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Sentiment and Stock Returns: Anticipating a Major Sporting Event

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Sentiment and Stock Returns: Anticipating a Major Sporting Event

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Abstract

This study documents the effect of the Super Bowl on the stock returns of firms that are geographically associated with the competing teams. We find significant upward return drift in the 9 trading days leading up to the Super Bowl, a pattern consistent with investors trading in anticipation of the game itself. The "anticipatory behavior" among investors leads to widespread pregame returns, which is not documented in prior studies. These pre-event abnormal returns are positive and statistically and economically significant for all firms, and the size of pre-event returns varies according to each team's favored status. In addition, firms associated with the winning team exhibit significant positive return drift over the 10-day period after their win. Firms associated with the losing team exhibit moderate downward drift. Our findings are strongest among the smallest quintile of firms and are robust to various risk adjustments and using a matched sample control group. The collective findings suggest that only by standing on the sideline will investors avoid winning around the Super Bowl.

Keywords

efficient markets, investor sentiment, sports, stock returns, Super Bowl

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It's ridiculous for a country to get all worked up about a game—except the Super Bowl, of course. Now that's important.

Andy Rooney, "Baseball haters—but good sports," October 1, 1984, *Chicago Tribune*

You cannot engender such torrid anticipation for an event so great that it requires Roman numerals as a suffix, then expect there to be no social repercussions at its end.

Robert Klein, "America's Pastime: Selling the Big Game," January 28, 1990, *The New York Times*

Introduction and Motivation

Empirical research indicates that the performance of local sports teams affects the safety, sentiment, and mood of the local community. Edmans, Garcia, and Norli (2007) provide a comprehensive review of this literature that documents a connection between sporting events, stock returns, and a wide range of mood variables. Our study tests the hypothesis that anticipation and mood affect stock returns in the days leading up to the Super Bowl by examining the stock returns of firms that are geographically associated with the competing teams. Using 42 Super Bowl games between 1967 and 2010, we investigate the stock performance of firms headquartered in the same state as professional football teams when their local team competes in a Super Bowl championship.[1] These criteria result in over 18,000 firm years—10,412 winning firms and 8,191 losing firms—during the study period. We measure both unadjusted returns and abnormal returns using a standard four-factor model.

Our focus is on the anticipatory behavior of investors prior to the sporting event, and to our knowledge, this is the first study to document widespread systematic presporting-event (i.e., anticipatory) return behavior.[2] The Super Bowl lends itself to analyzing anticipatory behavior because it is a rare sporting event that is important enough to influence investor sentiment. It also occurs far enough after preceding events (e.g., play-off games) that one can disentangle reaction from prior events from anticipation of future events.[3] To examine the anticipatory behavior of stock prices we expand our time window to include the 9 trading days prior to the Super Bowl. We also expand our postgame time window to test for the possibility of postevent return drift, which may not be fully captured if the time window is truncated only 1 or 3 days after the event, as most cited studies have done. This is a wider time window, both before and after the Super Bowl, than most of the studies in the literature.

Our study relates to several recent studies that examine the effect of sporting events on mood and international stock returns. Edmans et al. (2007) identify a significant loss effect in a country's stock market index 1 day after the country's soccer team loses an international match, though they find no evidence of an analogous winning effect. Palomino, Renneboog, and Zhang (2009) study returns over a 3-day window following British soccer matches and find that investors react strongly to an expected win but find insignificant abnormal returns following

expected losses. Bernile and Lyandres (2011) find that investors overestimate the probability of a win in European soccer matches and are on average disappointed ex post, which leads to negative average 1-day returns following the soccer match.

Two other related studies look at the relationship between sporting events and stock returns in the United States. Chang, Chen, Chou, and Lin (2012) study 1-day returns of local firms following National Football League (NFL) games. They document that losers have lower next-day returns than winners and that the 1-day returns are concentrated at the market open but not throughout the first trading day. Pantzalis and Park (2012) construct a local sports sentiment variable that represents the success of local professional sports teams. They find a correlation between stock performance and continuous, time-varying sentiment.

The first empirical contribution of our article is the documentation of significantly positive unadjusted returns in local stocks *prior to* the Super Bowl. We present unadjusted returns to provide a baseline of local firms' performance relative to a well-known market benchmark. The data show a viable trading strategy around the Super Bowl involving a zero net investment portfolio consisting of a long (short) position in all firms headquartered in competing teams' states (the Standard and Poor's [S&P] 500 index). Such a strategy has yielded an average return of 3.01% over the 19 trading-day (i.e., 4 weeks) window surrounding the Super Bowl. Alternatively, using odds makers' information about whether the team was favored of nonfavored, creating a portfolio long in favored (nonfavored) states' firms and short in the S&P 500 yields an average return of 3.17 (2.84) % over the same period. Interestingly, a team's favored status forms the basis of a trading strategy that is slightly more profitable than one based upon the actual (ex ante unknown) outcome of the game.

To determine whether these unadjusted returns are simply reward for bearing risk, we then present abnormal returns based on a well-established four-factor model. Abnormal returns are observed for the ex post winners and losers, as well as ex ante favored and nonfavored teams. The eventual winning and favored teams have slightly higher pregame returns than the nonfavored and eventual losing teams, suggesting that investor trading has some ability to predict the outcome of the game. This finding reconciles the apparently contradictory results of Palomino et al. (2009)—that the release of pregame betting odds has little immediate impact on stock prices—with Bernile and Lyandres (2011) who find that investors overestimate the ex ante probability of winning. Bernile and Lyandres do not explicitly look at pregame returns but conjecture that the observed negative 1-day return following the game is the result of investors being, on average, ex ante optimistic and ex post disappointed. We find that investors do in fact bid up the prices of both winners and losers ex ante, but that this effect is gradual and may be missed if looking only for an immediate price response the day betting odds are released. In addition, we observe abnormal positive returns after the Super Bowl for winners. This is generally consistent with the Palomino et al. (2009) finding that investors react to a strongly expected win in British soccer matches, but not to a weakly expected win or an expected loss.

The finding that investor behavior depends upon a team's favored status motivates our next test. We recompute abnormal returns by splitting teams based on their favored status, which to our knowledge is the first time this has been done in a study of stock price anticipation or reaction to the Super Bowl. The pregame price run-up is large for favored teams that win, which is consistent with the favored status containing information about the eventual outcome. On the other hand, a new result we document is that favored teams that lose have smaller pregame returns, suggesting investors "know" correctly that these favored teams will likely lose and therefore fail to bid up their prices. As for nonfavored teams, whether they win or lose, they also experience significant abnormal increases in price leading up to the Super Bowl. When we interact the actual outcome of the game with each team's favored status we find that postgame returns are quite insignificant *except* when the favored team wins, in which case the postevent return is positive and significant. These results corroborate those reported in Palomino et al. (2009), in which investors react only to a strongly expected win. And like those authors, we suggest that the observed asymmetry is difficult to reconcile with rational investor behavior.

As robustness checks, we conduct a year-by-year matched sample analysis of non-Super Bowl contending firms. The matched sample analysis supports the finding of a significant anticipatory effect for Super Bowl contending firms. We also analyze the results by dividing the firms in our sample into size quintiles, since the largest firms also tend to have the highest institutional ownership (see Demsetz & Lehn, 1985; Duggal & Millnar, 1999). We then rerun our analysis on separate quintiles sorted by firm size. If our documented results are due to local investor sentiment, the result will be strongest among the firms with highest local ownership (e.g., smaller firms). We find that the results are statistically significant for most size quintiles, but they are consistently most pronounced in the smallest size quintile. These robustness checks are consistent with an investor sentiment explanation.

Our study makes several contributions relative to the literature studying the effect of sporting events on mood and stock prices. First, by examining pregame returns, we demonstrate that returns not only respond to the outcome of the Super Bowl but actually move in anticipation of the game itself. To our knowledge, this is the first time such mood-based anticipatory behavior has been documented. Second, we demonstrate that this pregame price movement somewhat reflects each team's likelihood of winning. Lastly, we show that postgame price movement is significant for a period of time, but only for favored teams that win the game.

The rest of the article is organized as follows. The second section motivates our use of the Super Bowl as a laboratory for examining investor behavior. The third section discusses the data. The fourth section presents our empirical methodology and results. The fifth section concludes.

Motivation

The hypotheses in our article are motivated by three connected empirical findings that sporting events affect mood, that mood affects investor behavior, and that investor behavior can affect stock prices. We are particularly interested in the interplay between mood and the "anticipation" of a future event. This section highlights the literature on anticipation, mood, and their effect on stock prices.

Anticipation and Investor Mood

Many event studies document significant stock price changes in anticipation of an actual event such as earnings announcements (Rendleman, Jones, & Latane, 1982) and corporate takeovers (Keown & Pinkerton, 1981). In the context of our study, if a sporting event such as the Super Bowl affects stock prices, it is plausible that stocks prices may move in anticipation of the game itself. This is particularly so if investors possess information about the likelihood of the game outcome (e.g., publicly available point spreads or some private information).

Peterson (2010) describes recent work in neuroeconomics, which has confirmed that anticipatory brain activity affects investor mood and decision-making and has shown that it is related to very specific neural pathways and brain systems. Spencer (1880) describes the functions of the two major brain systems that can be generically referred to as the reward (pleasure seeking) and loss-avoidance (pain-avoidance) systems. Each system operates beneath conscious awareness and influences investor behavior by way of judgment, information processing, and choices made under uncertainty.

The reward system is activated by the perception or anticipation of a future reward. The anticipated future event sets the brain system in motion, with neurons carrying information using the neurotransmitter dopamine, which has been show to affect mood, behavior, and attention. This information is carried through the mesolimbic pathway that includes the nucleus accumbens (NAcc), medial prefrontal cortex, and anterior cingulate gyrus (Bozarth, 1994). The loss-avoidance system is somewhat less well defined and though runs through amygdala and anterior insula. Activation is associated with feelings of anxiety, disgust, pain, panic, and stress. DeMartino, Kumaran, Hold, and Dolan (2006) show that the behavioral bias of loss aversion is related to amygdala activation.

Kuhnen and Knutson (2005) show that NAcc activation precedes both risky choices and risk-seeking mistakes and often predicts irrational choices and behavior. Interior insula activation, on the other hand, precedes riskless decisions and risk-aversion mistakes. Thus, risk-seeking choices are driven by NAcc activation in positive anticipatory states, whereas risk-avoiding choices are associated with activation of the amygdala or anterior insula due to anticipation of a negative future event. Our fundamental hypothesis is that the 2-week period preceding the Super

Bowl is a positive anticipatory state for local investors and therefore may be associated with irrational choices and behavior.

Mood, Investor Behavior, and Stock Prices

Empirical research indicates that the performance of local sports teams affects the safety, sentiment, and mood of the local community. Edmans et al. (2007) provide a comprehensive review of this literature that documents a connection between sporting events and a wide range of mood variables, all the way from overall optimism, pessimism, and health to the specific number of homicides and suicides in a local community.

In addition, it is well-documented that mood affects human behavior. Akerlof and Shiller (2009) note that mood affects economic decisions and may affect stock prices. Some explanations for this connection include mood-based changes in risk aversion (Kliger & Levy, 2003) or investor misattribution (Lucey & Dowling, 2005). Regardless of the exact cause or explanation, the link between mood variables and stock market returns has been documented in numerous and diverse contexts.[4]

Edmans et al. (2007, p. 1969) identify three necessary conditions that a mood variable must satisfy in order to justify studying its link with stock returns:

> First, the variable must drive mood in a substantial and unambiguous way, so that its effect is powerful enough to show up in asset prices. Second, the variable must impact the mood of a large proportion of the population, so that it is likely to affect enough investors. Third, the effect must be correlated across the majority of individuals . . . .

We argue that the Super Bowl in the United States satisfies all three of these criteria. First, the impact of winning versus losing is discrete and unambiguous. In addition, anecdotal evidence suggests that the Super Bowl affects a large swath of the local population in the same way. Consider the following report from the Denver Post on February 9, 2016, regarding the Denver Broncos Super Bowl victory:

> Basking in football euphoria and sunshine, a surge of orange-clad fans estimated at more than 1 million poured into Civic Center and lined a downtown Denver parade route Tuesday to celebrate the Broncos' 24-10 Super Bowl 50 victory two days earlier over the Carolina Panthers. Warm February temperatures and the fulfillment of championship dreams brought Broncos Country together to revel in a singular success that had been missing for 17 years.[5]

This singular event inspired nearly 20% of the entire population of the state of Colorado (estimated to be 5,456,574 by the U.S. Census Bureau in 2015) to attend the outdoor wintertime parade.

The final link between local investor sentiment and stock returns of local firms is based upon the empirical fact that investors prefer to invest in local firms. Coval and Moskowitz (1999) show that U.S. investment managers prefer to invest in firms

headquartered close to home, while McQueen and Stenkrona (2012) document an investor preference for familiar financial institutions, which they call the "home-institution bias" (see also French & Poterba, 1991; Huberman, 2001; Ivkovic & Weisbenner, 2005; Kalev, Nguyen, & Oh, 2008 for evidence that U.S. households invest disproportionately in local firms). We follow the methodology of Giannetti and Wang (2016) and proxy local firms by identifying all firms headquartered in the same state as the competing Super Bowl team.

Characteristics of the Super Bowl

We focus exclusively on the Super Bowl for several reasons. First, prior studies (e.g., Edmans, Norli, & Garcia, 2007) find the postevent effect for sports events is strongest for most important games. In the U.S. NFL, the Super Bowl is more important than any other game, which includes key semifinal play-off games that occur 2 weeks prior to the Super Bowl.

Second, of all major sports team championships (e.g., baseball, basketball, and hockey) in the United States, the Super Bowl allows for the cleanest test of pregame returns that are not contaminated by investor reaction to prior games. This is because there are 2 full weeks (10 trading days) between the penultimate play-off games and the Super Bowl, which allow for the reaction to the play-off games to wane and anticipation of the Super Bowl to appear in returns. We note here that even though there are 10 trading days between the play-off game and the Super Bowl, most of our empirical work focuses on the 9 trading days prior to the Super Bowl. We limit the window to 9 days to acknowledge the possibility that the Super Bowl pre-event window may actually capture investor reaction to the preceding play-off win. The empirical results of Chang et al. (2012) indicate that the 1-day returns following a sporting event are concentrated at the market open and not throughout the first trading day, so we eliminate the first day of trading after the play-off game to remove the price impact of the play-off game from our sample.

A third advantage of the Super Bowl is that it is a one-game championship. The other candidate sports mentioned above use a best-of-seven championship series, with games occurring in close proximity to each other—often every other day. This rapid pace allows little time to disentangle reactive sentiment from the prior game from anticipatory sentiment toward the next game. Additionally, for these types of championship series, comparing the pre- and postchampionship-winning game return behavior contains added noise. This noise results from the dynamic probabilities of winning that evolve in a series that lasts between four and seven games over a 2-week period.

Finally, the Super Bowl occurs on a Sunday each year. As with Chang et al. (2012), our postgame data therefore capture all market response at the open of the Monday after the Super Bowl. No interday trading concerns occur as they could if the championship were won during a weekday. Also, this method controls for any

so-called Monday effect since Monday is day 0 for all firms contained in the sample.[6]

Data

This study includes individual firms' stock returns surrounding 42 Super Bowls between the years 1967 and 2010. Daily stock returns for firms headquartered in Super Bowl contenders' states come from Center for Research in Security Prices (CRSP). We obtain Super Bowl details (i.e., dates, team hometowns, etc.) from public Internet sources such as www.nfl.com.[7] We exclude the years 1991 and 1995 since the winning and losing states are the same—NY and CA, respectively. Table 1 shows the Super Bowl sample, detailing the winning and losing teams, the favored and nonfavored teams, and the respective numbers of firms in winning and losing states. The sample includes 18,603 firm years, with winning and losing firm years, numbering 10,412 and 8,191, respectively. The Monday immediately after Super Bowl Sunday represents day 0. Any intuition suggesting there are more winning than losing sample firms because larger markets tend to win more often generally holds, as the annual winning sample size is larger than the corresponding losing sample size in 25 of the 42 years.

To discern any systematic differences among winning, losing, favored, and nonfavored subsamples, we also collect firm-level characteristics data from Compustat North America. Each company must have a fully consolidated accounting statement (CONSOL=C), nonmissing close-to-close value-weighted average abnormal return (AAR) during the study window, and nonmissing data for firm size (*LOGSIZE*), which is the natural logarithm of the book value assets (TA) in millions of U.S. dollars. Table 2 shows the summary statistics for the sample. Panels A, B, C, and D show summary statistics for the winning, losing, favored, and nonfavored teams' firms, respectively. While the sample size for each firm characteristic can vary due to data availability for each firm, our sample for all subsequent analysis includes all 18,603 firm years.

It is important to note that there are various methods to determine "local" firms (e.g., zip codes, radial distance from focal point). In this article, the geographical connection is the state of the firms' headquarters and the state of the professional football team. This reflects the view and assumes that people associate themselves with their state of residence.[8] Geographical boundaries are used in similar studies (e.g., Agarwal, Duchin, & Sosyura, 2013; Edmans et al., 2007; Giannetti & Wang, 2016; Kavetsos & Szymanski, 2010).

Overall, Table 1 shows that although winning states' firms tend to come from larger markets in terms of having more firms headquartered in these states, there is no compelling evidence to suggest the winning and losing subsamples of firms (Panels A and B) differ grossly from one another in their attributes. Since favored (nonfavored) teams win (lose) more often than not, this subsample (Panels C and D) tends to compare closely with winning (losing) firms.

Table 1. Super Bowl Teams and Firms Headquartered in Winning and Losing Team States.

Year	Teams Winning/ Losing	Winning Firms	Losing Firms	Year	Teams Winning/ Losing	Winning Firms	Losing Firms
1967	Green Bay Packers/Kansas City Chiefs	15	26	1988	Washington Redskins/*Denver Broncos*	16	149
1968	Green Bay Packers/Oakland Raiders	18	113	1989	*San Francisco 49ers*/ Cincinnati Bengals	699	178
1969	NY Jets/Baltimore Colts	214	20	1990	San Francisco 49ers/Denver Broncos	676	141
1970	Kansas City Chiefs/ *Minnesota Vikings*	35	24	1992	Washington Redskins/Buffalo Bills	19	480
1971	Baltimore Colts/ *Dallas Cowboys*	20	125	1993	*Dallas Cowboys*/ Buffalo Bills	483	481
1972	Dallas Cowboys/ Miami Dolphins	135	61	1994	*Dallas Cowboys*/ Buffalo Bills	539	547
1973	Miami Dolphins/ Washington Redskins	72	8	1996	*Dallas Cowboys*/ Pittsburgh Steelers	578	283
1974	Miami Dolphins/ Minnesota Vikings	113	74	1997	*Green Bay Packers*/ New England Patriots	87	368
1975	*Pittsburgh Steelers*/ Minnesota Vikings	181	80	1998	Denver Broncos/ *Green Bay Packers*	172	83
1976	Pittsburgh Steelers/Dallas Cowboys	179	286	1999	*Denver Broncos*/ Atlanta Falcons	160	184
1977	Oakland Raiders/ Minnesota Vikings	345	84	2000	*St. Louis Rams*/ Tennessee Titans	97	84
1978	Dallas Cowboys/ Denver Broncos	302	70	2001	Baltimore Ravens/ NY Giants	109	509
1979	Pittsburgh Steelers/Dallas Cowboys	185	330	2002	New England Patriots/*St. Louis Rams*	285	88
1980	Pittsburgh Steelers/Los Angeles Rams	179	424	2003	TB Buccaneers/ *Oakland Raiders*	219	847
1981	Oakland Raiders/ Philadelphia Eagles	441	178	2004	New England Patriots/ Carolina Panthers	239	100

(continued)

Table 1. (continued)

Year	Teams Winning/ Losing	Winning Firms	Losing Firms	Year	Teams Winning/ Losing	Winning Firms	Losing Firms
1982	*San Francisco 49ers*/ Cincinnati Bengals	480	177	2005	*New England Patriots*/ Philadelphia Eagles	233	225
1983	Washington Redskins/*Miami Dolphins*	17	189	2006	Pittsburgh Steelers/Seattle Seahawks	220	95
1984	Los Angeles Raiders/ *Washington Redskins*	567	16	2007	Indianapolis Colts/ Chicago Bears	66	183
1985	San Francisco 49ers/Miami Dolphins	628	209	2008	NY Giants/*New England Patriots*	418	228
1986	Chicago Bears/ New England Patriots	210	203	2009	*Pittsburgh Steelers*/ Arizona Cardinals	188	47
1987	NY Giants/Denver Broncos	544	134	2010	New Orleans Saints/ *Indianapolis Colts*	32	60
Total						10,412	8,191

Note. This table shows the list of National Football League teams playing in the Super Bowl between 1967 and 2010. It also shows the number of publicly traded firms headquartered in the winning (losing) team's state as *winning firms* (*losing firms*). Winning teams are listed first, and favored teams are italicized. Years 1991 and 1995 are omitted due to same-state Super Bowl contenders (i.e., NY and CA, respectively). Data come from public Internet sources such as www.nfl.com and CRSP.

Method and Results

Since we are testing the link between sport-induced sentiment and returns, our specific methodology is to quantify and analyze the daily returns to firms headquartered in close geographical proximity to the teams competing in the Super Bowl for approximately 2 weeks before and after the game. Using every Super Bowl where contending teams are from different states, we select firms headquartered in the same state as these competing teams. As a preliminary analysis, we look first at unadjusted returns. Doing so provides a baseline for assessing the returns available to investors considering a local firm strategy. For comparative purposes, we measure these unadjusted returns against the common U.S. market benchmark, the S&P 500, over the same 4-week time period.

Since unadjusted returns fail to account for well-documented risk factors, the bulk of this study focuses on risk-adjusted or abnormal returns for three reasons.

Table 2. Summary Statistics for Firm Characteristics.

Panel A: Firm Characteristics of Winning Firms

Variable	*N*	Mean	Median	*SD*	5th	25th	75th	95th
LOGSIZE	10,412	4.71	4.49	2.24	1.38	3.11	6.16	8.70
MA/BA	9,119	2.06	1.29	4.64	0.72	0.97	1.99	5.02
LEVERAGE	10,260	0.25	0.20	0.29	0.000	0.06	0.37	0.64
ASSET TANG	10,286	0.29	0.22	0.25	0.01	0.08	0.42	0.81
RTE	10,249	−0.18	0.12	1.98	−1.78	−0.05	0.31	0.58
TE	10,395	0.45	0.47	0.43	0.05	0.29	0.66	0.87
ROA	9,394	0.07	0.12	0.50	−0.32	0.04	0.18	0.30
CASH	9,470	0.16	0.07	0.20	0.00	0.03	0.21	0.63

Panel B: Firm Characteristics of Losing Firms

Variable	*N*	Mean	Median	*SD*	5th	25th	75th	95th
LOGSIZE	8,191	4.92	4.76	2.28	1.40	3.30	6.44	8.85
MA/BA	7,000	1.93	1.23	2.86	0.69	0.94	1.93	5.06
LEVERAGE	8,079	0.25	0.20	0.25	0.00	0.05	0.37	0.65
ASSET TANG	8,060	0.26	0.20	0.24	0.01	0.06	0.39	0.77
RTE	8,090	−0.31	0.10	2.26	−2.42	−0.10	0.30	0.59
TE	8,181	0.44	0.45	0.33	0.05	0.27	0.65	0.88
ROA	7,223	0.05	0.11	0.49	−0.37	0.03	0.17	0.28
CASH	7,309	0.17	0.07	0.22	0.00	0.02	0.23	0.70

Panel C: Firm Characteristics of Favored Firms

Variable	*N*	Mean	Median	*SD*	5th	25th	75th	95th
LOGSIZE	9,919	4.77	4.59	2.20	1.39	3.20	6.24	8.63
MA/BA	8,689	1.92	1.26	2.88	0.71	0.96	1.92	4.81
LEVERAGE	9,788	0.24	0.20	0.30	0.00	0.05	0.37	0.64
ASSET TANG	9,802	0.29	0.22	0.25	0.01	0.08	0.43	0.81
RTE	9,763	−0.31	0.11	2.48	−2.23	−0.09	0.30	0.58
TE	9,912	0.45	0.47	0.45	0.05	0.29	0.67	0.88
ROA	8,972	0.06	0.11	0.42	−0.34	0.04	0.17	0.29
CASH	9,037	0.17	0.08	0.21	0.00	0.03	0.23	0.67

Panel D: Firm characteristics of nonfavored firms

Variable	*N*	Mean	Median	*SD*	5th	25th	75th	95th
LOGSIZE	8,684	4.84	4.62	2.32	1.37	3.16	6.36	8.94
MA/BA	7,430	2.10	1.27	4.94	0.71	0.95	2.01	5.25
LEVERAGE	8,551	0.25	0.21	0.24	0.00	0.06	0.38	0.65
ASSET TANG	8,544	0.27	0.20	0.24	0.01	0.07	0.39	0.77

(continued)

Table 2. (continued)

Panel D: Firm characteristics of nonfavored firms								
Variable	*N*	Mean	Median	*SD*	5th	25th	75th	95th
RTE	8,576	−0.16	0.12	1.59	−1.65	−0.05	0.31	0.59
TE	8,664	0.44	0.45	0.31	0.05	0.27	0.64	0.88
ROA	7,645	0.06	0.11	0.57	−0.33	0.04	0.17	0.29
CASH	7,742	0.16	0.07	0.21	0.00	0.02	0.20	0.65

Note. This table shows the firm characteristics for the event study around every Super Bowl from 1967 to 2010. Panel A and B show the descriptive statistics for winning states' firms and losing states' firms, respectively. Panels C and D show the descriptive statistics for the favored states' firms and nonfavored states' firms, respectively. *LOGSIZE* is the natural logarithm of the book value assets (TA) in million U.S. dollar. *MA/BA* is the market-to-book ratio calculated as the market value of equity (product of PRCC_C and CSHO) plus the book value of assets (AT) minus the book value of equity, all divided by the book value of assets. The book value of equity is calculated as book assets (AT) minus book liabilities (LT) minus preferred stock plus deferred taxes (TXDITC). And preferred stock equals the liquidation value (PSTKL) if not missing, or redemption value (PSTKRV) if not missing, or the carrying value (PSTK). *LEVERAGE* is the sum of short-term (DLC) and long-term (DLTT) debt divided by assets (AT). *ASSET TANGIBILITY* is net property, plant and equipment (PPENT) scaled by assets (AT). *RTE* is retained earnings (RE) scaled by the TA. *TE* is the shareholders' equity (CEQ) scaled by the book value of assets (AT). *ROA* is EBITDA (EBITDA**)** scaled by the TA. *CASH* is the cash and short-term investments balance (CHE) scaled by the TA.

First, the firms in the winning and losing states may have risk characteristics that are different from the S&P 500, which the unadjusted returns do not capture. Second, the Super Bowl occurs in late January or early February every year, leading to some potential seasonal (e.g., January) effects in returns. Third, measuring abnormal returns also helps control for potential systematic differences among our subsamples.

Risk-adjusted returns are computed using a conventional four-factor model, which include the Fama and French (1993) risk factors augmented with the Carhart (1997) momentum factor.[9] This factor model is shown in Equation 1.

$$R_{i,t} = \alpha_i + \beta_{i,MKT}\, MKT_t + \beta_{i,SMB} SMB + \beta_{i,HML} HML + \beta_{i,MOM} MOM + \varepsilon_{i,t}. \quad (1)$$

For each relevant local stock, we estimate stock-specific factor βs using daily returns over a 255-day "estimation period" window that ends 46 days prior to each respective Super Bowl. These firm-specific β estimates allow us to generate a set expected returns adjusting for these common risk factors. We calculate abnormal returns as the difference between these expected returns and the actual values. The abnormal return (or prediction error) for the common stock of firm i on day t is defined in Equation 2.

$$A_{i,t} = R_{i,t} - (\hat{\alpha}_i + \hat{\beta}_{i,MKT} MKT_t + \hat{\beta}_{i,SMB} SMB_t + \hat{\beta}_{i,HML} HML_t + \hat{\beta}_{i,MOM} MOM_t). \quad (2)$$

The coefficients, $\hat{\alpha}_i$, $\hat{\beta}_{i,MKT}$, $\hat{\beta}_{i,SMB}$, $\hat{\beta}_{i,HML}$, and $\hat{\beta}_{i,MOM}$, are OLS estimates of α_i, $\beta_{i,MKT}$, $\beta_{i,SMB}$, $\beta_{i,HML}$, and $\beta_{i,HML}$. The average (mean) abnormal return, AAR_t, is the sample mean as defined in Equation 3, where t is the trading day relative to the event (i.e., post-Super Bowl Monday) date.

$$AAR_t = \frac{\sum_{i=1}^{N} A_{i,t}}{N}. \tag{3}$$

These calculations occur daily over the 19-day study window that includes the periods 9 days prior to the event, the event date, and 9 days after the event date. Day 0 is the Monday after the Super Bowl. We then aggregate these abnormal returns across the 1967–2010 sample period for a total of 18,603 firm years for days −9 to +9. The cumulative average abnormal return, $CAAR_{T1,T2}$, is defined over an interval starting on day T_1 and ending on day T_2, as defined in Equation 4.[10]

$$CAAR_{T1,T2} = \frac{1}{N} \sum_{i=1}^{N} \sum_{t=T1}^{T2} A_{i,t}. \tag{4}$$

We correct for the potential problem of cross correlation of security returns using Brown and Warner (1980) and report their portfolio time-series *t*-statistic (CDA).[11] We also report a generalized sign *Z*-statistic (Cowan, 1992), which compares the proportion of positive abnormal returns around our event to the proportion from a period unaffected by the event (i.e., our estimation period). For examples of the generalized sign test in the literature, see Sanger and Peterson (1990), Singh, Cowan, and Nayar (1991), and Chen, Hu, and Shieh (1991).

To test the mean differences between individual groups and periods, we employ two approaches. First, we employ two-group tests of means, using either the paired two-sample test of means to compare cumulative returns of the prior (−9, −1) and post (0, +9) periods or the Satterthwaite unequal variance independent two-sample *t*-test of means to compare cumulative differences within and across groups. The second approach is a regression of cumulative returns on either a period dummy to compare cumulative returns of the prior (−9, −1) and post (0, +9) periods or a group membership dummy variable to compare cumulative returns of different groups. The standard errors are corrected using White–Huber's heteroskedasticity consistent estimator. The results of these two tests were qualitatively the same in every case, quantitatively identical in many cases, and statistically significant at the same levels (i.e., 1%, 5%, and 10%) in every respective case.

Unadjusted Daily Returns Around the Super Bowl

Figure 1 shows the raw returns to holding all the locally headquartered Super Bowl firms during the 9 days prior to the Super Bowl (−9, 0), the Monday after the Super Bowl (i.e., day 0), and the 9 subsequent trading days (+1, +9). Additionally, it shows the average raw returns to holding the subsamples of favored, nonfavored,

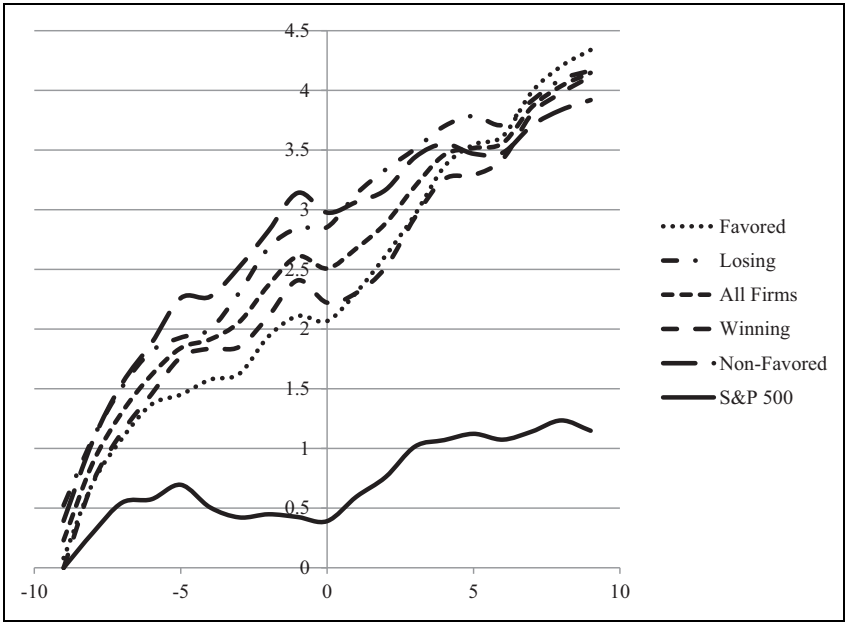

Figure 1. Cumulative raw returns around National Football League Super Bowl events for firms headquartered in favored states, nonfavored states, losing states, winning states, and the Standard and Poor (S&P) 500. This figure shows the close-to-close cumulative average raw returns for all firms headquartered in states that house the favored, nonfavored, winning, and losing Super Bowl teams. It also shows returns to the S&P's 500 stock index. Returns are measured daily for a 9 trading-day window around 42 Super Bowls between 1967 and 2010.

winning, and losing states' firms. For simple benchmarking purposes, we also show the average S&P 500 returns during the 19-day study window. While it is obviously not possible ex ante to identify the winning and losing firms as it is with the favored and nonfavored firms, we present all results for completeness. Table 3 reports the corresponding numerical data.[12]

Figure 1 indicates substantially increasing daily returns to firms headquartered near Super Bowl contenders across the entire 19-day window. These returns are generally increasing for the entire sample and all subsamples, and they appear to outpace the S&P 500 significantly. Table 3 confirms these results, showing cumulative returns over the pre-event $(-9, -1)$, postevent $(0, +9)$ and the whole $(-9, +9)$ window. The difference between the pre- and postevent returns is quantified using two-tailed *t*-tests to determine statistical significance. Holding a portfolio of all local Super Bowl firms has yielded an average return of 4.16% during the 19-day trading period around the Super Bowl, which annualizes to around 55%.[13] Holding only the favored (nonfavored) firms slightly increases (decreases) the return to 4.32 (3.99) % or approximately 57 (53) % annualized. The pre-event returns differ from

Table 3. Cumulative Raw Returns Around National Football League Super Bowl Events for Firms Headquartered in Losing, Winning, Favored, and Nonfavored States and the Standard and Poor (S&P) 500.

		Cumulative Raw Return (Daily)			
Portfolios		Prior (−9, −1)	Post (0, +9)	Whole (−9, +9)	Difference (Prior − Post)
(1)	All firms ($N = 18,603$)	2.61***	1.55***	4.16***	1.06***
(2)	Favored ($n = 9,919$)	2.11***	2.21***	4.32***	−0.10
(3)	Nonfavored ($n = 8,684$)	3.21***	0.79	3.99***	2.42***
(4)	Winning ($n = 10,412$)	2.45***	1.71***	4.16***	0.73***
(5)	Losing ($n = 8,191$)	2.85***	1.34***	4.18***	1.51***
(6)	S&P 500 ($n = 42$)	0.43	0.73*	1.15	−0.30
	(2) − (3)	−1.10***	1.42***	0.33	
	(4) − (5)	−0.40**	0.37**	−0.02	
	(1) − (6)	2.19***	0.83**	3.01***	
	(2) − (6)	1.68***	1.49***	3.17***	
	(3) − (6)	2.78***	0.07	2.84***	
	(4) − (6)	2.02***	0.99**	3.01***	
	(5) − (6)	2.42***	0.62**	3.03***	

Note. This table shows the cumulative raw returns for all firms headquartered in states that house the favored, nonfavored, winning, and losing Super Bowl teams along with returns to the US S&P 500 index. Returns are measured daily for a 9 trading-day window before and after 42 Super Bowls between 1967 and 2010. The columns (prior, post, and whole) show the cumulative mean unadjusted (raw) returns for all firms headquartered in states that house the losing, winning, favored, and nonfavored Super Bowl teams for various windows around the Super Bowl, which occurs on the Sunday prior to trading day 0. The final column shows the difference between the cumulative daily returns over the prior (−9, −1) and post (0, +9) windows. Tests for significance include both a paired two-sample test of means and a regression of cumulative unadjusted returns of the post-period returns on prior-period returns using a dummy variable to indicate whether the returns were from the post period. The standard errors in this regression are corrected using White–Huber's heteroskedasticity consistent estimator. Both methods yielded quantitatively similar results for differences and identical results for statistical significance. We report the paired sample values for ease of interpretation. The rows at bottom depict tests of mean results for the cumulative unadjusted returns between different groups, to include the S&P 500. All values are in percentages.

***, **, * Indicates significance at 1%, 5%, 10% levels.

postevent returns for the whole sample and for subsamples of nonfavored, winning, and losing firms. Neither favored firms nor the S&P 500 have returns that differ between the pre- and postevent periods. Winning and losing results are comparable, and they show that knowing the Super Bowl outcome is not critical to formulating a profitable trading strategy. In fact, publicly available ex ante betting information provides the highest average historical return with a long position in favored teams' firms.

While not necessarily riskless, a zero net investment portfolio long in the subject firms and short in the S&P 500 also performed well, on average, over the past four

Table 4. Annual Ex Post Raw Return Summary for a Zero Net Investment Portfolio of a Long Position in Firms Headquartered Near Super Bowl Contending Teams and a Short Position in the Standard and Poor (S&P) 500.

Portfolio Consisting of Short Position in S&P 500 and Long Position in:	Prior −9 to −1	Post 0 to +9	Whole −9 to +9
All firms (# years positive of 42-year sample)	33	27	35
Worst year (%)	−1.76	−3.40	−2.98
Best year (%)	13.22	5.51	16.43
Favored	32	28	33
Worst year (%)	−3.86	−2.59	−4.18
Best year (%)	13.45	6.03	17.86
Nonfavored	34	26	33
Worst year (%)	−1.13	−3.48	−2.87
Best year (%)	12.87	5.58	14.28
Winning	33	28	34
Worst year (%)	−2.22	−3.48	−2.87
Best year (%)	13.45	6.03	17.86
Losing	33	26	32
Worst year (%)	−3.86	−2.59	−4.19
Best year (%)	12.87	5.58	14.28

Note. This table summarizes the ex post annual return performance relative to the S&P 500 of portfolios consisting of firms headquartered near teams competing in the Super Bowl. It shows annual portfolio performance for the superset and subsets (i.e., favored, nonfavored, winning, and losing) of these firms during a 19-day window around 42 Super Bowls occurring annually between 1967 and 2010. The 19-day study window is broken down into a 9-day period prior to the Super Bowl, 10-day period after the Super Bowl, and the whole 19-day period. The first measure for each set of firms shows how many years the portfolio has higher returns than the S&P 500. Worst (best) year shows the lowest (highest) return for any year when holding a portfolio with a long position in locally headquartered stocks and a short position in the S&P 500. Since winning/losing firms are not known prior to the Super Bowl, this table only shows post-Super Bowl results for these firms. All values are in percentages.

decades. Such a portfolio long in all firms yielded an average of 3.01% (see (1)–(6) for the "whole" period). If odds makers' data are available and accurate beginning after the play-off game, then Figure 1 and Table 3, Panel A, show the returns to a portfolio long in favored (nonfavored) teams' firms and short in the S&P 500 has yielded 3.17 (2.84)% over this 19-day trading window.

Table 4 begins to explore the risk associated with the returns in Panel A. If the large returns in Panel A represent compensation for bearing large risk, then one might expect to observe relatively frequent negative return realizations as a manifestation of that risk. This does not appear to be the case. Specifically, Table 4 summarizes the results of a long–short strategy when subdividing the entire sample into its 42 annual events. Over the 42 years studied, firms in close proximity to the Super Bowl outperform the index average frequently. The last column shows that a zero net investment portfolio long in all firms and short in the S&P 500 yielded positive returns in 35 of the 42 years; returns were positive in 33 of the 42 years

when having a long position in either favored or nonfavored firms. Furthermore, these annual results are positively skewed with the best year for such a portfolio of all/favored/nonfavored firms yielding 16.43%/17.68%/14.28%. The worst single year yielded −2.98%/−4.18%/−2.87%, respectively. Thus, undertaking a long–short strategy has not proven excessively risky, offering the potential for positive returns in approximately 5 of every 6 years, with the most extreme positive returns greatly outweighing the most extreme negative returns. In all, these results suggest that a simple strategy of trading on odds makers' information is approximately equivalent to using a perfect foresight trading strategy based on the actual winning and losing teams.

Abnormal Returns for Firms in Winning, Losing, Favored, and Nonfavored States

Formal risk adjustment clearly requires a more established method, so all results going forward include abnormal returns from the four-factor model described earlier. We begin this section by confirming our results generally support prior studies. Since our hypothesis is that sentiment is not solely reactionary but also anticipatory, we then extend the literature by widening the study window and exploring the possibility of such anticipatory sentiment as well as postevent drift. To do so, we examine pre- and postevent abnormal returns for winning, losing, favored, and nonfavored states' firms.

With respect to the prior literature that primarily analyzes reactionary sentiments, the post-Super Bowl daily return behavior generally supports these findings. The results for the day immediately after the Super Bowl (i.e., day 0) are generally consistent with previous studies.[14] We find a negatively signed abnormal return of −0.06% on the day after the Super Bowl for losing states' firms and zero return for winning states' firms, which supports the Edmans et al.'s (2007) finding of an asymmetric loss effect.[15] The statistically insignificant (i.e., two-tailed p value of .174) loss effect in our data is less pronounced than in other studies, most likely due to sample differences. For instance, related prior studies define local firms by drawing a radius around the city of interest (e.g., Chang, Chen, Chou, & Lin, 2012), whereas we use all firms within a team's home state. Beyond the immediate reaction effect, the individual daily returns for winning and losing firms after the Super Bowl begin to show the anticipation effect given the preponderance of significant positive daily returns leading up to the Super Bowl compared to their frequency after the game.

To investigate our hypothesis regarding anticipatory sentiment, we compare firm performance before and after the Super Bowl. Again, we limit our pregame window to the 9 trading days before the Super Bowl, eliminating the price impact from the first trading day following the previous play-off game. Limiting the sample to winning or losing firms evaluates pre-event performance by subdividing the sample based solely on the actual Super Bowl outcome, which is information known only ex post. Because abundant pre-event information exists such as injury reports, weather

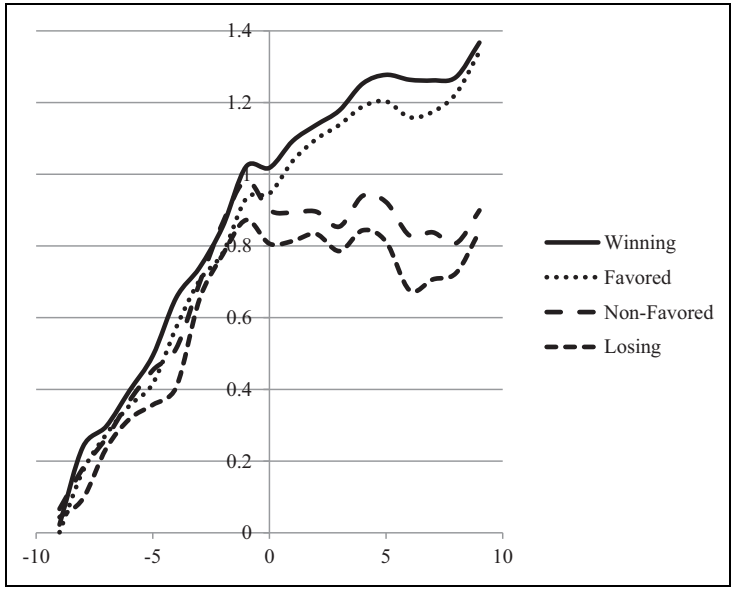

Figure 2. Cumulative abnormal returns around National Football League Super Bowl events for firms headquartered in winning, losing, favored, and nonfavored states. This figure shows the close-to-close value-weighted cumulative average abnormal return for all firms headquartered in states that house the winning, losing, favored, and nonfavored Super Bowl teams. Returns are measured daily for a 9 trading-day window around 42 Super Bowls between 1967 and 2010. Abnormal returns come from a four-factor model with 252-day estimation period that ends 46 days prior to the Super Bowl event.

forecasts, game location, and so on, it is necessary to account for this information when considering any anticipation effect. A large wagering market exists to account for these pre-event variables and places odds on the game outcome.[16] We incorporate the information from this wagering market in our tests. Instead of only subdividing the sample by the game outcome (i.e., winning or losing), as before, we treat betting odds as a proxy for all other potentially valuable information in predicting a Super Bowl winner and also subdivide the sample into the two other groups: Firms geographically associated with the favored or nonfavored team leading up to the Super Bowl game.

Figure 2 shows the cumulative abnormal return results and tabulated statistics for the period spanning 9 days prior to the Super Bowl, postgame Monday, and the subsequent 9 trading days after the Super Bowl. The plots indicate that the daily abnormal return behavior for the subject stocks changes around Super Bowl Sunday for all subcategories of teams' firms. The Super Bowl results and the pregame favored status appear highly correlated—favored (nonfavored) and winning (losing) teams appear to move closely together. Interestingly, the actual winning and losing

Table 5. Cumulative Abnormal Returns Around National Football League Super Bowl Events for Firms Headquartered in Losing, Winning, Favored, and Nonfavored States.

	Cumulative Abnormal Return (Daily)			
Portfolios	Prior (−9, −1)	Post (0, +9)	Whole (−9, +9)	Difference (Prior − Post)
All firms ($N = 18{,}603$)	0.95***	0.19	1.14***	0.76***
Favored ($n = 9{,}919$)	0.95***	0.40**	1.35***	0.55***
Nonfavored ($n = 8{,}684$)	0.98***	−0.07	0.91***	1.05***
Winning ($n = 10{,}412$)	1.03***	0.33**	1.36***	0.70***
Losing ($n = 8{,}191$)	0.87***	0.00	0. 87***	0.87***
Favored–nonfavored	−0.03	0.47***	0.44*	
Winning–losing	0.16	0.33*	0.49**	

Note. This table shows the cumulative average abnormal returns for all firms headquartered in states that house the favored, nonfavored, winning, and losing Super Bowl teams. Abnormal returns come from a four-factor model with 252-day estimation period that ends 46 days prior to the Super Bowl event. Returns are measured daily for a 9 trading-day window before and after 42 Super Bowls between 1967 and 2010. The columns (prior, post, and whole) show the cumulative mean abnormal returns for all firms headquartered in states that house the losing, winning, favored, and nonfavored Super Bowl teams for various windows around the Super Bowl, which occurs on the Sunday prior to trading day 0. The final column shows the difference between the cumulative daily returns over the prior (−9, −1) and post (0, +9) windows. Tests for significance include both a paired two-sample test of means and a regression of cumulative unadjusted returns of the post-period returns on prior period returns using a dummy variable to indicate whether the returns were from the post period. The standard errors in this regression are corrected using White–Huber's heteroskedasticity consistent estimator. Both methods yielded quantitatively similar results for differences and identical results for statistical significance. We report the paired sample values for ease of interpretation. The rows at bottom depict tests of means results for the cumulative unadjusted returns between different groups. All values are in percentages.
***, **, * Indicates significance at 1%, 5%, 10% levels.

portfolios have slightly more extreme returns, which is because the postgame results for favored and nonfavored firms include the "surprise" games (i.e., favored teams losing and nonfavored teams winning), whereas the winning/losing contains only the winning and losing firms.

Table 5 quantifies these CAARs, analogous to the cumulative raw returns in Table 3. Across the whole sample and for every subsample of winning, losing, favored, and nonfavored firms, the CAARs are significantly positive in the period before the Super Bowl (−9, −1) as well as across the whole time period under study (−9, +9). The first column in the cumulative returns section of Table 5 contains one of the major results in our study: Pregame returns are significant for *all* teams, regardless of favored status or actual outcome, which is consistent with the hypothesized "anticipation effect." Coupled with prior findings, these results suggest a bidding up in locally headquartered firms' prices for the 2 weeks prior to their local team's participation in the Super Bowl. On the contrary, cumulative returns in the post (0, +9) period are only significant for winning and favored teams.

Further supporting the anticipatory sentiment argument, the CAARs in the period prior to the Super Bowl are significantly higher than for the period after the Super Bowl in every single case. Winning, losing, favored, and nonfavored firms accumulate postevent returns that are 0.70%, 0.87%, 0.55%, and 1.05% lower, respectively, than their pre-event counterparts. If any pre-Super Bowl return behavior simply represents reaction to the play-off wins 2 weeks before, then one would expect the post-Super Bowl reaction to be stronger than the postplay-off (i.e., pre-Super Bowl) reaction. As we know from Edmans et al. (2007), more significant games yield stronger return reactions. One of the novel findings of this study is that despite the immediate loss effect and lack of winning effect, once we lengthen the post-Super Bowl period, winning states' firms outperform losing states' firms in the post-Super Bowl period.

Taken together, the results for abnormal returns are consistent with prior findings of immediate winning and losing effects, present evidence that splitting the sample based on a team's favored/nonfavored status yields analogous results to winning/losing, and also present novel evidence of a pregame anticipation effect as well as postgame drift.

So far, the evidence shows that stocks of firms in winning, losing, favored, and nonfavored states have positive raw and abnormal returns during the 2 weeks prior to the Super Bowl. When we expand the investigation window, the evidence indicates that abnormal returns to winning/favored (losing/nonfavored) states' firms drift upward (remain level) in the weeks after the Super Bowl victory and these winning (favored) states' firms have higher abnormal returns than losing (nonfavored) states' firms across the entire window. These conclusions support the hypothesis that sport-induced sentiment affects stock returns, the sentiment is not only reactive but anticipatory, and that the full effect of sentiment on prices is not concentrated immediately around the Super Bowl game. These conclusions lead to the question of whether pregame investor sentiment is correlated with the Super Bowl outcome. More specifically, does pregame sentiment offer any incremental information beyond that already contained in the well-known public information from odds makers? The next section tests whether investors exhibit this type of "informed anticipation."

Tests of Informed Anticipation

The supposition behind our next test is that if investors have information about the game outcome beyond that already contained in publicly available betting odds, then pregame returns will be correlated with both the favored status and the actual game outcome. In particular, we want to test whether investors accurately predict outcomes that both accord with and counter the odds makers' publicly available predictions.

Figure 3 and Table 6 report returns when we subdivide the sample into four categories: favored teams that win (*favored/winning*), nonfavored teams that lose (*nonfavored/losing*), nonfavored teams that win (*nonfavored/winning*), and favored

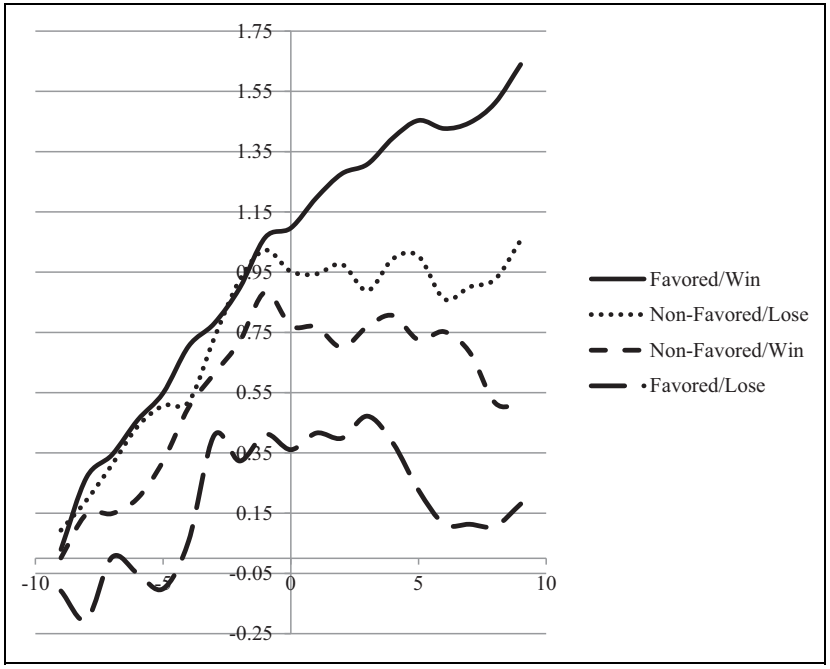

Figure 3. Cumulative abnormal returns around National Football League Super Bowl events for firms headquartered in favored and nonfavored states conditioned on whether the firm is in a losing or winning state. This figure shows the close-to-close value-weighted cumulative average abnormal return for all firms headquartered in states that house all combinations of the favored/nonfavored and winning/losing Super Bowl teams. Returns are measured daily for a 9 trading-day window around 42 Super Bowls between 1967 and 2010. Abnormal returns come from a four-factor model with 252-day estimation period that ends 46 days prior to the Super Bowl event.

teams that lose (*favored/losing*).[17] The plot shows a rather monotonic relationship among the cumulative returns across these four categories during the pre-event phase. That is, firms linked to favored teams that win are bid up more quickly (i.e., have higher cumulative returns) than nonfavored teams, which are in turn bid up more rapidly than favored teams that lose.

If investors possess perfect foresight then among winning (losing) teams, the pregame returns should be the same regardless of favored status. Looking at the cumulative returns in Table 6, however, the differences (1) − (3) (favored/winning − nonfavored/winning) and (2) − (4) (nonfavored losing − favored/losing) indicate that pregame returns depend upon more than just the actual outcome: Pregame returns are correlated with pre-Super Bowl odds. So, either investors do *not* possess incremental information beyond the odds or there exists an anticipation effect that affects all firms, obscuring our ability to

Table 6. Cumulative Abnormal Returns Around National Football League Super Bowl Events for Firms Headquartered in Losing, Winning, Favored, and Nonfavored States Conditioned on whether the Firm is in a Losing or Winning State.

Portfolios		Cumulative Average Abnormal Return (Daily)			
		Prior (−9, −1)	Post (0, +9)	Whole (−9, +9)	Difference (Prior – Post)
(1)	Favored/winning ($n = 7,906$)	1.09***	0.56***	1.65***	0.53***
(2)	Nonfavored/losing ($n = 6,176$)	1.03***	0.06	1.09***	0.97***
(3)	Nonfavored/winning ($n = 2,508$)	0.86***	−0.40*	0.47	1.26***
(4)	Favored/losing ($n = 2,013$)	0.39	−0.21	0.18	0.60
	(1) − (3)	0.23	0.96***	1.18***	
	(2) − (4)	0.64*	0.27	0.91**	
	(2) − (3)	0.17	0.46*	0.62	
	(1) − (4)	0.70***	0.77**	1.47***	
	(1) − (2)	0.06	0.50**	0.56*	
	(3) − (4)	−0.47*	−0.19	0.29	

Note. This table shows the cumulative average abnormal returns for all firms headquartered in states that house the combinations of nonfavored/favored and winning/losing Super Bowl teams. Abnormal returns come from a four-factor model with 252-day estimation period that ends 46 days prior to the Super Bowl event. Returns are measured daily for a 9 trading-day window before and after 42 Super Bowls between 1967 and 2010. The columns (prior, post, and whole) show the cumulative mean abnormal returns for all firms headquartered in states that house the losing, winning, favored, and nonfavored Super Bowl teams for various windows around the Super Bowl, which occurs on the Sunday prior to trading day 0. The final column shows the difference between the cumulative daily returns over the prior (−9, −1) and post (0, +9) windows. Tests for significance include both a paired two-sample test of means and a regression of cumulative unadjusted returns of the post-period returns on prior period returns using a dummy variable to indicate whether the returns were from the post period. The standard errors in this regression are corrected using White–Huber's heteroskedasticity consistent estimator. Both methods yielded quantitatively similar results for differences and identical results for statistical significance. We report the paired sample values for ease of interpretation. The rows at bottom depict tests of means results for the cumulative unadjusted returns between different groups. All values are in percentages.
***, **, * Indicates significance at 1%, 5%, 10% levels.

measure investors' incremental information. If there is an anticipation effect, then pregame returns are affected not only by the odds of winning but also by this more general anticipatory effect, so this test may not have much power.

We now describe an alternative way to test whether investors have additional information. If investors possess information beyond that contained in publicly available betting odds, then among favored teams, winning teams should have higher pregame returns than losing teams; among nonfavored teams, winning teams should also have higher pregame returns than losing teams. For nonfavored teams, the difference (2) − (3) shows that even though nonfavored losing firms outperform nonfavored winning firms, the difference is not significant. On the other hand, favored teams that lose do indeed have smaller pregame returns than favored teams that win (i.e., difference (1) − (4)), and these favored teams that lose have negatively

signed postgame returns. This result indicates that investors may ''sense'' correctly the favored teams that will likely lose versus the ones that will win, and they consequently do not bid up the prices as much. Nevertheless, the evidence on this is mixed and must be interpreted with care.

Overall, the postevent results in this subdivision of the sample provide evidence that supports prior findings and generates further questions. Like Palomino et al. (2009), we find that investors react strongly to an expected win (i.e., *favored/winning* exhibits upward drift), although as discussed earlier in this article, this average 0.56% cumulative abnormal return is significantly smaller in magnitude than the pre-event run-up in prices, which accumulates to 1.09%. Also, for *favored/losing* firms, the significantly lower cumulative returns in the postevent period are somewhat consistent with the idea that even though investors correctly anticipated a loss, they still exhibited the loss effect documented in prior literature. We expand this prior finding by noting this loss effect is not limited to the day immediately after the Super Bowl but drifts downward for some time.

Other results raise further questions. Specifically, there is scant evidence of a ''surprised'' reaction to an unanticipated postevent outcome. One might expect abnormally low returns for favored teams that lose and abnormally high returns for nonfavored teams that win due to an unanticipated outcome, at least according to odds makers' predictions. There is weak evidence for the former, as previously discussed, and no evidence for the latter of these predictions. In fact, the most puzzling result involves nonfavored teams that win. The firms associated with these teams experience positive cumulative abnormal returns prior to the Super Bowl of 0.86%, yet they experience negative abnormal returns of −0.40% after the unexpected victory. Nevertheless, this anticipation and letdown result has been documented elsewhere in the literature and is consistent with Bernile and Lyandres's (2011) finding of negative returns after a victory.

Robustness Analysis

Barber and Odean (2008) and Kumar (2009) document systematic differences in the buying behavior of individual versus institutional investors. Individual investors are, in general, more prone to behavioral biases. Individual investors also tend to invest more heavily in small capitalization stocks, whereas the largest firms tend to have the highest institutional ownership (see Demsetz & Lehn, 1985; Duggal & Millnar, 1999). If the observed pregame returns are attributable to investor biases, we hypothesize that they will be most pronounced among the smallest firms. Therefore, we rerun our results by dividing the firms in our sample into size quintiles.[18] Not only are the results strongest among the smaller firms in our sample, but the abnormal returns decrease nearly monotonically with firm size. Returns are statistically significant in all size quintiles among winning firms, but among the other firm categories, the abnormal returns are statistically insignificant in the largest two size

quintiles. These results are consistent with the explanation that pregame abnormal returns are driven by biases, especially among local, individual investors.

Another concern about these results involves the unique sample under study. Despite controlling for risk in the returns, it is possible the firms in states home to Super Bowl contending teams differ systematically in ways the standard four-factor risk model does not capture. To address this concern, we create a year-by-year matched sample of non-Super Bowl contending firms and evaluate their concurrent risk-adjusted performance.

If the return performance shown earlier for Super Bowl competing firms is not possibly related to local fan sentiment, then there ought to be no difference in CARs for the treatment and matched samples. Or, if there is not any anticipatory phenomenon occurring for Super Bowl vicinity firms, then the returns to the matched sample could outpace the treatment group in the pre-event period. If, however, any anticipatory sentiment exists, then CARs for the treatment sample should outpace those of the matched sample before the Super Bowl.

In every subsample, the treatment firms exhibit significantly higher mean CARs than the matched firms in the pre-event period. The average outperformance ranges from 39 bps (losing) to 53 bps (winning), and all differences are significant at conventional levels. As for the postevent period, while not statistically different, the point estimates at least suggest a winning and losing effect since the treatment group has higher (lower) mean CARs in the 10 days following the Super Bowl after a winning (losing) outcome. For the winning and favored subsamples, the higher mean CARs for the treatment group in the pre-event period, coupled with point estimate outperformance in the post-event period, lead to statistically higher mean CARs for the treatment groups than the matched samples across the entire event window.

In summary, a matched sample analysis supports this novel finding of an anticipatory effect for Super Bowl proximate firms. Using a matched sample that exhibits the same industries and very similar firm characteristics as the treatment sample, mean CARs for the treatment sample are higher in the pre-Super Bowl period than they are for the matched sample.

Conclusions

This study examines the connection between investor sentiment and stock returns by analyzing the performance of local sport teams and local stock returns. Specifically, we test the hypothesis that mood affects stock returns in the United States by examining the effect of a Super Bowl contest on the stock returns of firms that are geographically associated with the competing teams. One contribution of our study is the documentation of ''anticipatory sentiment'' among investors. We use a wider time window, both before and after the Super Bowl, than most of the other studies in this area and find that investor sentiment does not begin only after the Super Bowl is over; instead, sentiment also occurs in anticipation of the game itself. In particular,

we document significantly positive abnormal returns in local stocks prior to the Super Bowl. These abnormal returns are larger than those that occur after the Super Bowl, and they occur for firms associated with both competing teams. Our study is the first in the sports study literature to document such anticipatory sentiment.

We also analyze abnormal returns by splitting teams based on their favored status, which is the first time this has been done in a study of stock price reactions to the Super Bowl. Because favored teams usually win, a team's favored status is highly correlated with the actual outcome of the game. The pregame returns are positive, significant, and nearly identical for both favored and nonfavored teams, which are consistent with an anticipatory "euphoria" among investors. Postgame returns are positive and significant for favored teams (again, because they usually win), and negative and insignificant for losing teams.

The pregame price run-up is largest for favored teams that ultimately win, which is consistent with the favored status containing information about the eventual outcome that investors use to inform their trades. In particular, it appears that investors correctly anticipate when a favored team will lose. The postgame price responses are more nuanced: Favored teams that win exhibit positive post-Super Bowl returns, favored teams that lose exhibit negative post-Super Bowl returns, and win or lose, nonfavored teams exhibit neutral or negative post Super-Bowl returns. When we interact the actual outcome of the game with each team's favored status, we find modest postgame returns *except* when the favored team wins. These results corroborate those reported in Palomino et al. (2009) in which investors react only to a strongly expected win, and like those authors we suggest that the observed asymmetry is difficult to reconcile with rational investor behavior.

We perform two robustness tests to bolster these findings. First, since our tests rely on local investors moving local firms' stock prices, we separate the sample of firms into size quintiles. Prior studies have found smaller firms experience more individual ownership. In support of our overall findings, the smallest quintile of firms experiences the largest anticipatory effect. Additionally, we perform a matched sample analysis and conclude that a portfolio of firms with similar characteristics to our sample firms does not exhibit the same degree of anticipatory return behavior.

Finally, the data suggest a viable trading strategy around the Super Bowl involving a zero net investment portfolio consisting of a long position in all firms headquartered in competing teams' states and a short position in the S&P 500. Such a strategy has yielded an average return of 3.01% across the 19 trading-day window and has been profitable in 33 of the 42 years. Alternatively, using odds makers' information, creating a portfolio long in favored (nonfavored) states' firms and short in the S&P 500 has yielded an average return of 3.17 (2.84) % over the same period. Interestingly, a team's favored status forms the basis of a trading strategy that is more profitable than the one based upon the actual (*ex ante* unknown) outcome of the game. In sum, the evidence here suggests trading in firms headquartered near the competing teams before and after the Super Bowl is generally a winning strategy. Standing on the sidelines is the only sure way for investors to avoid winning this game.

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Notes

1. We follow the methodology of Giannetti and Wang (2016) and proxy local firms by identifying all firms headquartered in the same state as the competing Super Bowl team.
2. Chen and Chen (2012) document significant abnormal stock returns for the companies that owned Japanese professional baseball teams when those teams qualified for the final championship series and attributed this to the marketing of the baseball teams. In contrast, our focus is on the returns of firms whose only connection with the professional football team is geographic proximity.
3. Specifically, we use a horizon of 9 trading days prior to the Super Bowl. Teams qualify for the Super Bowl by winning a play-off game 2 weeks (10 trading days) before the Super Bowl. In light of the results of Chang et al. (2012), we exclude the returns from the day following each team's win in the play-off game thus eliminating returns that may capture investor response to the play-off game, and not anticipation of the Super Bowl.
4. Kamstra, Kramer, and Levi (2003) study daylight, Hirshleifer and Shumway (2003) look at sunlight, Cao and Wei (2005) investigate temperature, Yuan, Zheng, and Zhu (2006) focus on lunar cycles, Kelly and Meschke (2010) study the Seasonal Affective Disorder, and Bialkowski et al. (2012) study the effects of the Ramadan holiday on investor psychology and stock returns.
5. From a story published on February 9, 2016, in the Denver Post and accessed at http://www.denverpost.com/news/ci_29494891/broncos-victory-celebration-will-wind-through-crowded-denver
6. See French (1980) and Keim and Stambaugh (1984) for a discussion of the day of the week effect.
7. Super Bowl favored and nonfavored data come from www.databasefootball.com/leagues/superbowl.htm
8. This is a robustness test in itself, as it represents the weakest "home bias" link when compared to other geographical connection measures such as the aforementioned zip code or distance from focal point approaches. If the relationship does truly exist, then this expansive variable should show a statistical connection. As in other similar empirical papers, this study inevitably tests the joint hypothesis of whether there is a statistical relationship between the event and stock returns and whether people associate with the state they live in. For the reasons of the joint hypothesis, we selected the geographical variable that represents the weakest link to present a stronger

argument for our results. It is possible that some states' residents are closer to the competitor's city than their own state's city. A review of the sample cities shows this could really be the case only in 2007, which represents less than 1% of the overall sample. Likewise, fan bases can extend beyond a state's borders; however, measuring individual preferences is beyond our scope and serves as a potential improvement for future analyses.

9. In brief, these factors include the market risk premium, where the market is the value-weighted market return in CRSP, the return difference between portfolios containing the smallest decile of stocks and the largest decile of stocks across the market as measured by size, the return difference between portfolios containing the highest decile of stocks and lowest decile of stocks across the market as measured by the ratio of book equity-to-market equity, and the return difference between portfolios containing the highest decile of stocks and lowest decile of stocks across the market as measured by recent return (i.e., momentum).
10. We correct for the potential problem of cross correlation of security returns using Brown and Warner (1980) and report their portfolio time-series *t*-statistic (CDA). We also report a generalized sign *Z*-statistic (Cowan, 1992) that compares the proportion of positive abnormal returns around our event to the proportion from a period unaffected by the event (i.e., our estimation period). For examples of the generalized sign test in the literature, see Sanger and Peterson (1990), Singh et al. (1991), and Chen et al. (1991).
11. For further application, see N. Dopuch, Robert W. Holthausen, R. Leftwich (1986), Abnormal stock returns associated with media disclosures of 'subject to' qualified audit opinions, Journal of Accounting and Economics, Vol. 8, No. 2 (June), pp. 93-118. and Brickley, James A., Dark, Frederick H. and Weisbach, Michael, (1991), An Agency Perspective on Franchising, Financial Management, 20, issue 1.
12. An Online Appendix located at http://digitalcommons.unl.edu/financefacpub/31 tabulates the average daily returns over the (−9, +9) window that supports Table 3.
13. Although we report annualized figures, we present them *solely* for contextual purposes. The purpose of this article is to report returns before and after the Super Bowl not to imply any trading strategy is repeatable year round.
14. The Online Appendix located at http://digitalcommons.unl.edu/financefacpub/31 tabulates the average daily returns over the (−9, +9) window to support this point and further discussion related to Table 5.
15. While there exists an extensive literature documenting asymmetric returns in response to various types of information (see, e.g., Chan, 2003; Chulia, Martens, & van Dijk, 2010; Kurov, 2010), studies by Akhtar, Faff, Oliver, and Subrahmanyam (2011) and Akhtar, Faff, Oliver, and Subrahmanyam (2012) are among the first to document sentiment-based asymmetry in returns, which they attribute to a "negativity" effect. Over a 1-day window, we find a similar asymmetric effect on returns in response to a loss.
16. Breuer, Guido Hauten, and Kreuz (2009) study a new class of financial instruments designed as lotteries on the outcome of highly visible sporting events. Such investments give investors an alternative to direct betting using available bookmakers' odds.
17. the Online Appendix located at http://digitalcommons.unl.edu/financefacpub/31 tabulates the average daily returns over the (–9, +9) window to support this point and further discussion related to Table 6.

18. See Online Appendix located at http://digitalcommons.unl.edu/financefacpub/31 for tabulated values that support all robustness tests.

Supplemental Material

The online [appendices/data supplements/etc.] are available at http://journals.sagepub.com/doi/suppl/10.1177/1527002516684170.

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