

Investor Sentiment, Post-Earnings Announcement Drift, and Accruals

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We examine whether stock price reactions to earnings surprises and accruals vary systematically with investor sentiment. Using quarterly drift tests and monthly trading strategy tests, we find that holding good news firms (and low accrual firms) following pessimistic sentiment periods earns higher abnormal returns than holding good news firms (and low accrual firms) following optimistic sentiment periods. We also document that abnormal returns in the short-window around earnings announcements for good news firms are higher during periods of low sentiment. Overall, our results indicate that investor sentiment influences the source of excess returns from accounting-based trading strategies.

Keywords: Investor Sentiment, Post-Earnings Announcement Drift, Accruals, Anomalies

INTRODUCTION

We investigate whether investor sentiment influences the immediate and long-run market reactions to earnings surprises and accruals. Investor sentiment broadly represents the mood of investors at any given time. Relying on behavioral finance theories, several studies examine how waves of investor sentiment affect assets prices (e.g., Brown and Cliff, 2005; Baker and Wurgler, 2006; Lemmon and Portniaguina, 2006). The general result from this literature is that following periods of low (high) investor sentiment, subsequent market returns are relatively high (low), suggesting that stocks are underpriced (overpriced) in low (high) sentiment states but that prices eventually revert to fundamental values. Because a common explanation for post-earnings announcement drift is that investors initially underreact to the earnings news and a common explanation for the accruals anomaly is that investors initially overreact to accruals, it is possible that investor sentiment plays a role in how these two accounting anomalies unfold.

In order to determine whether stock price responses to earnings and accruals vary systematically with the state of investor sentiment, we form ten portfolios based on the level of earnings surprise or accruals across three investor sentiment categories (low, neutral and high sentiment) using data from 1987 – 2005. Our proxy for investor sentiment is based on the Baker and Wurgler (2006, 2007) composite sentiment index. We calculate abnormal returns for each portfolio over three time windows: First, we conduct traditional quarterly drift and accruals tests from the preliminary earnings announcement or SEC filing through the subsequent quarter's earnings announcement. Second, we report calendar time abnormal

returns for each month. Finally, we report short-window abnormal returns around earnings announcements.

Our results suggest that investor sentiment does affect the source of excess returns previously documented in the accounting-based market anomaly literature. The quarterly drift and monthly trading strategy tests indicate abnormal returns following *low* sentiment periods have a nonlinear, “hockey-stick” shape across the earning surprise distribution; returns are relatively close to zero for most earnings surprise deciles and then spike up for extreme good news. Abnormal returns following *high* sentiment periods follow the reverse pattern; returns are small for most earnings surprise deciles and then plummet for extreme bad news. The upward stock price drift following extreme positive earnings surprises is greater for low sentiment periods than for high sentiment periods. We report similar findings for accruals – holding low accrual firms following low sentiment periods earns higher abnormal returns than holding low accrual firms following high sentiment periods. These results suggest that some investors initially underreact to earnings or accruals information that contradicts their overall beliefs about the state of the market.

Our short-window tests provide evidence that investor sentiment affects abnormal returns around earnings announcement as well. Specifically, announcement returns for extreme good news firms are significantly higher during periods of low sentiment than during periods of high sentiment. This result is consistent with investors correctly, but maybe not fully, updating their beliefs when they receive contrary information. Taken together, our short-window and drift returns results suggest that market participants are able to incorporate news contrary to the prevailing sentiment level into prices at the time of the preliminary earnings release or SEC filing, albeit not completely; prices appear to react more fully later, possibly when investors obtain corroborating evidence.

In order to better understand how different market participants react during various investor sentiment states, we also examine analyst forecast revisions. We document that analysts are significantly more likely to revise forecasts downward immediately following bad news during low sentiment periods than during high sentiment periods, which suggests analysts do not fully react to negative news during high sentiment periods. However, we also find that upward forecast revisions to good news are not statistically different during low and high sentiment periods. Thus, analysts seem to be generally optimistic in revising their forecasts after good news which is independent of investor sentiment.

This paper adds to the evolving literature which studies the impact of investor sentiment on asset prices. In particular, we link investor sentiment and financial reporting by documenting how investor sentiment affects excess returns from earnings-based trading strategies. These findings are important for academics interested in understanding what may cause temporary departures of market prices from intrinsic firms’ valuations, and the speed in which those departures are subsequently corrected. Our study may also be relevant to professional investors who attempt to capture excess returns from temporary market mispricing. By jointly focusing on well-documented anomalies and investor sentiment states, professional investors may actually generate short-term excess returns that may be too risky to attain by focusing on investor sentiment alone, because the length of the period for correcting the mispricing is not known in advance.

RELATED LITERATURE AND RESEARCH QUESTION

Background on Investor Sentiment

Investor sentiment can be broadly defined as the degree of optimism or pessimism about stocks which is not justified by fundamental information (Baker and Wurgler, 2006). While classical finance theory relies on rational investors to set asset prices, behavioral finance theories suggest that investor sentiment can also influence prices. Optimism can result in over-valuation and pessimism can result in under-valuation. Daniel, Hirshleifer and Subrahmanyam (1998), Barberis, Shleifer and Vishny (1998) and Hirshleifer and Teoh (2003) formally model certain cognitive biases or information processing limitations (i.e., overconfidence, self-attribution, conservatism, representativeness heuristic, limited attention) which can result in mis-valuation by noise traders. The correlated sentiment of noise traders can cause prices to

diverge from fundamental values because rational arbitrageurs with short time horizons face the risk that investor sentiment will become more extreme in the short-term (DeLong, Shleifer, Summers and Waldmann, 1990; Kumar and Lee, 2006). Ultimately, however, prices do revert to fundamental values.

Because mispricing is difficult to identify directly, empirical research generally looks for systematic patterns of subsequent returns relative to the sentiment levels at a given time in order to provide evidence that investor sentiment affects stock prices. If investor sentiment results in mispricing, periods of optimism (pessimism) will be followed by relatively low (high) returns as prices revert to fundamental values. The empirical evidence indicates that proxies for investor sentiment are negatively associated with the subsequent long-run market returns (Brown and Cliff, 2005; Baker and Wurgler, 2006; Lemon and Portniaguina, 2006; Tetlock, 2007). This result appears particularly pronounced for small stocks and stocks with low institutional ownership (Lemon and Portniaguina, 2006), and also stocks with valuations that are more subjective, including young, highly volatile, and extreme growth firms (Baker and Wurgler, 2006).

Link Between Investor Sentiment and Market Reactions to Accounting Information

Another stream of research that investigates potential mispricing is the literature on accounting-based market anomalies, specifically the post-earnings announcement drift anomaly and the accrual anomaly. Prior research (Ball and Brown, 1968; Foster, Olsen, Shevlin, 1984; Bernard and Thomas, 1989, 1990) shows that there is a tendency for future abnormal returns to drift in the direction of the earnings surprise following the earnings announcement. Transaction costs, failure to properly control for risk, and methodological issues are all possible explanations for the delayed price response. However, based on empirical research (e.g., Rendleman, Jones and Latané, 1987; Bernard and Thomas, 1989, 1990; Ball and Bartov, 1996), the most common explanation is that investors initially underreact to the earnings news.

Likewise, prior research on accruals (Sloan, 1996) suggests that the market may not properly price the information in accruals. When current accruals are high (low), future abnormal returns tend to be negative (positive). Stock prices act as if investors fail to fully recognize this difference by initially overreacting to accruals. This apparent overreaction is reversed in the next period when the market learns that accruals are not sustainable. Collins and Hribar (2000) and Battalio, Lerman, Livnat and Mendenhall (2009) confirm this result using quarterly data.

We link the literatures on investor sentiment and accounting-based market anomalies by examining whether the post-earnings announcement drift and accrual results are sensitive to the optimism or pessimism in the market. If investors initially underreact to earnings surprises or overreact to accruals, the manner in which these two anomalies play out can be affected by the level of investor sentiment in any given period as discussed below. While we draw on behavioral theory in order to demonstrate that investor sentiment may play a role, the purpose of this study is not to test any particular behavioral theories. Instead, our objective is to evaluate whether investor sentiment predicted by these theories influences how the anomalies unfold relative to the null hypothesis that investor sentiment has no influence.

For example, the post-earnings announcement drift research suggests that investors do immediately react in the right direction to earnings surprises, but not completely. One possible explanation for this underreaction is that investors are overconfident about their own information and, thus, weigh it too heavily when updating their beliefs (Odean, 1998). If investors are slow to update their beliefs in face of new evidence (Edwards, 1968), then it is possible that drift returns are different in periods of positive and negative sentiment. Presumably, during periods of high (low) sentiment, investors generally expect good (bad) news. If, however, a firm reports earnings contrary to these expectations, investors may initially react to the new and conflicting information only partially at the time of the earnings announcement, seeking additional information to determine whether to incorporate the earnings surprise fully into price subsequently. Thus, drift returns may be greater for bad (good) news following periods of high (low) investor sentiment than following periods of low (high) investor sentiment as the belief updating process occurs, and investors are able to confirm the direction of the initial news using subsequent information. Although not specifically addressing investor sentiment, Veronesi (1999) offers a similar prediction for

positive earnings surprises in low sentiment periods. He presents a rational expectations model where, due to uncertainty, investors underreact to good news in bad times. This initial underreaction may result in greater drift for good news following low sentiment periods relative to high sentiment periods.

Alternatively, if investors are uncertain about the true state of the market, they may immediately incorporate information contrary to their prior beliefs. Veronesi (1999) also models how prices can overreact to bad news in good times due to uncertainty. Instead of dismissing bad news during high sentiment periods, investors may immediately use the bad news to update their valuations. If investors more fully incorporate contrary news at the time of the earnings announcement, then drift returns may be greater for good (bad) news following periods of high (low) investor sentiment than following periods of low (high) investor sentiment. It is an open empirical question how, if at all, investor sentiment affects abnormal drift returns. There is limited prior research on the influence of investor sentiment on post-earnings announcement drift. Mian and Sankaraguruswamy (2012) report that upward (downward) price drift is greater during high (low) sentiment periods.

It is also possible that the accrual anomaly differs in periods of high and low sentiment. Testing the limited attention hypothesis (Hirshleifer and Teoh, 2003), Ali and Gurun (2009) estimate a regression of subsequent returns on total annual accruals and report that the coefficient on total annual accruals from this estimation is negatively associated with investor sentiment for small firms (but not for large firms). Based on this result, they suggest that mispricing of accruals is greater during high sentiment periods for small firms because investors pay less attention to the components of earnings during optimistic periods. However, Ali and Guran (2008) use one overall measure of annual accruals, rather than examining the market reactions to high and low accruals separately and, thus, leave open the question of whether investor sentiment influences the source of abnormal returns from such an accruals-based trading strategy.

So far, we have focused primarily on the long-run consequence of investor sentiment on asset prices. Brown and Cliff (2005) note the difficulties of documenting short-term investor sentiment effects. Nevertheless, there is a small but growing literature examining the effect of investor sentiment on short-run returns around earnings announcements. On one hand, investors may believe earnings news that is consistent with their prior beliefs and shrug off earnings news that contradicts their prior beliefs. Mian and Sankaraguruswamy (2012) report evidence that the price response to negative earnings surprises is greater during low sentiment periods than during high sentiment periods and that the price response to positive earnings surprises is greater during high sentiment periods than during low sentiment periods. On the other hand, good (bad) news may already be expected and impounded in price during high (low) sentiment periods. Instead of dismissing bad news during high sentiment periods, investors may use the bad news to update their beliefs (David, 1997; Veronesi, 1999). Conrad, Cornell and Landsman (2002) find that the negative reaction to bad news increases as the level of the market increases, where the level of the market is measured by the relative market P/E. They find less significant evidence that the positive reaction to good news decreases as the level of the market increases. The contradictory evidence from these prior studies suggests further research is warranted to understand how investor sentiment influences abnormal returns around earnings announcements.

SAMPLE SELECTION AND VARIABLE DEFINITIONS

We identify our sample using all firms with available data in Compustat from June 1987 through December 2005. This sample period spans 74 quarters (223 months). We eliminate observations with market values less than \$10 million, average total assets less than \$10 million, or a price per share less than \$1. The sample selection process results in 340,795 quarterly observations (1,061,418 monthly observations). Due to data limitations, the number of observations drops for the accruals tests.

For our monthly trading strategy tests, we calculate earnings surprises and accruals using the Compustat Point-In-Time (PIT) dataset. Every month we compute EPS Surprise as the most current split-adjusted, diluted earnings per share (excluding extraordinary items) for quarter t minus split-adjusted, diluted earnings per share for quarter $t-4$, scaled by price per share at the end of quarter t . Every month we compute accruals as net income before extraordinary items minus net cash flow from operations scaled by

average total assets during the quarter. Thus, our tests are similar to calendar time tests where the frequency of portfolio rebalancing is monthly. At each month-end, we form ten portfolios based on the level of earnings surprise or accruals, and then examine portfolio excess return for the subsequent month. We also examine the average return on a hedge portfolio that consists of long (short) positions in the most extreme positive (negative) decile of earnings surprises, or the lowest (highest) decile of accruals.

TABLE 1
DESCRIPTIVE STATISTICS

Variable	N	Mean	Std Dev	10 th Pctl	Median	90 th Pctl
<i>Drift and Short-Window Tests</i>						
Abnormal Return _{Drift Announcement}	340,795	0.004	0.296	-0.264	-0.013	0.256
Abnormal Return _{Announcement}	340,795	0.002	0.088	-0.081	0.000	0.086
EPS Surprise	340,795	-0.002	0.082	-0.020	0.000	0.015
Abnormal Return _{Drift SEC Filing}	161,914	0.004	0.301	-0.273	-0.012	0.260
Accruals	161,914	-0.014	0.066	-0.063	-0.011	0.036
Market Value (in millions)	340,795	2,044	10,886	25	198	3,128
Number of Analyst Forecasts	182,441	4.6	4.480	1	3	10
<i>Monthly Trading Strategy Tests</i>						
Abnormal Return _{NextMonth}	1,061,418	0.001	0.198	-0.151	-0.007	0.151
EPS Surprise	1,061,418	0.000	0.150	-0.029	0.001	0.025
Accruals	831,519	-0.011	0.063	-0.057	-0.009	0.039
Market Value (in millions)	1,061,418	2,047	10,838	25	194	3,138

For our quarterly-based drift and short-window tests, EPS Surprise equals I/B/E/S actual EPS minus the mean analyst EPS forecast during the 90-day period prior to the preliminary earnings announcement, scaled by price. When there is no analyst forecast, EPS Surprise equals net income before extraordinary items for quarter t minus net income for quarter $t-4$ scaled by market value at the end of quarter t . The quarterly earnings drift window spans day +2 through one day after the earnings announcement of the subsequent quarter, or 90 days if the subsequent announcement date is unavailable. The short-window abnormal returns are calculated for days -1 through +1, where day 0 is the earnings release date.

For the event time tests using accruals, we use the S&P Filings Dates database to identify precise SEC filing dates. We use only the first 10-Q or 10-K forms after the fiscal quarter or year end, and only if the filing was not more than 55 (100) days after the fiscal quarter (year) end. This ensures we exclude cases of late filings. Because EDGAR filings were voluntary prior to 1996, we exclude filings made prior to 1996. As with earnings, the drift returns are for days +2 through one day after the preliminary earnings announcement of the subsequent quarter, or 90 days if the subsequent announcement date is unavailable.

We calculate abnormal returns for our three sets of tests using daily return data from the Center for Research in Security Prices (CRSP). Abnormal Return is the buy and hold return on a stock minus the buy and hold return on the portfolio of stocks with similar size and book-to-market (B/M) ratio, cumulated over the respective period. We obtain the benchmark returns for the size and B/M portfolios from Professor Kenneth French's data library, which classifies the market into six (two size and three B/M) portfolios. Table 1 provides descriptive statistics for the variables used in our tests.

We measure investor sentiment monthly using the composite index developed by Baker and Wurgler (2006, 2007). We then assign each month in the sample to an investor sentiment tercile (low, neutral, or high). To avoid look-ahead bias for the trading strategy tests, we assign the terciles based on the current month's sentiment relative to previous sentiment levels. Month_{*t*} is assigned a tercile based on the distribution of investor sentiment from January 1966 (when monthly data is first available) through month *t*. That is, at each month-end, we re-estimate the investor sentiment rank using the same procedure used by Baker and Wurgler (2007). This procedure ultimately results in 35 low sentiment months, 134 neutral sentiment months, and 54 high sentiment months for our sample period.

TABLE 2
DRIFT RETURNS BY LEVEL OF INVESTOR SENTIMENT

<i>Panel A: Mean Abnormal Return_{Drift Announcement} in EPS Surprise Portfolios</i>					
EPS Surprise	Investor Sentiment				Test:
Decile Rank	All	Low	Neutral	High	Low = High
Lowest	-0.028	0.010	-0.017	-0.072	<.001
2	-0.017	0.003	-0.009	-0.046	<.001
3	-0.014	-0.007	-0.012	-0.021	<.001
4	-0.011	0.002	-0.017	-0.005	0.141
5	-0.002	-0.004	-0.003	0.003	0.070
6	0.005	0.002	0.006	0.007	0.215
7	0.015	0.021	0.015	0.009	0.008
8	0.021	0.031	0.022	0.012	<.001
9	0.031	0.055	0.031	0.019	<.001
Highest	0.039	0.079	0.042	0.013	<.001
All	0.004	0.019	0.006	-0.008	
n	340,795	48,506	199,478	92,811	

<i>Panel B: Mean Abnormal Return_{Drift SECFiling} in Accruals Portfolios</i>					
Accruals	Investor Sentiment				Test:
Decile Rank	All	Low	Neutral	High	Low = High
Lowest	0.019	0.056	0.037	-0.013	<.001
2	0.013	0.068	0.021	-0.012	<.001
3	0.012	0.033	0.023	-0.008	<.001
4	0.009	0.028	0.011	0.002	<.001
5	0.006	0.026	0.011	-0.004	<.001
6	0.003	0.010	0.005	-0.003	0.032
7	-0.002	0.011	-0.003	-0.003	0.035
8	-0.005	0.013	-0.005	-0.010	<.001
9	-0.002	0.028	0.003	-0.016	<.001
Highest	-0.013	0.019	-0.008	-0.027	<.001
All	0.004	0.029	0.01	-0.01	
n	161,914	16,582	81,431	63,901	

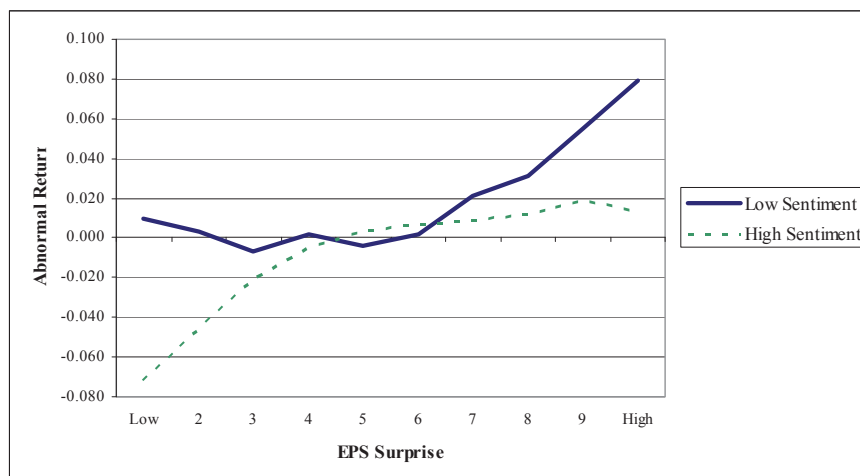
EMPIRICAL RESULTS

Quarterly Drift Returns

Table 2 presents mean abnormal drift returns for the overall sample and for each investor sentiment tercile. In Panel A, we report abnormal drift returns following the preliminary earnings announcement, spanning roughly a quarter (from two days after the preliminary earnings announcement through one day after the subsequent earnings announcement). For each quarter, observations are placed in deciles based on the most recent earnings surprise, where the lowest portfolio includes the most extreme “bad news” firms and the highest portfolio includes the most extreme “good news” firms for each quarter. Not surprisingly, the extreme negative earnings surprise observations have negative excess returns on average of -2.8% over the subsequent quarter and the extreme positive earnings surprise observations have an average excess return of 3.9%. Thus, the hedge portfolio yields about 6.7% per quarter, similar to the magnitudes reported in prior studies (see, e.g., the summary in Livnat and Mendenhall, 2006). The positive returns following the most extreme positive earnings surprises, though, are driven mainly by periods of low investor sentiment. For extreme good news, the mean drift for low investor sentiment periods is 7.9%, while the mean drift return for high investor sentiment periods is 1.3%. On the other hand, the mean drift return for extreme bad news following high investor sentiment is -7.2%, whereas the mean drift return for extreme bad news following low investor sentiment is 1.0%. The differences in abnormal drift returns across sentiment states are significant for both the extreme good news and extreme bad news deciles.

Figure 1 shows graphically the difference in returns patterns for low and high sentiment periods. Abnormal drift returns following low sentiment periods have a nonlinear, “hockey-stick” shape across the earning surprise deciles; that is, abnormal returns are relatively close to zero for most earnings surprise deciles and then spike for extreme good news. Abnormal returns following high sentiment periods follow the reverse pattern; that is, abnormal returns are relatively close to zero for most earnings surprise deciles and then plunge for extreme bad news. Overall, this evidence suggests that investor sentiment influences the source of abnormal returns following the preliminary earnings announcement.

FIGURE 1
DRIFT RETURNS IN LOW AND HIGH SENTIMENT PERIODS



In Panel B of Table 2, we place observations into accrual portfolios, where the lowest portfolio includes the most negative accruals and the highest portfolio includes the most positive accruals for each quarter. Generally, when accruals are relatively high, subsequent returns are low (Sloan, 1996), which is consistent with our overall results where the mean abnormal quarterly return in the lowest decile is 1.9% and the mean abnormal return in the highest decile is -1.3%. The positive returns for low accruals are driven by periods of low investor sentiment. The mean drift return for low accrual observations following low investor sentiment periods is 5.6%, whereas the mean drift return for low accrual observations following high investor sentiment periods is -1.3%. The negative returns in the highest accrual decile are driven by periods of high investor sentiment. The mean drift return for high accrual observations following high investor sentiment periods is -2.7%, whereas the mean drift return for high accruals following low investor sentiment periods is 1.9%. These results suggest that the level of investor sentiment influences the market's reaction to accrual information. Investors seem to be rewarded more when they select higher earnings quality firms (low accruals) during low sentiment.

TABLE 3
TRADING STRATEGY RETURNS BY LEVEL OF INVESTOR SENTIMENT

<i>Panel A: Abnormal Return_{Drift} Announcement for Extreme EPS Surprises (p-values below)</i>						
	Investor Sentiment			Test:	Test:	Test:
	Low	Neutral	High	Low	Low	Neutral
				High	Neutral	High
Short (Low EPS Surprise)	0.003 0.889	0.022 0.019	0.065 <.001	-0.062 0.024	-0.019 0.411	-0.043 0.016
Long (High EPS Surprise)	0.070 0.007	0.039 <.001	0.013 0.163	0.057 0.027	0.031 0.210	0.026 0.072
Hedge	0.073 <.001	0.061 <.001	0.078 <.001	-0.005 0.767	0.012 0.395	-0.017 0.121
n	12	44	18			
<i>Panel B: Abnormal Return_{Drift} SEC Filing for Extreme Accruals (p-values below)</i>						
	Investor Sentiment			Test:	Test:	Test:
	Low	Neutral	High	Low	Low	Neutral
				High	Neutral	High
Short (High Accruals)	-0.025 0.464	0.007 0.437	0.029 0.007	-0.054 0.167	-0.032 0.370	-0.022 0.085
Long (Low Accruals)	0.057 0.069	0.036 0.114	-0.014 0.345	0.071 0.028	0.021 0.497	0.050 0.064
Hedge	0.032 0.084	0.043 0.01	0.015 0.159	0.017 0.312	-0.011 0.587	0.028 0.128
n	4	21	14			

Table 3 reports drift returns for the extreme earnings surprise and accrual portfolios by level of investor sentiment. Holding good news firms following low sentiment periods earns drift returns of 7.0% on average, while holding good news firms following high sentiment periods earns only 1.3% on average as seen in Panel A. This difference is statistically significant ($p=0.027$). In addition, shorting bad news firms following high sentiment periods earns significantly higher drift returns than shorting bad news firms following low sentiment periods (6.5% versus 0.3%, difference significant with $p=0.024$). Panel B indicates that holding low accrual firms results in significantly higher drift returns following low sentiment periods than following high sentiment periods ($p=0.028$).

Overall, the results in Tables 2 and 3 indicate that investor sentiment influences subsequent drift returns. In particular, it appears that firms with extreme positive earnings surprises and low accruals earn higher abnormal returns after a period of low sentiment than after a period of high sentiment. In the next sub-section, we provide additional evidence on the effect of investor sentiment using a more conservative trading strategy approach – calendar time tests where the portfolio is rebalanced monthly.

TABLE 4
MONTHLY RETURNS BY LEVEL OF INVESTOR SENTIMENT

<i>Panel A: Mean Abnormal Return_{NextMonth} in EPS Surprise Portfolios</i>					
EPS Surprise Decile Rank	Investor Sentiment				Test:
	All	Low	Neutral	High	Low = High
Lowest	-0.012	-0.002	-0.009	-0.022	<.001
2	-0.006	0.000	-0.005	-0.01	<.001
3	-0.002	0.000	-0.002	-0.003	0.014
4	0.001	0.003	0.001	0.001	0.151
5	0.006	0.002	0.005	0.009	<.001
6	0.005	0.006	0.003	0.007	0.332
7	0.004	0.007	0.003	0.004	0.131
8	0.005	0.008	0.004	0.005	0.040
9	0.006	0.013	0.005	0.003	<.001
Highest	0.004	0.018	0.006	-0.007	<.001
All	0.001	0.006	0.001	-0.001	
n	1,061,418	142,045	616,710	302,663	
<i>Panel B: Mean Abnormal Return_{NextMonth} in Accruals Portfolios</i>					
Accruals Decile Rank	Investor Sentiment				Test:
	All	Low	Neutral	High	Low = High
Lowest	0.003	0.015	0.006	-0.006	<.001
2	0.004	0.012	0.006	-0.002	<.001
3	0.004	0.008	0.007	-0.002	<.001
4	0.003	0.005	0.003	0.000	0.004
5	0.001	0.006	0.000	0.000	0.001
6	0.001	0.003	0.000	0.003	0.941
7	0.000	0.005	-0.001	0.00	0.004
8	-0.001	0.004	-0.002	-0.001	0.033
9	-0.002	0.006	-0.003	-0.003	<.001
Highest	-0.004	0.002	-0.004	-0.008	<.001
All	0.001	0.007	0.001	-0.002	
n	831,519	120,401	467,046	244,072	

Monthly Trading Strategy

Table 4 presents mean monthly abnormal returns for the overall sample and for each investor sentiment tercile. In Panel A, observations are again placed in ten portfolios based on the most recent earnings surprise for each month. The extreme negative earnings surprise observations have negative excess returns on average of -1.2% in the subsequent month and the extreme positive earnings surprise observations have an average excess return of 0.4%. The positive return for extreme good news is driven by periods of low investor sentiment. The mean abnormal return for the good news decile following months of low investor sentiment is 1.8%, whereas the mean abnormal return for good news following months of high investor sentiment is -0.7%. On the other hand, the negative returns on the most extreme negative earnings surprises, though, are driven mainly by periods of high investor sentiment. The mean abnormal return for the bad news decile following months of high investor sentiment is -2.2%, whereas the mean abnormal return for bad news following months of low investor sentiment is only -0.2%.

In Panel B of Table 4, we place observations into accrual portfolios, where the lowest portfolio includes the most negative accruals and the highest portfolio includes the most positive accruals. The mean abnormal return in the lowest decile is 0.3% and the mean abnormal return in the highest decile is -0.4%. The positive returns for low accruals are driven mainly by periods of low investor sentiment. The mean abnormal return for low accrual observations following months of low investor sentiment is 1.5%, whereas the mean abnormal return for low accrual observations following months of high investor sentiment is -0.6%. The negative returns in the highest accrual decile are driven mainly by periods of high investor sentiment. The mean abnormal return for high accrual observations following months of high investor sentiment is -0.8%, whereas the mean abnormal return for high accruals following months of low investor sentiment is 0.2%.

In untabulated tests, we compute abnormal returns from a trading strategy that assumes long (short) positions in firms in the highest (lowest) decile of earning surprises. This strategy earns an abnormal hedge return of 1.6% on average over the subsequent month for the overall sample. Again, the source of this abnormal return differs across sentiment levels. Holding good news firms following low sentiment months earns significantly higher returns than holding good news firms following high sentiment months (1.4% versus -0.6%, statistically different with $p=0.04$). We find no significant difference in the abnormal returns earned from shorting bad news firms across sentiment levels.

We also examine a trading strategy that assumes long (short) positions in firms in the lowest (highest) decile of accruals. Recall that Ali and Guran (2009) report that mispricing of annual accruals is greatest during periods of high sentiment but do not separate high versus low accrual firms or compute hedge returns. We find that overall hedge returns vary across sentiment levels. Both the low and neutral sentiment periods yield statistically significant hedge returns. Interestingly, our results indicate that the high sentiment period does not yield a significant hedge return, contrary to Ali and Guran (2008). The evidence suggests that there is no benefit to shorting high accruals following low sentiment or holding long positions in firms with low accruals following high sentiment. Similar to Panel B of Table 3, holding low accrual firms following low sentiment periods earns significantly higher monthly returns than holding low accrual firms following high sentiment months (1.3% versus -0.5%, statistically different with $p=.049$).

Results from the traditional quarterly drift tests and the monthly calendar time tests indicate that investor sentiment appears to play a role in how accounting-based anomalies unfold. We document that subsequent abnormal returns are greater when firms report earnings or accruals which seem to contradict the given mood of the market (i.e., bad news in high sentiment periods). Thus far, our evidence suggests that some investors initially underreact to new information and that subsequent returns reflect the belief updating process which occurs when investors are able to confirm the direction of the initial (contradictory) news using additional information. We provide further evidence on the role of investor sentiment by investigating the short-term reactions to earnings surprises in the next sub-section.

Short-Window Returns

We report abnormal returns during the three-day window surrounding the disclosure of preliminary earnings by level of investor sentiment. For these tests, we measure investor sentiment during the month in which the preliminary earnings announcement occurs. Table 5 presents mean abnormal returns surrounding the preliminary earnings announcement using all available earnings surprises (analyst forecast error when available and seasonal random walk forecast otherwise). Observations are placed in deciles based on the most recent earnings surprise, where the lowest decile includes the most extreme “bad news” firms and the highest decile includes the most extreme “good news” firms. The mean short-window return for the good news decile during low investor sentiment is 3.4%, whereas the mean short-window return for good news during high investor sentiment is 3.0%. Alternatively, the mean short-window return for the extreme bad news decile during a period of high investor sentiment is -2.8%, whereas the mean short-window return for bad news during a period of low investor sentiment is -2.3%. This evidence suggests that good news is rewarded slightly more when investor sentiment is low and bad news is punished slightly more when investor sentiment is high, which is generally consistent with Conrad, Cornell and Landsman (2002).

TABLE 5
EARNINGS ANNOUNCEMENT RETURNS BY LEVEL OF INVESTOR SENTIMENT

EPS Surprise Decile Rank	Investor Sentiment				Test:
	All	Low	Neutral	High	Low = High
Lowest	-0.025	-0.023	-0.023	-0.028	0.046
2	-0.018	-0.021	-0.018	-0.019	0.217
3	-0.014	-0.018	-0.013	-0.014	0.012
4	-0.009	-0.011	-0.009	-0.01	0.608
5	-0.001	-0.002	-0.001	-0.002	0.741
6	0.008	0.007	0.008	0.010	0.018
7	0.013	0.015	0.013	0.013	0.224
8	0.016	0.020	0.015	0.016	0.009
9	0.021	0.024	0.020	0.021	0.041
Highest	0.030	0.034	0.030	0.030	0.030
All	0.002	0.003	0.002	0.002	
n	340,795	48,506	199,478	92,811	

Assuming we could actually create hedge portfolios each quarter with long (short) positions in the top (bottom) decile of all available earnings surprises, untabulated results indicate the average hedge excess return is 5.4%. Holding good news firms during low sentiment periods earns a return of 3.7% on average, while holding good news firms during high sentiment periods earns 2.9% on average. This difference is statistically significant ($p=0.047$). The difference in abnormal returns for extreme good news announcements during low sentiment periods compared to neutral sentiment periods is also significant ($p=0.032$). There is no statistical difference in shorting bad news firms during high sentiment periods than shorting bad news firms in low sentiment periods (2.7% versus 2.3%).

The short-window return results show that there may be slight differences in the immediate market reactions to extreme earnings surprises between high and low sentiment periods, but that these differences cannot completely explain the differences in subsequent month returns that we documented in the previous tests. To the extent that subsequent drift and monthly returns represent initial underreaction to the earnings surprises, the short-window results indicate that market participants correctly assess the news at the time of the preliminary earnings release, but possibly look for corroborating evidence when the

news conflict with their prevailing beliefs (i.e., good news during low sentiment or bad news during high sentiment). They react more fully once more information is subsequently revealed, resulting in the observed “hockey stick” patterns of Figure 2.

Analyst Forecast Revisions

Assuming the post-earnings announcement drift returns reported in Tables 2 and 3 result from initial underreaction to earnings surprises, in this final sub-section, we investigate the reaction of professional investors. In particular, we examine analysts’ annual earnings forecast revisions immediately following preliminary earnings announcements across the different sentiment periods. Bergman and Roychowdhury (2008) provide preliminary evidence that analyst’s long-horizon earnings forecasts are more optimistic during periods of high consumer confidence. Our analysis sheds further light on how, if at all, analysts behave differently depending on the relative mood of the market.

Table 6 presents the results from our analyst forecast revision tests for the full sample period and for each investor sentiment period. Because we limit the sample to those observations with the necessary data, including at least one forecast revision, the sample size for this test drops to 80,863 observations. The analyst forecast revision variable is defined as (number of upward revisions - number of downward revisions) divided by total number of revisions in the ten day period following a preliminary earnings announcement. The revisions are for annual earnings forecasts, where a revision is for the same analyst and the same forecast period. We place observations in deciles based on the most recent earnings surprise (analyst forecast error), where the lowest decile includes the most extreme “bad news” firms and the highest decile includes the most extreme “good news” firms.

TABLE 6
MEAN ANALYST FORECAST REVISIONS BY LEVEL OF INVESTOR SENTIMENT

EPS Surprise Decile Rank	Investor Sentiment			
	All	Low	Neutral	High
Lowest	-0.556	-0.615	-0.560	-0.498
2	-0.499	-0.597	-0.495	-0.442
3	-0.479	-0.507	-0.479	-0.462
4	-0.303	-0.307	-0.329	-0.244
5	0.046	-0.003	0.013	0.150
6	0.320	0.219	0.323	0.374
7	0.435	0.368	0.437	0.472
8	0.510	0.467	0.532	0.489
9	0.540	0.528	0.540	0.548
Highest	0.519	0.508	0.529	0.502
All	0.070	0.014	0.070	0.107
n	80,863	13,934	46,090	20,839

Consistent with Bergman and Roychowdhury (2008), we document that, overall, analysts issue more upward revisions during periods of high sentiment (0.107) than during periods of low sentiment (0.014). However, this result is not uniform throughout the earnings surprise distribution. During periods of low sentiment, the mean analyst forecast revision following extreme bad news is -0.615 while, during periods of high sentiment, the mean analysts forecast revision following the same level of extreme bad news is only -0.498. Untabulated results indicate that this difference is statistically significant (p-value < 0.001). This result suggest that during periods of high investor sentiment analysts may “underreact” to extreme bad news by not revising subsequent forecasts downward to the same extent they do during low and neutral sentiment periods. On the other hand, for extreme good news surprises, there is no statistical

difference in the mean analyst forecast revision during periods of low investor sentiment (0.508) and during periods of high investor sentiment (0.502). This result suggests that analysts can still be optimistic during low sentiment periods. In summary, we report evidence that analysts' reactions to earnings surprises generally vary by the level of investor sentiment, except in the most extreme good news deciles.

CONCLUSION

The evidence presented in this paper suggests that investors' overall level of optimism or pessimism can influence market reactions to earnings surprises and accruals. Our quarterly drift and monthly trading strategy tests indicate that the upward (downward) stock price drift following extreme positive (negative) earnings surprises is greater for low (high) investor sentiment periods than for high (low) investor sentiment periods. In particular, our results consistently show that holding extreme goods news firms following low sentiment periods earns significantly higher excess returns than holding goods news firms following high sentiment periods. In addition, holding low accrual firms following low sentiment periods earns significantly higher excess returns than holding low accruals firms following high sentiment periods. We also provide some evidence that the price response to positive earning surprises around the preliminary earnings announcement is greater in low sentiment periods than in high sentiment periods. This study extends the literature on investor sentiment by examining a specific setting in which market prices depart from and then revert back to intrinsic value within a quarter. The results of this study may also be relevant to professional investors attempting to earn excess returns from a joint strategy combining accounting-based anomalies and investor sentiment.

REFERENCES

- Ali, A., & Gurun, U. G. (2009). Investor sentiment, accruals anomaly, and accruals management. *Journal of Accounting, Auditing & Finance*, 24(3), 415-431.
- Ball, R., & Bartov, E. (1996). How naive is the stock market's use of earnings information? *Journal of Accounting and Economics*, 21(3), 319-337.
- Ball, R., & Brown, P. (1968). An empirical evaluation of accounting income numbers. *Journal of Accounting Research*, 159-178.
- Baker, M., & Wurgler, J. (2006). Investor sentiment and the cross-section of stock returns. *Journal of Finance*, 61(4), 1645-1680.
- Baker, M., & Wurgler, J. (2007). Investor sentiment in the stock market. *Journal of Economic Perspectives*, 21(2), 129-152.
- Barberis, N., Shleifer, A., & Vishny, R. (1998). A model of investor sentiment. *Journal of Financial Economics*, 49(3), 307-343.
- Battalio, R. H., Lerman, A., Livnat, J., & Mendenhall, R. R. (2012). Who, if anyone, reacts to accrual information? *Journal of Accounting and Economics*, 53(1-2), 205-224.
- Bergman, N. K., & Roychowdhury, S. (2008). Investor sentiment and corporate disclosure. *Journal of Accounting Research*, 46(5), 1057-1083.
- Bernard, V. L., & Thomas, J. K. (1989). Post-earnings-announcement drift: delayed price response or risk premium? *Journal of Accounting Research*, 27, 1-36.
- Bernard, V. L., & Thomas, J. K. (1990). Evidence that stock prices do not fully reflect the implications of current earnings for future earnings. *Journal of Accounting and Economics*, 13(4), 305-340.
- Brown, G. W., & Cliff, M. T. (2005). Investor sentiment and asset valuation. *Journal of Business*, 78(2), 405-440.
- Collins, D. W., & Hribar, P. (2000). Earnings-based and accrual-based market anomalies: one effect or two? *Journal of Accounting and Economics*, 29(1), 101-123.
- Conrad, J., Cornell, B., & Landsman, W. R. (2002). When is bad news really bad news? *Journal of Finance*, 57(6), 2507-2532.

- Daniel, K., Hirshleifer, D., & Subrahmanyam, A. (1998). Investor psychology and security market under- and overreactions. *Journal of Finance*, 53(6), 1839-1885.
- David, A. (1997). Fluctuating confidence in stock markets: Implications for returns and volatility. *Journal of Financial and Quantitative Analysis*, 32(4), 427-462.
- De Long, J. B., Shleifer, A., Summers, L. H., & Waldmann, R. J. (1990). Noise trader risk in financial markets. *Journal of Political Economy*, 98(4), 703-738.
- Edwards, W. (1968). Conservatism in human information processing. In: B. Kleinmütz (Ed.), *Formal Representation of Human Judgment* (pp. 17-52). New York, NY: John Wiley and Sons.
- Foster, G., Olsen, C., & Shevlin, T. (1984). Earnings releases, anomalies, and the behavior of security returns. *Accounting Review*, 59(4), 574-603.
- Hirshleifer, D., & Teoh, S. H. (2003). Limited attention, information disclosure, and financial reporting. *Journal of Accounting and Economics*, 36(1-3), 337-386.
- Kumar, A., & Lee, C. M. (2006). Retail investor sentiment and return comovements. *Journal of Finance*, 61(5), 2451-2486.
- Lemmon, M., & Portniaguina, E. (2006). Consumer confidence and asset prices: Some empirical evidence. *Review of Financial Studies*, 19(4), 1499-1529.
- Livnat, J., & Mendenhall, R. R. (2006). Comparing the post-earnings announcement drift for surprises calculated from analyst and time series forecasts. *Journal of Accounting Research*, 44(1), 177-205.
- Mian, G. M., & Sankaraguruswamy, S. (2012). Investor sentiment and stock market response to earnings news. *The Accounting Review*, 87(4), 1357-1384.
- Odean, T. (1998). Volume, volatility, price, and profit when all traders are above average. *Journal of Finance*, 53(6), 1887-1934.
- Rendleman Jr, R. J., Jones, C. P., & Latané, H. A. (1987). Further insight into the standardized unexpected earnings anomaly: Size and serial correlation effects. *Financial Review*, 22(1), 131-144.
- Sloan, R. G. (1996). Do stock prices fully reflect information in accruals and cash flows about future earnings? *Accounting Review*, 289-315.
- Tetlock, P. C. (2007). Giving content to investor sentiment: The role of media in the stock market. *The Journal of Finance*, 62(3), 1139-1168.
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185(4157), 1124-1131.
- Veronesi, P. (1999). Stock market overreactions to bad news in good times: a rational expectations equilibrium model. *Review of Financial Studies*, 12(5), 975-1007.