

# Prioritizing Sponsorship Resources in Formula One Racing: A Longitudinal Analysis

**Joe Cobbs**

Northern Kentucky University

**B. David Tyler**

Western Carolina University

**Jonathan A. Jensen**

University of North Carolina at Chapel Hill

**Kwong Chan**

Northeastern University

Accessing and exploiting organizational resources are essential capabilities for competitive sport organizations, particularly those engaged in motorsports, where teams lacking resources frequently dissolve. Corporate sponsorship represents a common method for resource acquisition, yet not all sponsorships equally benefit the sponsored organization. Sponsorship utility can be dependent on institutional dynamics such as league governance that produces competitive disparities. Through this study we extend the resource-based view to assert that sponsorships vary in their propensity to contribute to team survival, warranting prioritization in sponsorship strategy based on access to different sponsor resources. To empirically investigate the influence of a variety of sponsorships, survival analysis modeling was used to examine 40 years of corporate sponsorship of Formula One racing teams. One finding from the longitudinal analysis was that sponsorships offering financial or performance-based resources enhance team survival to a greater degree than operational sponsorships. However, such prioritization is subject to team experience, changes in institutional monetary allocation, and diminishing returns.

**Keywords:** motorsports, survival analysis, marketing strategy, resource-based view, resource priority, competitive advantage

In the charity, arts, entertainment, and sport industries, corporate sponsorship has flourished as a structured exchange mechanism whereby the industries' organizations can access heterogeneous resources from commercial partners in return for promotional affiliation and enhancement (Meenaghan, 2001). Sponsorship represents an important platform for interorganizational research in sports for several reasons. Scholars have recognized the potential for a sponsorship alliance to differentiate and add financial value to a sponsoring firm's brand while serving as a primary method of resource acquisition for sponsored sport organizations (Jensen, Cobbs, & Turner, 2016). For example, since 1995, Shell has provided the Ferrari Formula One (F1) racing team with

diverse resources such as financial investment, petroleum products, and technological performance expertise. In exchange, Ferrari provides Shell with the F1 product testing, knowledge, and sponsorship resources to meet Shell's promotional objectives of creating awareness for Shell's premium products, sustaining its perceived position as a technology leader, solidifying key stakeholder relationships via event hospitality, and encouraging purchase through themed point-of-sale promotions (Verity, 2002).

Moreover, because corporate sponsorship is an institutionalized support mechanism ubiquitous throughout sport and its various segments, engagement in this type of interorganizational alliance spans a myriad of connected industries, organizations, activities, and managers (Crowley, 1991). Yet, the managerial aspects of sponsorship alliances have received scant attention in an otherwise maturing body of research (Cornwell, 2008). Similar to other alliances, the resources exchanged within a sponsorship are heterogeneous and not necessarily related to a sustainable competitive advantage (Amis, Pant, & Slack, 1997). Since Amis and colleagues (1997) first used the resource-based view (RBV) to study sponsorship management, scholars building on their work have maintained their investigative focus on the sponsoring firm while

---

Joe Cobbs is with the Department of Marketing, Economics, and Sports Business, Northern Kentucky University, Highland Heights, KY. B. David Tyler is with the College of Business, Western Carolina University, Cullowhee, NC. Jonathan A. Jensen is with the Department of Exercise and Sport Science, University of North Carolina at Chapel Hill, Chapel Hill, NC. Kwong Chan is with the Department of Marketing, Northeastern University. Address author correspondence to Joe Cobbs at [cobbsj1@nku.edu](mailto:cobbsj1@nku.edu).

ignoring the influence on the sponsored sport organization (e.g., Fahy, Farrelly, & Quester, 2004; Jensen et al., 2016; Papadimitriou & Apostolopoulou, 2009). In this paper, we advance the RBV agenda in sport by evaluating the heterogeneity of resources accessed by the sponsored sport organization in relation to its competitive survival.

Finally, the growing popularity of sponsorship alliances as a mechanism for resource exchange is evidenced by the rapid expansion of corporate sponsorship investment, which reached an estimated worldwide expenditure of US\$55.3 billion in 2015 (International Events Group, 2015). Given these factors, empirical research to test how sponsorships offering divergent resources impact the longevity of sponsored sport organizations is broadly relevant and important to the sports industry as managers make decisions on prioritizing sponsorship solicitation.

## Background

### The Compelling Context of Formula One Racing

Sport organizations are particularly dependent on sponsorship as a resource necessary for survival in the highly competitive arena of motorsport, such as the National Association for Stock Car Auto Racing (NASCAR), V8 Supercars, and F1 racing, where up to 70% of team budgets are funded by sponsorships (Sylt & Reid, 2008). The ultracompetitive arena of F1 motor racing provides an ideal context within which to study the influence of sponsorship resources on organizational survival. In October of 2014, two different F1 teams (Caterham and Marussia) approached administration, the British equivalent of Chapter 11 bankruptcy (Sylt, 2015). The Marussia team went into administration in late 2014 and missed the final three races of the 2014 F1 season, while the remaining Caterham assets were liquidated at auction in early 2015 (Smith, 2015). The loss of two teams temporarily reduced the starting grid for F1 races to only 18 cars, which posed a management crisis for the sport as the 100-year agreement for the sport's commercial rights between the Fédération Internationale de l'Automobile (FIA) and private equity firm CVC was put in jeopardy of default (Sylt, 2015). Given F1 teams' heavy reliance on sponsorship to fulfill budgetary needs (Sylt & Reid, 2008), a better understanding of sponsorship resource priority could help existing and future teams survive and avoid administration or bankruptcy.

The purpose of this longitudinal study is to prioritize and test the influence of differing categories of sponsorship (in the form of performance, financial, and operational-related alliances) on the survival of sport organizations. To achieve this aim, we employed a survival model utilizing 40 years of data that included the sponsorship alliances between 124 different F1 racing teams and 1,077 supporting commercial sponsors. Survival analysis modeling, commonly used in the health field to examine the determinants of a person's lifetime, is an appropriate

method to study how various factors influence the duration to a particular event (Singer & Willett, 2003). In this study, the event of interest is the dissolution of the sport organization or team. In survival analysis, the modeled dependent variable is the hazard rate, which is a function that denotes the probability of the organization experiencing dissolution (Audretsch & Mahmood, 1995). The hazard rate is based on the age and characteristics of an organization (i.e., independent or control variables in the model) in relation to its peers within a particular institutional environment. Therefore, a negative coefficient in a survival analysis model indicates the associated variable reduces the *hazard of dissolution*, or likelihood of the organization's ceasing to exist in a particular year. For example, successfully registering patents may contribute to the survival of sports technology firms such as Sportvision and Hawk-Eye, purveyors of American football's first-down graphic and soccer's goal line technology. If so, we would expect a negative coefficient to be associated with a variable that measures registered patents because such patents reduce the likelihood of sports technology firms' bankruptcy or dissolution.

F1 teams are competitive enterprises that access various categories of resources via corporate sponsorship to enhance performance and in turn, maintain operations on an international scale (Cobbs, Groza, & Pruitt, 2012; Jensen & Cobbs, 2014). Because of the high-profile nature of F1, a team's birth, survival, competitive performance, sponsorship activity, dissolution, and institutional conditions are all publicly documented across global media sources. While scholars have recognized the theoretical diversity of interorganizational alliance resources and suggested situational contingencies to their utility (e.g., Cui, 2013), we can empirically test how a sport organization's access to such resources through sponsorship influences its survival in the dynamic, highly competitive institutional environment of F1 racing.

### RBV and Resource Heterogeneity

While the popularity of the RBV has focused attention on the contribution of organizational resources to a sustained competitive advantage (Barney, 1991; Wernerfelt, 1984), the mere sustainability of operations concerns many sport enterprises. In a dynamic, competitive environment, an organization's administrators must continually manage resources in a manner conducive to sustaining operations while organizational learning accumulates. Levitt and March (1988) explain that "organizations are seen as learning by encoding inferences from history into routines that guide behavior" (p. 319). To maintain operations during this process, sports team administrators often formulate interorganizational alliances in the form of corporate sponsorships, which act as a quasi-market mechanism to enable the team to leverage its own core capabilities as bartering chips in relationships with sponsors that facilitate additional resource access (Cobbs et al., 2012). The RBV initially emphasized the characteristics (i.e., rare, valuable, inimitable, nonsubstitutable)

and competitive implications of resources internal to the organization (Barney, 1991). Sport strategy theorists later extended the RBV beyond the boundaries of the firm to recognize the potential competitive contribution of interfirm alliances and their associated resources (Amis et al., 1997; Jensen et al., 2016).

While alliances such as sponsorships often have clear short-term benefits in terms of resource access, relying on interorganizational relationships for access to a range of resources entails dependency dilemmas that may be detrimental over time (Pfeffer & Nowak, 1976). Furthermore, an organization's capacity to manage multiple alliances is finite (Cui, Calantone, & Griffith, 2011; Deeds & Hill, 1996), organizational and alliance resources are not homogeneous (Cui & O'Connor, 2012; Grant, 1991), and their utility is subject to dynamic conditions (Cui, 2013). In other words, a certain sponsorship resource (e.g., tire supplier for a racing team) may be particularly valuable in a given set of organizational or institutional conditions (e.g., where teams are responsible for sourcing their own tires), whereas that same resource may be less relevant when such conditions change (e.g., the racing series contracts with a single tire supplier for all competing teams, as happened in F1 in 2011). As a result, ongoing prioritization and maximization of resources is necessary when managing any alliance strategy, including sponsorship solicitation and execution.

According to the RBV, resources are heterogeneously distributed across firms and do not represent identical benefits (Barney, 1991). Grant (1991) identified six general categories of firm resources: financial, physical, human, technological, reputation, and organizational. In empirical contexts emphasizing resource exchange, scholars have routinely reduced the categorization to designations such as technical versus nontechnical (Chan, Kensinger, Keown, & Martin, 1997), marketing versus research (Anand & Khanna, 2000), technological versus marketing (Das, Sen, & Sengupta, 1998), and unilateral support versus bilateral cooperation (Lee, Lee, & Penning, 2001). In the sports context, Fahy et al. (2004) designated sponsorship resources as tangible and intangible assets and capabilities of the sponsoring firm. However, all of these resource categorizations tend to describe the actual resource or alliance relationship and not necessarily a sponsorship's potential contribution to the sponsored team in relation to its competitive environment. While the RBV emphasizes internally available resources, it is most beneficial for strategy development when considered with the external perspective of the industrial organization (Wernerfelt, 1984; see Truysens, De Bosscher, Heyndels, & Westerbeek, 2014, for a discussion of the industrial organization perspective and the RBV applied to sport). Likewise, certain sponsorship resources may offer a more direct contribution to a team's survival in a particular environment, and that contribution may change with the dynamics of the competitive environment (e.g., adjustments to the league revenue distribution model).

Prior researchers who focused on the competitive environment have applied a "complementarity" or

"strategic relatedness" approach to resource application by characterizing the resource exchange within an alliance relationship based on a comparison of each partner's industry or operational context (Chung, Singh, & Lee, 2000; Sarkar, Echambadi, Cavusgil, & Aulakh, 2001; Tsai, 2000). Complementarity with alliance partners offers a distinctive basis for prioritization of complementary resources. Sarkar et al. (2001, p. 360) conceptualize alliance complementarity as a symmetry consisting of "unique and valuable resources available to achieve strategic objectives," which thus enhance "competitive viability." This perspective implies not only that resources are heterogeneously distributed across firms and industries but also that resources retain a strategic dimension relating to their potential utility in competition. In other words, sponsorships provide access to certain resources that may be more or less relevant to a team's survival based on the competition faced in a specific environment. To that end, we propose sponsorship alliance distinctions within this study based on access to three different types of resource categories: performance-based sponsorships, financial sponsorships, and operational sponsorships. While access to each type of resource constitutes a different element of sponsorship strategy, we hypothesize each to deter team dissolution to varying degrees based on resource complementarity within the institutional context of F1 racing.

## Hypotheses

### Performance-Based Sponsorships

The first sponsorship resource designation—labeled performance-based—is signified by high industry relatedness between sponsorship partners where the complementarity of available resources directly relates to competitive performance. Dyer and Singh (1998) define complementary resources as collectively generating "greater rents than the sum of those obtained from the individual endowments of each (alliance) partner" (pp. 666–667). In the context of F1 racing, such alliances are most common in the form of sponsorships with automobile component manufacturers, aerodynamic engineering firms, or other high tech partnerships focused on enhancing track performance. A sponsor that shares an industry with or operates in an industry strategically related to the team's competitive environment is likely better equipped to offer complementary resources that enhance performance and combat rivals (Varadarajan & Cunningham, 1995). Accessing complementary resources to enhance performance is a foundation of alliance formation (Chung et al., 2000). Likewise, in the expansive literature on sponsorship congruence (for a review, see Fleck & Quester, 2007), sponsor product relevance is one key to high-fit sponsorships (Olson & Thjømøe, 2011).

Bergmann Lichtenstein and Brush (2001) found resources relating directly to the production process to be more salient to entrepreneurs, who typically pursued such resources through interorganizational partnerships

in congruent industries. This assertion follows organizational learning theory (Levitt & March, 1988), which includes the tenet that entrepreneurial enterprises can compensate for their liability of newness by gaining relevant industry knowledge through alliances with established firms (Freeman, Carroll, & Hannan, 1983). However, as the entrepreneurial organization accumulates competitive experience over time, the necessity of accessing performance-based resources may diminish (Bergmann Lichtenstein & Brush, 2001). As a result, we anticipate resources exchanged within congruent industry sponsorships to exert a positive influence on a team's performance in head-to-head competition and thereby stave off organizational dissolution, but we expect the survival effect of such sponsorships to diminish as a team accumulates competitive experience:

**H1a:** A team's performance-based sponsorships are negatively related to the hazard of dissolution.

**H1b:** As a team gains experience, the negative relationship between dissolution and performance-based sponsorships weakens.

## Financial Sponsorships

Financial or monetary resources represent the most ubiquitous designation of firm resource categorization (e.g., Barney, 1995; Grant, 1991), which is not surprising given their versatility. Financial resources not only possess an intrinsic transformative nature but can also symbolize the ultimate aim of many organizations—that being to increase financial wealth. Indeed, this money-making condition is so vital to an entrepreneurial enterprise such as a racing team that the financial numbers test (i.e., how will the business make money?) entails one of the two essential tenets of a viable business model (vs. the organizational narrative test, which asks if the story of the business makes sense; Magretta, 2002). In our context, financial sponsorships involve firms in industries unrelated to either competitive performance or business operations. For example, team sponsors such as Johnnie Walker spirits, Labatt's beer, Pepsi-Cola, and Universal Music Group fit this category, where the sponsors contribute financial resources to the team but do not otherwise contribute resources directly relevant to track performance or business operations (i.e., the subsequent sponsorship category).

Beyond simply creating monetary wealth, financial resources provide an organization with flexibility because their quality of liquidity enables these resources to be quickly exchanged for another resource deemed at the time to be vital to the team; however, Barney (1991) points out financial resources are often not rare and are therefore unlikely to solely generate a sustainable competitive advantage. While accessing financial resources may be imperative to team survival, some researchers have shown that in the early stages of organizational development, financial resources, though relevant, are not as important to the entrepreneur as those resources

relating directly to performance (Bergmann Lichtenstein & Brush, 2001; Brush, Greene, & Hart, 2001). Therefore, we formally hypothesize that access to financial resources through sponsorships contributes to a team's continued existence but suspect such sponsorships are not as vital as performance sponsors:

**H2a:** A team's financial-based sponsorships are negatively related to the hazard of dissolution.

**H2b:** The relationship between financial sponsors and dissolution is less intense than the relationship between performance sponsors and dissolution.

## Operational Sponsorships

Resources contributing to the ongoing operation of an organization, but that are not strictly monetary or straightforwardly influencing a team's direct competition with rivals, were labeled as operational sponsorships. This category is characterized by the commodity goods and services necessary for the continued functioning of a team and instrumental to accessing further resources (Brush et al., 2001). For most organizations, such resources might include office equipment, Internet access, certain basic employee services, and other administrative capabilities. Similarly, for racing teams this category may include sponsors in the logistics (e.g., FedEx, DHL, Hanjin), human resources (e.g., Adecco, Randstad), or office supply industries (e.g., Brother, IKON). This type of operational resource is typically not the primary basis for competition within an industry and tends to be easier to access given their near universal utilization. As a result, operational resources are not particularly rare, and similar to financial resources, are unlikely to be a source of competitive advantage (Barney, 1991). In addition, these resources lack the flexibility and liquidity of pure financial resources. We therefore formally hypothesize operational sponsorships to contribute to organizational survival but suspect access to such resources is less influential than either performance or financial sponsorships in predicting team dissolution:

**H3a:** A team's operational sponsorships are negatively related to the hazard of dissolution.

**H3b:** Operational sponsorships are the least influential to dissolution compared with performance or financial sponsorships.

## Sponsorship Management Constraints

Though sponsorships offer a convenient mechanism for interorganizational resource exchange, like individuals, an organization's capacity for managing relationships may be bounded and subject to diminishing returns (McFadyen & Cannella, 2004). Firms possess an alliance management capability that is constrained by factors such as partner evaluation, coordination, and integration costs in time, focus, and monetary investment (Ireland, Hitt, & Vaidyanath, 2002). Managing different types and



increasing numbers of sponsorships can strain a team's capability for maximizing returns to the numerous relationships (Rothaermel & Deeds, 2006). Deeds and Hill (1996) describe this phenomenon as arising "because the effectiveness with which the firm can select and manage alliance partners is likely to be negatively related to the number of alliances the firm is managing" (p. 42). Given this cost to managing increasing alliance relationships, too many sponsorships may eventually exhibit diminishing returns and be detrimental to a team's continuity. For example, adding a tenth performance-based sponsor to a racing team's portfolio may not produce marginal benefits equivalent to the second or third performance-based sponsor signed because the team already has nine other performance-based sponsors and must also manage each of these corporate partnerships:

**H4:** Increasing numbers of (a) performance, (b) financial, and (c) operational sponsorships will exhibit diminishing returns to reducing the hazard of team dissolution.

## Method

To test the prioritization of sponsorships offering heterogeneous resources, we employed a survival analysis modeling methodology, also referred to as event history (e.g., Singer & Willett, 2003), in the context of F1 motor racing. In this study, we define the organizational form as a motor racing team competing within the institutional system of F1. By setting the system boundary based on a particular industry (F1), we negate cross-industry discrepancies and emphasize the variance among teams and their particular strategies for navigating a common institutional environment (Miller & Shamsie, 1996; Rao, 1994).

## Sample

Given the historical international popularity of F1 racing and the characteristics described above, data on F1 team existence and alliances with sponsoring firms were feasible to compile from the institution's formal organization in 1950 through 2007.<sup>1</sup> We acquired the foundation of the data from the online database ChicaneF1, which provides a comprehensive catalog of historical team and sponsoring firm information (Davies & Lawrence, n.d.). Next, the data were cross-checked with data we obtained from an internal F1 team source to verify reliability (SportsPro Media, 2007). We further consulted historical F1 texts containing pictures of various teams' race cars in an attempt to match visible corporate partner logos on the vehicles with sponsorships compiled in the data (Donaldson, 2002; Schlegelmilch & Lehbrink, 2004). These cross-verification efforts supported the general reliability of the ChicaneF1 team-sponsor data and served to clear up ambiguities where present. To compile historical team performance data, we referenced the official F1 website (Formula One Administration [FOA], n.d.). The resulting data set consisted of 124 separate F1 team

organizations,<sup>2</sup> 776 team years,<sup>3</sup> 1,077 sponsoring firms, and 5,054 team-sponsor alliance years.

## Dependent Variable

Survival analysis examines event occurrences or changes in a subject or organization's condition over time. In the current study, the data set is longitudinal in annual intervals and cross-sectional in that a multitude of teams are chronicled. The potential outcome conditions in any given time period of the F1 teams studied here are only twofold: operational or nonoperational. While survival may be more difficult to discern when applied to traditional organizations (Freeman et al., 1983), the motor racing context enables delineation based on whether a team competed in a race in a particular season or not. Therefore, we composed a binary survival term coded 1 if a team dissolved in a given year (i.e., did not compete further following that season), and 0 if the team continued in competition following the given year.

From this data, we generated annual hazard rates based on the proportion of the teams at risk with a given level of experience that incur dissolution (Singer & Willett, 2003). This hazard of team dissolution represents the dependent variable in survival analysis (Audretsch & Mahmood, 1995). Essentially, survival analysis produces an age-based hazard function for the population of teams that represents the chronological probability of team failure, given the team has not yet dissolved. The hazard function accounts for both noncensored cases (i.e., teams whose entire life span is represented within the data set) and censored cases (i.e., teams that remain in existence when data set concludes in 2007) in computing probabilities, which is vital to the analysis given that teams still in existence have yet to experience dissolution and are therefore right-censored in the data set. The independent variables then predict probabilities of dissolution, or hazard rates. As a result, a *negative* coefficient to an independent variable signifies a reduced hazard of dissolution or, alternatively, an *increased* probability of survival.

## Independent Variables

The primary hypotheses (H1–H3) addressed the nature of resources exchanged between sponsorship partners according to the complementarity between the sponsoring firm's industry<sup>4</sup> and the team's competitive environment (Sarkar et al., 2001). Each team's competitive experience (per H1b) was noted in the number of years of F1 race participation. Before classifying the sponsorships in this context, two researchers developed sponsorship resource designations of (a) performance-based, (b) financial, or (c) operational by studying the relevant literature referenced in the hypotheses outlined above and extensively reviewing the press announcements of over 100 F1 sponsorships. A third researcher and two F1 team sponsorship managers then reviewed these three designations and confirmed their face validity.

We defined performance-based sponsorships as those accessing resources that directly contribute to the team's racing performance on the track, such as Brembo brakes and Pirelli tires. Financial sponsorships offered resources strictly monetary in nature from sponsors in industries unrelated to motorsports or business operations, such as Martini spirits and GoldenPalace casino gaming. Operational sponsorships provided access to resources that contribute to the organizational operations of the team but not team performance in racing competition, such as Allianz commercial insurance and Accenture management consulting.

Next, two researchers independently classified each sponsorship in the data set as primarily performance-based, financial, or operational. The initial intercoder reliability was 89%, and conflicts were subsequently reconciled through discussion and further clarification of the classification descriptions, as well as a review of sponsorship announcements within the relevant industry under evaluation. Upon completion of the sponsorship classifications, we compiled three variables measuring the count of performance, financial, and operational sponsorships for each F1 team in each year of the data set. In total, the data featured 2,781 performance-based sponsorships, 1,318 financial sponsorships, and 955 operational sponsorships.

To test the fourth hypothesis, which predicted diminishing returns to sponsorship resource access, a separate quadratic term for each of the three sponsorship category variables was formulated (Hoang & Rothaermel, 2005). If such an effect existed, we would expect to see a positive coefficient on the quadratic terms, signifying that as the number of sponsorships offering the specified type of resource reached a certain level, incremental sponsorships of that type would positively influence the odds of team dissolution.

## Control Variables

On-track performance may affect team survival through both direct and indirect access to resources. Superior race results directly enhance financial resources through prize money allocations, and potential sponsors theoretically desire to align themselves with prestigious others (Stuart, 1998), indicating that generating prestige through superior performance might facilitate additional sponsorship resource access. In these ways, competitive performance seems highly probable to influence team survival. Therefore, we control for the performance of F1 teams both recently and historically. We operationalize recent success through a rolling average of the annual points earned by a team over the previous 5 years.<sup>5</sup> Historical success we derive by an aggregation of the drivers' championships won by a team previous to the current season.

To account for several other factors with the potential to impact team longevity, we compiled four additional control variables. Based on organizational learning theory (Levitt & March, 1988), sponsors' experience in the F1 competitive environment may influence their sponsored team's survival. As a result, we included a variable that summed the years of F1 involvement for all of a team's

sponsors in a particular year. Because sports leagues are not static institutions, we examined adjustments in the governance of F1 during our study's time span and denoted two specific eras using a binary variable. Specifically, team years after 1995 were signified as 1 and years before 1996 we denoted as 0. Following the 1995 season, the governing body of F1 (FIA), the commercial rights holder (Formula One Promotions and Administration), and F1's competing teams renegotiated their operating agreement (i.e., Concorde Agreement), which resulted in a greater distribution of financial resources to the teams based on annual competitive performance (Collings, 2004). Consequently, team points may be more important to survival and financial sponsors less important after 1995. Finally, we include both the number of times in which a team has been sold before a given year and the world gross domestic product (GDP) annual growth rate (U.S. Department of Agriculture Economic Research Service, 2016) as additional covariates relating to the characteristics of a team and the global macroeconomic condition, respectively.

Descriptive statistics and the correlation matrix for the variables appear in Table 1. Unsurprisingly given the large sample size, almost all correlations are statistically significant. However, all variance inflation factors (VIF) are less than 10, which indicates multicollinearity is not overly concerning (O'Brien, 2007).<sup>6</sup>

## Model Estimation

Researchers employing survival analysis must determine whether a specified shape of the baseline hazard function is appropriate to their context. The hazard function is based on the chronological shape of the hazard rate and depicts the probability that dissolution will occur after any given duration. As there is no *a priori* reason to specify a hazard rate functional form in the F1 context (i.e., no exogenous reason to assume that teams are systematically more or less viable at any given period), we use Cox regression (Cox, 1972) to model the data. Although hazard rates are assumed to be proportional between groups in Cox regression and other semiparametric models, this technique is preferred because of its ability to model both time-dependent and continuous covariates. For a detailed description of Cox regression applied in management research, see Brett et al. (2007). For explanation of survival analysis and a call for application in sport management research, see Jensen and Turner (2016). In the current study, continuous variables include global GDP growth; team points; team drivers' championships; alliance partners' experience; and compilations of performance, financial, and operational sponsors by team.

## Results

### Overall Hazard Function

Analyzing the lifetime of F1 teams utilizing survival analysis modeling results in a computation of the overall hazard rate for the dissolution of an F1 team, which is

**Table 1 Descriptive Statistics and Correlations**

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
1. Performance-based sponsors	4.46	5.47									
2. Team experience (years)	11.88	12.12	.46								
3. Financial sponsors	2.14	2.80	.73	.35							
4. Operational sponsors	1.53	2.78	.77	.33	.74						
5. Team sponsors' experience (years)	40.54	52.71	.85	.65	.64	.67					
6. Post-1995 dummy	0.22	0.41	.77	.41	.76	.77	.70				
7. Team points	25.46	35.37	.42	.69	.23	.23	.65	.29			
8. Drivers' championships	1.87	3.10	.33	.86	.14	.14	.57	.22	.81		
9. Team sold	0.04	0.19	.13	.01	.18	.16	.07	.16	-.09	-.10	
10. Global GDP growth (%)	3.11	1.29	-.03	-.07	-.02	-.01	-.05	.03	-.00	-.03	-.03

*Note.* There are 570 team years and 124 unique teams. Correlations with absolute values equal to or greater than .09 are significant at the  $p < .05$  level. GDP = gross domestic product.

the dependent variable. Dating back to 1967, the overall hazard function for F1 teams is 0.12, defined as the conditional probability that an F1 team may fail at any given time (11.69%).

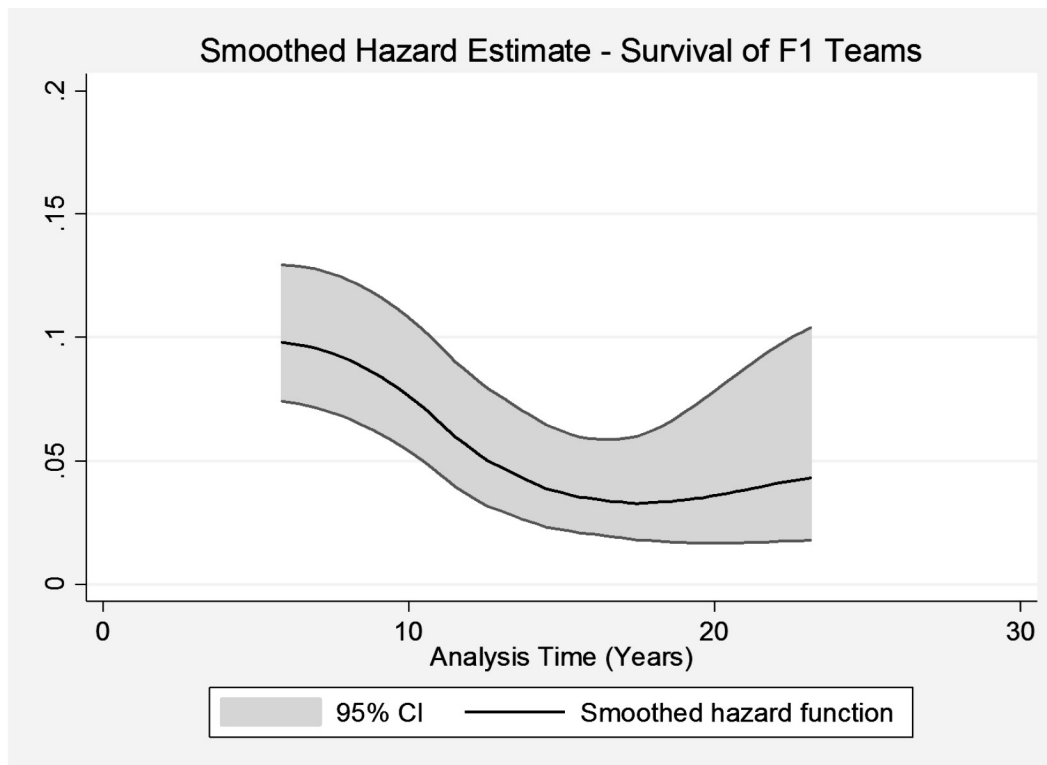
The hazard function can also be computed across various time frames to determine whether teams are more or less likely to fail early or later in the team's life. For example, in Year 1 of an F1 team's experience, the hazard for dissolution is 0.29, which is the conditional probability that an F1 team will fail after only 1 year of existence (i.e., 28.92%). As one might expect, the hazard decreases to 26.79% after the second year, 15.0% after the third, and to only 5.26% after the fourth. A smoothed version of the baseline hazard function visually depicts how the hazard changes over time. As illustrated in Figure 1 and in accordance with the data, the hazard for dissolution is highest in the first decade of existence and slowly drops as the team gains experience. After 15 years of existence, the expected hazard for dissolution remains relatively consistent through subsequent years.

## Hypotheses

We propose an empirical model based on prioritization for predicting the dissolution of motorsports teams reliant on sponsorship resources for survival. To test our hypotheses, we start with a basic model (Model 1 in Table 2) inclusive of the primary variables representing

three sponsorship categories—performance, financial, and operational—as well as most control variables (i.e., sponsors' experience, team points, drivers' championships, team sold, and global GDP growth). Next, we insert quadratic terms to examine the possibility of diminishing returns to each resource category—both with (Model 3) and without (Model 2) a measure quantifying team experience. Finally, we insert the dichotomous indicator of the institutional change that followed the 1995 season—first, in a model without the quadratic resource terms (Model 4) and then in a full comprehensive model (Model 5). All five models outperform a constant-only model at a highly significant level ( $p < .001$ ). The third and fourth models also outperform nested Model 1, and the final model outperforms nested Model 4 at a marginally significant level ( $p < .10$ ). Results for each model are displayed in Table 2, and discussion of findings is based on the statistically preferred comprehensive model (Model 5) unless stated otherwise.

H1 is the first of three hypotheses through which we examine the effects of sponsorships that vary in the resources offered to competing teams. Keep in mind that a negative coefficient to an independent variable signifies a reduced hazard of dissolution or, alternatively, an increased probability of survival. As we generally predicted in H1 and H2, access to both performance and financial resources enhanced the likelihood of



**Figure 1** — Plot of smoothed hazard estimate of survival of Formula One (F1) teams over time. CI = confidence interval.



**Table 2 Results of Survival Analysis of Team Dissolution**

Variable	Hypothesis (effect)	Model 1	Model 2	Model 3	Model 4	Model 5
Performance-based sponsors	1a (-)	-0.64*** (0.17)	-0.77*** (0.18)	-0.81*** (0.18)	-0.89*** (0.19)	-1.11*** (0.25)
Performance sponsors squared	4a (+)		0.03*** (0.01)	0.03*** (0.01)		0.04 (0.03)
Team experience		0.09 (0.09)		0.11 (0.10)	0.08 (0.11)	0.11 (0.11)
Performance Sponsors × Team Experience	1b (+)	0.03*** (0.01)		0.01 (0.01)	0.05*** (0.02)	0.04* (0.02)
Financial sponsors	2 (-)	-0.28 <sup>†</sup> (0.15)	-0.71** (0.25)	-0.65** (0.25)	-0.47* (0.20)	-1.20** (0.37)
Financial sponsors squared	4b (+)		0.08* (0.03)	0.07 <sup>†</sup> (0.03)		0.23* (0.10)
Operational sponsors	3 (-)	0.14 (0.19)	0.17 (0.29)	0.15 (0.29)	0.10 (0.28)	-0.17 (0.47)
Operational sponsors squared	4c (+)		-0.02 (0.03)	-0.02 (0.03)		0.10 (0.20)
Team sponsors' experience	control (-)	0.02 (0.02)	0.03 (0.02)	0.03 (0.02)	0.02 (0.02)	0.03 (0.02)
Post-1995 dummy	control				-1.02 (2.67)	6.16 (4.26)
Financial Sponsors × Post-1995	control (+)				1.71** (0.62)	-0.89 (1.15)
Team points	control (-)	-0.09** (0.03)	-0.07** (0.03)	-0.08** (0.03)	-0.08** (0.03)	-0.08** (0.03)
Team Points × Post-1995	control (-)				-2.93** (1.04)	-3.64** (1.32)
Drivers' championships	control (-)	-0.38 (0.33)	-0.21 (0.30)	-0.42 (0.40)	-0.74 <sup>†</sup> (0.43)	-0.80 <sup>†</sup> (0.45)
Team sold	control	-16.12 (1489)	-26.44 (998)	-24.18 (1040)	-37.05 (1427)	-76.17 (1157)
Global GDP growth	control	-0.02 (0.11)	-0.03 (0.11)	-0.03 (0.11)	-0.02 (0.12)	-0.01 (0.12)
- 2 log-likelihood		241.83	235.43	232.85	218.26	211.47
Likelihood ratio $c^2(df)$		73.76*** (10)	80.16*** (11)	82.74*** (13)	97.33*** (13)	104.12*** (16)
Change vs. prior nested model (1, 4)				8.975*	23.572***	6.785 <sup>†</sup>

Note. Standard errors are in parentheses. GDP = gross domestic product.

<sup>†</sup>  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$  (two-tailed tests).

survival by negatively influencing team dissolution to a significant degree ( $p < .01$ ). For each additional performance-based sponsor, the team's odds of dissolving the following season fell by 67% (or a factor of 0.33).<sup>7</sup> We further hypothesized based on organizational learning theory that the effect of performance-based sponsorships would weaken as the team gained experience (H1b). Indeed, this interaction with team experience is empirically supported ( $p < .05$ ). As a team gained a year of experience, the marginal contribution to team survival of an additional performance-based sponsor was reduced by 4.2%. However, results did not match the expectation that financial sponsors are less influential to survival than performance-based sponsors (H2b). Instead, sponsors primarily offering financial resources had a slightly greater impact on team survival—reducing the odds of team dissolution by 70% for each additional financial sponsor—though the difference in effect compared with performance-based sponsors was not statistically significant ( $Z = 0.10$ ,  $p > .05$ ). The results also fail to provide significant support for the hypothesis (H3a) that access to operational resources enhances the likelihood of team survival, but this finding follows the hypothesized prioritization of sponsorship resource categories in that operational sponsorships appear to be least influential (H3b).

Given that sponsorships offering either performance or financial resources enhance the likelihood of team survival, we offer a test of diminishing returns to these effects in H4. Initially, we examined this hypothesis in a base model (Model 2) that included the associated quadratic terms in addition to the linear terms for each sponsorship category, and the control variables, but did not control for the effects of team experience or the institutional change after 1995. This model specification maintained the main effects of the number of performance and financial sponsors as significant negative influencers of the odds of dissolution (i.e., enhancing survival) while also revealing significant positive quadratic terms for both resource types ( $p < .05$ ). The positive coefficients on the quadratic terms signify diminishing returns to both sponsorship types. That is, as the number of sponsorships offering performance or financial resources reaches a certain level, incremental sponsorships of each type positively influence the odds of team dissolution (i.e., reduce the likelihood of survival). Although H4a and H4b are supported by these results, neither the main effect nor the quadratic term for operational sponsorships (H4c) was significant.

## Control Variables

In subsequent models, we enter the variable of team experience (Model 3) and control for the institutional change after the 1995 season in the full model (Model 5). The quadratic effects for sponsorships offering performance or financial resources remain at least marginally significant when simultaneously considered with team experience. However, the effect of diminishing returns to

performance-based sponsorships (H4a) loses statistical significance when modeled with the post-1995 dummy variable in the full model. Because greater numbers of sponsorships occur in the modern era, the binary variable signifying the institutional change after 1995 appears to also capture the effect of diminishing returns to performance-based sponsorships.

Further concerning the post-1995 control variable, which marked the increase in prize money allocated to teams, we speculated that enhanced access to institutional financial resources might reduce teams' survival dependence on financial resources via sponsorship and marginally increase the importance of race results (i.e., team points). As expected (and displayed in Model 4), the interaction of the dichotomous variable indicating the more recent era (i.e., post-1995) and the variable quantifying a team's financial sponsorships does significantly influence team dissolution in the positive direction ( $p < .01$ ), thereby signaling a reduced impact of sponsorships offering financial resources after 1995. Simultaneously, the negative relationship between team points and team dissolution has indeed been enhanced in the modern era ( $p < .01$ ). Before the change, each 1-point rise in the 5-year average reduced a team's odds of dissolution by just 7.7%. After the change in the Concorde Agreement, a 1-point rise in the 5-year average of team points scored reduced a team's odds of dissolution by almost 95%.<sup>8</sup> When evaluated in the presence of the quadratic terms in the full model (Model 5), however, the reduced effect of financial sponsors after 1995 is no longer statistically significant. The sign of the coefficient on the interaction term actually changes, which implies correlation with the quadratic term—most likely as an indicator of the greater number of sponsorships in the modern era. As a result, any conclusions regarding the longitudinal effect of financial resources via sponsorship in the context of institutional changes (here post-1995) should be considered tentative and the subject of further research that also allows for diminishing returns to sponsorship resources.

The control variables quantifying sponsors' experience, sales of teams, and annual global GDP growth did not achieve significance in any model specifications. However, both control terms measuring team performance (points and drivers' championships) show at least marginal significance in the most comprehensive models, and team points is a significant deterrent to team dissolution in all models ( $p < .01$ ).

In summary, the broad findings across hypotheses indicate that sponsorships offering access to certain resources contribute to the survival of sponsored teams even when controlling for teams' competitive performance. Specifically, sponsorships that offer either performance or financial resources exhibit a significant negative relationship to team dissolution in every application of the model. We also uncover evidence that suggests the relationship to team dissolution may be subject to diminishing returns and institutional dynamics such as changes in prize money distribution.

## Discussion: Implications, Limitations, and Future Research

The development of the RBV of the firm refocused the search for a competitive advantage from external industry factors to internal organizational resources (Barney, 1995). Since then, scholars have migrated back toward a middle ground where external elements such as institutional norms, regulations and governance, and even other firms impose limits, offer provisions, or present access to useful resources (Auh & Menguc, 2009). The latter of these perspectives frames the context of this study, where we address with our primary research question how access to various resources through corporate sponsorship influences the survival of F1 teams in their highly competitive environment. To address this question, we studied teams competing in F1 motor racing over 40 years as entrepreneurial enterprises that rely on their alliances with sponsoring firms to access different types of organizational resources. Though a team's offering to its sponsoring firms may be relatively consistent (i.e., promotional and hospitality services), the reciprocal resources accessed from sponsors are not necessarily equivalent and their impact on team outcomes differs.

By accessing either performance or financial resources through sponsors, F1 teams were able to reduce their odds of dissolution by over 65%. However, sponsorships offering operational resources had no effect on the team's survival. Though contrary to the third hypothesis, this finding did confirm the anticipated lower priority of operational resources. Such divergent effects based on resource type supports Grant's (1991) theory of heterogeneous resources and challenges organizational scholars to closely examine the type of sponsorship and other alliance contributions. Future researchers should be mindful of the utility of alliance categorization based on the exchanged resources' strategic application in the relevant institutional environment. This contribution supports Skilton's (2009) claim that segmenting resources should be "supplemented by an understanding of the functions of different resources in a production system" (p. 840).

While this study's findings provide evidence to support the contention that sponsorships offering access to performance-based resources are effective survival tools in this context, the impact of such sponsorships appears to weaken as teams gain experience. The interaction effect between sponsor-based performance resources and organizational experience arises because F1 teams become more self-sufficient and less reliant on external sources for a competitive performance advantage as maturing teams develop internal performance competencies over time (Levitt & March, 1988). Accordingly, researchers must consider organizational experience or life stage in future studies of resource utility. Managers of a new or young team would be wise to prioritize sponsorships offering resources directly related to competitive performance. After teams establish internal performance expertise, managers may wish to reallocate their focus

to more financially oriented sponsorships while being cognizant of the potential for diminishing returns.

The influence of the quadratic terms in this investigation provides support for the argument that sponsorships offering access to performance or financial resources contribute to team survival but are not unlimited in their capacity to ward off dissolution. At a certain threshold, adding incremental sponsorships fails to discourage team dissolution, thereby suggesting an inverted U-shaped relationship. This finding further substantiates the theory that organizations possess an alliance management capability (Ireland et al., 2002), which is not without restrictions. Though Deeds and Hill (1996) uncovered a similar effect when examining the influence of alliances on rates of new product development, the idea of diminishing returns to alliance engagement has yet to be widely adopted in interorganizational research or questioned in a sponsorship context (Rothaermel & Deeds, 2006). At the very least, future studies quantifying sponsorship propensity as related to team performance should consider curvilinear possibilities. Meanwhile, scholars must also recognize that a single dependent variable (e.g., team survival) does not capture the complete utility of sponsorship resources.

Future researchers should recall the potential for diminishing returns in light of the study's limitations. Although we quantify the number of sponsorships offering access to different resources, a weighting of each sponsorship by the quantity of resources exchanged would be a more accurate measure of each sponsorship's meaning. However, the magnitude of resources exchanged within each sponsorship is unknown here. This research compromise confines the scope of conclusions drawn since some sponsorships likely contribute a greater magnitude of resources than other sponsorships. To demonstrate such disparity, a team could access resources worth US\$50 million annually from just one sponsor, while other teams may be dependent on five sponsorships providing US\$10 million each to access equivalent resources. Presumably, managing five sponsorships to access the same magnitude of resources that competitors acquire in a single sponsorship would strain a team's sponsorship management capacity, but comparing the magnitude of resources across teams in this longitudinal study was not feasible because of data restrictions.

Likewise, this study represents a test of sponsorship resource prioritization in just one sporting context that admittedly entertains some unique institutional qualities (e.g., global market, barriers to entry/exit, competitive rules, and team operating structure [Concorde Agreement]). Still, the empirical evidence offered for the varying influence on survival of different sponsorship resources in combination with diminishing returns represents relevant consideration for ongoing research in this domain. Future researchers might test the prioritization of performance and financially based sponsorships versus operational sponsorships in other sporting domains. Of particular interest may be sporting events that rely on

sponsorship for continued operation and situations of team promotion and relegation. Beyond motorsports, events in golf, tennis, athletics, and other sports depend on corporate sponsor engagement to survive. Is there a sponsorship prioritization relevant to these types of events? Might operational sponsors be a higher priority in such instances where the dependent organization is an event operator as opposed to a competing team (as in this study)?

Where team sponsorship is the focus, circumstances of promotion and relegation provide an interesting context to study whether certain types of sponsors provide greater assistance in avoiding relegation or achieving promotion to a more competitive league. Accordingly, what distinctions in sponsorship resource prioritization might be necessary between sports that heavily rely on equipment in combination with human performance (e.g., motor racing, sailing) and those that minimize the use of equipment external to the athlete (e.g., soccer, athletics, basketball)? For instance, when compared with business operations sponsors such as Staples or Accenture, do human performance-oriented sponsors such as nutritional, training, or specialized apparel and equipment firms (e.g., AdvoCare, Cybex, Under Armour) contribute disproportionately to the success of soccer, basketball, or baseball teams? Finally, as related to diminishing returns, is there a consistent relationship between the number of sponsors and sporting success or organizational longevity in various sporting contexts? Each of these questions challenges researchers to extend the results of this study more broadly.

Furthermore, analysis of the control variable for institutional era illustrates the potential for a governing force (i.e., league) to change the competitive environment and influence the resource dependency of teams operating within that environment. Within this study's F1 racing context, evidence of a major alteration in institutional governance emerged after 1995, when the flow of resources from the regulatory institution was adapted to provide enhanced financial reward for race performance. Consequently, sponsor-based financial resources became less influential in staving off team dissolution after the institutional change (though this finding is tentative given nonsignificance in the full model), and team points increased in importance. Such fluctuation in sponsor resource utility emphasizes the peril in neglecting dynamic institutional forces present within an investigative context (Miller & Shamsie, 1996). Though many interorganizational studies do not take a longitudinal approach, recognition of the institutional conditions and their influence on the current reality as well as their potential for change is a necessary contemplation toward achieving relevance in organizational research (Koza & Lewin, 1998). Failure to consider the institutional dynamics within this particular context would have not only overlooked the changing influence of financially based sponsorships but also left hidden the increasing reward for earning team points through positive race results.

## Conclusion

By analyzing over 4 decades of sponsorships between F1 teams and their corporate partners, this study has taken the perspective of sponsored sport organizations that offer promotional services to sponsoring firms in exchange for various other resources. The relationship between this exchange process and the team's propensity to survive was explicated, and certain resources were identified as more crucial than others. For sport managers, the results offer empirical evidence to consider in the prioritization of sponsorship resources subject to team experience and institutional dynamics. Sponsorships based on operational resources, such as those providing logistical or office services, should receive the lowest priority. Teams early in their history should seek to engage sponsors that can offer performance-related resources relative to the teams' competitive environment, while mature teams are wise to focus on sponsorships that maximize financial resources.

For scholars, the findings advance the broadening scope of the RBV (Auh & Menguc, 2009), where the strategic value of organizational resources is a function of both internal capacities and competitive influences. Sponsorship may be the most popular interorganizational exchange mechanism in sports, but the resources available through sponsoring firms are heterogeneous in their utility. Consequently, further theoretical development in sponsorship management strategy must account for such disparity and incorporate a prioritized delineation of the potential resources accessed. Methodologically, this paper provides an empirical framework for conducting longitudinal studies via organizational survival analysis, which are rare to date in sport management scholarship despite their enhanced efficacy in drawing causal inferences (Jensen & Turner, 2016).

## Acknowledgment

The authors would like to thank Jonathan Davies at Chicanef1 for assistance in data collection, and Jay Gladden, Neil Longley, Robert Faulkner, and Mark Groza for their helpful guidance and useful suggestions regarding an earlier version of this manuscript.

## Notes

<sup>1</sup>Before 1967, corporate sponsorship was prohibited by F1 regulations; thus sponsorship data begins in 1967.

<sup>2</sup>In addressing the sale of teams (represented by name changes) within the collection of 124 teams, we recognized the team as continuing to exist as a consistent organization when the name changes. This data treatment is consistent with the fact that corporate sponsorships, team personnel, and even previous season team results (for the purposes of grid and pit positioning) are typically transferred as a condition of the sale.

<sup>3</sup>Of the total 776 team years, 570 occurred after 1967 when the institutional regulations first permitted corporate sponsorships.



This latter time frame serves as the context of the investigation here, though drivers' championships and team experience accumulated before 1967 are represented in the analyzed data (i.e., control variables).

<sup>4</sup>Given the historical nature of the data set, a primary industry classification for the sponsoring firm was only feasible for 91.75% of the team-sponsor alliance years in the raw data set. For example, even after consulting various sources, we could make no solid determination as to what sponsoring firm was referenced by "LBT" in relationship to the 1982 March racing team. As a result, the analysis and data descriptions are inclusive of solely the sponsoring firm data with verifiable industry designations.

<sup>5</sup>FOA awards points to teams at the conclusion of each race based on the finish of their cars in that race. More points are awarded for better finishes. FOA then maintains a running tally of points throughout the season, which is deemed the Constructors' Championship. FOA also tracks individual drivers' earned points throughout the race season for the awarding of the Drivers' Championship, which has traditionally been the more prestigious of the F1 Championship awards.

<sup>6</sup>VIF statistics ranged from 1.074 to 7.349 (drivers' championships). Even though VIF values less than 10 indicate inconsequential collinearity (O'Brien, 2007), several alternate models were analyzed that isolated, excluded, and transformed variables that were correlated above .70 (Van den Poel & Larivière, 2004). Coefficient values and model significance did not change substantially between models compared with the primary specification. Therefore, we judged estimates within the primary model to be generally robust to collinearity concerns.

<sup>7</sup>In the Cox regression model, the antilog of the variable's coefficient produces the hazard ratio, which is the dissolution rate for an enterprise with 1 more unit of the variable in comparison with the dissolution rate for another enterprise without that additional variable unit. As it concerns performance-based sponsors, the antilog of the estimated coefficient ( $e^{1.11}$ ) produces a ratio of 0.33, which indicates that a 1-unit increase in performance-based alliances yields a 67% reduction in the odds of the team's dissolving in the following season.

<sup>8</sup>This interaction effect is calculated by antilogging the aggregated coefficients of the team points term and its associated interaction with the post-1995 binary variable, which is coded as 1 after 1995. The resulting statistic is the hazard ratio for a unit (point) increase after 1995, which we calculate from Model 4 as  $e^{(-0.08-2.93)} = 0.05$ . The interpretation is that a team with 1 more average point scored over the previous 5 seasons enjoys a probability of dissolution the following season that is reduced by a factor of 0.05 or 95% ( $1-0.05$ ) compared with a team without the additional average point.

## References

- Amis, J., Pant, N., & Slack, T. (1997). Achieving a sustainable competitive advantage: A resource-based view of sport sponsorship. *Journal of Sport Management*, 11, 80–96. doi:10.1123/jsm.11.1.80
- Anand, B.N., & Khanna, T. (2000). Do firms learn to create value? The case of alliances. *Strategic Management Journal*, 21, 295–315. doi:10.1002/(SICI)1097-0266(200003)21:3<295::AID-SMJ91>3.0.CO;2-O
- Audretsch, D.B., & Mahmood, T. (1995). New firm survival: New results using a hazard function. *The Review of Economics and Statistics*, 77, 97–103. doi:10.2307/2109995
- Auh, S., & Menguc, B. (2009). Broadening the scope of the resource-based view in marketing: The contingency role of institutional factors. *Industrial Marketing Management*, 38, 757–768. doi:10.1016/j.indmarman.2008.02.011
- Barney, J.B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17, 99–120. doi:10.1177/014920639101700108
- Barney, J.B. (1995). Looking inside for competitive advantage. *The Academy of Management Executive*, 9(4), 49–61.
- Bergmann Lichtenstein, B.M., & Brush, C.G. (2001). How do 'resource bundles' develop and change in new ventures? A dynamic model and longitudinal exploration. *Entrepreneurship Theory and Practice*, 25(3), 37–58.
- Brett, J.A., Olekalns, M., Friedman, R., Goates, N., Anderson, C., & Lisco, C.C. (2007). Sticks and stones: Language, face, and online dispute resolution. *Academy of Management Journal*, 50, 85–99. doi:10.5465/AMJ.2007.24161853
- Brush, C.G., Greene, P.G., & Hart, M.M. (2001). From initial idea to unique advantage: The entrepreneurial challenge of constructing a resource base. *The Academy of Management Executive*, 15(1), 64–78. doi:10.5465/AME.2001.4251394
- Chan, S.H., Kensinger, J.W., Keown, A.J., & Martin, J.D. (1997). Do strategic alliances create value? *Journal of Financial Economics*, 46, 199–221. doi:10.1016/S0304-405X(97)00029-9
- Chung, S.A., Singh, H., & Lee, K. (2000). Complementarity, status similarity and social capital as drivers of alliance formation. *Strategic Management Journal*, 21, 1–22. doi:10.1002/(SICI)1097-0266(200001)21:1<1::AID-SMJ63>3.0.CO;2-P
- Cobbs, J., Groza, M., & Pruitt, S. (2012). Warning flags on the race track: The global markets' verdict on F1 sponsorship. *Journal of Advertising Research*, 52, 74–86. doi:10.2501/JAR-52-1-074-086
- Collings, T. (2004). *The Piranha Club*. London, UK: Virgin.
- Cornwell, T.B. (2008). State of the art and science in sponsorship-linked marketing. *Journal of Advertising*, 37(3), 41–55. doi:10.2753/JOA0091-3367370304
- Cox, D.R. (1972). Regression models and life-tables. *Journal of the Royal Statistical Society. Series B. Methodological*, 34, 187–220.
- Crowley, M. (1991). Prioritising the sponsorship audience. *European Journal of Marketing*, 25(11), 11–21. doi:10.1108/EUM00000000000628
- Cui, A.S. (2013). Portfolio Dynamics and alliance termination: The contingent role of resource dissimilarity. *Journal of Marketing*, 77(3), 15–32. doi:10.1509/jm.11.0164
- Cui, A.S., Calantone, R.J., & Griffith, D.A. (2011). Strategic change and termination of interfirm partnerships. *Strategic Management Journal*, 32, 402–423. doi:10.1002/smj.881
- Cui, A.S., & O'Connor, G. (2012). Alliance portfolio resource diversity and firm innovation. *Journal of Marketing*, 76(4), 24–43. doi:10.1509/jm.11.0130

- Das, S., Sen, P.K., & Sengupta, S. (1998). Impact of strategic alliances on firm valuation. *Academy of Management Journal*, 41, 27–41. doi:10.2307/256895
- Davies, J., & Lawrence, B. (n.d.). Sponsors [data file]. *ChicaneF1*. Retrieved February 19, 2009, from <http://www.chicaneF1.com/list.pl?who=s>
- Deeds, D.L., & Hill, C.W.L. (1996). Strategic alliances and the rate of new product development: An empirical study of entrepreneurial biotechnology firms. *Journal of Business Venturing*, 11, 41–55. doi:10.1016/0883-9026(95)00087-9
- Donaldson, G. (2002). *Formula 1: The autobiography*. London, UK: Weidenfeld & Nicolson.
- Dyer, J.H., & Singh, H. (1998). The relational view: Cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review*, 23, 660–679.
- Fahy, J., Farrelly, F., & Quester, P. (2004). Competitive advantage through sponsorship: A conceptual model and research propositions. *European Journal of Marketing*, 38(8), 1013–1030. doi:10.1108/03090560410539140
- Fleck, N.D., & Quester, P. (2007). Birds of a feather flock together . . . Definition, role and measure of congruence: An application to sponsorship. *Psychology and Marketing*, 24(11), 975–1000. doi:10.1002/mar.20192
- Formula One Administration. (n.d.). Season results [data file]. Retrieved March 3, 2014, from <http://www.formula1.com/results/season/>
- Freeman, J., Carroll, G.R., & Hannan, M.T. (1983). The liability of newness: Age dependence in organizational death rates. *American Sociological Review*, 48, 692–710. doi:10.2307/2094928
- Grant, R.M. (1991). The resource-based theory of competitive advantage: Implications for strategy formulation. *California Management Review*, 33(3), 114–135. doi:10.2307/41166664
- Hoang, H., & Rothaermel, F.T. (2005). The effect of general and partner-specific alliance experience on joint R&D project performance. *Academy of Management Journal*, 48, 332–345. doi:10.5465/AMJ.2005.16928417
- International Events Group. (2015, January 26). Sponsorship spending report: Where the dollars are going and trends for 2015. Retrieved from <http://www.sponsorship.com/Resources/Sponsorship-Spending-Report-Where-The-Dollars-Are.aspx>
- Ireland, R.D., Hitt, M.A., & Vaidyanath, D. (2002). Alliance management as a source of competitive advantage. *Journal of Management*, 28, 413–446. doi:10.1177/014920630202800308
- Jensen, J.A., & Cobbs, J.B. (2014). Predicting return on investment in sport sponsorship: Modeling brand exposure, price, and ROI in Formula One automotive competition. *Journal of Advertising Research*, 54, 435–447. doi:10.2501/JAR-54-4-435-447
- Jensen, J.A., Cobbs, J.B., & Turner, B.A. (2016). Evaluating sponsorship through the lens of the resource-based view: The potential for sustained competitive advantage. *Business Horizons*, 59, 163–173. doi:10.1016/j.bushor.2015.11.001
- Jensen, J.A., & Turner, B.A. (2016). Event history analysis of longitudinal data: A methodological application to sport sponsorship. *Sport in Society*, 19(6), 1–18. doi:10.1080/17430437.2016.1179728
- Koza, M.P., & Lewin, A.Y. (1998). The co-evolution of strategic alliances. *Organization Science*, 9, 255–264. doi:10.1287/orsc.9.3.255
- Lee, C., Lee, K., & Pennings, J.M. (2001). Internal capabilities, external networks, and performance: A study on technology-based ventures. *Strategic Management Journal*, 22(6–7), 615–640. doi:10.1002/smj.181
- Levitt, B., & March, J.G. (1988). Organizational learning. *Annual Review of Sociology*, 14, 319–338. doi:10.1146/annurev.so.14.080188.001535
- Magretta, J. (2002). Why business models matter. *Harvard Business Review*, 80(5), 86–93.
- McFadyen, M.A., & Cannella, A.A., Jr. (2004). Social capital and knowledge creation: Diminishing returns of the number and strength of exchange relationships. *Academy of Management Journal*, 47, 735–746. doi:10.2307/20159615
- Meenaghan, T. (2001). Understanding sponsorship effects. *Psychology and Marketing*, 18(2), 95–122. doi:10.1002/1520-6793(200102)18:2<95::AID-MAR1001>3.0.CO;2-H
- Miller, D., & Shamsie, J. (1996). The resource-based view of the firm in two environments: The Hollywood film studios from 1936 to 1965. *Academy of Management Journal*, 39, 519–543. doi:10.2307/256654
- O'Brien, R.M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality & Quantity*, 41, 673–690. doi:10.1007/s11135-006-9018-6
- Olson, E.L., & Thjømøe, H.M. (2011). Explaining and articulating the fit construct in sponsorship. *Journal of Advertising*, 40(1), 57–70. doi:10.2753/JOA0091-3367400104
- Papadimitriou, D., & Apostolopoulou, A. (2009). Olympic sponsorship activation and the creation of competitive advantage. *Journal of Promotion Management*, 15(1–2), 90–117. doi:10.1080/10496490902892754
- Pfeffer, J., & Nowak, P. (1976). Joint ventures and interorganizational interdependence. *Administrative Science Quarterly*, 21, 398–418. doi:10.2307/2391851
- Rao, H. (1994). The social construction of reputation: Certification contests, legitimation, and the survival of organizations in the American automobile industry: 1895–1912. *Strategic Management Journal*, 15(S1), 29–44. doi:10.1002/smj.4250150904
- Rothaermel, F.T., & Deeds, D.L. (2006). Alliance type, alliance experience and alliance management capability in high-technology ventures. *Journal of Business Venturing*, 21, 429–460. doi:10.1016/j.jbusvent.2005.02.006
- Sarkar, M.B., Echambadi, R., Cavusgil, S.T., & Aulakh, P.S. (2001). The influence of complementarity, compatibility, and relationship capital on alliance performance. *Journal of the Academy of Marketing Science*, 29, 358–373. doi:10.1177/03079450094216
- Schlegelmilch, R.W., & Lehbrink, H. (2004). *Formula 1, 1950–present*. Berlin, Germany: Feierabend Verlag OHG.
- Singer, J.D., & Willett, J.B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. New York, NY: Oxford University Press. doi:10.1093/acprof:oso/9780195152968.001.0001

- Skilton, P.F. (2009). Knowledge based resources, property based resources and supplier bargaining power in Hollywood motion picture projects. *Journal of Business Research*, 62, 834–840. doi:10.1016/j.jbusres.2008.05.001
- Smith, L. (2015, February 5). As Caterham's F1 story ends, will Marussia live on? *NBCSports.com*. Retrieved December 11, 2015, from <http://motorsportstalk.nbcsports.com/2015/02/05/as-caterhams-f1-story-ends-will-marussia-live-on/>
- SportsPro Media. (2007). *Black Book Formula One*. London, UK: SportsPro Media.
- Stuart, T.E. (1998). Network positions and propensities to collaborate: An investigation of strategic alliance formation in a high-technology industry. *Administrative Science Quarterly*, 43, 668–698. doi:10.2307/2393679
- Sylt, C. (2015, January 4). Marussia F1 Team Lost \$45,000 in Bid to Race at Final Grand Prix. *Forbes*. Retrieved December 11, 2015, from <http://www.forbes.com/sites/csylt/2015/01/04/marussia-f1-team-lost-45000-in-bid-to-race-at-final-grand-prix/>
- Sylt, C., & Reid, C. (2008, May 20). Keeping the wheels turning. *Financial Times*. Retrieved June 12, 2008, from <http://www.ft.com/cms/s/2/333268be-25c4-11dd-b510-000077b07658.html#axzz1hyABN6cD>
- Truyens, J., De Bosscher, V., Heyndels, B., & Westerbeek, H. (2014). A resource-based perspective on countries' competitive advantage in elite athletics. *International Journal of Sport Policy and Politics*, 6, 459–489. doi:10.1080/19406940.2013.839954
- Tsai, W. (2000). Social capital, strategic relatedness and the formation of intraorganizational linkages. *Strategic Management Journal*, 21, 925–939. doi:10.1002/1097-0266(200009)21:9<925::AID-SMJ129>3.0.CO;2-I
- U.S. Department of Agriculture Economic Research Service. (2016). Real GDP historical data set. Retrieved January 9, 2016, from <http://www.ers.usda.gov/Data/Macroeconomics/>
- Van den Poel, D., & Larivière, B. (2004). Customer attrition analysis for financial services using proportional hazards models. *European Journal of Operational Research*, 157, 196–217. doi:10.1016/S0377-2217(03)00069-9
- Varadarajan, P.R., & Cunningham, M.H. (1995). Strategic alliances: A synthesis of conceptual foundations. *Journal of the Academy of Marketing Science*, 23, 282–296. doi:10.1177/009207039502300408
- Verity, J. (2002). Maximising the marketing potential of sponsorship for global brands. *European Business Journal*, 14, 161–173.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5, 171–180. doi:10.1002/smj.4250050207