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Outracing the market: A NASCAR portfolio as a test case of returns and diversification.

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Abstract

This paper examines an equity portfolio comprised of publicly traded firms that serve as the primary sponsor of a NASCAR race team to determine whether such a "specialty fund" could diversify risk as effectively as a more carefully chosen portfolio. We calculate risk adjusted return measures and find that the NASCAR portfolio consistently outperforms market benchmarks. We also find that over longer time periods (greater than three years) the constructed portfolio exhibits lower risk than a market benchmark. We contend that NASCAR sponsorship may serve as a signal to the market of a firm's financial health.

I. Introduction

While investors develop portfolios with a few primary objectives in mind (namely to reduce unsystematic risk and/or to enhance portfolio returns) there are often underlying objectives of secondary importance. As an example, socially responsible funds attract investors who seek to align their personal investment strategies with their religious, social, or political beliefs. The funds have become extremely popular since the first such fund was introduced in 1971. In addition, there are many other "specialty" funds that invest solely in sectors, such as multimedia, energy, financial, healthcare, leisure industry, life science, etc.

In this paper we developed a specialty fund comprised only of firms that serve as a primary sponsor for cars in the top racing series of the National Association of Stock Car Racing (NASCAR), what is now known as the Sprint Cup Series. NASCAR popularity has skyrocketed in recent years and the sport enjoys tremendous fan support and loyalty. We compare the risk-adjusted return performance of this portfolio with that of more established benchmarks. This paper has broad importance and practical significance in that investors may be better able to earn higher risk-adjusted returns by including this specialty fund in

their asset allocation strategy. This paper will also provide insight into whether targeted diversification (by investing in a range of firms that have some common denominator) can be effective in reducing portfolio risk.

Over the last several years NASCAR sanctioned auto racing has become one of the most popular spectator sports in the United States. This is particularly true of race events at the body's top level, Sprint (formerly Winston, formerly Nextel) Cup. NASCAR is a sponsor-driven sport with the cars, drivers, and crew adorned with the colors and logos of a number of sponsors. Fortune Magazine reported that for 2004, NASCAR had sponsorship revenue of $1.5 billion, more than the National Football League and Major League Baseball combined (O'Keefe, 2005). In addition to monetary investment by the automobile companies, sponsors are drawn from a wide range of products including alcohol (Budweiser, Miller Lite and Coors Lite are long-time sponsors), home and consumer products (Tide, M&M's, Office Depot) as well as building supplies (Home Depot, Lowe's and DeWalt).

This paper seeks to answer three portfolio related questions using financial data from firms who sponsor NASCAR race cars. First, is it possible to build a simple investment portfolio of publicly traded companies who invest in sponsoring NASCAR race cars and outperform established benchmarks on a risk-adjusted basis? Second, is it possible for the NASCAR portfolio to diversify risk as effectively as a more broad selection of stocks? Finally, does full vs. partial sponsorship lead to differences in excess returns? We hope to use the answers to these three questions to provide insight into whether sponsorship serves as a signal for strong companies.

II. Sponsorship Basics

There are many ways for a company to be involved in NASCAR racing. In this paper we focus on those companies who have chosen to be the primary sponsor of a race car at some point during a NASCAR Sprint Cup racing season. An online article posted on Jeff Gordon's official website provides a user friendly overview of sponsorship (Jeff Gordon online, 2005). The cost for the primary sponsor position on a car, which provides space on both rear quarter panels of the car, hood, team transporter, and team uniforms, ranges between $8 million and $21 million per year. Primary sponsors also typically pay for signage at the track as well as hospitality and other related costs, some of which may double sponsor financial involvement (O'Keefe et al. 2005).

Even at these costs, firms are eager to contribute. Part of this can be attributed to the unique role sponsors have in racing. Unlike most televised sports where sponsor messages are secondary to the telecast of the event, the telecast of the race provides air time for the sponsors. Each time a car is shown on television the sponsors receive on-air exposure. One return on a sponsor's investment is this "free" television exposure. Joyce Julius and Associates, Inc. estimated that Lowe's received nearly $20 million of in-broadcast exposure during the 2006 Daytona 500 won by Jimmie Johnson, who drives the car sponsored by Lowe's (Joyce Julius and Associates, Inc., 2006). An estimated $11.6 million of this came from the display of the primary sponsor logo on the hood of the car. On average, primary sponsors received $1.4 million in television broadcast race exposure for each of the 36 races

in the 2005 season. Additionally, merchandise sold to the fans typically also includes the sponsor's name and colors as part of the merchandise.

Market research has also shown that NASCAR fans are quite loyal to the brands that sponsor their favorite driver. Prior to their entry into NASCAR sponsorship, Office Depot found that "forty four percent of NASCAR fans who shopped at a competitor would switch to Office Depot" as a result of their sponsorship of a car (Daniel, 2006). O'Keefe et al. reported that Home Depot saw a double-digit increase in ladder sales after offering a 10% discount to anyone who brought in an ad featuring Tony Stewart climbing the fence at the Daytona Motor Speedway after a July 2005 victory at the track. (The ad copy read "Hey Tony, we have ladders").

That advertising dollars translate into economic benefits for firm shareholders is well documented. Reilly, McGann, and Marquardt find a positive relationship between substantial advertising expenditures and the relative wealth position of the firm's owners (Reilly, McGann, and Marquardt, 1977). Schonfeld and Boyd report that corporate advertising has a positive and statistically significant effect on stock prices (Schonfeld and Boyd, 1982). They find that it is advertising that affects stock prices, not vice versa. Further, their results are robust and are consistent over two different time periods.

Ben-Zion used a regression framework to highlight the effect of advertising dollars on returns to shareholders (Ben-Zion, 1978). He regressed advertising and promotions dollars on current stock price. He concluded that the estimated coefficient represents the present value of future cash inflows attributed to this period's advertising and promotion dollars. Erickson and Jacobson propose an information asymmetry argument (Erickson and Jacobson, 1992). They suggest that increases in a firm's advertising and promotions budget may send a positive signal to the market that the firm has discretionary cash flows available for such expenditures.

Other studies have employed an event student methodology to document capital market reactions that result from specific marking events such as slogan changes, brand introductions, and celebrity endorsements (Agrawal and Kamakura 1995)(Conchar, Kinkhan, and Bodkin 2003)(Kim and Morris 2003)(Mathur and Mathur 1995, 1996, 2000)(Mathur, Mathur, and Rangan 1997)(Lane and Jacobson 1995). These and other studies document the positive relationship that exists between levels of adverting and promotional spending and the market value of the firm. Marketing activities (specifically advertising and promotions spending) are generally expected to deliver future positive cash flows and result in increases in shareholder wealth.

III. Methodology and Data

To carry out this analysis we examine several equally-weighted portfolios consisting of equity from all publicly traded firms who sponsored cars at the Sprint Cup level of NASCAR in the years 2000-2005, regardless of the level or amount of sponsorship. (During the time period under consideration the Sprint Cup Series was known as the Winston Cup Series). The investment strategy in each portfolio is to purchase and hold equity in the firms

who are the primary sponsor in at least one race during the purchase year. Our analysis consists of six, five, four, three, two, and one-year holding periods. For multi-year holding periods the portfolios were re-balanced each year (by dropping and adding firms) to include only those firms active in sponsorship for the new season. Thus, the two year holding period (2004-2005) includes all of the firms active in sponsorship for the 2004 season, and all of the firms active in sponsorship for the 2005 season. Specifically, if a firm was active in sponsorship for both years, then its return was used in the calculation of the portfolio return for both years. If a firm sponsored races in 2004 but did not continue to do so in 2005, then the firm's return was used to calculate the portfolio return for 2004 only. If the firm did not sponsor races in 2004 but did so in 2005, then its return was used to calculate the portfolio return for 2005 only. In most cases, firms continue to sponsor cars year after year. However, our portfolio construction ensures that firms who drop out of sponsorship are not erroneously included in risk and return measures for multi-year holding periods. For each portfolio, we calculate risk-adjusted return measures. We will examine the monthly returns of holding this portfolio from purchase on the first trading day of the month until the last trading day of the month. The risk and annualized return results of these portfolios are compared to results from larger equity index measures. We ignore transactions costs in the computation of rates of return.

The data consist of stock price data collected for all of the publicly traded companies which served as the primary sponsor of a NASCAR Sprint Cup car during the period 2000-2005. The data on NASCAR sponsorship details on a race-by-race basis was taken from race information at www.racing-reference.info. Returns were calculated using the adjusted share prices for a given company. The historical prices used were the monthly adjusted closing prices provided by Commodity Systems Inc. and reported by finance.yahoo.com, which represented the closing price for a particular company on the last day of every month, specifically adjusted for dividends and splits.

IV. Results

Monthly returns were calculated for each firm that sponsored at least one car (for any number of races) during the racing season. The number of firms comprising the sample for each period of observation are reported in Table 1.

For each period, the compound annual return was calculated, as well as the portfolio standard deviation and beta. Summary statistics may be found in Table 2.

The results indicate that the NASCAR portfolio consistently earned higher returns than the S&P 500. Additionally for the two longest holding periods, the NASCAR portfolio had a lower standard deviation than did the S&P 500. For shorter periods, the S&P 500 had a much lower standard deviation. Additionally portfolio beta suggests that for longer holding periods the NASCAR portfolio is less volatile than the market. It is reasonable that a small sample of firms would be more volatile in the short run than a larger market basket. There was a statistically significant difference in the returns between the portfolio for both the 2000-2005 period and the 2001-2005 period regardless of how standard deviations were calculated. When the monthly standard deviations were annualized the 2002-2005 and the

2003-2005 periods also saw a statistically significant difference between the NASCAR portfolio and the S&P 500. It is not surprising that t-statistics became smaller the shorter the time period under consideration.

To assess the risk-adjusted performance of the two portfolios three widely-recognized measures were calculated. They include the Sharpe ratio, Treynor measure, and alpha (Sharpe, 1966)(Treynor, 1965)(Jensen, 1969). Investors and financial advisors find these tools to be useful when ranking portfolios in terms of their risk-adjusted performance.

The Sharpe measure is the ratio of excess portfolio return divided by the portfolio standard deviation. It is a relative measure of risk-adjusted performance:

$$S = \frac{R_P - R_f}{\sigma_P} \tag{1}$$

In this measure, R_p is the return from our NASCAR portfolio while R_f represents the risk-free rate of return. We use the return on a 90-day Treasury bill as our measure of risk-free returns. The σ_p in the denominator is the standard deviation of the NASCAR portfolio.

The Treynor measure is also a relative measure of risk-adjusted performance. The numerator is identical to that of the Sharpe ratio, that is, portfolio return in excess of the risk-free rate of return. The denominator, however, is the portfolio beta coefficient:

$$T = \frac{R_P - R_f}{\beta_P} \tag{2}$$

The difference in the two performance measures, therefore, is that the Sharpe ratio adjusts for total risk (measured by standard deviation) while the Treynor measure adjusts for market risk only (measured by beta).

Jensen's alpha is an absolute measure of risk-adjusted performance. Alpha is estimated through a regression of excess portfolio return on excess market returns:

$$ER_{pt} = \propto_p + \beta_p ER_{mt} + \varepsilon_{pt} \tag{3}$$

where ER_{pt} is the excess portfolio return (this is the return on the portfolio in month t minus the risk-free rate during month t); β_p is the portfolio beta, ER_{mt} is the excess return on the market portfolio during month t, ε_{pt} is the residual term during month t, and α_p is the risk-adjusted excess return earned over the time period.

Following Reilly and Norton, we also computed another performance measurement tool that is a variation of the traditional Sharpe ratio (Reilly and Norton, 2003). The New Sharpe ratio examines the differential returns of a portfolio against its benchmark.

$$\bar{S} = \frac{R_P - R_{mt}}{\sigma_D} \tag{4}$$

where R_{pt} is the portfolio return in month t, R_{mt} is the return on the market portfolio during month t, and σ_D is the standard deviation of the differential return over the time period. Like Jensen's alpha, this is an absolute measure of risk-adjusted performance. This measure allows for direct comparison against a benchmark portfolio. They differ, however, in that Jensen's alpha adjusts for systematic risk while the new Sharpe ratio adjusts for total risk.

Table 3 reports the risk-adjusted performance measures for the six periods observed.

Both of our relative measures indicate that the NASCAR portfolio outperformed our market benchmark in all six periods of analysis. Our absolute measures of performance also indicate that on a risk adjusted excess return basis the NASCAR portfolio typically outperforms the market portfolio. It should be noted that for the three shortest portfolio periods Jensen's Alpha was not statistically different from zero.

Over the time period of our analysis some firms (such as Budweiser) consistently sponsored a car. Others engaged in a partial sponsorship plan in which they shared the primary sponsor role with other companies. Office Depot's previously mentioned sponsorship of Carl Edwards would be an example. In addition, some firms made very brief appearances sponsoring cars on a very infrequent, inconsistent basis. We would like to know whether excess returns to sponsoring firms are related to the decision to sponsor a car at all, or whether full season sponsorship is required to see excess returns. To facilitate the comparison, the following regression was estimated on the periods of observation:

$$R_t^* = \alpha + \alpha^* D_{st} + \beta R_{mt} + \delta_i Year_i + e_t \qquad (5)$$

where

R^*_t = the stacked vector of company excess returns (return in excess of the risk-free rate)
D_{st} = shift dummy variable that takes on a value of 0 if the firm sponsored all races, 1 if the firm sponsored less than 100% of the races
R_{mt} = excess market returns (market return minus the risk-free rate)
α^* = the shift in the estimate of excess returns due to the firm sponsoring less than all of the races
β^* = a measure of the firm's systematic risk
$Year_i$ = a dummy variable for the year i where i ranges from 2000 to 2004.

In the data 1,968 observations come from firms which sponsored all the races while ninety six (96) observations are from firms which engaged in partial sponsorship. The results from this regression are reported in Tables 4 and 5.

The coefficient on the dummy variable for partial sponsorship is positive and statistically significant and indicates that firms which sponsor a team for some, but not all, of the races in a season have excess returns 1.98 percentage points higher than those firms that sponsor a car for the entire season. As expected, the coefficient for excess market returns is positive and statistically significant. This outcome supports the market model that argues that the returns on a security are linearly related to the returns on a market portfolio.

We have included dummy variables for each year, omitting 2005, to control for any year specific effects on return levels. With the exception of 2002 none of these dummy variables are statistically significant.

These results suggest that firms who sponsor a car for less than a full season earn a higher excess return than those firms who sponsor a car for the entire season. This suggests that excess returns are a pre-cursor to a firm sponsoring a NASCAR car. This would lend credence to the idea that firms that enter into race sponsorship agreements are in fact strong firms relative to others in the market and that sponsorship may serve as a signal of a firm's financial health.

To test whether these results are affected by the racing season we also estimated the model using a dummy variable for observations in the months of December and January when there are no NASCAR races. [1] This dummy variable was not statistically significant and its inclusion did not qualitatively change the coefficient estimates presented above. Additionally we estimated a model containing a dummy variable indicating that the sponsors car finished in the top five in points in the previous year. The coefficient on this dummy variable was also not statistically significant.

V. Conclusion

With this paper we hoped to answer three portfolio related questions. First, is it possible to build a simple investment portfolio which will outperform established benchmarks on a risk-adjusted basis? Our analysis using relative and absolute risk performance measures suggests the answer to this question is yes. The NASCAR portfolio outperformed the S&P 500 in all periods using relative measures, and nine of twelve cases using absolute measures.

Second, can the NASCAR portfolio diversify risk as effectively as a more broad selection of stocks. Here our results were mixed. The NASCAR portfolio has a portfolio beta of less than one and a lower standard deviation than the S&P 500 for the 2000-2005 and the 2001-2005 time periods. For shorter time periods the portfolio beta is greater than one, and the portfolio standard deviation is higher than that for the S&P 500.

These are important results as the equity which makes up our NASCAR portfolio was not chosen based on careful financial analysis, but instead because of their participation in race sponsorship. That a portfolio constructed in this way can lower risk beyond the market benchmark over relatively short (three years and beyond) periods is a quite interesting finding.

Finally, we wanted to know whether NASCAR sponsorship was a signal for excess returns. Our results may also suggest that sponsorship serves as a signal of high performing firms. This would suggest that firms that self-select into NASCAR sponsorship do so in part

[1] In 2001 the season began on February 11 and continued to November 23.

because of the potential gains in customer loyalty, but that these firms were likely already in solid financial shape prior to entering into sponsorship agreements. As a result, higher risk adjusted returns are not likely caused by sponsorship, but sponsorship signals firms that are already likely to earn higher returns. The result that even brief sponsorship leads to excess returns would lend credence to this view.

Table 1:

Number of Public Companies as Primary Car Sponsors in Each Portfolio

Year	Number
2000-2005	26
2001-2005	32
2002-2005	30
2003-2005	29
2004-2005	27
2005	28

Table 2:
Risk and Return Measures: NASCAR Portfolio vs. S&P 500

Period	Compound Annual Return		Standard Deviation		NASCAR
	NASCAR	S&P 500	NASCAR	S&P 500	Portfolio Beta
2000-2005	0.0793 *	-0.0268 **	0.370	0.372	0.826
2001-2005	0.0945 *	-0.0112**	0.330	0.333	0.878
2002-2005	0.1079 *	0.0211	0.300	0.270	1.015
2003-2005	0.1696 *	0.1237	0.218	0.158	1.281
2004-2005	0.0879	0.0595	0.145	0.105	1.212
2005	0.0301	0.0300	0.124	0.078	1.475

Note:
The * indicates that the difference between the NASCAR return and the S&P 500 return is statistically different from zero at the 10% level (two-tailed) using annualized standard deviations.

The ** indicates that the difference between the NASCAR return and the S&P 500 return is statistically different from zero at the 10% level (two-tailed) using normalized standard deviations.

Table 3:
Risk-adjusted Return Measures, NASCAR Portfolio and S&P 500

	Sharpe Ratio		Treynor Ratio		Jensen's Alpha	New Sharpe
Period	**NASCAR**	**S&P 500**	**NASCAR**	**S&P 500**	**NASCAR**	**NASCAR**
2000-2005	0.1413	-0.1448	0.0632	-0.0539	0.008007	0.040
2001-2005	0.2229	-0.0965	0.0837	-0.0321	0.008239	0.054
2002-2005	0.3008	0.0124	0.0888	0.0033	0.006976	0.058
2003-2005	0.6931	0.6665	0.1180	0.1053	0.001256*	0.040
2004-2005	0.4497	0.3527	0.0539	0.0370	0.001722*	0.033
2005	-0.0111	-0.0185	-0.0009	-0.0014	0.000302*	0.006

*Alphas not significantly different from zero for the periods 2003-2005, 2004-2005,2005

Table 4:
Regression Statistics for Excess Returns Model

Regression Statistics	
Multiple R	0.397
R Square	0.157
Adjusted R Square	0.154
Standard Error	0.085
Observations	2,064

Table 5:
Regression Results for Excess Returns Model

	Coefficients	Standard Error	t Stat	P-value
Intercept	-0.0003	0.0046	-0.07	0.944
Partial Sponsor Dummy	0.0198	0.0093	2.13	0.033
Excess Market Returns	0.8387	0.0448	19.69	0.000
Year 2000	0.0070	0.0068	1.04	0.300
Year 2001	0.0094	0.0065	1.44	0.148
Year 2002	0.0131	0.0066	1.99	0.046
Year 2003	0.0096	0.0066	1.45	0.147
Year 2004	0.0058	0.0067	0.87	0.386

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