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A test of the representativeness bias effect on stock prices: A study of Super Bowl commercial likeability

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ABSTRACT

We test 17 years of Super Bowl commercials, finding that “liked” commercials coincide with higher stock returns, despite controls for firm size and changes in sales. This is consistent with representativeness bias, the irrational relation of firm characteristics to returns.

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1. Introduction

When making decisions that should otherwise be complex, people often take mental shortcuts rather than engage in longer analytical processing (Yates, 1990). The representativeness bias is one such shortcut and is defined as the tendency to irrationally attribute one characteristic to imply another (Tversky and Kahneman, 1974). In essence, the representativeness bias is a reliance on stereotypes to form quick and otherwise irrational opinions (Sheffrin, 2005). For example, when buying a used car, we might simply assume a clean car is indicative of a well-running and well-maintained car, ignoring that cleanliness is merely a superficial characteristic.

Representativeness bias may also affect investment decision making. Hirshleifer (2001) provides an extensive review of this literature. For example, Antunovich and Laster (1998) point out that investors might misattribute a firm’s reputation for producing quality products, for being environmentally-friendly, etc., to being indicative of a good stock investment despite the fact that many other factors affect returns. While each of these characteristics may contribute to firm value, investing based on any one of them alone is irrational.

To test for and identify the representativeness bias, we study investors’ reactions to the likeability of Super Bowl commercials. We use *USA Today’s* AdMeter results to measure likeability for 529 commercials aired during 17 Super Bowls. Using an event-study methodology, we test

post-event returns to see whether firms that aired more likeable 39 commercials experience higher returns. This analysis is useful for three 40 reasons: first, the Super Bowl is the most watched television event of the 41 year so its commercials (often first-time airings) quickly become part of 42 public awareness; second, Super Bowl ads air within a short five hour 43 period, providing reliable timing for our event study and allowing us to 44 associate any immediate stock price reaction to the ad’s likeability; and 45 third, the likeability of a commercial is obviously not related to the long- 46 term value proposition for a firm so any stock price reaction would be 47 strongly suggestive of a representativeness bias. 48

Pursuant to the last point above, an obvious alternate hypothesis is 49 that likable Super Bowl ads generate an increase in sales, potentially 50 making a positive relation between stock price and commercial likeability 51 rational. We control for this possibility by including changes in sub- 52 sequent firm sales in our tests. Likewise, commercial likeability may act as 53 an information signal for investors such that less-known firms benefit 54 more from airing a commercial. Therefore, we further include firm size as 55 a proxy for information asymmetry as a control variable. Results show 56 that firms with better-liked commercials experience higher returns on 57 days following the Super Bowl (though, while causation is implied, it is 58 not assured), despite the aforementioned controls, which is a finding that 59 is consistent with the representative bias effect. 60

2. Data and empirical tests

Since 1989, *USA Today* has measured real-time adult reactions to 62 television commercials aired during the Super Bowl in several locations 63 around the United States. Participants register how much they liked each 64

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Table 1
Summary statistics

	Mean	Min	Max	Stdev
Ads per year	35.7647	23	52	6.0676
Rating	6.6452	3.33	9.66	1.1092
[0,1] Returns	0.0012	-0.1040	0.0855	0.0216
[0,2] Returns	0.0019	-0.1435	0.1188	0.0317
[0,5] Returns	0.0140	-0.1567	0.3036	0.0506
[0,20] Returns	0.0233	-0.5480	0.5631	0.1038
[0,1] Abnormal returns	-0.0009	-0.1261	0.0720	0.0209
[0,2] Abnormal returns	-0.0005	-0.1261	0.1092	0.0301
[0,5] Abnormal returns	0.0109	-0.1564	0.2763	0.0496
[0,20] Abnormal returns	0.0191	-0.5472	0.5563	0.1038
Size	30,381.6	14.7	295,294.9	39,820.3
Δ in sales	0.9315	0.0282	3.4610	0.3026

This table presents summary statistics on the likeability of 529 commercials aired during Super Bowls from 1989 to 2005. A scale of 1 to 10 is applied, with 1 indicating a “bad” commercial. Cumulative returns from day 0 to day t are calculated such that day 0 is the Friday before the Super Bowl and day 1 is the Monday after. Abnormal returns are gross returns less S&P 500 returns from the same period. Firm market cap (Size) in millions and percent change in firm sales adjusted by industry mean (Δ in Sales) are also reported.

commercial on a scale of 1 to 10, 1 being least liked. A computer calculates average scores indicating the overall likeability of each commercial. We hand-collect these likeability scores for each Super Bowl commercial since the inception of the measure, spanning the period from 1989 to 2005. We then identify the parent company for each firm or product advertised. Any commercials originating from privately-held or foreign-listed firms are dropped from the analysis. Table 1 presents summary statistics of variables used in our study.

Our filtered data consists of 529 Super Bowl commercials aired by 102 publicly-traded firms. The highest and lowest number of ads aired by publicly-traded firms in any given year is 52 and 23, respectively. The average likeability rating is 6.6, and the standard deviation of 1.1 indicates a high degree of variability. In addition to testing the ratings themselves, we also test the rank of commercials (rank 1 being the best-liked) and create dummy variables for the 10 most- and least-liked commercials each year. It is possible that some firms might have commercials appearing in both the top and bottom 10 within the same year, but in our dataset this occurred only nine times and it does not materially affect results.

Daily stock price data are retrieved from CRSP. Gross returns $R_{i,t}$ are calculated as the closing price of stock i on day t divided by the closing price on day 0, where day 0 is the Friday before the Super Bowl and day 1 is the Monday after. Abnormal returns $r_{i,t}$ are calculated as $R_{i,t} - R_{0,t}^m$ where $R_{0,t}^m$ is the return of the S&P 500. Table 1 shows that both gross and abnormal returns are approximately zero on the Monday and Tuesday following the Super Bowl. Therefore, airing a Super Bowl commercial does not seem to immediately yield excess stock returns. Average returns are significantly positive at longer horizons.

Results reported in Table 2 likewise show that firms airing the top and bottom 10 commercials both exhibit positive abnormal returns, though again not significantly in the immediate days following the

Table 2
Univariate results

	Top 10	Bottom 10	Difference
[0,1] Abnormal returns	0.0026 (0.1533)	0.0001 (0.9457)	0.0025***
[0,2] Abnormal returns	0.0037 (0.2862)	0.0007 (0.7895)	0.0030***
[0,5] Abnormal returns	0.0163*** (0.0066)	0.0140*** (0.0023)	0.0023***
[0,20] Abnormal returns	0.0298*** (0.0015)	0.0147 (0.1354)	0.0151***

This table presents abnormal stock returns of firms with top and bottom 10 commercials based on likeability according to surveys administered by USA Today for each Super Bowl from 1989 to 2005. Abnormal returns are defined in Table 1. Means and p -values (in parentheses) are reported. *** denotes statistical significance at the 1% level.

Super Bowl. However, we see that abnormal returns for the top 10 group are significantly higher than those of the bottom 10. These results provide preliminary evidence that investors react positively to firms with liked commercials compared to those with less liked ones.

3. Regression results

Our regression models are as follows:

$$Returns = a + b \times Rank + c \times Size + d \times \Delta \text{ in Sales} + \epsilon, \tag{1}$$

$$Returns = a + b1 \times Top10 + b2 \times Bottom 10 + c \times Size + d \times \Delta \text{ in Sales} + \epsilon, \tag{2}$$

where *Returns* are either gross or abnormal returns over the periods [0,1], [0,2], [0,5], and [0,20]; a is the intercept; and b , c , and d are coefficients that reflect the relation between returns and the rank of the commercial, the log market capitalization of the firm, and the change in year-end annual sales adjusted by industry mean, respectively.

Table 3 reports regression results using abnormal returns as the dependent variable (regression results using gross returns as the dependent variable yield qualitatively similar findings as the reported results). Panel A of Table 3 shows that returns are negatively related to the Rank variable, and significantly so, at virtually every horizon. That is, better-liked ads (ranked closer to 1) exhibit higher returns, suggesting that, when people like ads, they also like the stocks of those firms that aired them. Panel B shows that the 10 most liked commercials generate higher returns while the 10 least liked do not generate any significant return, suggesting that the impact of likeability is not symmetric.

We scan the Nexus database for news items pertaining to our sample firms around our event dates and do not find any evidence that firm-

Table 3
Regression results on abnormal returns

	Immediate [0,1]	2 days [0,2]	Week [0,5]	Month [0,20]
<i>Panel A: excess returns = a + b × rank + c × size + d × Δ in sales</i>				
Intercept	-0.0016 (0.6989)	-0.0052 (0.3803)	0.0347*** (0.0002)	0.0462** (0.0201)
Coefficient on rank	-0.0001** (0.0208)	-0.0002*** (0.0072)	-0.0002 (0.1054)	-0.0005** (0.0406)
Coefficient on size	0.0006 (0.3517)	0.0015 (0.1205)	-0.0023 (0.1322)	-0.0077** (0.0155)
Coefficient on Δ in sales	0.0020 (0.4759)	0.0056 (0.1697)	-0.0124* (0.0547)	0.0115 (0.3986)
# of obs.	529	529	529	529
Adj. R ²	0.76%	1.65%	0.78%	1.51%
F-value	2.35	3.96	2.39	3.70
<i>Panel B: excess returns = a + b1 × top 10 + b2 × bottom 10 + c × size + d × Δ in sales</i>				
Intercept	-0.0064 (0.1122)	-0.0118** (0.0364)	0.0269*** (0.0027)	0.0344* (0.0680)
Coefficient on top 10	0.0047** (0.0206)	0.0059** (0.0391)	0.0043 (0.3459)	0.0159* (0.0949)
Coefficient on bottom 10	0.0010 (0.6236)	-0.0005 (0.8477)	0.0036 (0.4203)	-0.0151 (0.1108)
Coefficient on size	0.0007 (0.2987)	0.0016 (0.1015)	-0.0020 (0.1869)	-0.0080** (0.0116)
Coefficient on Δ in sales	0.0021 (0.4670)	0.0057 (0.1612)	-0.0122* (0.0581)	0.0118 (0.3823)
# of obs.	529	529	529	529
Adj. R ²	0.60%	1.09%	0.31%	2.09%
F-value	1.80	2.46	1.41	3.81

This table presents coefficients of a regression model where the dependent variable is abnormal returns as defined in Table 1. Rank is based on likeability where 1 is most liked. Top 10 and bottom 10 are dummy variables equal to one if the commercial is ranked in the top or bottom 10 each year, respectively; otherwise, they are equal to zero. Firm size and change in sales variables are defined in Table 1. ***, **, and * denote statistical significance at the 1, 5, and 10% levels, respectively.

124 specific news is driving stock price reactions. Because the Super Bowl is
 125 the only major event that occurs between day 0 and day t , we infer that
 126 the likeability of the commercials drives the stock price reaction.

127 Note that our main findings hold despite controls for changes in
 128 sales and differences in information asymmetry. The size variable is
 129 not generally significant except for the longest term cumulative return
 130 where it is significantly negative, implying that smaller firms (those
 131 with more information asymmetry) may enjoy a more positive impact
 132 from airing a Super Bowl commercial. The change in sales variable is
 133 mostly positively related to returns, but the only relation that is
 134 statistically significant is an unexpected negative relation, suggesting
 135 that subsequent change in sales is not reliably or predictably related to
 136 event-period returns. Most importantly, even after controlling for
 137 both possible effects, our main finding of a positive relation between
 138 ad likeability and returns persists. Again, people seem to like the
 139 stocks of firms that air likeable commercials.

140 4. Robustness tests

141 We conduct several robustness checks in an attempt to ensure
 142 documented abnormal returns, and the relation between returns and
 143 ad likeability, are reliably statistically significant. With respect to the
 144 dependent variable, we re-run all tests using gross rather than excess
 145 returns. With respect to independent variables, we use demeaned ad
 146 ratings rather than rank, ad ratings aggregated by firm rather than
 147 each commercial separately, alternative specifications of firm size and
 148 the change in sales variables, and different pre- and post-event time
 149 horizons. In each case our qualitative findings are unchanged. We also
 150 conduct tests in an attempt to make sure alternative hypotheses do
 151 not explain our results. For example, risk and momentum could
 152 explain our abnormal returns (Fama and French, 1996). However, this
 153 does not appear to be the case. For example, our sample firms with
 154 positive abnormal returns do *not* have positive pre-event abnormal
 155 returns, so momentum does not seem to be a factor. Note also that our
 188

firm size and change in sales variables could be viewed as controls for 156
 the size and value premium, respectively. All robustness test results 157
 are available upon request. 158

5. Conclusion 159

Human beings are often subject to behavioral biases. In investment 160
 decision making, the representativeness bias is the act of irrationally 161
 relating a particular aspect of a firm to its expected stock returns. To 162
 test for and identify this effect, we investigate television commercials 163
 aired during the Super Bowl from 1989 to 2005 to see if commercial 164
 likeability affects stock prices. We find that firms with liked Super 165
 Bowl commercials experience higher stock price reactions during the 166
 days immediately following the Super Bowl (though, while causation 167
 is implied, it is not assured) despite controls for changes in sales and 168
 differences in information asymmetry. Our finding is consistent with a 169
 representativeness bias effect. To simply relate commercial likeability 170
 to expected stock returns is irrational. We conduct several robustness 171
 checks and find that our qualitative findings hold. More general 172
 modeling specifications and examination of causality will of course be 173
 needed to confirm results, a matter we leave to future research. 174

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