *ERLYPRARET* is the average of its early peers' three-day earnings announcement excess returns in the same quarter; and *ERLYPRRESP* is the average of its early peers' three-day excess returns around firm *i*'s earnings announcement. *SIZERANK* (*BMRANK*) is the decile ranking of a firm's market value of equity (book-to-market ratio), with the bottom (top) decile assigned a value of 1 (10). See table 1 for detailed definitions. Each quarter, we sort firms into 10 deciles based on *RESP*, and calculate the mean values for firms in each decile, and then report in each cell above the time-series mean across 132 quarters from 1973:1 to 2005:IV; *t*-statistics in parentheses are Fama-MacBeth *t*-statistics. There are 245,742 firm-quarter observations in the sample. Portfolios with fewer than 10 stocks are eliminated. All variables except *ARET* are Winsorized at 1% and 99%.

stocks yields a three-day market excess return of 1.16%, with a t -statistic of 10.12. All t -statistics in this paper are based on the time-series distribution of hedge portfolios returns or slope coefficients estimated for each of the 132 quarters in our sample, as in Fama and MacBeth [1973].¹¹ The return differential between D1 and D10 is not due to differences in size and the book-to-market ratio, two firm characteristics that potentially affect expected returns, as the results in the last two columns reveal that firms-quarters in D1 and D10 are similar in terms of mean decile ranks for size (measured as market value of equity) and the book-to-market ratio.

Note that the spread of -1.11% for *ERLYPRARET* between the top and bottom *RESP* deciles is of the same magnitude as the corresponding spread for *ARET* (1.16%), even though *RESP* is contemporaneous with and in the same direction as *ERLYPRARET*, whereas *RESP* and *ARET* are separated in time and move in opposite directions. In essence, much of *RESP* represents information that is unrelated to *ERLYPRARET*.

Because of clustering in earnings announcement for firms in the same industry, our requirement that peers' announcement dates be at least five days earlier than firm i 's earnings announcement eliminates many peers and also reduces the pool of late-announcing firms; for example, a second announcer that reports earnings within five days of the first announcer is deleted from our sample. To estimate the impact of this reduction in sample, we repeat the analysis using one-day earnings announcement returns (day 0 alone) and consider all peer firms that announced their earnings before firm i 's announcement date.¹² For this sample, only the first announcer in each industry is excluded from our sample. Our results are robust to this alternative specification. The one-day D1–D10 hedge return is 0.52% ($t = 6.99$), which is consistent with the three-day hedge return of 1.16% ($t = 10.12$) in table 2.

To investigate the overreaction further, we regress *ARET* on *RESP* in the presence of control variables (results reported in table 3). These control variables include early peers' announcement returns (*ERLYPRARET*), the announcement returns for firm i in the prior quarter and the same fiscal quarter in the prior year ($ARET_{t-1}$ and $ARET_{t-4}$), log of market capitalization (*SIZE*), log of book-to-market ratio (*BM*), firm i 's return over the prior six months (*RET6*), and the level of accruals (*ACC*). *RET6* and *ACC* are included to control for the price momentum and Sloan [1996] accrual anomalies, respectively. The results reported in models 1 through 4 indicate

¹¹ We also consider Huber-White standard errors as an alternative to the Fama-MacBeth approach (see Petersen [2007]). Specifically, for the main regression of *ARET* on *RESP* (see column 2 in table 7), we find that attempts to cluster observations along industry and time generate t -statistics that are *higher* than those observed using the Fama-MacBeth approach.

¹² This sample, based on one-day announcement windows and no minimum gap between announcements for early announcing peers and firm i , contains 284,418 firm-quarters. Since our actual sample contains 245,742 firm-quarters, we effectively reduce the sample size by about 13.6% by using three-day announcement windows and requiring a five-day minimum gap.

TABLE 3
Regressions of ARET on RESP and Control Variables

	1	2	3	4	5 (<i>D</i> = dummy for consistency of information transfer news)
Intercept	0.000 (0.99)	0.000 (0.39)	0.000 (0.73)	0.000 (0.37)	0.000 (0.26)
<i>RESP</i>	-0.076 (-12.15)	-0.102 (-13.64)	-0.079 (-12.67)	-0.104 (-13.75)	-0.084 (-7.46)
<i>D</i>					-0.000 (-0.94)
<i>D</i> * <i>RESP</i>					-0.034 (-2.12)
<i>ERLYPRARET</i>			0.027 (5.28)	0.015 (2.61)	0.023 (3.33)
<i>ARET</i> _{<i>t</i>-1}		0.035 (10.13)		0.035 (10.11)	0.035 (10.25)
<i>ARET</i> _{<i>t</i>-4}		-0.004 (-1.02)		-0.004 (-1.05)	-0.004 (-1.02)
<i>SIZE</i>		0.000 (0.12)		0.000 (0.09)	0.000 (0.42)
<i>LOGBM</i>		0.002 (5.47)		0.002 (5.51)	0.002 (5.92)
<i>RET6</i>		0.002 (1.39)		0.002 (1.40)	0.002 (1.49)
<i>ACC</i>		-0.015 (-5.09)		-0.014 (-5.03)	-0.014 (-4.97)
Adj. <i>R</i> ²	0.002	0.012	0.003	0.013	0.013

This table reports the time-series mean coefficient estimates across regressions of *ARET* on *RESP* and other variables estimated in each of 132 quarters from 1973:I to 2005:IV; *t*-statistics in parentheses are Fama-MacBeth *t*-statistics. There are 245,742 firm-quarter observations in the sample. *ARET* is firm *i*'s three-day earnings announcement excess returns; *RESP* is the average of firm *i*'s three-day excess returns around its peers' earnings announcements; *ERLYPRARET* is the average of its early peers' three-day earnings announcement excess returns in the same quarter; and *ERLYPRRESP* is the average of its early peers' three-day excess returns around firm *i*'s earnings announcement. *SIZE* is the logarithm of the market value at the end of the prior fiscal year; *LOGBM* is the logarithm of the book-to-market ratio; *RET6* is the buy-and-hold six-month stock returns leading up to one week before firm *i*'s earnings announcement date; and *ACC* is total accruals. In model 5, *D* is a dummy variable set equal to 1 if *RESP***ERLYPRARET* > 0, and 0 otherwise; i.e., *D* = 1 if the early announcer's news and the late announcer's response are consistent. See table 1 for detailed definitions. All variables are Winsorized at 1% and 99%.

that the magnitude of the coefficient on *RESP* and the associated *t*-statistics do not vary much when these control variables are introduced.¹³ Overall, the negative relation between *RESP* and *ARET* appears unrelated to the different pricing anomalies considered here.

The analysis reported in model 5 of table 3 is designed to investigate whether the degree of overreaction differs across observations depending

¹³ In fact, the magnitude and significance of the coefficient on *RESP* increases slightly as we add control variables to the simple regression in model 1. Apparently, the correlations between *RESP* and the control variables (noted in table 2) bias toward zero the magnitude of the coefficient on *RESP* in model 1 when the control variables are omitted.

on the consistency between the news revealed by the early announcer (*ERLYPRARET*) and the implications of that news for the late announcer (*RESP*). Specifically, we use a dummy variable, D , which is set to one when *RESP* and *ERLYPRARET* are of the same sign, indicating that the good (bad) news reported by the early announcer implies good (bad) news for the late announcer.¹⁴ Note that *RESP* incorporates a considerable amount of firm-specific information, unrelated to the information transferred from *ERLYPRARET*. In essence, our consistency dummy is identifying cases where the late announcer's response contains relatively more information transfer and less firm-specific information. Observing a negative and significant coefficient on $D * RESP$ in table 3 indicates that the overreaction to information transfers is greater when there is more information transfer.

To determine if the overreaction is asymmetric between good and bad news, we repeat the model 5 regressions but reset the dummy variable to one when *RESP* is positive and zero otherwise.¹⁵ Untabulated results show that the coefficients on D and $D * RESP$ are insignificant, which suggests that the overreaction is symmetric between good and bad news. We find similar results when we measure good and bad news based on *ERLYPRARET*, rather than *RESP*.

3.2 COULD RISK EXPLAIN THE RESULTS?

Since we subtract market returns when calculating excess three-day returns, it is possible that the excess returns we document may disappear if we measure risk properly and adjust excess returns for that risk. We offer three reasons why that possibility appears unlikely. First, given the short (three-day) windows over which we measure returns, the risk levels necessary to explain our results would be unreasonably large. This is because expected returns are close to zero for short windows, regardless of the return expectation model chosen by researchers (Fama [1998]). Second, our results are robust to controls for commonly accepted potential risk factors, such as size, the book-to-market ratio, price momentum, and the post-earnings announcement drift. Finally, if firm risk is relatively stable in the short term, we should observe positive correlations between market-adjusted abnormal returns (which do not properly control for risk) at the two dates. The observed negative correlation in stock returns appears unlikely to be due to mismeasured risk since it requires large risk shifts to occur relatively quickly; that is, a firm that is of high (low) risk when peers announce their earnings should become low (high) risk when it announces earnings a few days later. We also offer additional evidence in section 5.4 that is inconsistent with the

¹⁴ Note that this procedure creates measurement error. For example, *RESP* includes information other than that transferred from the early announcer's earnings report. Also, the mean values for *RESP* and *ERLYPRARET* are positive in table 1, panel A, suggesting that a positive (negative) value for these variables does not necessarily correspond to good (bad) news.

¹⁵ Prior literature suggests that overreaction is more extreme for bad news events (e.g., Schaub [2006]).

hedge portfolios being risky. Overall, we conclude that it is unlikely that our results are caused by mismeasured risk.

3.3 COULD MARKET MICROSTRUCTURE EFFECTS EXPLAIN THE RESULTS?

Because firm i and its peers are in the same industry and have the same fiscal quarter-end, they tend to announce their earnings close to each other. As reported in panel A of table 1 the mean (median) time lag between firm i and its peers' earnings announcement dates is 13.68 (10.37) days. Given the proximity of the three-day windows associated with *RESP* and *ARET*, it is possible that the observed negative correlation is due, at least partly, to the microstructure effects that are partially responsible for the very short-term price reversals noted in the literature (e.g., Jegadeesh [1990], Lehmann [1990]). Whereas sections 4.1 and 4.2 contain results of tests that focus on specific microstructure effects identified in prior research, we consider here a methodology that should control for spurious overreaction due to all potential microstructure effects. In the analysis described below, we make the conservative assumption that all of the very short-term price reversal, referred to hereafter as the Jegadeesh effect, is due to market microstructure effects. To the extent that we overstate the impact of microstructure effects we are understating the extent to which the stock prices overreact to intra-industry transfers.

To gauge the extent to which our results are related to very short-term price reversals, we investigate the return pattern during a pseudo event period that does not contain earnings announcements. Specifically, we shift the event dates for *RESP* and *ARET* back by four weeks. Shifting by four weeks rather than one month ensures that the pseudo events we create occur on the same weekday as the actual events, to remove any potential weekday effects.¹⁶ We then calculate *ARET*, *RESP*, and *ERLYPRARET* on these pseudo event dates and repeat the *RESP* decile analysis reported in table 2.

Our results for pseudo event dates are reported in panel A of table 4. The four-week shift in event dates produces 0.49% for the D1–D10 hedge portfolio for *ARET*. Note that the spread in *RESP* between D1 and D10, representing the spread in news across deciles for the nonannouncement period, is comparable to that for the announcement period (–12.91% in table 4, panel A, versus –13.06% in table 2). The extent of overreaction that occurs on these pseudo event dates is substantial (and statistically significant, as indicted by a t -statistic of 4.82) and the magnitudes are consistent with the reversals noted in Jegadeesh [1990] and Lehmann [1990].

More relevant to our analysis, panel B in table 4 provides the difference between the hedge returns reported in panel A for pseudo events and those

¹⁶ As a robustness check, we also shift the event dates by nine weeks (approximately two months) and find similar results. We do not pick pseudo event dates earlier than two months prior to the actual events because those pseudo events could include earnings announcements from the prior quarter.

TABLE 4
Evidence of Overreaction at Pseudo Events Due to the Jegadeesh [1990] Effect, and Controls for That Overreaction

Panel A: One-way sort by <i>RESP</i> on pseudo event dates			
	<i>RESP</i>	<i>ARET</i>	<i>ERLYPRARET</i>
D1 (Low)	-5.92%	0.44%	-0.31%
D2	-2.77%	0.14%	-0.20%
D3	-1.63%	0.12%	-0.17%
D4	-0.90%	-0.01%	-0.01%
D5	-0.32%	0.02%	0.05%
D6	0.23%	0.00%	0.13%
D7	0.82%	0.00%	0.22%
D8	1.59%	-0.02%	0.37%
D9	2.88%	-0.07%	0.43%
D10 (High)	6.99%	-0.05%	0.47%
D1-D10	-12.91%	0.49%	-0.78%
	(-43.56)	(4.82)	(-13.18)

Panel B: Hedge portfolio returns (<i>ARET(DI-D10)</i>) for pseudo events versus actual events			
	True Events (Table 2)	Pseudo Events	True Minus Pseudo
1973-2005	1.16%	0.49%	0.67%
			(4.25)
1973-1979	0.48%	0.58%	-0.10%
			(-0.30)
1980-1989	1.01%	0.23%	0.79%
			(3.21)
1990-1999	1.55%	0.64%	0.91%
			(3.39)
2000-2005	1.52%	0.65%	0.87%
			(2.14)

To examine the role of very short-term price reversals, we create pseudo events by shifting all events back by four weeks and repeating the table 2 analysis. *ARET* is firm *i*'s three-day pseudo earnings announcement excess returns; *RESP* is the average of firm *i*'s three-day excess returns around its peers' pseudo earnings announcements; *ERLYPRARET* is the average of its early peers' three-day pseudo earnings announcement excess returns. In panel A, we sort firms into 10 deciles each quarter based on *RESP*, and portfolio returns are average stock returns of firms in each decile. Portfolios with fewer than 10 stocks are eliminated. In Panel B we compare the results for pseudo events with those for the actual events reported in table 2, for different subperiods. The cells in both panels report the time-series mean across 132 quarters from 1973:1 to 2005:IV; *t*-statistics in parentheses are Fama-MacBeth *t*-statistics. There are 245,511 firm-quarter observations in the sample. All variables except *ARET* are Winsorized at 1% and 99%.

reported in table 2 for the actual intra-industry transfer events. We report this difference for the overall sample period (in the first row) as well as for separate comparisons during the 1970s, 1980s, 1990s, and 2000s (in the four rows below). Our main finding is that the 0.49% hedge return reported for the overall sample period for pseudo events is considerably smaller than the 1.16% based on actual event dates (table 2), and this difference of 0.67% is statistically significant ($t = 4.25$). Our second finding from the subperiod results in the remaining rows of panel B is that investor overreaction appears to be weaker during the early part of our sample period. The difference in hedge returns between actual and pseudo events is smaller and insignificant in the 1970s, but larger and highly significant in the 1980s, 1990s, and 2000s (see also discussion in section 5.4.)

The excess overreaction documented in panel B of table 4 represents a conservative estimate of the overreaction to intra-industry information transfers. Not all the overreaction observed in panel A of table 4 for pseudo events is due to market microstructure effects, and some of it is potentially due to overreaction to firm-specific news (e.g., Subrahmanyam [2005]). Also, if microstructure effects are larger during periods when stocks are thinly traded and if earnings announcement periods are associated with more liquidity than nonannouncement periods, overreaction due to microstructure effects is likely to be larger for the pseudo events in Panel A of table 4, relative to the actual events in table 2. Overall, we believe that while microstructure effects account for part of the anomaly observed here, much of the empirical regularity documented in table 2 is consistent with overreaction to information released in early peers' earnings announcements.

4. Why Do Stock Prices Overreact to Intra-industry Information Transfers?

The explanation we offer for the presence of overreaction is based on the average positive correlation in earnings news observed across firms in the same industry and bias caused by the representativeness heuristic (e.g., Chen, Frankel, and Kothari [2004]). Not only are seasonally differenced earnings positively related across industry peers, but earnings announcement returns are also positively related (e.g., positive correlation of 0.021 between *ARET* and *ERLYPRARET* in panel B of table 1), which suggests that the stock market is surprised when firms in the same industry report earnings that are positively related, even though that positive relation is predictable. Given that the news from each announcement is associated with intra-industry information transfers to firms that haven't yet announced, there is a potential for this reinforcement effect to cause too much information transfer about earnings yet to be reported by late announcers. While there may be little or no overreaction in stock prices of late announcers when the first early announcer discloses earnings, an overreaction may build as the industry information transferred by the first announcer is reinforced when second, third, and subsequent early announcers report earnings.¹⁷ Uncertainty about this quarter's earnings is resolved when late announcers report their earnings, and any overreaction is then corrected at that date.

We offer three analyses to investigate the validity of our overreaction explanation. First, we examine whether the overreaction differs across the first, second, and third early announcer in each industry/quarter. Observing smaller (larger) overreaction when the early announcer is the first (second and third) announcer would support this explanation. Because of the mechanical negative relation due to microstructure effects between the degree of overreaction and the time lag between the earnings announcements

¹⁷ We find some preliminary support for this explanation in prior research (e.g., Ramnath [2002]), which is unable to document overreaction for samples based on the first early announcer.

TABLE 5
Does the Overreaction Increase for Each Subsequent Early Announcer?

Time Lag (Days between <i>RESP</i> and <i>ARET</i>)	Hedge Portfolio Return: <i>ARET</i> (<i>Q1</i> – <i>Q5</i>)		
	Based on the Response to the First Announcer	Based on the Response to the Second Announcer	Based on the Response to the Third Announcer
5	0.99% (2.70) [6,701]	1.49% (4.88) [7,870]	1.95% (5.66) [7,611]
6	0.77% (3.31) [11,380]	1.03% (4.44) [12,191]	1.09% (4.21) [11,777]
7	0.50% (2.11) [15,209]	1.22% (5.47) [15,811]	0.72% (3.39) [15,292]
8	0.95% (4.40) [13,659]	0.77% (3.12) [13,633]	0.62% (2.29) [12,537]
9	0.05% (0.19) [9,632]	0.39% (1.47) [9,164]	0.96% (3.00) [8,746]
10	0.09% (0.32) [6,584]	0.71% (2.20) [6,281]	0.00 (0.00) [5,700]
11	0.24% (0.61) [6,267]	0.89% (2.41) [6,019]	–0.40% (–0.74) [5,223]

This analysis investigates whether the anomaly differs across positions taken based on the first, second, and third early announcer in each industry-quarter. Evidence suggesting that the overreaction is smaller (greater) for the first (second and third) announcer is consistent with the explanation provided in the paper, which posits that the overreaction is due to subsequent early announcers confirming the news contained in the first announcer’s earnings. The cells describe hedge portfolio returns (*Q1*–*Q5*) for *ARET*, with a long position in the bottom *RESP* quintile and a short position in the top *RESP* quintile, where *RESP* is firm *i*’s response (three-day market excess returns) to the first, second, or third announcer’s earnings release. To control for time lags between the first/second/third announcer and the late announcing firm (firm *i*), we hold time lag constant in each row. Each quarter, we sort firms with a certain time lag with respect to the first (second or third) announcer’s earnings announcement date into five *RESP* quintiles. Any quintile with fewer than five stocks is eliminated. We report the time-series mean of hedge returns across 132 quarters from 1973:1 to 2005:IV; *t*-statistics in parentheses are Fama-MacBeth *t*-statistics. Numbers in brackets are the number of observations for each cell (including all five quintiles). All variables except *ARET* are Winsorized at 1% and 99%.

for the early and late announcers, we report the results in table 5 separately for time lags equal to 5 days, 6 days, and so on, through 11 days. For example, when constructing samples for the five-day time lag, we identify three samples containing all firms in each quarter that announce their earnings five days after the first, second, and third announcer’s earnings release in each industry, respectively. Then we form five quintiles based on the firm’s response to the early peer’s earnings announcement (*RESP*), and calculate the mean announcement returns (*ARET*) for these different *RESP* quintiles.¹⁸ The results in table 5 suggest that the evidence of overreaction is

¹⁸ We use quintiles rather than deciles of *RESP* to increase the likelihood of finding at least five firms in each quarter for the different announcer–time lag combinations.

weakest for the first announcer in each row (the lone exception being the row corresponding to time lag = 8), but it is considerably larger when quintiles are formed based on the second or third announcer being the early announcer.¹⁹

Second, we consider differences in overreaction between the subsample where the early announcers tend to report news that is “confirming,” or positively correlated with each other, and the remaining observations with early announcers reporting news that is disconfirming. Our explanation predicts that the overreaction is greater for the first subsample, as overreaction is more likely to occur in the presence of confirming reports. Since there are typically more than two early announcers, we use the following procedure to identify the confirming subsample. For each late announcing firm i , we split the early announcers into two groups based on the median time lag between the announcement dates for the early announcers and the late announcer. For example, if firm i has six early peers from the same industry/quarter, the first group consists of the first three early announcers and the second group contains the last three early announcers. We compute the mean values of information transfers for the two groups and label them *RESP1* and *RESP2*. We then create a dummy variable, D , that is set to one if *RESP1* and *RESP2* are of the same sign, and set to zero otherwise. In effect, $D = 1$ represents the subsample with confirming information transfers, and $D = 0$ represents the remaining firms.

The results reported in the first column of table 6 suggest that the overreaction is larger when the two subsamples provide confirming information transfers. The basis for this conclusion is the significantly negative coefficient of -0.055 on $D * RESP$. The second column contains the results of repeating the analysis using the early announcer’s earnings announcement return (*ERLYPRARET*), rather than the late announcer’s response to this announcement (*RESP*), as the measure of news. Again, the coefficient on $D * RESP$ is negative and significant.²⁰

Finally, we attempt to track the stock returns for each late announcer over the period beginning with the first early announcement through the late announcer’s earnings report and continuing up to the late announcer’s earnings report for the next quarter. To allow a clean separation between the late announcer’s responses to the first announcement and to subsequent early announcers, we create a sample of observations where the early announcer is restricted to be the first early announcer for that industry/quarter in our

¹⁹ We find similar patterns when the time lag is greater than 11 but elect to not tabulate those results because the hedge returns tend to become insignificant in each case even though the magnitude is still large. The lack of significance for longer time lags is probably due to fewer observations in each portfolio.

²⁰ We expect weaker results for *ERLYPRARET*, relative to *RESP*, for two reasons. First, *RESP* contains the news transferred, which is more relevant to our explanation than *ERLYPRARET*. Second, the larger positive mean reported for *ERLYPRARET* in table 1, panel A, relative to that for *RESP*, suggests that there is more measurement error associated with using the sign of *ERLYPRARET* in column 2, relative to that in column 1 (which is based on the sign of *RESP*).

TABLE 6

Does the Overreaction Depend on Whether Early Peers' Earnings Announcements Are Confirming?

	1 <i>D</i> = 1 (Confirming) if <i>RESP1</i> * <i>RESP2</i> > 0	2 <i>D</i> = 1 (Confirming) if <i>ERLYPRARET1</i> * <i>ERLYPRARET2</i> > 0
Intercept	0.001 (0.42)	0.000 (0.16)
<i>RESP</i>	-0.074 (-8.22)	-0.089 (-10.70)
<i>D</i>	-0.001 (-2.65)	-0.000 (-0.68)
<i>D</i> * <i>RESP</i>	-0.055 (-4.23)	-0.033 (-2.26)
<i>ERLYPRARET</i>	0.013 (2.29)	0.012 (2.11)
<i>ARET</i> _{<i>t</i>-1}	0.034 (10.03)	0.035 (10.01)
<i>ARET</i> _{<i>t</i>-4}	-0.003 (-0.96)	-0.004 (-0.97)
<i>SIZE</i>	0.000 (0.34)	0.000 (0.45)
<i>LOGBM</i>	0.002 (5.89)	0.002 (5.88)
<i>RET6</i>	0.002 (1.62)	0.002 (1.44)
<i>ACC</i>	-0.015 (-5.10)	-0.014 (-5.01)
Adj. <i>R</i> ²	0.013	0.013

This table examines the effect of confirming versus nonconfirming information on investors' overreaction to intra-industry information transfers. *ARET*, the dependent variable, is firm *i*'s three-day earnings announcement excess returns; *RESP* is the average of firm *i*'s three-day excess returns around its peers' earnings announcements; *ERLYPRARET* is the average of its early peers' three-day earnings announcement excess returns in the same quarter. *SIZE* is the logarithm of the market value at the end of the prior fiscal year; *LOGBM* is the logarithm of the book-to-market ratio; *RET6* is the buy-and-hold six-month stock returns leading up to one week before firm *i*'s earnings announcement date; and *ACC* is total accruals. Additional details of all variables are provided in table 1. We split the early announcers for each late announcing firm into two groups based on the median earnings announcement dates for the early-announcing peers. For example, if firm *i* has six early peers, the first group consists of the first three early-announcing peers and the second group includes the last three early-announcing peers. We compute the mean values of two information variables, *RESP* and *ERLYPRARET*, for each subgroup. For each information variable, we set the dummy variable *D* = 1 if the sign of the information variable in the first half (*RESP1* and *ERLYPRARET1*) equals the sign of that information variable in the second half (*RESP2* and *ERLYPRARET2*). The cells above report the time-series mean of coefficient estimates from quarterly regressions from 1973:1 to 2005:IV (204,218 observations); *t*-statistics in parentheses are Fama-MacBeth *t*-statistics. All variables are Winsorized at 1% and 99%.

sample. We compute excess returns for each late announcer *i* over the following two windows to supplement *RESP* and *ARET*: (1) *PRERET* is the excess return for firm *i* over the window between the dates used to compute *RESP* and *ARET*, during which other early announcements are made, and (2) *POSTRET* is the excess return for the period between *ARET* and the next quarter's earnings announcement window; that is, from the second day after the earnings announcement for this quarter to the first day after the earnings announcement for the next quarter. In effect, the four adjacent windows (*RESP*, *PRERET*, *ARET*, and *POSTRET*) provide a comprehensive

description of firm i 's stock response following the earnings report of the first announcer in that industry/quarter.

Our explanation predicts that the overreaction around subsequent early announcements (indicated by a negative correlation between *PRERET* and *ARET*) is greater than the overreaction around the first early announcement (indicated by a negative correlation between *RESP* and *ARET*). And we include *POSTRET* to confirm that the overreaction that occurs during *RESP* and *PRERET* is fully corrected when the late announcer reports its earnings (*ARET*). If the correction is not complete, *POSTRET* should be negatively related to *RESP* and *PRERET*.

Given the substantial negative correlation observed in our pseudo event analysis (table 4), we again create a pseudo event data set for the subsample based on first early announcements by shifting event dates back by four weeks. We pool together the two data sets and separate the two sets of observations by setting a dummy variable, D , equal to one (zero) for observations associated with the actual event (pseudo event). In effect we estimate separate coefficients for both data sets and the difference between the two coefficients (measured by the coefficient on the slope interacted with the dummy variable) indicates the overreaction due to intra-industry information transfers, after controlling for any overreaction due to the Jegadeesh [1990] effect.

The results of our investigation are reported in table 7. The three columns correspond to cases where the dependent variable is the return for the late-announcing firm i over the second, third, and fourth windows, and the explanatory variables in each column include firm i 's returns for all earlier windows. Each explanatory variable is also interacted with the dummy variable to estimate the incremental overreaction observed for actual events, above and beyond that present in the pseudo event data. The coefficient on *RESP* in model 1 is substantially negative, indicating a strong Jegadeesh [1990] effect. The coefficient on $D * RESP$ is positive, but not significant, suggesting that the response to the first announcement is only weakly positively correlated to the average response to subsequent early announcers.

Model 2 in table 7, which describes cross-sectional variation in *ARET* due to *RESP* and *PRERET*, contains the results most relevant to our explanation. The overreaction at the first early announcement, indicated by the coefficient of -0.017 on $D * RESP$, is weaker than that at subsequent early announcements, indicated by the substantially more negative coefficient of -0.178 on $D * PRERET$.²¹ Note that the coefficient on *PRERET* is more

²¹ Since the *PRERET* window includes both days when information is transferred from early announcements occurring on those days and other days when no announcements occurred, we investigate whether the results are more pronounced for the subset of days that are associated with information transfers, when early announcers report earnings. We split the return for firm i over the *PRERET* period into two subsets based on whether each day in that period is included in or excluded from the three-day announcement windows for early announcers, and the returns over the two subsets are referred to as *PRERETTRANSFER* and *PRERETNOTTRANSFER*,

TABLE 7

The Relations among Returns over Different Windows for Late Announcers Based Only on the First Early Announcer, after Controlling for the Jegadeesh [1990] Effect

	Dependent Variable Is		
	1 <i>PRERET</i>	2 <i>ARET</i>	3 <i>POSTRET</i>
Intercept	0.0004 (3.33)	0.0001 (2.07)	-0.001 (-0.37)
<i>D</i>	0.000 (0.30)	0.000 (0.37)	-0.001 (-0.83)
<i>RESP</i>	-0.016 (-16.70)	-0.008 (-1.80)	0.011 (1.01)
<i>D*RESP</i>	0.002 (1.39)	-0.017 (-2.60)	0.003 (0.21)
<i>PRERET</i>		-0.345 (-15.30)	-0.210 (-3.06)
<i>D*PRERET</i>		-0.178 (-5.65)	0.133 (1.56)
<i>ARET</i>			-0.087 (-9.03)
<i>D*ARET</i>			0.079 (6.88)
Adj. <i>R</i> ²	0.010	0.009	0.014

We create two data sets, one based on actual earnings announcements and the other based on pseudo events, created by shifting the dates backward by four weeks for the observations in the first data set. For each late announcer (firm *i*), we focus only on the first early announcer in that quarter, and compute returns over the following four windows in both data sets. *RESP* is the three-day excess return for firm *i* around the earnings announcement date for the first early announcer and *ARET* is the three-day excess return around firm *i*'s earnings announcement date. *PRERET* is the excess return for firm *i* over the window between the dates used to compute *RESP* and *ARET*, and *POSTRET* is the excess return for the period from the second day after the earnings announcement for that quarter to the day after the earnings announcement for the next quarter. We then pool the two data sets but separate the two sets of observations using a dummy variable, *D*, which is set to one if the data relate to the true event and zero if the data refer to the pseudo event. In effect the coefficients on *RESP*, *PRERET*, and *ARET* capture the overreaction due to the Jegadeesh [1990] effect, since they are observed for pseudo events. The coefficients on the same variables when they are interacted by the dummy variable (e.g., *D*RESP*) represent the overreaction due to intra-industry information transfers, after controlling for the Jegadeesh [1990] effect.

negative than that on *RESP*, confirming that the Jegadeesh effect (measured on pseudo events) is lower when the windows are further apart.

The results in model 3 of table 7 suggest that the overreaction to early announcers is fully corrected when the late announcer reports its earnings. The absence of a significant negative coefficient on *D*RESP*, *D*PRERET*, and *D*ARET* suggests that there is no continuation of the correction past the late announcer's earnings report. In fact, the positive coefficients on those three variables suggest that not only is there no more correction of

respectively. We then re-estimate the regression in column 2 of table 7, after replacing *PRERET* with *PRERETTRANSFER* and *PRERETNOTTRANSFER*. We find that, while the coefficient on *D*PRERETTRANSFER* is more negative than that on *D*PRERETNOTTRANSFER* (-0.114 vs. -0.082), that difference is not statistically significant. This inability to observe a significant difference between the two subsets of *PRERET* could possibly be due to information transfers occurring outside the three-day announcement windows considered here.

overreaction at this point, the underreaction associated with earnings momentum is now dominant. The Jegadeesh effect is indicated by the negative coefficients on *PRERET* and *ARET*, with the former being less negative than the latter. The fact that the coefficient on *RESP* is no longer negative (it is positive, but insignificant) confirms that the Jegadeesh effect is relatively short-lived and does not survive at longer horizons.

Overall, these three sets of results are consistent with our explanation that the overreaction we document is relatively low in response to the first early announcer, but it builds thereafter in response to subsequent early announcements, and is corrected when the late announcer discloses its earnings.

5. Robustness Checks

We provide below the results of our efforts to conduct four additional robustness checks. We also consider a number of other robustness checks, such as the inclusion of non-December fiscal year-end firms, and find that our overreaction results remain relatively unchanged.

5.1 POTENTIAL BIAS IN CRSP RETURNS BECAUSE CLOSING PRICES ARE SYSTEMATICALLY BID OR ASK PRICES

While the pseudo event analysis described in table 4 and section 3.3 should control for the negative correlation induced in adjacent period stock returns based on closing prices that are systematically bid and ask prices, it is possible that the pseudo event control is insufficient as the bid-ask spread could be higher during announcement events. To gauge the effect of this bid-ask bounce on our main results we consider a return measure that is free of such an effect. We construct daily returns using the midpoints of closing bid and ask prices; that is, daily return = $(P_t + D_t - P_{t-1}) / P_{t-1}$, where P is the midpoint of the closing bid and ask prices and D is the dividend (all adjusted for stock splits). Since closing bid and ask prices are available on CRSP only after December 28, 1992, the sample for this analysis is limited to the 1992–2005 subperiod.

As in table 2, we form 10 *RESP* deciles but measure returns based on bid-ask midpoints. Untabulated results indicate that *ARET* decreases monotonically from 0.57% for decile 1 to -0.78% for decile 10, resulting in a D1–D10 hedge portfolio return of 1.35% ($t = 6.56$). For comparison purposes, we also replicate the same analyses based on returns as reported in CRSP for the same sample of firms and find that the D1–D10 hedge return is 1.61%, with a t -statistic of 8.54. The hedge return is smaller when using midpoint prices than it is when using CRSP reported returns, suggesting that bid-ask bounce is partially responsible for the overreaction documented in tables 2 and 3. But the effect of the bid-ask bounce on hedge returns (roughly 0.26%) is relatively small compared to the overall overreaction effect of 1.61%.

5.2 FURTHER EVIDENCE ON MICROSTRUCTURE EFFECTS

Prior literature examines the role of microstructure effects on return reversals. For example, Avramov, Chordia, and Goyal [2006] argue that price pressure resulting from a large block of trades could induce very-short term price reversals for illiquid stocks. We believe that our pseudo analysis from section 3.3 provides a reasonable control for illiquidity and other microstructure effects as long as these effects are relatively stable over the short term. Nevertheless, we conduct robustness checks using proxies for microstructure effects mentioned in the prior literature. Panels A, B, and C of table 8 contain the results of a portfolio analysis where we report hedge portfolio results (*ARET* for low *RESP* quintiles less *ARET* for high *RESP* quintiles) for different subsamples based on variation in three proxies for cross-sectional differences in microstructure effects. We use quintiles rather than deciles to ensure that we retain a reasonable number of observations in each of the 25 portfolios in each quarter.

The first proxy for market microstructure effects we consider is firm size (*SIZE*), measured as the logarithm of market capitalization. Observing overreaction only for small firms might suggest that the results reported in table 2 are due to lower liquidity and trading volumes and higher bid-ask spreads associated with smaller firms. Table 8, panel A, provides results on the variation of overreaction across firms of different *SIZE*. We sort firms sequentially into quintiles, first based on *SIZE* and then *RESP*, and report the mean *ARET* values for the 25 groups, as well as the hedge portfolio returns from investing long (short) in the lowest (highest) quintile of *RESP* for each *SIZE* quintile. Even though the hedge portfolio results decline as size increases, the hedge portfolio result for the largest size quintile (*SIZE5*) is 0.54% and very significant.²² In fact, the associated *t*-statistics (or the Sharpe ratios) of the hedge portfolios are very stable across the five *SIZE* quintiles. Unreported results confirm that *SIZE* is relatively constant across the *RESP* quintiles within each column, suggesting that there is no unintended residual correlation between *RESP* and *SIZE* when we form our 25 portfolios.²³

Second, we examine the effect of liquidity on the reversal of intra-industry information transfers. Avramov, Chordia, and Goyal [2006] show that both stock turnover and illiquidity are monotonically related to very short-term price reversals, suggesting that very short-run reversals may be driven by the price pressure caused by noninformational trade demand for illiquid

²² Examination of the average level of *ARET* within each size quintile confirms the results in Chari, Jagannathan, and Ofer [1988] that unconditional returns at earnings announcement dates are quite positive for small firms, but closer to zero for large firms.

²³ We also examine the effect of bid-ask bounce across the five *SIZE* quintiles by using returns constructed from bid-ask data for the 1992–2005 subperiod (see section 5.1). Untabulated results show that (1) the bid-ask effect is relatively large for small firms but is relatively minor for large firms and (2) the *RESP1*–*RESP5* hedge returns constructed from the bid-ask midpoints are highly significant across all five *SIZE* quintiles—0.93% ($t = 3.91$), 0.78% ($t = 3.27$), 0.98% ($t = 4.69$), 1.08% ($t = 4.95$), and 0.68% ($t = 3.85$) for *SIZE1*–*SIZE5*, respectively.

TABLE 8
Robustness Checks: Further Evidence on Microstructure Effects

Panel A: Earnings announcement returns (<i>ARET</i>) based on two-way sort by <i>SIZE</i> and <i>RESP</i>					
	<i>SIZE</i> (Smallest)	<i>SIZE</i> <i>SIZE</i> 2	<i>SIZE</i> <i>SIZE</i> 3	<i>SIZE</i> <i>SIZE</i> 4	<i>SIZE</i> (largest)
<i>RESP</i> 1	1.14%	0.24%	0.10%	0.41%	0.35%
<i>RESP</i> 2	0.72%	0.03%	-0.05%	0.11%	0.09%
<i>RESP</i> 3	0.70%	0.06%	-0.13%	0.08%	0.07%
<i>RESP</i> 4	0.35%	0.06%	-0.12%	-0.04%	0.03%
<i>RESP</i> 5	0.17%	-0.63%	-0.62%	-0.48%	-0.18%
<i>RESP</i> 1- <i>RESP</i> 5	0.97%	0.87%	0.72%	0.89%	0.54%
	(5.11)	(5.37)	(5.38)	(7.36)	(5.71)
Panel B: Earnings announcement returns (<i>ARET</i>) based on two-way sort by illiquidity (<i>ILLIQ</i>) and <i>RESP</i>					
	<i>ILLIQ</i> (Most Liquid)	<i>ILLIQ</i> <i>ILLIQ</i> 2	<i>ILLIQ</i> <i>ILLIQ</i> 3	<i>ILLIQ</i> <i>ILLIQ</i> 4	<i>ILLIQ</i> (Most Illiquid)
<i>RESP</i> 1	0.46%	0.24%	0.20%	0.14%	0.97%
<i>RESP</i> 2	0.09%	0.01%	0.11%	0.09%	0.62%
<i>RESP</i> 3	0.14%	0.02%	-0.10%	-0.08%	0.50%
<i>RESP</i> 4	0.02%	-0.05%	-0.21%	0.02%	0.33%
<i>RESP</i> 5	-0.21%	-0.58%	-0.60%	-0.61%	-0.02%
<i>RESP</i> 1- <i>RESP</i> 5	0.68%	0.82%	0.81%	0.75%	0.99%
	(5.89)	(6.15)	(5.85)	(4.96)	(5.21)
Panel C: Earnings announcement returns (<i>ARET</i>) based on two-way sort by turnover (<i>TO</i>) and <i>RESP</i>					
	<i>TO</i> (Lowest <i>TO</i>)	<i>TO</i> <i>TO</i> 2	<i>TO</i> <i>TO</i> 3	<i>TO</i> <i>TO</i> 4	<i>TO</i> (Highest <i>TO</i>)
<i>RESP</i> 1	0.90%	0.54%	0.35%	0.26%	0.14%
<i>RESP</i> 2	0.51%	0.24%	0.17%	-0.01%	-0.16%
<i>RESP</i> 3	0.38%	0.25%	0.02%	0.03%	-0.32%
<i>RESP</i> 4	0.18%	0.17%	0.12%	-0.16%	-0.56%
<i>RESP</i> 5	0.24%	-0.10%	-0.20%	-0.53%	-0.94%
<i>RESP</i> 1- <i>RESP</i> 5	0.66%	0.64%	0.55%	0.79%	1.09%
	(4.53)	(4.03)	(3.89)	(5.14)	(6.37)

This table describes how overreaction (the negative correlation between *ARET* and *RESP*) varies across three proxies for microstructure effects (*SIZE*, *ILLIQ*, and *TO*), where *SIZE* is the logarithm of the market value of equity; *ILLIQ* is illiquidity measured as the average of the absolute value of daily returns scaled by dollar trading volume (in million dollars) over the month leading up to one week prior to firm *i*'s earnings announcement date; *TO* is stock turnover measured as dollar trading volume over the month leading up to one week prior to firm *i*'s earnings announcement date scaled by beginning market value of equity; and *ARET* and *RESP* are firm *i*'s excess returns around its own and its early-announcing peers' earnings announcement dates. See table 1 for detailed definitions. Panels A, B, and C refer to portfolio analyses based on quintiles of the relevant explanatory variables. Each quarter, we first sort stocks into five quintiles based on the proxy for microstructure effects, and then for each resulting quintile we further sort stocks into five *RESP* portfolios. Portfolios with fewer than 10 stocks are eliminated. We report the time-series mean of the quarterly portfolio returns across 132 quarters from 1973:I to 2005:IV; *t*-statistics in parentheses are Fama-MacBeth *t*-statistics.

stocks. In our setting, stock trading is likely to be information driven because we identify a specific set of information (peers' earnings announcements) in our research design. Nevertheless, we examine the effect of liquidity on our results. Following Avramov, Chordia, and Goyal [2006], we compute turnover (*TO*) as the monthly dollar trading volume scaled by market

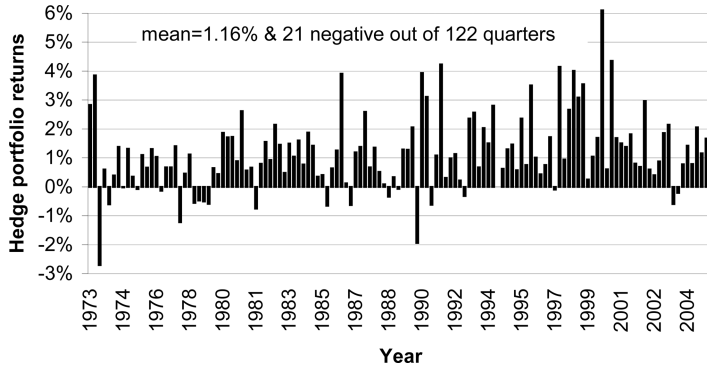


FIG. 2.—Quarter-by-quarter profits from investing in overreaction to intra-industry information transfers. The strategy invests long (short) in firms that are in the lowest (highest) *RESP* decile, where *RESP* is a firm’s average return in response to its peers’ earnings announcements made at least five days prior to the firm’s own earnings announcement. The investments are made one day before the late announcer’s earnings announcement and held for one day after the announcement.

capitalization, and illiquidity (*ILLIQ*) as the absolute price change per dollar of daily trading volume. Specifically, $ILLIQ_{it} = \frac{1}{D_{it}} \sum_{d=1}^{D_{it}} \frac{|R_{itd}|}{DVOL_{itd}} * 10^6$, where R_{itd} and $DVOL_{itd}$ are the daily return and dollar trading volume of stock i on day d in month t , and D_{it} is the number of days in month t for which data are available for stock i . We require at least 10 days with trades each month for monthly *TO* and *ILLIQ*, and both *TO* and *ILLIQ* are measured one week prior to firm i ’s earnings announcement date.

Panels B and C in table 8 show how overreaction varies across the five *ILLIQ* and *TO* quintiles, respectively. The *RESP* effect is highly significant in each *ILLIQ* (*TO*) quintile. In terms of magnitude, the *RESP1*–*RESP5* hedge returns are relatively stable for the first four *ILLIQ* (*TO*) quintiles but tend to be higher for the highest *ILLIQ* (*TO*) quintile. Therefore, lack of liquidity may tend to exaggerate the overreaction effect for a small subset of our sample with high *ILLIQ* and *TO*, but the presence of large and significant hedge returns even for stocks that have the lowest *ILLIQ* and *TO* suggests that the Avramov, Chordia, and Goyal [2006] effects are unlikely to explain completely the overreaction we document.²⁴

We also estimate regressions of *ARET* on *RESP* and the three proxies for microstructure effects along with interactions between *RESP* and the three proxies (we use decile ranks for the three proxies). Our results (not tabulated here) indicate insignificant coefficients on the three interaction terms, which suggest that the differences in overreaction across the columns in panel A, B, and C are not statistically significant.

²⁴ We also calculate *TO* and *ILLIQ* over a weekly window ending one week before firm i ’s earnings announcement as well as the same three-day window of firm i ’s response to peers’ earnings announcements and find results for those measures of turnover and illiquidity that are similar to those reported in table 8 for the monthly measures.

Whereas firm size, illiquidity, and turnover are included in this analysis because they proxy for microstructure effects, prior literature on pricing anomalies has also considered these three variables as proxies for limits to arbitrage; that is, an anomaly is more likely to be due to investor irrationality if it is stronger for stocks that are harder to arbitrage (e.g., Shleifer and Vishny [1997], Barberis and Thaler [2003]). To provide some evidence on limits to arbitrage, we first control for potential microstructure effects associated with these three proxies and then investigate if overreaction is stronger when firm size is smaller and illiquidity and turnover are higher. Specifically, we repeat the portfolio analysis in table 8 for both actual earnings announcement events and pseudo events (moved back by four weeks) and check if the return difference between actual and pseudo events varies across the three proxies. Untabulated results show that the differential overreaction is stronger for smaller stocks, illiquid stocks, and stocks with high turnover, consistent with investor irrationality playing a greater role in these cases.

5.3 THE ROLE OF THE PREDICTABILITY OF EARNINGS ANNOUNCEMENT DATES

Since the analysis so far is based on actual Compustat earnings announcement dates, a trading strategy based on this anomaly can only be implemented if those actual dates can be predicted in advance. Not only is it the case that some earnings announcement dates are not predictable, firms reporting late tend to be associated with negative market excess returns (e.g., Givoly and Palmon [1982], Chambers and Penman [1984]). A concentration of these firms in the D10 decile might explain our results. To mitigate this concern, we examine whether hedge returns vary with the timeliness of a firm's earnings announcement, where the expected report date is measured as the actual report date for the same fiscal quarter in the previous year. Our results suggest that this is not the case: A strong *RESP* effect is observed across all five timeliness quintiles.

5.4 CONSISTENCY WITH WHICH THE HEDGE RETURNS ARE OBSERVED OVER TIME

One standard approach to investigate the robustness of results observed at an aggregate level is to repeat the analysis over different subperiods and check if the result is observed consistently in each subperiod. Figure 2 shows that the hedge returns from investing long (short) in late announcers in the lowest (highest) decile of *RESP* around their announcement dates reveal a consistent pattern of profitability. Losses are observed in only 21 of the 132 quarters, with most of these negative returns being relatively small (one quarter is associated with a negative hedge return between -2% and -3% , two quarters have hedge returns between -1% and -2% , and the remaining 18 loss quarters have hedge returns between 0% and -1%). Also, while

the *RESP* effect is weakest during the 1970s (mean hedge returns of 0.48%), it is relatively stable and strong during the 1980s, 1990s, and 2000s (mean of 1.01%, 1.55%, and 1.52%, respectively). This consistent profitability suggests that the observed empirical regularity is unlikely to be associated with mismeasured risk; if the strategy is risky, there should be more quarters associated with significant losses.

6. Discussion of Overreaction Evidence, Given General Evidence of Underreaction

As mentioned in the introduction, it is hard, in general, for an explanation based on irrational investors to reconcile apparent overreaction amidst considerable underreaction over the same horizon. It is harder still for any explanation to also be consistent with specific features of the evidence documented here, some of which are as follows: (1) underreaction to own firm earnings (positive partial correlation between $D*ARET$ and $POSTRET$ in table 7), (2) overreaction to information transfers from early peers' announcements that is corrected when a late announcer reports earnings (general negative correlation between *RESP* and *ARET*), (3) overreaction to information transfer is lower at the first early announcer's report but increases as subsequent early announcers report earnings (partial correlation between *ARET* and $D*RESP$ in table 7 is less negative than that between *ARET* and $D*PRERET$), (4) no evidence of overreaction to information transfers from late announcers to early peers,²⁵ (5) positive lead/lag comovement between announcement returns for early and late announcers (positive correlations between $ERLYPRARET$ and *ARET*), and (6) positive lead/lag comovement between responses by early and late announcers to others announcements (positive correlations between *RESP* and $ERLYPRRESP$).

Our review of the behavioral finance literature does not suggest a theory that provides a comprehensive explanation for the various facets of our evidence noted above. For example, the overreaction explanations based on representativeness also predict an overreaction to information transfers from late announcers to early peers. While some theories offer explanations for both under- and overreaction, the predicted positive and negative autocorrelation in returns relate to different horizons, and generally do not relate to cross-firm lead/lag relations. The explanation in Peng and Xiong [2006] appears promising initially, as it offers a theory based on investor overconfidence and limited investor attention, which suggests positive comovement across returns of firms in the same sector, and also negative

²⁵ For example, the correlation between early peers' response to the late announcer's report ($ERLYPRRESP$) and early peers' response to their own announcements next quarter is insignificant, after controlling for the Jegadeesh effect (coefficient is 0.0075, *t*-statistic = 0.78).

autocorrelation in firm-level returns.²⁶ Unfortunately, the theory does not fit well with specific aspects of our evidence (e.g., items (3) and (4) mentioned in the paragraph above).

One extension of our explanation for overreaction that could also potentially explain the underreaction effects is as follows. Consider the possibility that the late announcer's response to early announcers' earnings reports is in the right direction but the "correction" in the opposite direction at the late announcer's earnings report is in error. That is, stock prices are, in general, underreacting to the full implications of news being released this quarter by firms in the same industry, and the price movement at the late announcer's earnings report is a temporary adjustment in the wrong direction. This explanation is consistent with a stock market that is unaware of the spillover effects of this quarter's earnings surprise at the earnings announcement (Lys and Soffer [1999]) but incorporates those spillover effects as information is released subsequently about the next quarter's earnings (Ball and Bartov [1996]).

To illustrate this "temporary erroneous correction" explanation, assume that a late announcer is going to disclose a seasonally adjusted earnings increase of \$0.10 in this quarter, which implies, on average, a seasonally adjusted earnings increase of \$0.04 in the next quarter (e.g., Bernard and Thomas [1990]). Assume also that the price implications of these two surprises are \$1.00 and \$0.40, respectively. That is, while the price in an efficient market should rise by \$1.40 as soon as the earnings surprise for this quarter is known, actual prices increase by only \$1.00 when this quarter's earnings are released, with the remaining increase of \$0.40 occurring by the time next quarter's earnings are released. Finally, assume that the first early announcer's report causes investors to revise their earnings expectations for this quarter to \$0.10 (which is unbiased) and to bid prices up by \$1.00. The release of positively correlated earnings surprises by other early announcers this quarter could cause investors to expect an earnings increase this quarter that is greater than \$0.10, say \$0.12. As a result, this additional \$0.02 causes prices to rise by an additional \$0.20. However, that price increase is given back when investors are disappointed by the disclosed earnings of \$0.10. Over the next quarter, however, prices continue their upward climb toward the final price increase of \$1.40.

While this extension to our overreaction explanation provides a relatively straightforward rationale for different facets of our results, an important testable implication is not supported. That implication is that *RESP* (the price response of the late announcer to the earnings release of early announcers, corresponding to the increase of \$0.12 in the illustration above) should be positively correlated with *POSTRET* (the price response of the

²⁶ The intrasector positive comovement is due to investors overweighting market and sector information because they allocate insufficient attention to firm-specific disclosures. The negative autocorrelation, described as short run momentum followed by longer-term reversals, is caused by investors allocating more attention to firm-specific information, especially in sectors where intrasector positive comovement is low.

later announcer between the earnings releases in this quarter and the next, corresponding to the increase of \$0.40 in the illustration above). The results in model 3 of table 7 reveal that although the coefficient on $D*RESP$ is positive (0.003), it is insignificant at conventional levels (t -statistic = 0.21). Since table 7 is based only on the first early announcer, we re-estimate the model 3 regression using all early announcers. The results (not tabulated) again do not support this explanation: While the coefficient on $D*RESP$ is positive (0.0003), it remains insignificant at conventional levels (t -statistic = 0.38).²⁷

We return to our original overreaction explanation and consider a different extension to generate a description of investor irrationality that is consistent with both overreaction and underreaction to earnings information and the overreaction being corrected when the late announcer discloses its earnings, even though the underreaction continues past that date. We begin by separating earnings information into two components: one part that has spillover implications for adjacent quarters and a second part that does not, and assume that investors are unable to project spillover effects until they become apparent. We posit that the earnings information that is contained in intra-industry information transfers from early announcers to firms that have not yet announced is, for the most part, described by the second earnings component, which does not have implications for adjacent quarters. As a result, any stock price overreaction leading up to the late announcer's earnings report is corrected when those earnings are disclosed.

In contrast, information transfers from earnings reports of late announcers to early announcers must relate to subsequent quarters, since early announcers have already disclosed their earnings for this quarter. To the extent that investors do not fully project the implications of that earnings information for future quarters' earnings, stock prices underreact to that intra-industry transfer information. For the same reason, investors underreact to all other earnings information that is generated by sources other than intra-industry transfers, as long as some fraction of that earnings information has implications for future quarters' earnings.

To review, we summarize the results of our efforts to generate potential comprehensive explanations for different facets of the anomalous evidence noted in this paper. While we reject some of those explanations and offer one explanation that is consistent with the joint evidence of over- and underreaction, we believe there is considerable room for future research to probe that explanation as well as to suggest other theories.

7. Conclusion

We document an anomalous negative relation between the price response of a firm to earlier earnings announcements of other firms in the same

²⁷ Positive but insignificant coefficients on $D*RESP$ are observed even when we exclude the terms relating to $ARET$ and also the terms relating to $PRERET$.

industry and the returns of the same firm when it subsequently announces its own earnings. Our results are not easily explained as being due to investor irrationality because this negative own-firm return relation (implying investor *overreaction* to intra-industry information transfers) is surrounded by other positive own-firm and cross-firm return relations (which imply investor *underreaction* to all other earnings news). The following is a summary of what readers can take away from our efforts to understand the results reported in this paper.

First, we consider carefully the possibility that our results are due to some explanation other than investor irrationality, but find no supporting evidence. In particular, we do not believe our results are caused by microstructure effects or mismeasured risk.

Second, we can provide a straightforward irrational investor explanation for apparent investor overreaction. That explanation, which is consistent with bias caused by investors relying on the representativeness heuristic, suggests that investors are surprised by firms in the same industry reporting earnings surprises that are predictably positively correlated. We are able to explain why this causes an overreaction to information transferred from early announcers to the late announcer, why the overreaction increases as subsequent early announcers release their earnings, and why the overreaction is reversed at the late announcer's earnings report.

Third, we make some progress on generating possible unified theories for overreaction amidst widespread underreaction and investigate the extent to which they are consistent with all facets of our evidence. Our review of the behavioral finance literature suggests that while different theories can explain different aspects of our results, it is difficult to combine those theories in a meaningful way. We also consider explanations that are based on investors not understanding the extent to which news in earnings this quarter spills over to adjacent quarters' earnings (e.g., Bernard and Thomas [1990]). One such variation that is consistent with our evidence is based on earnings information containing two components: one part that has spillover effects for adjacent quarters and a second part that does not. We posit that the earnings information that is contained in intra-industry information transfers from early announcers to firms that have not yet announced is for the most part described by the second earnings component, which does not have implications for adjacent quarters. We suspect, however, that there are other explanations and encourage future research to build on what we develop here.

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