Impact of NASCAR Sponsorship Announcements on Shareholder Wealth: A Replication

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Introduction

Pruitt, Cornwell, and Clark (2004, page 281) state that NASCAR sponsorship announcements were accompanied by the largest increases in shareholder wealth ever recorded in the marketing literature in response to a voluntary marketing program – represents a striking and unambiguous stock market endorsement of the sponsorships. Indeed, the 24 sponsors analyzed in this study experienced mean increases in shareholder wealth of over $300 million dollars, net of all of the costs associated with the sponsorships.

Purpose

This research replicates the Pruitt, Cornwell, and Clark event study. They found statistically significant positive daily abnormal rates of return for the two-day period, one day before the announcement date and the announcement date. We try to recreate their results. Then we alter some of their research procedures. For instance, their event study method has an estimation period that is after the test period. We duplicate the study with an estimation period that is before the test period. Our results are significantly different.

NASCAR Sponsorship

One possible reason why a firm would want to be a NASCAR sponsor is the belief that this investment has a positive net present value. That is, the present value of the incremental revenue is greater than the cost. This would imply a positive abnormal rate of return when a firm announces a sponsorship.

An alternative hypothesis is that NASCAR sponsorship is an executive perk. That is, the top executives get to participate in NASCAR weekends. This perk has a cost and no expected benefits and consequently should have a negative impact on the stock price when sponsorship is announced.

Pruitt, Cornwell, and Clark Event Study Methodology

The features of their event study are:

- Studied 24 firm announcements. The firm names, sponsor's name, driver, car number, and announcement are in Exhibit I (all Exhibits are at the end of the paper). This Exhibit is in Table 1 of Pruitt, Cornwell, and Clark (2004, page 287).

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- Used daily data. The daily rates of return are from CRSP.
- Used the Scholes and Williams standardized cross-sectional market model to estimate the parameters of the market model. See Cowan and Sergeant (1996) and Scholes and Williams (1977).
- Market model estimation period is t = +101 to +200 relative to day t = 0. Day t = 0 is the first day of trading following the NASCAR sponsorship announcement date.
- Test period is from 25 trading days prior to day t = 0 to 100 trading days following the announcement.
- Market proxy is CRSP value weighted index.
- Measure of the impact of the announcement is the abnormal rate of return. This is the actual rate of return for a stock on a specified day minus the expected rate of return for this stock on the same day. The expected daily rate of return is calculated using the Scholes and Williams market model. This model accounts for the problems associated with non-synchronous trading which can occur in event studies that have firms with exceptionally low trading volume.

Exhibit II, which is Table II in Pruitt, Cornwell, and Clark (page 288), contains their key results. The mean daily abnormal rate of return for event days -1 and 0 is 0.0129 and is the only statistically significant result at the five percent level. This one statistically significant result is the primary result that justifies their statement of the impact of a NASCAR sponsorship announcement on shareholders wealth.

Critique

Three important issues that Pruitt, Cornwell and Clark did not discuss are

- Whether or not any other information (confounding event) was announced on the sponsorship announcement date. For instance, is the NASCAR sponsorship announcement date on the same day as a positive earnings announcement?
- Most event studies use an estimation period prior to the event date. Their estimation period is from 101 to 200 trading days after the event date. They do not state why they selected a post event day time period for the estimation period.
- Most event studies include both the daily and cumulative abnormal rates of return. They provide mean daily abnormal rates of return for 16 out of the 126 event days. There are no cumulative returns for the mean daily abnormal rates of return. After event day 1 six of the eight mean daily abnormal rates of return are negative (Exhibit II). While none are statistically significant this is a signal that something significant could be happening after the event day. And this could be checked by looking at the cumulative returns.

Abnormal Rate of Return Model

The daily abnormal rate of return is the difference between the daily actual rate of return and the daily expected rate of return. The use of any model to estimate the expected daily rates of return requires two time series of return data for each security for each event. They are an estimation period for estimating the model parameters and an event period for calculating

abnormal rates of return. Usually, in order to avoid biasing the parameter estimates, the estimation period and event period do not overlap.

The single factor market model is used to estimate the expected daily rates of return. The alphas and betas of the market model are estimated by ordinary least squares and the method of Scholes and Williams (1977).

The daily abnormal rate of return $AR_{j,t}$ for the common stock of the j^{th} firm on day t during the test period is

$$AR_{j,t} = R_{j,t} - (a_j + b_j * R_{m,t})$$

where the coefficients a_j and b_j are ordinary least squares estimates (estimated using daily data from the estimation period), $R_{j,t}$ is the daily observed rate of return on stock j on day t during the test period, and $R_{m,t}$ is the daily observed rate of return on the market m on day t during the test period.

The Scholes and Williams method is also used to estimate those coefficients. The beta estimator is

$$b_{j^*} = \frac{b_{j-} + b_j + b_{j+}}{1 + 2\rho_m}$$

where b_{j-} is the ordinary least squares slope estimate form the simple regression of $R_{j,t}$ on $R_{m,t-1}$, b_j is the ordinary least squares slope estimate from the simple regression of $R_{j,t}$ on $R_{m,t}$, b_{j+} is the ordinary least squares slope estimate from the simple regression of $R_{j,t}$ on $R_{m,t+1}$, and ρ_m is the estimated first order correlation of the daily rate of return on the market, R_m. The intercept estimator a_{j^*} is

$$a_{j^*} = \bar{R}_j - b_{j^*} * \bar{R}_m$$

where $\bar{R}_j$ is the mean return for stock j during the estimation period and $\bar{R}_m$ is the mean market return during the estimation period.

The average abnormal daily rate of return, AAR_t on date t is

$$AAR_t = \frac{\sum_{j=1}^{N} AR_{j,t}}{N}$$

where t is the number of trading days relative to the announcement date (for instance t = -10 means 10 trading days before the event and N is the number of common stocks studied.

The cumulative average daily abnormal rate of return, $CARR_{T1,T2}$ beginning with trading day *T1* and ending with trading day *T2* is

$$CAAR_{T1,T2} = \frac{1}{N}\sum_{j=1}^{N}\sum_{t=T1}^{T2} AR_{j,t}$$

where all of the terms are as defined above.

The Features of Our Study

The features of our study are

- Study the same firms as Pruitt, Cornwell, and Clark.
- Study a sample which deleted two firms that had confounding information.
- Use the CRSP value and equal weighed index as a proxy for the market rate of return.
- Study two estimation periods:
    - The same future time as Pruitt, Cornwell, and Clark (2004).
    - An estimation period from 16 days before the even to 75 days before the event.
- Use the Market model to estimated expected rate of return.
- Use two methods to estimate the market model parameters:
    - Standard ordinary least squares regression method.
    - Scholes and Williams method to estimate beta.

Our Results

Exhibits III through VII contain our results. The replication of the Pruitt, Cornwell, and Clark results indicate that the daily abnormal rates of return are significantly different. For instance, as shown in Exhibit III Pruitt, Cornwell, and Clark have an abnormal rate of return of +0.0129 for the two days t = -1 and t = 0. Our replication of their study for these same two days resulted in a two-day abnormal rate of return of +0.0063 which is less than half of their value. When the estimation period is before the test period this two day abnormal rate of return is +0.0023. While these two results are positive they are significantly less than the result obtained by Pruitt, Cornwell and Clark and are not statistically significant (at the five percent level).

Exhibits IV through VII show the charts of cumulative abnormal rates of return for the entire test period. Exhibit IV shows the cumulative abnormal rate of return when the estimation period is after the test period and the Scholes and Williams method is used to estimate the parameters of the market model. The cumulative abnormal rate of return at the end of the test period is -2.09%. Exhibit V shows the cumulative abnormal rate of return when the estimation period is after the test period and the standard market model is used. The cumulative abnormal rate of return at the end of the test period is -1.53%. Exhibit VI shows the cumulative abnormal rate of return when the estimation period is before the test period and the Scholes and Williams method is used to estimate the parameters of the market model. The cumulative abnormal rate of return at the end of the test period is -17.92%.

Exhibit VII shows the cumulative abnormal rate of return when the estimation period is before the test period and the standard market model is used. The cumulative abnormal rate of

return at the end of the test period is -18.79%. These results change significantly when the estimation period is changed from after the test period to before the test period.

While not reported here we obtained similar results for daily abnormal rates of return around the announcement date and cumulative abnormal rates of return during the test period when the equal weighted CRSP index is used and when the sample with two firms with confounding information is omitted.

The calculation procedure was checked using the sample data in O'Hara (2006). O'Hara provides announcement dates and sample firms for an event study and then gives the results. We replicated her study and get the same abnormal rates of return. This replication, which is not included here, was done using the same calculation procedure used to replicate the NASCAR study.

Summary

This study replicates the event study of the announcement of NASCAR sponsorship studied by Pruitt, Cornwell, and Clark. Our results are significantly different. We do not get any statistically positive abnormal rates or return around the announcement date. We also use an estimation period before the test period. In this case the cumulative abnormal rates of return for the test period are negative. We verified the accuracy of our calculation procedure using another data set that contained event dates, sample firms, and estimated abnormal rates of return.

Exhibit I: NASCAR Sponsorship Sample (Table 1 in Pruitt, Cornwell, and Clark, 2004)

Obs.	Company Name	Sponsorship Name	Driver/Car	Date
1	Ashland Oil	Valvoline	Jimmy Benson/10	8/19/00
2	Conseco	Conseco	Larry Foyt/14	9/3/99
3	Daimler Chrysler	Dodge	Everham Racing/2 cars	1/11/00
4	Delphi Automotive	Delphi Automotive	Jerry Nadeau/25	10/31/00
5	Fleetwood	Fleetwood RVs	Dale Jarrett/88	12/3/97
6	Ford Motor Co.	Motorcraft	Elliot Sadler/21	11/14/97
7	Ford Motor Co.	Quality Car Service	Dale Jarrett/88	11/11/95
8	General Mills	Cheerios	Johnny Benson/26	1/13/98
9	Georgia Pacific	Georgia Pacific	Roy Jones/44Rusty Wallace/2	9/21/00
10	Harley Davidson	Harley Davidson	Rusty Wallace/2	6/2/99
11	Home Depot	The Home Depot	Tony Steward/20	9/2/99
12	Kroger	Ralph's Supermarkets	Brett Bodine/11	11/13/99
13	Mattel	Hot Wheels	Kyle Petty/44	10/19/96
14	Mobil Oil	Mobil	Penske Racing/12	2/4/98
15	Nations Rent	Nations Rent	Michael Waltrip/7	11/13/99
16	Newell Rubbermaid	Sharpie	Kurt Busch/97	4/4/01
17	Oakwood Homes	Oakwood Homes	Ken Schrader/33	7/3/99
18	Paychex	Paychex	Brett Bodine/11	1/8/98
19	Phillip Morris	Miller Lite Beer	Rusty Wallace/2	6/2/99
20	Phillips Petroleum	Phillips 66	Elliot Sadler/29	4/2/97
21	Pfizer, Inc.	Viagra	Mark Martin/6	6/30/00
22	Sara Lee	Jimmy Dean	Derrick Cope/30	1/12/99
23	Sprint	Sprint	Adam Petty/45	11/15/99
24	United Parcel Service	UPS	Dale Jarrett	11/17/00

Exhibit II: Mean Shareholder Wealth Effects Associated with a NASCAR Sponsorship Announcement for the Full Sample of 24 Announcements
(Table 2 in Pruitt, Cornwell, and Clark, 2004)

Event Day	Mean Abnormal Return	t-statistic	Median Abnormal Return	Sample Size	N+	Z-Statistic
-25	-0.0051	-0.97	-0.0059	24	10	-0.58
-10	-0.0014	-0.70	-0.0061	24	10	-0.58
-5	+0.0056	+0.93	-0.0013	24	11	-0.17
-4	+0.0032	+1.20	+0.0038	24	15	+1.06
-3	-0.0001	-0.05	-0.0029	24	10	-0.58
-2	-0.0079	-1.25	-0.0118	24	9	-0.99
-1/0	+0.0129	+2.08*	+0.0148	24	16	+1.88
1	+0.0001	+0.44	+0.0021	24	13	+0.65
2	-0.0021	-0.44	-0.0016	24	11	-0.17
3	+0.0009	-0.03	+0.0014	24	13	+0.65
4	-0.0074	-1.30	-0.0088	24	8	-1.39
5	-0.0044	-0.62	-0.0017	24	12	0.00
10	-0.0141	-1.21	-0.0042	24	9	-0.99
25	-0.0069	-1.51	-0.0019	24	12	0.00
50	-0.0035	-1.34	-0.0048	24	10	-0.58
100	+0.0002	-0.55	-0.0026	24	10	-0.58

Significant at the 5 percent level, two tailed test.
N+ is the number of positive mean abnormal daily rates of return on the event day.

Exhibit III: Mean Daily Abnormal Rates of Return for Sample of 24 Announcements from Pruitt, Cornwell, and Clark (2004) and Our Replications

Event Day	Mean Daily Abnormal Rate of Return Pruitt, Cornwell, and Clark	Mean Daily Abnormal Rate ofReturn Replication Test period After	Mean Daily Abnormal Rate of Return Replication Test period Before
-25	-0.0051	-0.0053	-0.0040
-10	-0.0014	-0.0035	-0.0052
-5	+0.0056	+0.0048	+0.0034
-4	+0.0032	-0.0014	-0.0032
-3	-0.0001	+0.0018	+0.0000
-2	-0.0079	-0.0046	-0.0062
-1/0	+0.0129	+0.0063	+0.0023
1	+0.0001	+0.0002	-0.0013
2	-0.0021	-0.0011	-0.0019
3	+0.0009	-0.0007	-0.0009
4	-0.0074	-0.0055	-0.0056
5	-0.0044	-0.0053	-0.0059
10	-0.0141	-0.0151	-0.0163
25	-0.0069	-0.0053	-0.0063
50	-0.0035	+0.0008	+0.0005
100	+0.0002	-0.0013	+0.0005

Exhibit IV: Plot of Cumulative Daily Abnormal Rates of Return, estimation period is after announcement, value weighted market index, Scholes and Williams method.

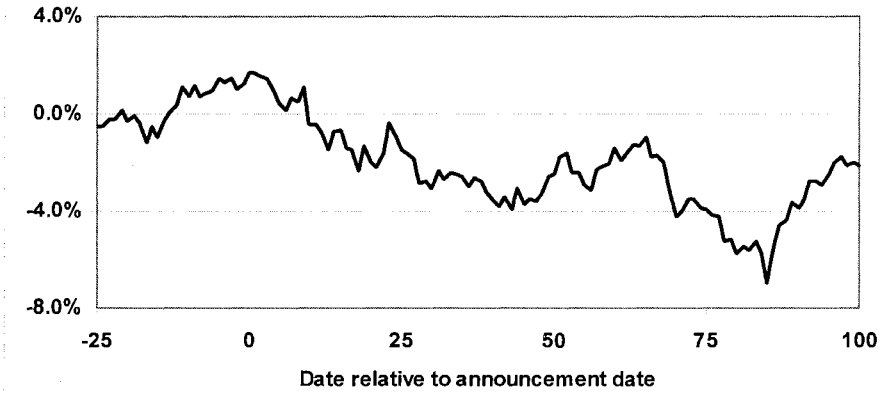


Exhibit V: Plot of Cumulative Daily Abnormal Rates of Return, estimation period is after announcement, value weighted market index, standard market model.

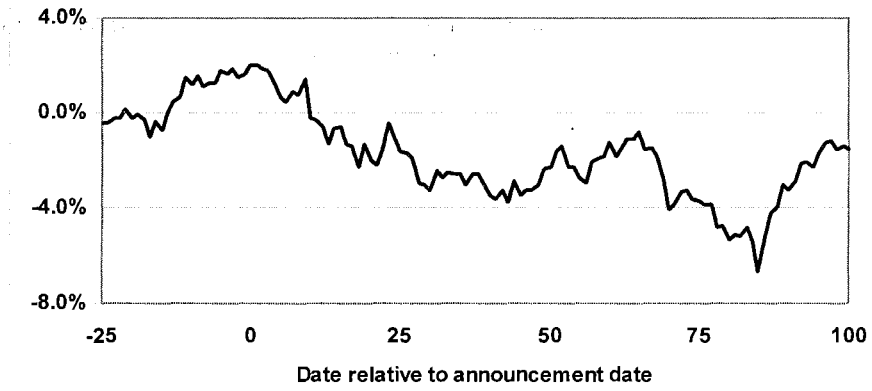


Exhibit VI: Plot of Cumulative Daily Abnormal Rates of Return, estimation period is before announcement, value weighted market index, Scholes and Williams method.

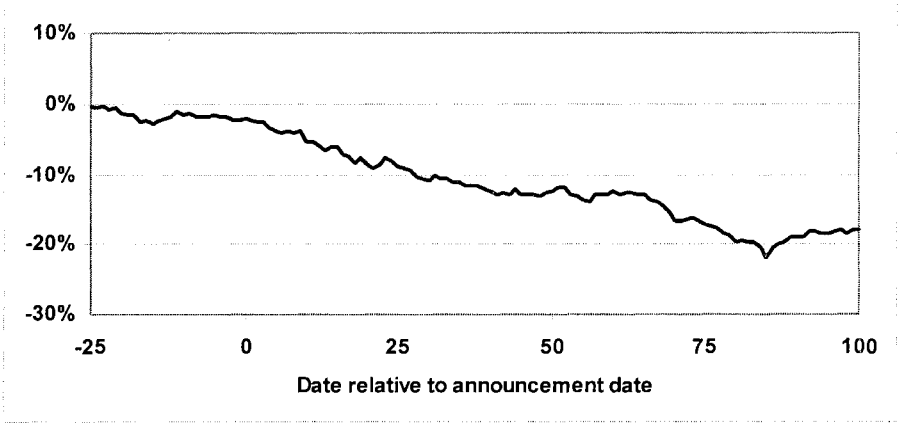
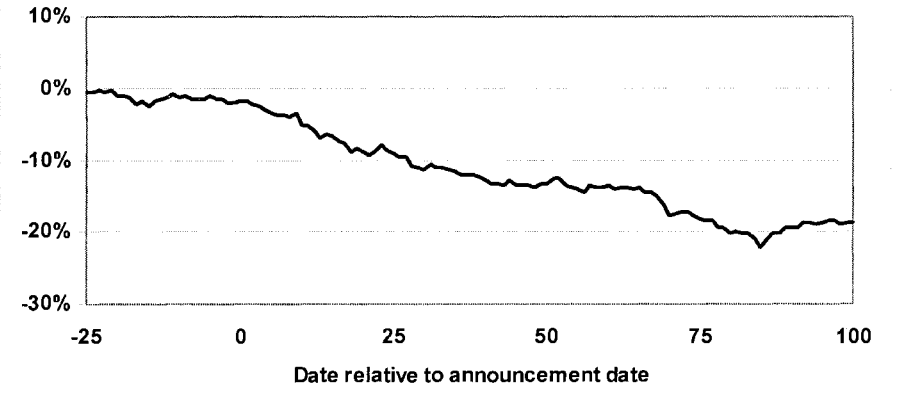


Exhibit VII: Plot of Cumulative Daily Abnormal Rates of Return, estimation period is before announcement, value weighted market index, standard market model.



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