

Investor Sentiment and Stock Market Response to Corporate News

G. Mujtaba Mian
The NUS Business School
National University of Singapore
Singapore
E-mail: bizgmm@nus.edu.sg

Srinivasan Sankaraguruswamy
The NUS Business School
National University of Singapore
Singapore
E-mail: bizsrini@nus.edu.sg

November 13, 2007

PRELIMINARY DRAFT

Discussions with Roni Michaely, Inmoo Li, He Wen, A. Subramanyam, Harrison Hong, Sugato Bhattacharya and Shen Jianfeng helped us improve the paper. We thank Inmoo Lee and Joseph Lakonishok for providing us the data on stock repurchases. We also acknowledge the financial support of National University of Singapore for the completion of this research.

Investor Sentiment and Stock Market Response to Corporate News

ABSTRACT

We test the hypothesis that the prevailing market-wide investor sentiment sways the stock market response to good and bad corporate news in the direction of the sentiment. We use the Baker and Wurgler (2006) index of investor sentiment, and investigate stock price response to earnings shocks. Consistent with our hypothesis, we find that the three-day announcement period return for positive (negative) earnings news is greater for the earnings that are announced during high (low) sentiment periods than those announced during low (high) sentiment periods. Furthermore, the effect of sentiment persists in the near term. Over the 60 days following the announcement of earnings, the well-documented stock price drift associated with positive (negative) earnings news is greater for the earnings that are announced during high (low) sentiment periods than those that are announced during low (high) sentiment periods. In the cross-section, the relation between sentiment and the stock price response to news is more pronounced for small stocks, young stocks, volatile stocks, non-dividend paying stocks and distressed stocks.

Keywords: Investor Sentiment, Corporate News, Event Studies, Behavioral Finance

JEL Classification: D14, D21, G24

I. Introduction

Do waves of *market-wide* optimism or pessimism, or investor sentiment¹, influence the stock market response to *firm specific* news? According to the efficient markets view, the answer is an unequivocal no—stock prices in efficient markets have little to do with non-fundamental factors such as sentiment. Motivated by this view, the voluminous event study literature in finance and other areas of economics typically pool together events that happen during boom times with events that happen during bear periods. Tests are then conducted, for instance, to quantify the impact of various corporate events on the fundamental value of the firm² under the maintained assumption that stock price reaction to corporate news is independent of the state of the stock market.

In contrast, both the anecdotal evidence³ and several papers in the recent behavioral finance literature suggest that the prevailing sentiment could significantly influence the way investors respond to new information and update their belief. One strand of this literature provides evidence that the optimism reflected in generic non-economic proxies of investor mood is positively correlated with the optimistic beliefs about future economic conditions (Hirshliefer and Shumway (2003), Edmans, Garcia and Norli (2007), and Puri and Robinson (2007)). To the extent that extreme bouts of market-wide investor sentiment and the mood of marginal investor are intertwined, the link between positive mood and optimistic assessments of future prospects implies a similar relation between positive sentiment and optimistic assessment of new information by investors. Furthermore, a related strand of the recent behavioral literature focuses directly on developing measures of sentiment and relating these to expected stock return (Baker and Wurgler (2006, 2007), Lemmon and Portniaguina (2006), Qiu and Welch (2006), Brown and Cliff (2005)). This literature begins with the premise that shocks to speculative demand combine with limits on arbitrage to generate mispricing in stocks. The speculative demand tends to be high (low) during periods of high (low) sentiment, which pushes up (down) the contemporaneous stock prices, and lowers (increases) the future stock returns. Given that investors often trade

¹ One could broadly define investor sentiment as the beliefs about future cash flows or discount rates that are not supported by the prevailing fundamentals (Lemmon and Portniaguina (2006), p. 1499, and Baker and Wurgler (2006), page 6). This excessive optimism or pessimism may be associated with investors trading on noise (Black (1986)) or on popular models (Shiller (2005)).

² Kothari and Warner (2006) note that more than 500 event studies have been published in top finance journals, many of which rely on the stock market reaction to news as the primary yardstick for ascertaining the value impact of the news.

³ The following comments are typical of the views frequently expressed by financial press. “Gauging how investors respond to news is a classic way of reading investor sentiment. In a bull market, investors respond positively to good news. In a bear market, investors use any strength generated in a stock from positive news as an opportunity to sell.When information becomes ubiquitous and trading costs become zero, anything becomes an excuse to buy or sell, depending on that day’s Zeitgeist. ...” Susan Pulliam, Good News is No News for Tech Stocks, *Wall Street Journal*, 24 May 2000.

heavily around significant corporate news announcements⁴, during high (low) sentiment periods when speculative demand is high (low), investors are more likely to bid up (down) the price around a corporate news announcement. Specifically, the stock price response to good (bad) news that arrives in high sentiment period is likely to be greater (lower) than the stock price response to good (bad) news that arrives during low sentiment period, other things being equal.

Equally importantly, some of the most cited cognitive biases on the part of individuals, observed in the experimental psychology and noted in the behavioral finance literature, provide micro foundations for a hypothesized relation between sentiment and stock market response to corporate news. Individuals tend to suffer from *confirmatory bias* whereby they interpret new evidence in a fashion consistent with their prior beliefs. They are reluctant to accept the inconsistent facts, attributing these to luck or faulty data gathering (Barberis and Thaler (2003), and Hirshliefer (2001)). The confirmatory bias would, therefore, lead investors to respond more strongly to good (bad) news during periods of high (low) sentiment. Moreover, as Shiller (2005) argues, investors have a tendency to form their expectations about future price changes by *anchoring* on recent price changes. The *representativeness* heuristic reinforces such extrapolation of the recent price trends. The problem gets especially severe if, as Statman, Thorley and Vorkink (2006) note, investors ignore that “rising water lifts all boats” and anchor on the absolute value of recent price changes rather than on changes relative to the market. Consequently, in time of high (low) sentiment, which tend to be preceded by stock price increases (drops), investors underreact to bad (good) news as they believe the stock price would continue its recent rise (drop). *Overconfidence*, social interaction⁵ and media also play a critical role in reinforcing the representativeness heuristic and in persuading investors to underreact to evidence that contradicts the prevailing sentiment (Shiller (2005)).

Understanding the impact of sentiment on stock market response to news could yield new perspectives on key debates in financial economics. First, despite a number of recent studies, the debate on the importance of sentiment is far from settled, and much remains to be learnt about the role sentiment plays in financial markets. The evidence in recent studies that stocks are mispriced in the direction of the sentiment raises the possibility that a significant amount of this mispricing occurs on the days of the arrival of news. Specifically, overreaction (underreaction) of investors to good news or underreaction (overreaction) to bad news during periods of high (low) sentiment could be an important channel through which stocks become overpriced (underpriced) during high (low) sentiment periods. A confirmation of this would not only help identify a channel through which sentiment causes mispricing but would also suggest that the importance of sentiment documented in the recent literature is not spurious. Second, by focusing on the effect of sentiment on stock price response in the short window around the announcement

⁴ This is especially true for small investors that might be more prone to speculative demand shocks. For example, Lee (1992), and Battalio and Mendelhall (2005), among others, find that while both large and small traders increase their trading around earnings announcements, small traders do so much more than their large counterparts.

⁵ For example, in a survey of individual investors, Kuran and Sunstein (1999) describe the process of belief formation as leading to “availability cascades”, wherein an expressed perception is perceived to be more plausible as a consequence of its increased availability in public discourse.

of news, one could garner fresh evidence on the efficiency of the instantaneous response of the stock market to new information. Many researchers interpret the evidence accumulated in the voluminous event studies literature as an indication that human psychology plays no role in how markets respond to news, and treat the evidence as a key pillar in support of the efficient market hypothesis (see, for example, Fama (1991) and Ross (2005)).⁶ Any evidence that proxies of sentiment influence the stock market response to news would call into question the efficiency of the stock market's instantaneous reaction to news. Finally, the event-study methodology has been widely used by researchers in finance and other areas of economics, to quantify the impact of various corporate events on the fundamental value of the firm.⁷ In a world where the stock market reaction to news varies significantly across periods of high and low sentiment, it is not clear how useful it is to rely solely on the market reaction as a measure of the valuation impact of the news event.

In this paper, we examine empirically how the prevailing sentiment influences stock market response to news. Specifically, we test the hypothesis that prevailing sentiment sways the stock market response to news in the direction of the sentiment. That is, stock market response to good news is greater during high sentiment periods than that during low sentiment periods. Similarly, stock market response to bad news is greater during low sentiment periods than that during high sentiment periods.

To test our hypothesis, we rely on the proxies of the sentiment developed by Baker and Wurgler (2006, 2007). Baker and Wurgler (2007) sentiment index is based on six proxies: trading volume as measured by NYSE turnover, the dividend premium, the closed-end fund discount, the number and first day returns on IPOs, and the equity share in new issues. This index is available at monthly frequency. The corporate news event we primarily focus on is earnings surprises, although in the latter part of our paper, we confirm the robustness of our results for several other corporate events including dividend changes, stock splits and stock repurchases. Earnings news is perhaps the most prominent news event, which unlike many other corporate events, is not voluntary and is a regular feature of corporate calendars. We measure the news content of an earnings announcement by comparing the actual earnings with the analyst consensus forecast in the month prior to the earnings announcement date. We use the standard event study methodology and examine the 3-day abnormal returns around the announcement of the news events. Our analyses incorporate standard control variables that have been identified by prior research to explain the stock price reaction to earnings surprises. Our results indicate that market reacts more to good news during high sentiment periods than during low sentiment periods. Similarly, market reacts more to bad news during low sentiment periods than during

⁶ While some studies, done over the last decade or so, have documented incidents of over and underreaction of news by documenting medium term drift in returns following the announcement of news (references), this evidence has been challenged on account of inconsistent out-of-sample evidence and on methodological grounds (Brav (2000)).

⁷ For example, Kothari and Warner (2006) report that more than 500 event studies have been published in top finance journals, many of which rely on the stock market reaction to news as the primary yardstick for ascertaining the value impact of the news.

high sentiment periods. We confirm that our results also hold for other corporate events, namely dividend changes, stock splits and stock repurchases.

We also examine the stock returns in the 60 days following the announcement of earnings news to see if the effect of sentiment persists or reverses during this period. The results indicate that sentiment continues to impact the stock price behavior in the period subsequent to the earnings announcement. That is, the upward stock price drift following positive earnings news, commonly documented by prior literature, is greater when earnings are announced in high sentiment periods than those that are announced during low sentiment periods. Similarly, the downward stock price drift following negative earnings news is greater for earnings that are announced during low sentiment periods. In fact, we find that there is no drift associated with negative earnings shocks that are announced during high sentiment periods. This is probably not surprising given that the sentiment measure we use has very high persistence—the autocorrelation coefficient for the monthly Baker-Wurgler index is 0.95 during our sample period. This is also consistent with the recent sentiment literature that argues that the effect of sentiment persists over weekly and monthly frequency, and reverses only at yearly horizons (Brown and Cliff (2004, 2006) and Baker and Wurgler (2006)).

The behavioral finance literature suggests that firms that are more difficult to value and harder to arbitrage are more susceptible to sentiment impacting their stock prices (see, for example, Shleifer and Vishny (1997)). More specifically, Baker and Wurgler (2006) argue that firm size, age, stock price volatility, and growth prospects are the characteristics that delineate firms that are more or less susceptible to market sentiment. Therefore, we examine whether the influence of sentiment is stronger on investor response to news for small firms, young firms, volatile firms, and growth firms. We find that sentiment indeed plays a greater role in determining the stock price reaction to corporate earnings news for these firms than for other firms.

While we document that stock market response to good (bad) news is stronger during high (low) than low (high) sentiment periods, our tests, per se, cannot discern whether stock market overreacts to good (bad) news during high (low) sentiment period or underreacts to good (bad) news during low (high) sentiment periods. For this, we rely on recent studies, example, Baker and Wurgler (2006). These studies find that both high and low sentiment periods contributes to mispricing—stocks that are more prone to sentiment such as small stocks, earn unusually high returns following periods of low returns *and* earn unusually low returns following periods of high sentiment.

We also consider alternative explanations for our results, but rule them out for being inconsistent with some of the evidence. One possibility is that that investors' risk aversion changes across periods of high and low sentiment, and that explains market's differential reaction to news over time. However, we note that for this explanation to hold, stock price response to both good and bad news should be muted during periods of low sentiment. This is because during these times, investors' increased risk aversion pushes up the discount rate; and

any news about the future cash flows is, therefore, worth less in present value terms. Our results are not consistent with this explanation as we find that stock price reaction to bad news is greater during periods of low sentiment. It is also possible that good (bad) news released during high (low) sentiment period has greater information content, and market's greater response to good (bad) news during high (low) sentiment period simply reflects this differential strength of the news signal. To control for this possibility, we introduce the ex-post earnings change associated with each earnings surprise as an additional variable in our regression analyses. We find that our conclusion remains robust to the inclusion of this variable.

At least two recent papers have documented instances, albeit in narrow settings, where the stock market ignored the firm-level fundamentals apparently under the influence of the broad market sentiment. Lamont and Thaler (2003) document how in the case of equity carve-out of technology companies at the peak of the Internet bubble, investors valued non-technology parent and technology-oriented subsidiary companies at prices that violated the fundamental law of one price. Cooper, Dimitrov and Rau (2001) document that a mere alignment of a company's name to what is considered fashionable in the market can enhance stock price, even when the operations of the company are little changed. They document that at the peak of the Internet bubble, companies that added dotcom to their names experienced a cumulative abnormal return of 74% in the ten days surrounding the announcement of the name change. Our paper generalizes the findings in these studies by showing that the influence of sentiment on stock market reaction to news extends beyond the narrow settings of these studies.

The rest of the paper is organized as follows. In Section II, we discuss our data selection process and research methodology. In Section III, we report our results on the effect of sentiment on stock price response to earnings news. We then examine the effect of sentiment on stock price response for three other corporate events, namely, dividend changes, stock splits and stock repurchases in Section IV. We conclude the paper in Section V.

II. Data and Research Design

A. Data and Sample Selection

We extract the realized and forecast values of quarterly earnings from the IBES summary file. The IBES data for quarterly earnings is sparse for the years before 1985, so our sample period begins in 1985. We end our sample in 2005, as this is the last year for which the Baker-Wurgler Sentiment Index is available at the time of writing this paper. Since the date of the earnings announcement is critical in our study, we retain only those IBES earnings announcements for which the date of announcement is within one day of the corresponding date in the Compustat dataset. For each earnings announcement, we then define a 3-day event window centered on the date of the event, and compute the cumulative market-adjusted returns (CAR) using data from the Centre for Research in Security Prices (CRSP). For each firm and

each report date, the CRSP equally-weighted market returns are subtracted from the raw returns for each of the three days in the event window. The abnormal return for each day is then summed to compute the overall cumulative abnormal return for each earnings announcement.

To analyze the price impact of earnings news in the announcement period, unexpected earnings, UE, are computed as follows.

$$UE = \frac{\text{Actual Earnings} - \text{Consensus Forecast Earnings}}{\text{Beginning of the Month Stock Price}} \quad (1)$$

Consensus earnings forecast in Equation (1) is the median forecast available in the IBES monthly summary file for the month preceding the earnings announcement date. The stock price in the denominator is the share price as at the beginning the month in which the earnings is announced. In order to ensure stock splits or stock dividends do not impact our results, we remove observations where there is a stock split in the window of -40 to +5 days of the earnings announcement date. Further, to reduce the impact of outliers, we delete observations where unexpected earnings are less than 1% or greater than 99% of the distribution. Finally, consistent with the prior research, which shows earnings response coefficients are essentially zero for firms reporting negative earnings (Hayn (1995) and Lipe, Bryant, and Widener (1998)), we delete observations where firms report negative earnings.

We rely on the Baker-Wurgler measure of sentiment to test the key hypotheses in our paper. The monthly values of this index ending in 2005 are available from the web site of Jeffrey Wurgler⁸. It is derived through a principal component analysis of six measures of investor sentiment: closed-end fund discount, NYSE share turnover, number of IPOs, share of equity issues in total debt and equity issues, and dividend premium (the log difference of the average market-to-book ratios of payers and nonpayers). Each of these is first orthogonalized to the macroeconomic variables that capture variations in the business cycle, namely growth in industrial production index, consumer durables, consumer nondurables, and consumer services. Positive values of the index represent periods of high sentiment, whereas negative values represent low periods. Baker and Wurgler (2006, 2007) show that this sentiment index does a good job of explaining cross-sectional variation in expected stock returns. Figure 1 depicts the level of the Baker-Wurgler index over our sample period. Quite predictably, the index is negative in the years following the stocks market crashes of 1987 and 2000. Many of the years that experience the most bullish values of the index are from the period of the late 1990s.

B. Regression Specification

We measure stock market response to earnings news by the elasticity of stock prices to unexpected earnings at announcement dates. It is widely documented in the extant literature that

⁸ <http://pages.stern.nyu.edu/~jwurgler/>

stock market responds differently to good and bad earnings. Therefore, in our empirical design, we allow for the separate analyses of positive and negative unexpected earnings. We follow the prior literature (see, for example, Conrad, Cornell and Landsman (2002)) and create two indicator variables, UP and DOWN. The first variable, UP, is set equal to one if the unexpected earnings is positive and zero otherwise; the second, DOWN, is equal to one if the surprise is negative and zero otherwise. We then estimate a regression of the following basic form.

$$RET_{it} = \alpha_0 + \beta_0 UEUP_{it} + \beta_1 UEUP_{it} x PosSent_t + \gamma_0 UEDOWN_{it} + \gamma_1 UEDOWN_{it} x PosSent_t + \alpha_1 Size_{it} + \varepsilon_{it} \quad (2)$$

In this equation, RET_{it} is the cumulative abnormal return for firm i during the earnings announcement period as defined above. $UEUP$ ($UEDOWN$) is the product of the unexpected earnings, UE , as defined in Equation (1) above, and the indicator variable, UP ($DOWN$). This specification permits the slope on UE to be different, conditional on the sign of the earnings surprise. Prior literature shows that the stock price reaction to good news is stronger than the stock price reaction to bad news (Bartov, Givoly and Hayn (2002)).

The variable $PosSent$ in the above equation is an indicator variable that takes the value of one if the investor sentiment at the time of the earnings announcement is positive, and zero otherwise. The interaction variables, $UEUP \times PosSent$ and $UEDOWN \times PosSent$, therefore, allow us to test our key hypotheses that stock market responds more to good earnings news during high than low sentiment periods, and more to bad earnings news during low than high sentiment periods. $UEUP \times PosSent$ and $UEDOWN \times PosSent$, measure how market's response to good and bad earnings news, respectively, differs during periods of high sentiment relative to that during periods of low sentiment. The β_0 (γ_0) in the above equation would thus capture market's response to good (bad) earnings news when sentiment is low, whereas $\beta_0 + \beta_1$ ($\gamma_0 + \gamma_1$) would capture market's reaction when sentiment is high. If investors are swayed by the prevailing sentiment in their response to earnings news, we expect β_1 to be positive and statistically significant, and γ_1 to be negative and statistically significant.

Finally, to control for risk differences not already reflected in excess returns and to control for potential scale differences (Barth and Kallapur (1996)), we also add $Size$ as a control variable in the regression. $Size$ is defined as the decile rank of firm i as at the beginning of the month in which earnings is announced, where the ranks are assigned using the NYSE size breakpoints.

Besides estimating Equation (2), we also estimate the model after adding a number of control variables as specified below.

$$\begin{aligned}
RET_{it} = & \alpha_0 + \beta_0 UEUP_{it} + \beta_1 UEUP_{it} x PosSent_t + \beta_2 UEUP_{it} x FGrowth_{it} + \beta_3 UEUP_{it} x Time_t \\
& + \beta_4 UEUP_{it} x |UEUP_{it}| + \beta_5 UEUP_{it} x Size_{it} + \beta_6 UEUP_{it} x EVol_{it} \\
& + \gamma_0 UEDOWN_{it} + \gamma_1 UEDOWN_{it} x PosSent_t + \gamma_2 UEDOWN_{it} x FGrowth_{it} + \gamma_3 UEDOWN_{it} x Time_t \\
& + \gamma_4 UEDOWN_{it} x |UEDOWN_{it}| + \gamma_5 UEDOWN_{it} x Size_{it} + \gamma_6 UEDOWN_{it} x EVol_{it} \\
& + \alpha_1 Size_{it} + \varepsilon_{it}
\end{aligned}
\tag{3}$$

The first control variable we add in the model is the ex post realization of growth in earnings. It is possible that earnings news during positive and negative sentiment periods might contain different information about future earnings. To control for this possibility, we add the interaction variables $UEUP \times FGrowth$ and $UEDOWN \times FGrowth$ in the above equation to allow for the differential response of the market to earnings news that might carry more information about future earnings. $FGrowth$ is the difference between the 4-quarter-ahead earnings and the earnings in the current quarter, scaled by the stock price at the beginning of the month. The variable $FGrowth$ is set to missing whenever the current earnings are zero, since the percentage growth cannot be calculated in such cases.

The other control variables we add in Equation (3) are all motivated by the evidence in the extant literature, which find these to be important in explaining stock market response to earnings news. For instance, Francis and Schipper (1999) document that the stock market response to earnings news changes over time. To account for this trend in earnings response coefficient, we create the variable $Time$ which is a linear time trend variable. The interaction terms $UEUP \times Time$ and $UEDOWN \times Time$ allow the response to earnings news to change over time. Furthermore, the variables $UEUP \times |UEUP|$ and $UEDOWN \times |UEDOWN|$ allow for non-linearity in market's response to earnings news. Lipe, Bryant, and Widener (1998) document that market's responds proportionally less to positive and negative earnings news that are extreme. They argue that extreme earnings consist of a greater proportion of temporary and one time items and hence are of lower persistence, leading to a lower earnings response coefficient. Similarly, the variables $UEUP \times Size$ and $UEDOWN \times Size$ allow for the differential response of market to earnings news of small and large firms. Larger firms have higher analyst coverage and are covered more widely in the news media. Thus prices anticipate the information contained in an earnings surprise to a greater extent in large firms than in small firms. Finally, the variables $UEUP \times EVol$ and $UEDOWN \times EVol$ allow for the differential impact of earnings news for firms with greater earnings volatility. Firms with greater volatility in earnings tend to have lower persistence due to higher proportion of one time special items, and this leads to a lower earnings response coefficient for higher (lower) volatility firms. $EVol$ is computed as the standard deviation of previous four quarters' actual earnings divided by the beginning of the month stock price. Omitting such control variables would bias the coefficients downwards (Collins et al. 1989).

The behavior finance literature argues that the impact of behavioral biases is greater for stocks that are harder to value and difficult to arbitrage (see, for example, Shleifer and Vishny

(1997)). It is, therefore, likely that sentiment affects the stock price of such firms more than the prices of other firms (Lemmon and Portniaguina (2006), Qiu and Welch (2006), Brown (2006) Baker and Wurgler (2006, 2007)). There seems general agreement in the recent sentiment literature that small stocks are a natural candidate to fit this description. The trading in these stocks may be more dominated by small investors that might be more prone to sentiment, these stocks also tend to be difficult to value, and short-sale constraints tend to be more binding for such stocks. Accordingly, many of the recent papers establish the importance of sentiment for asset pricing by relating the lagged values of sentiment with the excess returns small stock earn relative to the returns on large stocks. Given this evidence, we hypothesize that the effect of sentiment on stock market response to news that we hypothesize is exacerbated for small stocks.

In addition, Baker and Wurgler (2006) argue that, besides small stocks, certain other categories of stocks are also more prone to sentiment. They find that young stocks, high volatility stocks, unprofitable stocks, non-dividend-paying stocks, extreme growth stocks, and distressed stocks are also more prone to sentiment. In our sample, we remove firms that report negative earnings from our sample, as noted earlier, so we cannot investigate profitability as a firm attribute in our cross-sectional tests. However, for all the other categories of stocks, young stocks, high volatility stocks, non-dividend-paying stocks, extreme growth stocks, and distressed stocks, we test the hypotheses that the impact of sentiment on stock market response to news is greater for stocks with these characteristics.

For each of these cross-sectional characteristics, we compute the value of each by following closely the computations in Baker and Wurgler (2006). All firm characteristics, except dividend payments and book values, are computed at monthly frequency using the CRSP files. *Size* is represented by the market capitalization which is computed for each stock at each month end using the CRSP dataset. *Age* is computed as the number of years since the firm's first appearance on CRSP, measured to the nearest month. *Stock return volatility* is measured as the standard deviation of monthly returns over the preceding 12 months. *Dividend payouts* are noted from Compustat and are computed once a year at the end of each June. Labeling of *growth* and *distressed* stocks is done using the book-to market ratios of the stocks. The book values are from Compustat and are computed at the end of each June, using the information contained in the financial statements of the year ending in the preceding December. These book values are then compared with the market value of the stocks for each month to compute monthly book-to-market ratios.

For each attribute, except for the classification of payers versus non-payers, we then rank all available firms within each month into deciles using the NYSE breakpoints. Firms that fall in the bottom 30% and top 30% are labeled as those with low and high values, respectively, with respect to the attribute. For instances, stocks that fall in the bottom (top) 3 deciles of size in each month are labeled as small (large) stocks. The book-to-market differs from the other characteristics in the sense that it helps identify both growth and distressed stocks. As in Baker and Wurgler (2006), we label the stocks with the highest 30% of the book-to-market ratios as the distressed stocks, and those with the lowest ratios as growth stocks. This labeling of stock

characteristics is then matched to the earnings announcements of the subsequent month. As noted above, following Baker and Wurgler, the classification of firms into payers versus non-payers is done once a year at the end of June. This identification then holds for the earnings announcements in the subsequent 12-month period.

To investigate cross-sectional differences in the impact of sentiment, we estimate Equation (2) separately for the sub-samples of stocks, which are created using each of the characteristics. For instance, to investigate whether firm size helps identify cross-sectional differences in the impact of sentiment. We divide our sample into three groups: small stocks (bottom 30%), medium-sized stocks (middle 40% of the stocks), and large stocks (top 30% of the stocks). We then estimate Equation (2) for each of the sub-group. If small stocks are more prone to sentiment, then we should observe that the economic and statistical significance of the interaction variables involving sentiment should be especially more pronounced for the sample of small stocks. The significance of the sentiment variables should diminish or disappear for large stocks. We follow the same procedure testing the role of the other four characteristics: age, stock return volatility, dividend payouts, and book-to-market ratios.

C. Summary Statistics

Our sample includes 166,134 earnings announcements over the years 1985-2005. In Table 1, we report the number of total quarterly earnings announcements for each year in Column (2). The number increases monotonically from 1985 through to 1998, after which it declines a little, especially after the bursting of the tech bubble. Looking at Columns (9) through (11), which depict the coverage of our sample relative to all the stocks in the CRSP NYSE/AMEX/NASDAQ database, it looks as if the increase in the number of firms in the earlier years of the sample is driven by both an increase in the number of the listed firms as well as an increase in coverage of firms by analysts. However, in later years of our sample, variations in the number of firms are primarily driven by changes in the number of listed firms. In general, the firms included in our sample represent 50% of all listed firm on NYSE/AMEX/NASDAQ by number and about 85% by market capitalization. The large median market capitalization reported in Column (12) reflects the well-known large firm bias of the analyst forecast data.

In Columns (3) through (8) of Table 1, we report the break up of the earnings announcements into those that carry positive shocks, negative shocks and no shocks. This last category represents the incidents where actual earnings were the same as that anticipated by the consensus analyst forecast. As the last row of the table indicates, across all year, the proportion of positive, negative and no-news earnings shocks has been 53%, 31% and 16%, respectively.

However, it is instructive to note the secular trends in the proportions of positive, negative and no-news earnings shocks. We report the proportion of positive, negative and no news earnings announcements as a function of the total earnings announcements for each year of our sample in Columns (4), (6) and (8), respectively. The proportion of negative earning shocks

experience a significant decline during our sample period. Negative shocks were about 50% of the total earnings shocks at the beginning of our sample in 1985. This proportion declines to slightly above 20% towards the later part of our sample. This drop in negative shocks has been accompanied by increases in the proportions of positive and no-news earnings announcements. The proportion of positive shocks increases from 40% to 60% during our sample period, whereas the proportion of no-news earnings announcements increases from about 6% to around 15%. In an unreported regression of the ratio of positive to negative earnings shocks on a linear time trend, the coefficient of the time trend is hugely statistically significant. A detailed investigation of what might explain the reduction in bad-news earnings announcements over time is beyond the scope of this paper, but it is plausible that markets have become increasingly adept at forecasting bad corporate earnings. Alternatively, managers may be more forthcoming in disclosing bad news, or/and may be manipulating reported earnings more to match the analyst forecasts.

More relevant issue from the perspective of our paper might be as to how the proportions of positive and negative earnings shocks vary with the prevailing sentiment. In untabulated results, we regress the ratio of positive to negative earnings shocks on the sentiment index and a linear time trend. While the coefficient for the sentiment index turns out to be positive, it is statistically insignificant. This is perhaps expected, in that we measure expectations of actual earnings fairly close to the date of the announcement of actual earnings, so there is no reason to expect that there should systematically be more positive (negative) shocks during periods of high (low) sentiment.

The summary statistics of the key variables in Equation (3) are reported in Table 2. The mean (median) 3-day abnormal return on the announcement of earnings is 0.37% (0.18%). This is the average response to all earnings shocks including positive, negative and no-news shocks. The range of these abnormal returns is from -24% to +24%. Baker-Wurgler Sentiment Index ranges from -0.648 to 1.994, with a mean (median) of 0.277 (-0.016). The earnings volatility, which is computed as the standard deviation of quarterly earnings of the last 4 quarters scaled by stock price, has a mean (median) of 0.87% (0.38%). The mean (median) growth in earnings, relative to that of the same quarter in the prior year, scaled by stock price is -5.43% (5%). The mean value of the variable Size, which is the size decile rank of firms using the NYSE breakpoints, is 4.64.

III. Stock Price Response to Earnings News across Periods of Positive and Negative Investor Sentiment

We report the results of our regression estimates in Table 3. In Column (2), we begin by estimating our base regression model in Equation (2) without the interaction variables involving sentiment. In this specification, the intercept captures the stock price response to those earnings announcements that equal the consensus analyst forecast and hence contain minimal information

content. Perhaps expectedly, therefore, the estimate for the intercept is economically small and statistically insignificant. The coefficient for the variable *FEUP*, which captures the sensitivity of stock price to positive earnings shocks, is 3.196 and is highly statistically significant with *t*-statistic of 65.6. This is hardly surprising, and is consistent with a large literature in accounting and finance which documents that earnings surprises contains strong information content, and that stock price reacts to this information. The coefficient of *FEDOWN*, which depicts stock price sensitivity to negative earnings shocks is 1.32 and is highly statistically significant with *t*-statistics of 30.2. Again, this is consistent with stock price moving in the direction of the earnings surprise. Further, the evidence of a larger coefficient for *FEUP* and *FEDOWN* is also consistent with the extant literature that finds that positive earnings surprises are usually taken to be more informative by the market than corresponding negative coefficients, possibly due to the possibility of managers taking earnings bath (see, for example, Conrad et al. 2002). The coefficient for the variable *Size* is negative and statistically significant. This is consistent with the unconditional returns of small stocks being greater than those on large stocks during our sample period.

In Column (2) of Table 3, we report the results of estimating Equation (2) with the interaction variables that capture the effect of sentiment on stock market sensitivity to positive and negative earnings shocks. In this specification, the coefficient for the variable *FEUP* captures market's response to positive earnings shocks during periods of negative market sentiment, whereas the coefficient of the interaction variable, *FEUPxPosSent*, indicates whether this response is different during periods of positive sentiment. The coefficient for *FEUP* reported in Column (3) is 3.09 (*t*-statistic = 49.4). The coefficient for the interaction variable is 0.24 with a *t*-statistics of 2.7. A positive and statistically significant coefficient indicates a stronger reaction of the market to the announcement of positive earnings shocks when the prevailing investor sentiment is positive. In economic terms, these coefficient estimates translate into stock price sensitivity to positive earnings shocks being 3.09 during periods of negative sentiment, and increases to 3.33 [=3.09+0.24] during periods of positive sentiment. This reflects an increase of about 8%. However, stronger effect of sentiment is observable for the negative earnings shocks. Not only is the coefficient for *FEDOWNxPosSent* is negative and highly statistically significant (*t*-statistic = 6.3), its economic magnitude -0.45 is large relative to the coefficient of *FEDOWN* which is 1.36 (*t*-statistic = 26.3). These numbers indicate a strong variation in the stock market sensitivity to negative earnings shocks across periods of positive and negative sentiment. The stock price sensitivity to negative earnings shocks is 1.36 during periods of negative sentiment and reduces to 0.92 [=1.36-0.44] during periods of positive sentiment. This represents a decrease of 32% in the sensitivity of the stock price to negative earnings shocks from negative to positive sentiment periods.

To check the robustness of our results to the inclusion of other control variables, we report the results of estimating Equation (3) in Columns (4) of Table 3. The key conclusions, regarding the role of sentiment in market's response to positive and negative earnings shocks remain unchanged with the inclusion of these control variables. Nevertheless, it is instructive to note the coefficient estimates of the control variables. *FGrowth* is the control variable that

captures the ex-post growth of actual earnings from the current quarter to the same quarter next year, and is meant to control for the possibility that earnings shocks announced during periods of positive sentiment might contain differential information about future corporate profit growth than those announced during periods of negative sentiment. The coefficient for the interaction variable $FEUP \times FGrowth$ is positive and statistically significant. This is consistent with the notion that the market has some ability to differentiate between earnings shocks based on what they entail for future corporate earnings. Similarly, the interaction variable $FEDOWN \times FGrowth$ is negative and statistically significant, again suggesting that market responds more to negative earnings shocks that are followed by less earnings in the future.

The other control variables in Column (4) were motivated by the prior literature finding these to be useful explanatory variables for stock market sensitivity to earnings news. In general, the coefficient estimates for these have the signs that are expected and are consistent with the prior studies. The coefficients for the non-linear terms, $FEUP \times Abs(FEUP)$ and $FEDOWN \times Abs(FEDOWN)$, are negative and significant, indicating that stock price response is proportionally less for large positive and negative earnings shocks. The coefficient for the interaction term $FEUP \times Size$ is negative and significant, indicating that market responds more to the positive earnings shocks for small firms. This is consistent with the notion of greater information asymmetry and hence greater information content of earnings shocks for small firms. However, the corresponding coefficient for $FEDOWN \times Size$ is positive and statistically significant, indicating that negative earnings shocks are treated more important for larger firms. Perhaps the negative news shocks are seen as transitory for small firms. Furthermore, it is also interesting to observe the negative coefficients for $FEUP \times EVol$ and $FEDOWN \times EVol$, indicating that market responds less to the earnings shocks of companies whose earnings are more volatile.

We also examine the stock returns in the 60 days following the announcement of earnings news to see if the effect of sentiment persists or reverses during this period. The results, reported in Table 4, indicate that sentiment continues to impact the stock price behavior in the period subsequent to the earnings announcement. That is, the upward stock price drift following positive earnings news, commonly documented by prior literature, is greater when earnings are announced in high sentiment periods than those that are announced during low sentiment periods. Similarly, the downward stock price drift following negative earnings news is greater for earnings that are announced during low sentiment periods. In fact, we find that there is no drift associated with negative earnings shocks that are announced during high sentiment periods. This is probably not surprising given that the sentiment measure we use has very high persistence—the autocorrelation coefficient for the monthly Baker-Wurgler index is 0.95 during our sample period. This is also consistent with the recent sentiment literature that argues that the effect of sentiment persists over weekly and monthly frequency, and reverses only at yearly horizons (Brown and Cliff (2004, 2006) and Baker and Wurgler (2006)).

So far in our regression analyses, we have used the indicator variable $PosSent$ to examine how earnings response coefficients vary across periods of bullish and bearish sentiment periods. Our conclusions about the significance of the sentiment remain robust to the use of sentiment as

a continuous variable in the interaction terms.

IV. Cross-Sectional Variation in the Role of Sentiment

A central theme in the behavior finance literature is that the impact of behavioral biases is not uniform across all stocks. Specifically, it is argued that behavioral biases would have greater impact on stocks that are harder to value and difficult to arbitrage (see, for example, Shleifer and Vishny (1997)). There seems general agreement in the recent sentiment literature that small stocks are a natural candidate to fit this description (Lemmon and Portniaguina (2006), Qiu and Welch (2006), Brown (2006) Baker and Wurgler (2006, 2007)). In addition, Baker and Wurgler (2006) argue that, besides small stocks, young stocks, high volatility stocks, non-dividend-paying stocks, extreme growth stocks, and distressed stocks, are also more prone to sentiment. To test the hypotheses that firms that have greater limits on arbitrage are more influenced by sentiment, we estimate Equation (2) separately for sub-samples of stocks sorted on these characteristics, and report the results in Table 5. In Panel A, we report the results of estimating Equation (2) for three sub-samples sorted on firm size. Panels B through E report similar results for sub-samples sorted on age, volatility, dividend payout and growth/distressed, respectively.

Examining Panel A, it is evident the effect of sentiment is more pronounced for small stocks, diminishes for the mid-sized stocks, and disappears altogether for the largest 30% of the stocks. In Column (2), the coefficients for both the interaction variables *FEUPxPosSent* and *FEDOWNxPosSent* are statistically significant indicating that the sensitivity of stock price to earnings shocks varies with sentiment for small stocks. The economic significance of the effect of sentiment is specially striking for the bad earnings news. The coefficient for *FEDOWN* is 1.16 (t -statistic = 15.9) which when compared to the coefficient of *FEDOWNxPosSent* of -0.54 (t -statistic = 5.7) suggest that the sensitivity of stock price to negative earnings shocks is 0.617 [=1.16-0.54] during positive sentiment periods and increases to 1.16 during negative sentiment period—an increase of 88%. For mid-sized stocks, the results reported in Column (3) show that sentiment influences sensitivity of stock price to positive news only, as the coefficient for *FEUPxPosSent* is statistically significant where the coefficient for *FEDOWNxPosSent* is not significant. Interestingly, both the interaction variables are insignificant in Column (4) indicating that for large firms, sentiment does not play an role in the sensitivity of stock prices to news. Overall, the results in Panel A are in line with the recent sentiment literature that argues that sentiment primarily influences small stocks where valuations are more subjective, where small investors are a more dominant proportion of the investor mix, and where arbitrage is difficult (see, for example, Baker and Wurgler (2007)).

The differential impact of sentiment on young firms is investigated in Panel B. Again the results are similar to those reported in panel A. Comparing the economic and statistical significance of the two interaction variables involving sentiment across Column (2) through (4) reveals that sentiment sways sensitivity to news of primarily young firms. In Column (3), which

report the estimates for young firms, the interaction variables, *FEUPxPosSent* and *FEDOWNxPosSent*, have the expected signs and are both statistically significant. In Column (4), which reports the estimates for old firms, the coefficient for *FEDOWNxPosSent* is statistically insignificant, indicating that the sensitivity of stock price to negative earnings shocks does not vary across positive and negative sentiment periods for old firms. Interestingly, the coefficient for *FEUPxPosSent* in Column (4) is of negative sign and is statistically significant (t -statistic = 2.6). This supports the idea in Baker and Wurgler (2007) that the effect of sentiment might even reverse for some of the stocks that are categorized by sentiment-driven investors more as bond-like investments. They argue that firms that are old, large, less volatile and that pay stable stream of dividends might be perceived by investors as bond-like, and might experience overpricing (underpricing) in periods of low (high) as investors flee to quality (look got growth).

The stock return volatility is another proxy for how likely the sentiment is to impact prices of a firm. In Panel C, we report the results of estimating Equation (2) on sub-samples of stock sorted on the volatility of the monthly stock returns over the preceding 12-month period. The results are again broadly consistent with the notion that sentiment plays a larger role in determining the sensitivity of stock price to earnings shocks of volatile than stable stocks. While, the coefficient for *FEUPxPosSent* is insignificant across all three sub-sample of stocks, the coefficient for *FEDOWNxPosSent* is economically and statistically more significant for volatile stocks in Column (2), and becomes insignificant for stable stocks in Column (4).

The dividend payers versus non-payers might be another useful distinction to identify firms whose prices are more likely to be affected by investor sentiment. In Panel D of Table 5, Column (2) reports the estimates of Equation (2) for non-payers, that is, firms that do not pay any dividend in the preceding year. In Column (4), we report the results for firms that fall in the top 30% in terms of their dividend payout among the group of the dividend paying firms. All the remaining firms are grouped in the middle sample, and the estimates for this group of firms are reported in Column (3). Examining Column (2), the interaction variable *FEUPxPosSent* is positive with a t -statistic of 1.6, so the effect of sentiment on sensitivity of stock price to positive earnings shocks seems limited for non-payers. However, the interaction variable *FEUPxPosSent* is negative, and is economically and statistically significant, indicating that sensitivity of stock price to negative earnings shocks vary significantly across positive and negative sentiment periods. In contrast to non-payers, the evidence for firms that pays the highest dividends reported in Column (4) is mixed. While there is evidence of the sensitivity to negative shocks to increase during periods of negative sentiment, the interaction variable capturing the effect of sentiment on stock price sensitivity to positive shocks, *FEUPxPosSent*, is of the opposite sign than one would expect if sentiment were to sway stock price sensitivity in the direction of the sentiment.

Finally, in Panel E of Table 5, we examine whether the relation between sentiment and stock market sensitivity to news exacerbate for distressed and growth firms relative to other firms. We label firms with the highest 30% of the book-to-market ratios as distressed firms and those with the lowest 30% of the book-to-market ratios as growth firms. The results indicate that the effect of sentiment is stronger for distressed firms, reported in Column (2) is stronger than

the firms with the medium levels of book-to-market ratios, depicted in Column (3). This is consistent with the notion that distressed firms are more prone to sentiment. However, the results for growth firms reported in Column (4) are not consistent with our hypothesis that sentiment plays a bigger role for the growth firms. Both the interaction variables involving sentiment, *FEUPxPosSent* and *FEDOWNxPosSent*, are insignificant for growth stocks.

In summary, our results in Table 5 show that sentiment plays a greater role in stock price sensitivity to news for small than for large stocks. There is also evidence that the role of sentiment is more pronounced for exacerbated for young stocks, high volatility stocks, non-dividend-paying stocks and distressed stocks. Overall, the results are consistent with the notion that sentiment plays more critical role for firms that are more difficult to value and harder to arbitrage. When sentiment is high, investors respond more to the good earnings news and less to the bad earnings news for these firms.

V. Sentiment and Stock Price Response to Other Corporate Events

Besides earnings announcements, other corporate events might also convey information about the firm to the market. In this section, we examine three such events: changes in dividends, the announcements of stock splits and the announcements of stock repurchases. Each of these events has been investigated in earlier studies, which find that stock price responds to each of these corporate news. Our focus in this section is to examine whether the sensitivity of the stock price to the announcement of these events varies systematically across periods of positive and negative sentiment. Dividend changes could be a good or bad news depending on whether the change is upward or downward, respectively. Stock prices should be more sensitive to dividend increases (decreases) when sentiment is positive (negative) than when sentiment is negative (positive). In contrast, stock splits and repurchases are good-news events, and we hypothesize that market would respond more positively to these events when sentiment is positive.

A. Sentiment and Market's Response to the Announcement of Changes in Dividends

To examine how sentiment influences stock price sensitivity to dividend changes, we extract the dividend data from CRSP. As in prior studies, we focus on changes in regular quarterly dividends (CRSP distribution code = 1232) for the companies listed on NYSE and AMEX. A dividend change is defined as the change in dividend over successive quarters divided by the dividend in the prior quarter. We exclude those dividend announcements whereby there was any other distribution from 10 days before the prior dividend to the 10 days after the current dividend. We also exclude the dividend announcements which occurred within 10 days of the announcements of actual earnings. Finally, we include only dividend announcements for common stocks only (share codes = 10 and 11). In total, we obtain a total of 52,832 observations of changes in regular quarterly dividends over the period 1985-2005. These include 6,575

dividend increases, 45,680 no changes, and 577 dividend decreases.

Using these data of dividend changes, we estimate a model similar to Equation (2), as specified below.

$$RET_{it} = \alpha_0 + \beta_0 DivUP_{it} + \beta_1 DivUP_{it}xPosSent_t + \gamma_0 DivDOWN_{it} + \gamma_1 DivDOWN_{it}xPosSent_t + \alpha_1 Size_{it} + \varepsilon_{it} \quad (4)$$

The variable *DivUp* is the amount of dividend change when the dividend change is positive, and zero otherwise. The interaction variable *DivUp_{it}xPosSent_t* allows for the response of the market to the announcement of dividend increases to vary across periods of positive and negative sentiment. If investors react more strongly to dividend increases when sentiment is positive, this interaction variable would be positive and statistically significant. Similarly, *DivDOWN* is the amount of dividend change when the dividend change is negative, and zero otherwise. The interaction variable *DivDown_{it}xPosSent_t* allows us to examine whether the market's response to dividend decreases varies across periods of positive and negative sentiment. A negative and statistically significant coefficient would indicate that market responds less to the news of dividend decreases during periods of positive sentiment. The regression is estimated using OLS and the pooled firm-event data. As before, to mitigate the effect of extreme observations on the regression estimates we winsorize the extreme 1% observations of dividend increases and decreases. The dependent variable of cumulative 3-day market-adjusted returns is also winsorized at 1% and 99%.

In Panel A of Table 6, we report the summary statistics of the variables included in Equation (4), whereas in Panel B, we report the estimates of the regression model. As expected, the coefficient for *DivUp* is a positive 0.013, and is statistically significant. This is consistent with the prior literature that documents positive stock price response to dividend increases. The variable of interest in our study, however, is the interaction variable *DivUp_{it}xPosSent_t*, which captures how stock price sensitivity to dividend increases differs across periods of positive and negative sentiment. The estimated coefficient for this variable is a positive 0.007 with a *t*-statistics of 1.85. This magnitude is economically very significant when compared to the coefficient for *DivUp*. Stock price sensitivity is 0.013 during periods of negative sentiment, and increases by more than 50% to 0.020 [=0.013 +0.007) during periods of positive sentiment.

Turning to dividend decreases, the coefficient for the variable *DivDown* captures the sensitivity of the stock price to dividend decreases during periods of negative sentiment, whereas the interaction variable *DivDown_{it}xPosSent_t* allows this sensitivity to change during periods of positive sentiment. As reported in Panel B of Table 6, the variable *DivDown* is significant and positive, indicating that stock price falls in response to the announcement of dividend decreases. The interaction variable *DivDown_{it}xPosSent_t* is negative (*t*-statistic of 1.9), consistent with the market responding less to dividend decreases in periods of positive sentiment. The coefficient estimate is also economically significant when compared to the coefficient of *DivDown*. Overall, our results in Table 6 indicate that stock price sensitivity to good and bad dividend news also

varies with sentiment, in a fashion that is broadly consistent with the evidence for the earnings news.

B. Sentiment and Market's Response to the Announcements of Stock Splits

Another corporate event that is treated as informative by market participants is stock splits. Unlike the announcements of earnings or dividends that could entail positive news, negative news or no news, stock splits are commonly perceived to be a positive information signals. To investigate whether market's positive reaction to the announcement of stock split is more pronounced when sentiment is high we proceed as follows. We extract all (i.e., 8,362) the stock splits and stock dividend announcements (CRSP distribution codes: 5523 and 5533) made by companies listed on NYSE/AMEX/NASDAQ over the period 1985-2005. This sample includes only those announcements whereby new stocks issued constitute at least 25% of the original issue. Finally, we include only common stocks (share codes = 10 and 11).

Using this sample of stock splits, we estimate the following regression model.

$$RET_{it} = \alpha_0 + \beta_0 PosSent_t + \gamma_0 SpFactor_{it} + \gamma_1 Size_{it} + \gamma_2 Time_t + \varepsilon_{it} \quad (7)$$

As before, *RET* is the 3-day event period return around the announcement of stock splits, and *PosSent* is an indicator variable that takes a value of one when the (monthly) Baker-Wurgler Sentiment Index is positive, and zero otherwise. *SpFactor* is the percentage of the new stocks issued. *Size* is the size rank of the stock as at the beginning of the earnings announcement month. *Time* is the time trend variable that aims to capture any variation over time in market's response to stock splits. As before, we winsorize the continuous variables in the above regression, *RET* and *SpFactor*, at 1% and 99% to avoid extreme values influencing our estimates. The regression is estimated using OLS and the pooled firm-event data.

In Table 7, we report the results of our estimation. The coefficient for the variable, *PosSent*, is 0.005 with a *t*-statistic of 4.1. A positive coefficient indicates that the response of market to the announcement of stock splits is greater when sentiment is positive. The evidence for stock splits, therefore, is consistent with the evidence reported earlier for earnings and dividend news, and provides support to the notion that the prevailing sentiment plays an important role in how the market perceives a new information signal.

The coefficients for the control variables have the expected signs. *SpFactor* has a positive coefficient, indicating that market treats the announcement of stock split as greater positive news when the percentage of the new stock issued is larger. The negative coefficient for *Size* indicates that stocks splits of smaller companies carry greater positive news. Finally, the positive coefficient for the time trend variable indicates that market's response to split announcements has been increasing over time.

C. Sentiment and Market's Response to the Announcements of Share Repurchases

The last corporate event that we focus on in this section is share repurchase. Several existing papers document that market perceives the announcements of share repurchases as a positive signal, and stock prices of firms that announce repurchase programs go up. If sentiment were to influence the perceptions of the market as to how positive an announced share repurchase program is, we should expect market's response to share repurchases to be stronger during periods of positive sentiment, and vice versa. To investigate this, our sample of share repurchases over the period 1980-2000 comes from Chan, Ikenberry and Lee (2004). We thank them for providing us their data. The total number of repurchases we obtain from their sample are 6,170 over the period from 1980-2000. This excludes those firm-event observations where another repurchase announcement was made by the same company over the previous 5 days. We also retain only those repurchases that are for common stocks (share codes = 10 and 11).

Using this sample of repurchases, we estimate the following model.

$$RET_{it} = \alpha_0 + \beta_0 PosSent_t + \gamma_0 RpRatio_{it} + \gamma_1 Size_{it} + \gamma_2 Time_t + \gamma_3 PriorRET_{it} + \varepsilon_{it} \quad (8)$$

The variables, RET , $PosSent$, $Size$ and $Time$ are as defined in earlier models. $RpRatio$ is the ratio of the number of shares to be repurchased divided by the total number of outstanding shares at the time of the repurchase announcement. $PriorRET$ is the return decile, based on returns over the prior 12 months, which the stock belongs to as at the beginning of the month in which the repurchase is announced. It captures the relative return performance of the stock. The literature on repurchases identifies it as one of the key variables that determine the stock market reaction to repurchases. We winsorize the continuous variables in the above regression, RET , $RpRatio$ and $PriorRET$, at 1% and 99% to avoid extreme values influencing our estimates. The regression is estimated using OLS and the pooled firm-event data.

We report the estimates of the above model in Table 8. Examining the control variables first, we note that most of the variables have coefficients consistent with the prior literature. The coefficient for $RpRatio$ is positive and significant; indicating that stock price response increases with the size of the announced repurchase program. The negative and significant coefficient for $PriorRet$ indicates that stocks with a greater recent price run-up experience a smaller stock price response on repurchase announcements. The negative coefficient for $Size$ suggests a greater response of market to repurchase announcement of smaller firms. Finally, the coefficient for time trend variable, $Time$, is negative and significant. This reflects that repurchase announcements are increasingly perceived as less informative by the stock market.

Our primary focus in this regression, however, is on the coefficient for $PosSent$ that captures the differential response of stock market to repurchase announcements during periods of positive sentiment. The estimated coefficient is 0.0039 with a t -statistic of 1.98. A positive and statistically significant coefficient indicates that market response to repurchase announcements is

greater during periods of positive sentiment, and is consistent with the evidence presented earlier for earnings, dividend and stock split news.

VI. Conclusion

One strand of the behavioral finance literature has recently emerged that adopts a top-down approach of examining the impact of investor biases on financial markets. This literature assumes that many of the bottom-up behavioral models lead to similar form of variation over time in mass psychology, and focuses on the measurement and the influence of this reduced form aggregate sentiment (Baker and Wurgler (2006, 2007); Lemmon and Po (2006), Qiu and Welch (2006), sports sentiment (2007)). This literature demonstrates that it is quite possible to measure investor sentiment, and that waves of sentiment have clearly discernable, important and regular effects on stock market. To the extent that measures of investor sentiment developed in this literature are reasonable proxies of aggregate investor biases, they open up a new opportunity for learning how investor psychology influence stock market response to news.

In this paper, we document that the measure of investor sentiment developed by Baker and Wurgler (2006, 2007) is systematically related to the stock price response to corporate news. Specifically, we find that stock price response to good news increases with the prevailing sentiment, whereas stock price response to bad news decreases with the prevailing sentiment. This is consistent with the hypothesis that the prevailing market-wide sentiment sways investor response to corporate news. We confirm the relation between sentiment and stock price response for earnings news, as well as for other corporate news including dividend changes, stock splits and stock repurchases. Moreover, the relation between sentiment and stock price response is especially pronounced for stocks that have more subjective valuations and face greater limits on arbitrage—small stocks, young stocks, volatile stocks, non-dividend paying stocks and distressed stocks.

Our study adds to the recently emerging literature that documents the impact of sentiment on financial markets. Our finding that stock price response to good (bad) news increases (decreases) systematically with the bullishness of the prevailing investor sentiment not only helps identify a channel through which sentiment causes mispricing but also suggests that the importance of sentiment documented in the recent literature is not spurious. Our results also provide fresh evidence to support the assertion that stock prices are more volatile than justified by news about fundamentals. Our results are inconsistent with the notion of the informational efficiency of the market in responding to new information, and raises doubt on the usefulness of event studies to measure the value relevance of various corporate events.

References

- Baker, M. and J. Wurgler, 2006a, Investor sentiment and the cross-section of stock returns, *Journal of Finance* 61, 1645-1680.
- Baker, M. and J. Wurgler, 2007, Investor sentiment in the stock market, *Journal of Economic Perspectives* 21, 129-151.
- Barberis, N. and R. Thaler, 2003, A survey of behavioral finance, *Handbook of the Economics of Finance*. volume 1, part 2, 1053-1128.
- Bartov, E., D. Givoly and C. Hayn, 2002, The rewards to meeting or beating analyst expectations, *Journal of Accounting and Economics* 33(2), 173-204.
- Battalio R. and R.R. Mendenhall, 2005, Earnings expectations, investor trade size, and anomalous returns around earnings announcements. *Journal of Financial Economics* 77, 289-319.
- Brav, A., 2000, Inference in long-horizon event studies: A Bayesian approach with application to initial public offerings, *Journal of Finance* 55, 1979-2016.
- Brown, G.W. and M.T. Cliff, 2005, Investor sentiment and asset valuation, *Journal of Business* 78, 405-440.
- Black, F., 1986, Noise, *Journal of Finance* 41, 529-543
- Chan, K., D. Ikenberry and I. Lee, 2004, Economic sources of gains in stock repurchases, *Journal of Financial and Quantitative Analysis* 39, 461-479.
- Collins, D., and S. P. Kothari, 1989, An analysis of inter-temporal and cross-sectional determinants of the earnings response coefficient, *Journal of Accounting and Economics* 11, 143-189.
- Conrad, J., B. Cornell and W. Landsman, 2002, When is bad news really bad news? *Journal of Finance* 57, 2507-2532.
- Cooper. M.J., O. Dimitrov, and P.R. Rau, 2001, A Rose.com by any other name, *Journal of Finance* 56, 2371-2388.
- Edmans, A., D. Garcia and Ø. Norli, 2007, Sports sentiment and stock returns, *Journal of Finance* 62, 1967-1998.
- Fama, E.F., 1991, Efficient capital markets: II, *Journal of Finance* 46, 1575-1617.
- Hayn, C., 1995, The information content of losses, *Journal of Accounting and Economics* 20, 125-153.
- Hirshleifer, D., 2001, Investor psychology and asset prices, *Journal of Finance* 56, 1533-1597.
- Hirshleifer, D. and T. Shumway, 2003, Good day sunshine: Stock returns and the weather, *Journal of Finance* 58, 1009-1032.

- Kleidon, A.W., 1986, Variance bound tests and stock price valuation models, *Journal of Political Economy* 94, 953-1001.
- Kothari, S.P. and J.B. Warner, 2006, Econometrics of Event Studies, in B. Espen Eckbo (ed.), *Handbook of Corporate Finance: Empirical Corporate Finance*, volume A, Elsevier/North Holland, Chapter 1.
- Kumar, A. and C. Lee, 2006, Retail investor sentiment and return comovements, *Journal of Finance* 61, 2451-2486.
- Lamont, O.A. and R.H. Thaler, 2003, Can the market add and subtract? Mispricing in tech stock carve-outs, *Journal of Political Economy* 111, 227-268.
- Lee, M. C., 1992, Earnings news and small traders: An intraday analysis. *Journal of Accounting and Economics* 15, 265-302.
- Lemmon, M., and E. Portniaguina, 2006, Consumer confidence and asset prices: Some empirical evidence, *Review of Financial Studies* 19, 1499-1529.
- Lipe, R., L. Bryant, and S. Widener, 1998, Do nonlinearity, firm-specific coefficients, and losses represent distinct factors in the relation between stock returns and accounting earnings? *Journal of Accounting and Economics* 25, 195-214.
- Puri, M. and D.T. Robinson, 2007, Optimism and economic choice, *Journal of Financial Economics* 86, 71-99.
- Ross, S., 2005, *Neoclassical Finance*, Princeton University Press, Princeton, N.J.
- Shleifer, A. and R.W. Vishny, 1997, The limits to arbitrage, *Journal of Finance* 52, 35-55.
- Shiller, R.J., 1981, Do stock prices move too much to be justified by subsequent changes in dividends?, *American Economic Review* 71, 421-436.
- Shiller, R.J., 2005, *Irrational Exuberance*. 2nd edition, Princeton University Press.
- Statman, M., S. Thorley and K. Vorkink, 2006, Investor overconfidence and trading volume, *Review of Financial Studies* 19, 1531-1565.
- Qiu L. and I. Welch, 2006, Investor sentiment measures, working paper. Brown University.
- Yu, J. and Y. Yuan, 2006, Investor sentiment and the mean-variance relation, working paper, University of Pennsylvania. Available at SSRN: <http://ssrn.com/abstract=831487>

Table 1
Yearly Summary Statistics

This table reports the yearly summary statistics of our earnings news sample. The time period ranges from 1985 to 2005. We extract the realized and forecast values of quarterly earnings from the IBES summary file. We retain only those earnings announcements for which the date of announcement in IBES is within one day of the corresponding date in the Compustat dataset. Earnings surprises are computed by subtracting the consensus analyst forecast from the actual earnings, where consensus forecast is the median forecast for the month preceding the earnings announcement date. We remove observations where there is a stock split in the window of -40 to +5 days of the earnings announcement date. Negative earnings are excluded from our sample. We also exclude observations where unexpected earnings are less than 1% or greater than 99% of the distribution. Columns (9) through (11) provide information about the coverage of our sample relative to the overall universe of stocks on CRSP.

Year	Number of Earnings Announcements						Number of Unique Firms			Avg Mkt Cap (in \$mil)	
	Total	Positive News		Negative News		No News		Total	# as % of All Listed Firms		Mkt Cap as % of All Listed Firms
		Number	% of Total	Number	% of Total	Number	% of Total				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1985	3,513	1,419	40%	1,889	54%	205	6%	1,216	19%	64%	971
1986	3,880	1,702	44%	1,915	49%	263	7%	1,302	20%	67%	1,179
1987	4,396	2,063	47%	2,031	46%	302	7%	1,513	22%	73%	1,245
1988	4,967	2,466	50%	2,146	43%	355	7%	1,653	25%	74%	1,068
1989	4,596	2,079	45%	2,154	47%	363	8%	1,818	28%	76%	1,136
1990	4,928	2,103	43%	2,393	49%	432	9%	1,936	31%	85%	1,109
1991	5,372	2,413	45%	2,440	45%	519	10%	2,008	32%	81%	1,166
1992	6,401	3,055	48%	2,561	40%	785	12%	2,342	37%	83%	1,185
1993	7,358	3,503	48%	2,816	38%	1,039	14%	2,601	39%	82%	1,227
1994	8,949	4,531	51%	3,045	34%	1,373	15%	3,139	44%	85%	1,108
1995	9,922	5,111	52%	3,290	33%	1,521	15%	3,425	46%	83%	1,141
1996	10,993	5,803	53%	3,259	30%	1,931	18%	3,757	47%	85%	1,280
1997	11,728	6,617	56%	2,922	25%	2,189	19%	3,954	49%	85%	1,407
1998	11,862	6,193	52%	3,204	27%	2,465	21%	4,051	51%	87%	1,542
1999	11,406	6,401	56%	2,743	24%	2,262	20%	3,800	50%	80%	1,664
2000	10,155	5,878	58%	2,450	24%	1,827	18%	3,403	48%	82%	2,037
2001	8,604	4,490	52%	2,413	28%	1,701	20%	2,898	45%	87%	2,186
2002	8,498	5,116	60%	1,627	19%	1,755	21%	2,709	47%	90%	2,175
2003	8,781	5,257	60%	1,922	22%	1,602	18%	2,757	51%	87%	2,093
2004	9,731	5,998	62%	2,219	23%	1,514	16%	3,003	58%	89%	2,374
2005	10,094	6,067	60%	2,586	26%	1,441	14%	3,063	60%	91%	2,555
All Years	166,134	88,265	53%	52,025	31%	25,844	16%				

Table 2
Distribution of the Key Variables in the Pooled Regression

This table reports the summary statistics for the variables that we use in Equation (2). The sample consists of 166,134 quarterly earnings announcements over the period 1985-2005

Variable	Number	Mean	Standard Deviation	Min	Max
<i>CAR_{-1, +1}</i>	166,134	0.0037	0.0702	-0.2429	0.2365
<i>PosSent</i>	166,134	0.5864	0.4925	0.0000	1.0000
<i>FEUp</i>	166,134	0.0016	0.0036	0	0.0371
<i>FEUp x PosSent</i>	166,134	0.0007	0.0025	0	0.0371
<i>FEUp x FGrwoth</i>	155,353	-0.0003	0.0087	-0.3470	0.2871
<i>FEUp x EVol</i>	160,369	0	0.0002	0	0.0060
<i>FEUp x Size</i>	166,134	0.0059	0.0143	0	0.3406
<i>FEDown</i>	166,134	-0.0014	0.0143	-0.1200	0
<i>FEDown x PosSent</i>	166,134	-0.0007	0.0034	-0.1200	0
<i>FEDown x FGrwoth</i>	155,353	0	0.0181	-0.7600	0
<i>FEDown x EVol</i>	160,369	0	0.0003	-0.0194	0
<i>FEDown x Size</i>	166,134	-0.0047	0.0150	-0.5241	0
<i>EVol</i>	160,369	0.0088	0.0171	0.000320157	0.1620
<i>FGrwoth</i>	155,353	-0.0543	1.6824	-9.5	8.0000
<i>Size</i>	166,134	4.6443	2.8827	1	10
<i>Size</i>	166,134	0.0037	0.0702	-0.2429	0.2365

Table 3
Sentiment and the Stock Returns during the 3-Day Window Surrounding the Announcements of Earnings News

This table provides estimates of the following model.

$$RET_{it} = \alpha_0 + \beta_0 UEUP_{it} + \beta_1 UEUP_{it} \times PosSent_{it} + \beta_2 UEUP_{it} \times FGrowth_{it} + \beta_3 UEUP_{it} \times Time_{it} + \beta_4 UEUP_{it} \times |UEUP_{it}| + \beta_5 UEUP_{it} \times Size_{it} + \beta_6 UEUP_{it} \times EVol_{it} \\ + \gamma_0 UEDOWN_{it} + \gamma_1 UEDOWN_{it} \times PosSent_{it} + \gamma_2 UEDOWN_{it} \times FGrowth_{it} + \gamma_3 UEDOWN_{it} \times Time_{it} + \gamma_4 UEDOWN_{it} \times |UEDOWN_{it}| + \gamma_5 UEDOWN_{it} \times Size_{it} + \gamma_6 UEDOWN_{it} \times EVol_{it} \\ + \alpha_1 Size_{it} + \varepsilon_{it}$$

The model is estimated using OLS and the pooled data of quarterly earnings announcements over the period of 1985-2005. RET_{it} is the 3-day cumulative abnormal return centered on the date of the earnings announcement. $UEUP$ ($UEDOWN$) is the product of the unexpected earnings, UE , and the indicator variable, UP ($DOWN$), which takes the value of one if UE is positive (negative) and zero otherwise. $PosSent$ is an indicator variable that takes the value of one if the investor sentiment at the time of the earnings announcement is positive, and zero otherwise. $FGrowth$ is the difference between the 4-quarter-ahead earnings and the earnings in the current quarter, scaled by the stock price at the beginning of the month. $Time$ is a linear time trend variable. The variables $UEUP \times |UEUP|$ and $UEDOWN \times |UEDOWN|$ allow for non-linearity in market's response to earnings news. $Size$ is the decile rank of the stock as at the beginning of the month in which the earnings are announced. $EVol$ is computed as the standard deviation of previous four quarters' actual earnings divided by the beginning of the month stock price. Statistical significance at 10, 5 and 1% are indicated as *, **, and *** respectively.

	Base Model	Model 1	Model 2
(1)	(2)	(3)	(4)
<i>Intercept</i>	0.0022*** (6.18)	0.0022*** (6.18)	-0.0023*** (5.39)
<i>FEUp</i>	3.196*** (65.61)	3.087*** (49.39)	6.345*** (33.55)
<i>FEUp x PosSent</i>		0.238*** (2.72)	0.210** (2.31)
<i>FEUp x Time</i>			0.136*** (17.38)
<i>FEUp x Abs(FEUp)</i>			-204.513*** (40.21)
<i>FEUp x Size</i>			-0.207*** (10.01)
<i>FEUp x EVol</i>			-2.597* (1.86)
<i>FEUp x FGrowth</i>			0.200*** (9.81)
<i>FEDown</i>	1.135*** (30.18)	1.358*** (26.25)	1.653*** (12.69)
<i>FEDown x PosSent</i>		-0.441*** (6.29)	-0.449*** (5.71)
<i>FEDown x Time</i>			0.070*** (9.29)
<i>FEDown x Abs(FEDown)</i>			-25.310*** (16.27)
<i>FEDown x Size</i>			0.046** (2.39)
<i>FEDown x EVol</i>			-9.402*** (9.51)
<i>FEDown x FGrowth</i>			-0.024** (2.43)
<i>Size</i>	-0.0004*** (6.84)	-0.0004*** (6.76)	-0.00003 (0.44)
Adjusted R-squared	3.58%	3.60%	5.98%
Number of pooled observations	166,134	166,134	149,856

Table 4**Sentiment and the Stock Price Drift in the 60 Days Following the Announcement of Earnings News**

This table provides estimates of the following model.

$$RET_{it} = \alpha_0 + \beta_0 UEUP_{it} + \beta_1 UEUP_{it} x PosSent_{it} + \gamma_0 UEDOWN_{it} + \gamma_1 UEDOWN_{it} x PosSent_{it} + \alpha_1 Size_{it} + \varepsilon_{it}$$

The model is estimated using OLS and the pooled data of quarterly earnings announcements over the period of 1985-2005. RET_{it} is the cumulative abnormal return over the trading days +2 to +60 following the earnings announcement. $UEUP$ ($UEDOWN$) is the product of the unexpected earnings, UE , and the indicator variable, UP ($DOWN$), which takes the value of one if UE is positive (negative) and zero otherwise. $PosSent$ is an indicator variable that takes the value of one if the investor sentiment at the time of the earnings announcement is positive, and zero otherwise. Statistical significance at 10, 5 and 1% are indicated as *, **, and *** respectively.

Variables	Coefficient Estimates
<i>Intercept</i>	-0.016*** (16.34)
<i>FEUp</i>	3.484*** (20.69)
<i>FEUp x PosSent</i>	0.466** (1.98)
<i>FEDown</i>	1.009*** (7.24)
<i>FEDown x PosSent</i>	-0.901*** (4.77)
<i>Size</i>	-0.002*** (9.62)
Adjusted R-squared	0.65%%
Number of pooled observations	166,134

Table 5
Cross-Sectional Variation in the Impact of Sentiment on the Three-day Stock Price Response to Earnings News

This table provides estimates of the following model.

$$RET_{it} = \alpha_0 + \beta_0 UEUP_{it} + \beta_1 UEUP_{it} x PosSent_t + \gamma_0 UEDOWN_{it} + \gamma_1 UEDOWN_{it} x PosSent_t + \alpha_1 Size_{it} + \varepsilon_{it}$$

The model is estimated using OLS and the pooled data of quarterly earnings announcements over the period of 1985-2005. RET_{it} is the 3-day cumulative abnormal return centered on the date of the earnings announcement. $UEUP$ ($UEDOWN$) is the product of the unexpected earnings, UE , and the indicator variable, UP ($DOWN$), which takes the value of one if UE is positive (negative) and zero otherwise. $PosSent$ is an indicator variable that takes the value of one if the investor sentiment at the time of the earnings announcement is positive, and zero otherwise. In each panel, we report the results of estimating this model for sub-samples of stock sorted on certain characteristic. These firm characteristics are computed following the computations in Baker and Wurgler (2006). All firm characteristics, except dividend payments and book values, are computed at monthly frequency using the CRSP files. $Size$ is represented by the market capitalization which is computed for each stock at each month end using the CRSP dataset. Age is computed as the number of years since the firm's first appearance on CRSP, measured to the nearest month. $Stock\ return\ volatility$ is measured as the standard deviation of monthly returns over the preceding 12 months. $Dividend\ payouts$ are noted from Compustat and are computed once a year at the end of each June. Labeling of *growth* and *distressed* stocks is done using the book-to market ratios of the stocks. The book values are from Compustat and are computed at the end of each June, using the information contained in the financial statements of the year ending in the preceding December. These book values are then compared with the market value of the stocks for each month to compute monthly book-to-market ratios. For each attribute, except for the classification of payers versus non-payers, we then rank all available firms within each month into deciles using the NYSE breakpoints. Firms that fall in the bottom 30% and top 30% are labeled as those with low and high values, respectively, with respect to the attribute. The book-to-market differs from the other characteristics in the sense that it helps identify both growth and distressed stocks. As in Baker and Wurgler (2006), we label the stocks with the highest 30% of the book-to-market ratios as the distressed stocks, and those with the lowest ratios as growth stocks. This labeling of stock characteristics is then matched to the earnings announcements of the subsequent month. As noted above, following Baker and Wurgler, the classification of firms into payers versus non-payers is done once a year at the end of June. This identification then holds for the earnings announcements in the subsequent 12-month period. Statistical significance at 10, 5 and 1% are indicated as *, **, and *** respectively.

Panel A: Small versus Large Firms

(1)	Small (2)	Medium (3)	Large (4)
<i>Intercept</i>	0.007*** (6.96)	0.0008 (1.06)	0.002 (0.38)
<i>FEUp</i>	3.177*** (32.94)	2.947*** (30.81)	2.640*** (13.39)
<i>FEUp x PosSent</i>	0.223* (1.72)	0.293** (2.11)	-0.407 (1.37)
<i>FEDown</i>	1.164*** (15.85)	1.784*** (20.30)	1.575*** (7.64)
<i>FEDown x PosSent</i>	-0.543*** (5.71)	0.086 (0.66)	0.167 (0.53)
<i>Size</i>	-0.004*** (6.43)	-0.00003 (0.26)	-0.0003 (0.44)
Adjusted R-squared	5.01%	2.89%	1.65%
Number of pooled observations	52,092	90,908	23,134

Panel B: Young versus Old Firms

	Young	Medium	Mature
(1)	(2)	(3)	(4)
<i>Intercept</i>	0.002*** (2.98)	0.001*** (2.97)	0.003** (2.62)
<i>FEUp</i>	3.057*** (25.55)	3.355*** (38.80)	2.245*** (19.85)
<i>FEUp x PosSent</i>	0.598*** (3.56)	0.155 (1.29)	-0.414** (2.62)
<i>FEDown</i>	1.281*** (14.21)	1.455*** (19.23)	1.217*** (11.89)
<i>FEDown x PosSent</i>	-0.307** (2.42)	-0.621*** (6.25)	-0.185 (1.33)
<i>Size</i>	-0.0003** (2.19)	-0.0003*** (3.49)	-0.0004*** (3.13)
Adjusted R-squared	3.17%	4.08%	3.53%
Number of pooled observations	55,340	84,821	25,973

Panel C: Volatile versus Stable Stocks

	Volatile	Medium	Stable
(1)	(2)	(3)	(4)
<i>Intercept</i>	-0.0007 (0.83)	0.004*** (8.20)	0.002*** (3.12)
<i>FEUp</i>	3.623*** (28.65)	2.877*** (35.61)	1.776*** (14.81)
<i>FEUp x PosSent</i>	0.236 (1.31)	0.174 (1.57)	0.196 (1.22)
<i>FEDown</i>	1.202*** (11.72)	1.519*** (22.94)	1.083*** (9.63)
<i>FEDown x PosSent</i>	-0.577*** (4.11)	-0.405*** (4.56)	-0.017 (0.12)
<i>Size</i>	0.00008 (0.43)	-0.0005*** (7.42)	-0.0004*** (4.57)
Adjusted R-squared	3.56%	3.97%	2.90%
Number of pooled observations	46,749	88,827	25,636

Panel D: Payer versus Non-payers

	Non-Payers	Medium	Highest Payers
(1)	(2)	(3)	(4)
<i>Intercept</i>	0.0007 (1.18)	0.003*** (6.12)	-0.0008 (0.670)
<i>FEUp</i>	3.623*** (35.41)	2.378*** (29.91)	2.674*** (13.62)
<i>FEUp x PosSent</i>	0.225 (1.60)	0.124 (1.10)	-0.837*** (3.18)
<i>FEDown</i>	1.302*** (15.76)	1.568*** (22.16)	1.647*** (10.08)
<i>FEDown x PosSent</i>	-0.581*** (5.37)	-0.223** (2.21)	-0.795*** (3.59)
<i>Size</i>	-0.00006 (0.44)	-0.0004*** (5.94)	-0.0009 (0.61)
Adjusted R-squared	3.77%	4.02%	3.07%
Number of pooled observations	74,228	64,972	13,690

Panel E: Growth versus Distressed Firms

	Distressed	Medium	Growth
(1)	(2)	(3)	(4)
<i>Intercept</i>	0.006*** (6.20)	0.004*** (8.41)	-0.004*** (4.36)
<i>FEUp</i>	2.413*** (21.86)	3.164*** (39.02)	4.689*** (23.21)
<i>FEUp x PosSent</i>	0.400*** (2.70)	0.048 (0.43)	-0.088 (0.31)
<i>FEDown</i>	0.849*** (8.20)	1.527*** (23.58)	1.912*** (12.34)
<i>FEDown x PosSent</i>	-0.464*** (3.70)	-0.405*** (4.50)	-0.061 (0.26)
<i>Size</i>	-0.001*** (7.08)	-0.0006*** (8.62)	0.0005*** (3.41)
Adjusted R-squared	6.41%	4.22%	2.84%
Number of pooled observations	18,149	90,837	43,937

Table 6
Sentiment and the Three-Day Stock Market Reaction to the Announcement of Dividend Changes

The numbers reported in this table are based on a total of 52,832 observations of changes in regular quarterly dividends (CRSP distribution code = 1232) for the companies listed on NYSE and AMEX over the period 1985-2005. These include 6,575 dividend increases, 45,680 no changes, and 577 dividend decreases. This sample excludes those dividend changes whereby there was any other distribution from 10 days before the prior dividend to the 10 days after the current dividend. We also exclude the dividend changes that occurred within 10 days of the announcements of actual earnings. Finally, we include only common stocks (share codes = 10 and 11). The continuous variables in the regression are winsorized at 1% and 99%. We winsorize the extreme 1% observations of dividend increases and decreases. The Sentiment Index is the monthly Baker-Wurgler Sentiment Index. Panel B reports the results of the following regression.

$$RET_{it} = \alpha_0 + \beta_0 DivUP_{it} + \beta_1 DivUP_{it} x PosSent_t + \gamma_0 DivDOWN_{it} + \gamma_1 DivDOWN_{it} x PosSent_t + \alpha_1 Size_{it} + \varepsilon_{it}$$

Here RET_{it} is the 3-day cumulative abnormal return centered on the date of the announcement of dividend changes. The regression is estimated using OLS and the pooled firm-event data. Statistical significance at 10, 5 and 1% are indicated as *, **, and *** respectively.

Panel A: Summary Statistics of the Variables Used in the Regression

Variable	Mean	Median	Standard Deviation	Min	Max
(1)	(2)	(3)	(4)	(5)	(6)
<i>CAR</i>	0.0000	-0.001	0.032	-0.093	0.106
<i>Divup</i>	0.078	0	0.445	0	8
<i>Divup x PosSent</i>	0.031	0	0.281	0	8
<i>Divup x Time</i>	0.844	0	5.973	0	168
<i>Divdown</i>	-0.041	0	0.562	-22.840	0
<i>Divdown x PosSent</i>	-0.016	0	0.341	-22.840	0
<i>Divdown x Time</i>	-0.428	0	6.739	-411.123	0
<i>Size</i>	5.586	6	3.001	1	10

Panel B: Regression Estimates

Variable	Coefficient Estimate
<i>Intercept</i>	0.0002 (0.23)
<i>DivUp</i>	0.013*** (5.57)
<i>DivUp x PosSent</i>	0.007* (1.85)
<i>DivDown</i>	0.048*** (13.45)
<i>Divdown x PosSent</i>	-0.010* (1.86)
<i>Size</i>	-0.00006 (1.42)
Adjusted R-squared	0.67%
Number of pooled observations	52,832

Table 7
Sentiment and the Three-Day Stock Market Reaction to the Announcement of Stock Splits

The numbers reported in this table are based on 8,362 splits and stock dividend announcements (CRSP distribution codes: 5523 and 5533) made by companies listed on NYSE/AMEX/NASDAQ over the period 1985-2005. The sample includes only those announcements whereby new stocks issued constitute at least 25% of the original issue. We include only common stocks (share codes = 10 and 11). All continuous variables are winsorized at 1% and 99%. Sentiment Index is the monthly Baker-Wurgler Sentiment Index. Panel B reports the results of the following regression.

$$RET_{it} = \alpha_0 + \beta_0 PosSent_{it} + \gamma_0 SpFactor_{it} + \gamma_1 Size_{it} + \gamma_2 Time_{it} + \varepsilon_{it}$$

Here RET_{it} is the 3-day cumulative abnormal return centered on the date of the announcement of stock splits. The regression is estimated using OLS and the pooled firm-event data. Statistical significance at 10, 5 and 1% are indicated as *, **, and *** respectively.

Panel A: Summary Statistics of the Variables Used in the Regression

Variable	Mean	Median	Standard Deviation	Min	Max
(1)	(2)	(3)	(4)	(5)	(6)
<i>CAR</i>	0.0293	0.020	0.058	-0.105	0.273
<i>Pos Sent</i>	0.527	1	0.499	0	1
<i>Split Factor</i>	0.783	1.000	0.487	0.250	9.000
<i>Size</i>	4.421	4	2.902	1	10

Panel B: Regression Estimates

Variable	Coefficient Estimate	<i>t</i> -statistics
Intercept	0.025***	11.77
Pos Sent	0.005	4.13
Split Factor	0.013***	9.99
Size	-0.004***	17.36
Time Trend	0.0006***	5.92
Adjusted R^2	4.16%	
Number of pooled observations	8,362	
Time Period	1985-2005	

Table 8
Sentiment and the Three-Day Stock Market Reaction to the Announcement of Stock Repurchases

The sample of repurchases used here comes from Lee, Lakanishok. The total number of repurchases are 6,170 over the period from 1980-2000. We remove those firm-event observations where another repurchase announcement was made by the same company over the previous 5 days. We include only common stocks (share codes = 10 and 11). All continuous variables are winsorized at 1% and 99%. Sentiment Index is the monthly Baker-Wurgler Sentiment Index. Panel B reports the results of the following regression.

$$RET_{it} = \alpha_0 + \beta_0 PosSent_{it} + \gamma_0 RpRatio_{it} + \gamma_1 Size_{it} + \gamma_2 Time_{it} + \gamma_3 PriorRET_{it} + \varepsilon_{it}$$

Here RET_{it} is the 3-day cumulative abnormal return centered on the date of the announcement of stock repurchases. The regression is estimated using OLS and the pooled firm-event data. Statistical significance at 10, 5 and 1% are indicated as *, **, and *** respectively.

Panel A: Summary Statistics of the Variables Used in the Regression

Variable	Mean	Median	Standard Deviation	Min	Max
(1)	(2)	(3)	(4)	(5)	(6)
<i>CAR</i>	0.0193	0.015	0.073	-0.243	0.245
<i>Pos Sent</i>	0.589	1	0.492	0	1
<i>Repurchase Ratio</i>	0.072	0.056	0.054	0.005	0.315
<i>Prior Ret</i>	-0.091	-0.129	0.402	-0.888	1.434
<i>Size</i>	5.231	5	2.890	1	10

Panel B: Regression Estimates

Variable	Coefficient Estimate	t-statistics
Intercept	0.036***	8.81
Pos Sent	0.0039**	1.98
Repurchase Ratio	0.126***	7.45
Prior Ret	-0.0077***	3.30
Size	-0.0028***	8.94
Time Trend	-0.001***	4.73
Adjusted R^2	3.10%	
Number of pooled observations	6,170	
Time Period	1980-2000	

Figure 1
Time Series of Monthly Baker-Wurgler Index (1985-2005)

