An Empirical Approach to Analyzing Sponsorships in Intercollegiate Athletics:

The Case of NCAA Bowl Sponsorships

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Revenue from sponsorship is critical to the continued survival of sport organizations, in particular the non-profit organizations that dominate the intercollegiate athletics industry. Thus, this paper seeks to assist those tasked with managing such intercollegiate athletics partnerships by applying survival analysis methodologies to the study of postseason National Collegiate Athletic Association (NCAA) bowl sponsorships. The application of these approaches allow managers to determine not just the aggregated percentage of sponsors who historically renew, but when sponsorships are most likely to continue, when the probability of a sponsorship ending is highest, and the sponsorship's median lifetime. Consistent with exchange theory, results indicate that bowl sponsorships are more susceptible to dissolution within the first eight years and the median lifetime of the sponsorships is just under four years, demonstrating the importance of providing intercollegiate athletic event organizers more advanced methodologies to assist in the industry's sponsorship revenue forecasting activities.

Keywords: intercollegiate athletics, sport sponsorship, survival analysis, NCAA, bowl games

Many sport-related organizations rely on sponsorship as an increasingly important means for survival. This is particularly the case for some of the world's most high profile non-profit sport organizations, such as the International Olympic Committee (IOC) and the Fédération Internationale de Football Association (FIFA; Cornwell & Maignan, 1998). For example, 39% of the revenue generated by the Olympic movement during the 2013-16 quadrennial resulted from sponsorship (IOC, 2017). This included $1.003 million in revenue from the IOC's TOP program and $2.037 billion in revenue from domestic Organizing Committee for the Olympic Games (OCOG) sponsorship programs (IOC, 2017), for a total of more than $3 billion of the $7.7 billion in total revenue. For FIFA's most recently completed 2011-14 event cycle, sponsorship revenue totaled $1.63 billion, 31.7% of total event-related revenue of $5.14 billio n (FIFA, 2015).

Sponsorship revenue is even more critical for smaller, amateur sport organizations, such as those in the U.S.-based intercollegiate athletics industry (Maxwell & Lough, 2009). The intercollegiate athletics system is comprised almost exclusively of non-profit organizations, such as institutions of higher learning, intercollegiate athletic conferences, postseason bowl games, and the National Collegiate Athletic Association (NCAA; Jensen, Turner, & McEvoy, 2015). Increasingly, the intercollegiate athletics industry has turned to sponsorship as an important tool to generate revenue to fund their continued operations. For example, during the 2017-18 academic year it is estimated that the 65 institutions in the five major athletic conferences (i.e., the Power Five) received $400 million in guaranteed rights fees as part of multimedia rights agreements with third party rightsholders such as International Management Group (IMG) and Learfield (CRIA, 2018). These rights fees provide the partner with the ability to monetize the institution's sponsorship assets by packaging them in agreements marketed to potential corporate sponsors of the athletic department. The agreements may include such diverse sponsorship-related assets as multimedia (i.e., television, radio, internet, and digital) broadcast rights, tickets, in-arena/stadium signage, print advertising, hospitality, and additional promotional opportunities for sponsors (CRIA, 2018). Yet another potential source of revenue for intercollegiate athletic departments are sponsorships with athletic apparel brands, such as Adidas, Nike, and Under Armour (Jensen, Wakefield, Cobbs, & Turner, 2016). The comprehensive agreements typically provide these brands with on-field apparel rights, a licensing agreement, and sponsorship assets that deliver exposure to the institution's students, alumni, and fans in a variety of ways (CRIA, 2017). It is estimated that member institutions of the Football Bowl Subdivision (FBS) will receive more than $350 million in cash and apparel from such agreements during the 2017-18 academic year (CRIA, 2017).

However, despite its importance in the financing of sport organizations' continuing operations, the accurate forecasting of future sponsorship revenue is still reliant on an aggregated measure of central tendency, the renewal rate. The renewal rate reflects the average, or mean, percentage of buyers who choose to repurchase (Brown, 2002). The renewal rate is still the prevailing measure in use by sport organizations for sponsorship revenue projections, who forecast future revenue based simply on the historical percentage of sponsors who choose to renew their sponsorships of the organization (Irwin, Zwick, & Sutton, 1999). There are several limitations to this oft-utilized approach. As an aggregated measure, the renewal rate simply tells the organization, on average, what percentage of sponsors renew. This data do not provide any

indication when sponsorships may be most susceptible to dissolution (i.e., early, mid-term, or later in the lifetime of a sponsorship). Second, it tells the organization nothing about the actual duration of the partnerships, nor predicts how long they should be expected to last. Finally, as a measure of central tendency, the renewal rate does not properly account for censored observations, or the durations of sponsorships that are currently ongoing.

Thus, despite the proliferation of advanced analytics across the sport industry, an argument can be made that historical sponsorship data has yet to be empirically investigated utilizing appropriate statistical methods. "Traditional statistical methods provide no ready way of simultaneously analyzing observed and censored event times," explained Singer and Willett (2003, p. 325). "Survival methods do." Therefore, the purpose of this exploratory study is to apply a survival-based methodology to an empirical investigation of postseason NCAA bowl sponsorships, in an effort to assist the intercollegiate athletics industry in ongoing sponsorship revenue forecasting activities. Rather than simply providing information on how many sponsors typically renew, this approach will provide a variety of additional information, including how many sponsorships have historically continued during each discrete time period and the probability of a sponsor renewing during each period. Lastly, in order to properly forecast how long such sponsorships should be expected to last, the median lifetime of sponsorships will be computed.

To begin, the study utilizes what Box-Steffensmeier and Jones (1997) termed a "life-table analysis" to construct the historical durations of bowl sponsorships. The life table can then be utilized to calculate the survival and hazard functions for sponsorships over discrete time periods. Together, these tools can then be used to determine the median lifetime for a sponsorship of a particular organization. Information will be provided to support the superiority of these approaches in allowing sport organizations to predict future revenues from sponsorships much more accurately than is possible using measures of central tendency, such as the traditional renewal rate.

Theoretical Framework

The relationship between the buyer and seller in any sponsorship relationship is undergirded by exchange theory (McCarville & Copeland, 1994). Dees (2011) suggests that exchange theory is foundational to the relationship between a sponsoring firm and sponsored property. In addition, it was noted that two conditions must exist for the relationship to be considered an exchange: two or more parties must be involved and the resources exchanged by the two parties must be of some value (Dees, 2011). The tenets of exchange theory suggest that if either of these two different yet interrelated conditions are not in place, then an exchange relationship will not transpire (Dees, 2011). Exchange theory is based on the concept that a successful exchange between parties is dependent on both agreeing that the price paid for their goods or services is at least equal to what has been offered in exchange (Crompton, 2004). In other words, both sides of the exchange must feel confident that the relationship is beneficial and meeting its stated objectives. In the sport context, exchange theory has been previously utilized to better understand the commitment of athletes (Schmidt & Stein, 1991), motivation and attrition among coaches (Weiss & Stevens, 1993), and the development of a sport league (Southall, Nagel, LeGrande, 2005). Exchange theory is a useful lens in which to examine the sponsorship relationship, which consists of a sponsoring brand (the buyer) and the sponsored sport, arts, music/entertainment, or non-profit organization (the seller).

Exchange theory has its roots in the work of Homans (1958), who first viewed social behavior as an exchange of goods. Homans, in turn, noted the work of Blau (1955), who described how the social structure in a real-life group of federal law enforcement agents was marked by an exchange process between its members. Blau (1967) later defined exchange in this social context as actions, which are contingent on rewarding actions from individuals. However, these actions may cease when the expected reactions from others are no longer forthcoming (Blau, 1967). McCarville and Copeland (1994) first applied exchange theory to understand the motivations of each side of a sponsorship relationship, proposing that the principles of rationality, marginal utility, and fairness guide sponsorship-related decision-making. As noted by Dees (2011), McCarville and Copeland suggest that a marketing relationship viewed through the lens of exchange theory will only continue if the sponsor is realizing its stated objectives via the partnership. This paper builds upon the prior work of McCarville and Copeland (1994) by embarking on an empirical investigation of the duration of sponsorship relationships. Palmatier, Dant, Grewal, and Evans (2006) reasoned that the duration of a relationship, defined as the "length of time that the relationship between the exchange partners has existed," (p. 138) has the ability to influence success. Viewing sponsorship through the lens of exchange theory informs the perspective that only when both sides are satisfied with the resources provided by each via the relationship will it continue. Thus, this empirical investigation is a useful step towards a more nuanced understanding of the importance of various types of resources for both sides of the sponsorship relationship.

Based on exchange theory (McCarville & Copeland, 1994), it is expected that the relationship between a sponsoring brand and sponsored organization would be most tenuous, and therefore most likely to fail, in the partnership's initial stages. The literature on marketing relationships suggest that trust is a key antecedent, and necessary in the development of a long-term commitment from both sides of a marketing-related relationship (Morgan & Hunt, 1994). Research has found that a greater degree of trust can lead to positive performance outcomes one year later in buyer-seller exchange relationships, and is particularly important in conditions of high interdependence (Katsikeas, Skarmeas, & Bello, 2009). Further, maintaining marketing-related relationships requires commitment and trust not typically found in transactional advertising and promotion allocations (Beck, Chapman, & Palmatier, 2015). During the early stages of any relationship, when trust is theoretically at its lowest, both sides of the relationship are provided with the opportunity to understand each other's capabilities and objectives (Palmatier et al., 2006). Partnerships of longer durations can provide both partners with more opportunities to better understand each other's capabilities, which, in turn, may lead to both sides learning ways in which the relationship can be enhanced. Doney and Cannon (1997) explained that longer-term marketing relationships may allow both sides to further understand each other's motives and expectations, which may reduce the risk that the partnership will fail. Once an understanding of the resources that may be brought to bear by both partners and trust is established, then a decision will likely be made by one or both partners whether to continue or end the relationship. The longer the partnership continues, the better the chance that the relationship will be enhanced by both partners leveraging each other's capabilities.

Literature Review

As stated, understanding a sponsoring brand's propensity to continue a partnership, with non-profit organizations in particular, is critically important for the organizations that depend on

sponsorship revenue for survival. However, research has demonstrated that the duration of time in which a brand is engaged in a sponsorship is also of crucial importance to the brand as well. In initial work on the importance of duration to sponsorships, Armstrong (1988) found that sponsorships of longer durations were more likely to assist the firm in moving beyond the initial objectives of brand awareness to influencing brand image, consistent with Keller's (1993) conceptualization of brand equity. A multi-year study of season ticket holders found that sponsorship length was predictive of both recall and decay rates of residual recall even after the sponsorship had ended (McDonald & Karg, 2014). Similar research on the length of outdoor (Bhargava, Donthu, & Caron, 1994) and television advertising campaigns (Dunlop, Cotter, Perez, & Wakefield, 2013) found that longer-running campaigns were predictive of higher rates of brand recall and behavioral change.

Olson and Thjømøe (2011) found that the announcement of a continuation of an existing sponsorship was perceived by consumers to enhance the fit of the sponsorship, compared to the announcement of a new sponsorship. Research by Kruger, Goldman, and Ward (2014) also found that the announcements of the continuation of sponsorship agreements were met with an increase in shareholder value of more than 4% in the short-term period after the announcement. The researchers reasoned that the continuance of the agreement may be seen by shareholders as a tacit endorsement by the marketers in their decision-making, given that the partnerships were worthy of renewal.

As explained by Cornwell, Roy, and Steinard (2001), a longer-term sponsorship relationship also increases the potential that the sponsorship may become a source of competitive advantage, based on its ability to better influence unique consumer-based outcomes. For example, the longer the duration of the sponsorship, the higher the potential is for a stronger association between the brand and property in a consumer's memory (Cornwell & Humphreys, 2013; Johar & Pham, 1999). According to Cornwell et al. (2001), "Seeing a sponsor's name associated with the same sporting event, year after year, gives the consumer multiple opportunities to elaborate about the significance of the product-sponsorship relationship, thus creating stronger associations in memory" (p. 42). As stated, the ability to not only continue relationships with sponsoring brands, but more accurately forecast their ultimate duration, is crucial for sport organizations that depend on such revenue for survival. Thus, this research not only fills an important gap in the sport marketing literature, but can assist such organizations in improving their understanding of the durations of the sponsorships that fund their continued operations.

The relationships examined in this study are a unique subset of partnerships with U.S.-based sport events: sponsorships of NCAA postseason bowl games. These events are typically hosted by cities in prime tourist destinations such as Southern California and Florida, in an effort to attract out-of-town visitors who are willing to travel in order to watch their favorite teams compete (Griffith, 2010; Seifried, 2012). Host committees, convention and visitors bureaus, and sports commissions organize postseason bowl games to boost visitor spending by traveling fans, a practice dating back to the first Rose Bowl Game held in Pasadena, California in 1902 (Coates & Depken, 2011; Seifried & Smith, 2011). Since that first college football bowl game in 1902, the number of post-season college football contests has exploded (Popp, Jensen, & Jackson, 2017). In 1989, there were only 19 post-season bowl games (Daughters, 2015). At the end of the 2015 college football season, there were 41 college bowl games staged across the country (Popp, et al., 2017), with more than 20 being owned by non-profit entities (Schrotenboer, 2017).

Part of the reason for the growth in popularity for these unique events are their attractiveness to brand marketers as a marketing platform. First, the majority of events take place during the key holiday and vacation timeframe of December, when brands are trying to reach consumers. Second, marketers desire advertising time during the televised events not only given their timing, but also given that they are broadcast live in a world of increasing digital video reorder (DVR) penetration and the growing popularity of subscription online streaming services, which allows consumers to forward through commercials, or not see them at all (Jensen, Walsh, Cobbs, & Turner, 2015). In addition to the attractiveness of the events as an advertising platform, they are increasingly coveted as a sponsorship vehicle as well. These events provide for sponsors what Wiles and Danielova (2009) have termed "brand integration," or brand exposure during the event itself, rather than solely during commercials. This can include branding on-screen, on the field, and on the uniforms themselves (Jensen et al., 2015). One example in the bowl sponsor context is Allstate, whose branded field goal nets integrate the brand into the Allstate Sugar Bowl and more than 80 universities (Jensen, Walsh, & Cobbs, 2018). Finally, research has demonstrated that clutter, or the number and variety of different sponsors processed by consumers, can negatively impact a consumer's ability to recall sponsors (Jensen & Cornwell, 2017). Title sponsorships, such as the bowl sponsorships investigated as part of this study, have been referred to as the "crown jewels of sports sponsorships programs" (Clark, Cornwell, & Pruitt, 2009, p. 169). Title sponsorships of bowl games provide sponsors with the unique ability to cut through the clutter of other advertisers and sponsors of such events.

Due to declining attendance, some have even argued that the events have evolved into made-for-television spectacles that exist solely for advertisers seeking to reach consumers during the holiday timeframe (Eddy, Rascher, Stewart, 2016). The events have consistently attracted large television audiences, another reason why they are attractive for sponsors (Baker, 2017). Consider the fact that the 2016 Miami Beach Bowl, the lowest-rated bowl game that season, attracted an average of 795,000 television viewers on a Monday afternoon on ESPN, out-rating ESPN's typical Wednesday night Major League Baseball game (Schrotenboer, 2017).

Bowl title sponsorships are not new, with the first beginning in 1986 (NCAA, 2014). The first sponsorships to debut in 1986 include the Sunkist Fiesta Bowl, the Mazda Gator Bowl, and the Sea World Holiday Bowl (NCAA, 2014). These events were chosen as the dataset for this study for two main reasons. First, their high profile nature allows for an accurate historical accounting for which sponsors continue their relationships with the event, and which ones fail to renew, over the 30-year period of the study. Second, the revenue received from such partnerships are critical for the survival of the event, ensuring that research investigating their durations is particularly valuable for those tasked with managing relationships with the sponsors of bowl events. Illustrative of the importance of sponsorship to these events, there have been several instances of the events suffering from financial troubles after failing to renew a title sponsor. For example, in 2015 the bowl game held in Birmingham, Alabama was forced to request an additional $200,000 from the city of Birmingham in order to continue its operations after its sponsor, BBVA Compass, failed to renew (Schrotenboer, 2016). The following year, after it again failed to secure a title sponsor, the event was forced to request $525,000 from the city in order to continue to host the event (Schrotenboer, 2016). A lack of sponsorship has even forced some bowls to disband or be sold, which was the case for the International Bowl in Toronto (Schrotenboer, 2016) as well as the non-profit Miami Beach Bowl, which could not find a sponsor since its inception in 2014 (Schrotenboer, 2017). Thus, being able to improve one's ability to forecast and plan for the potential end of a sponsorship is critically important for sport

organizations that rely in sponsorship, in particular for non-profit events such postseason NCAA bowl games.

As stated, the methodology chosen to empirically investigate such partnerships is survival analysis. Commonly utilized in fields such as biostatistics and public health, survival analysis is alternatively known across different academic fields as event history analysis (demography), duration analysis (econometrics), and failure-time analysis (engineering; Box-Steffensmeier & Jones, 2004). Survival analysis approaches have been previously utilized to analyze time-to-event duration data ranging from United Nations peacekeeping missions, military interventions, the careers of members of Congress, and marriages (Box-Steffensmeier & Jones, 2004). In other examples, Cooney, Kadden, Litt, and Getter (1991) utilized the methodology to examine the duration of after-care programs for alcoholics (with the event in question being a relapse to alcohol use), Bolger, Downey, Walker, and Steininger (1989) examined the duration of time before an undergraduate student ideates about suicide, while Furby, Weinrott, and Blackshaw (1989) investigated recidivism (return to prison) among sex offenders.

However, despite its widespread use across several diverse academic fields, survival analysis has scarcely been utilized to study time-to-event durations in the sport industry. One early application is an analysis of factors impacting a player's career, finding that both draft order (Staw & Hoang, 1995) and race (Hoang & Rascher, 1999) were significant predictors of the career longevity of basketball players. More recently, the method was utilized to examine the careers of baseball managers (Volz, 2009) and quarterbacks (Volz, 2017). The approach has also been utilized to study the effect of a soccer match's first goal on the timing of a subsequent goal (Nevo & Ya'acov, 2012). The small number of research studies utilizing survival-based approaches in sport marketing applications have thus far produced impactful results. Researchers have recently applied the methodology to illuminate factors contributing to the survival or dissolution of sport organizations (Cobbs, Tyler, Jensen, & Kwon, 2017) and marketing partnerships involving the Olympic Games and World Cup (Jensen & Cornwell, 2017).

Method

The first step in the application of the survival analysis methodology is to compile a complete history of all NCAA bowl title sponsorships. This analysis reveals that through the beginning of 2018 there have been 136 such sponsorships over the prior 30 years, with the longest-running lasting 21 years (the Outback Bowl in Tampa, Florida; NCAA, 2014). Given that in longitudinal datasets such as these there are multiple observations corresponding to the number of years in which the bowl sponsorship lasted, the 136 sponsorships equate to 677 total observations (an average of 4.98 observations for each). A history of each corporation that has engaged in a sponsorship of these events, including the year each sponsorship began and the home market, is detailed in Table 1. Sponsors included in the dataset include some of the most successful multinational brands in the world, including Exxon-Mobil, Federal Express, Mazda, Toyota, Ford, MasterCard, Sheraton, Citibank, Sony, Allstate, and John Hancock. In addition, firms represented in the data are headquartered in a wide variety of different countries, including Finland (i.e., Nokia), Japan (i.e., Sony and Toyota) and South Korea (i.e., Hyundai).

The next step in data compilation for survival analysis is to construct the censoring indicator, by indicating both if and when each firm experienced the target event (the end of the sponsorship). A dichotomous variable (0 = Not Ended, 1 = Ended) indicating whether the sponsorship ended or is censored (i.e., still ongoing) by the end of each year was compiled. For

example, there are 34 sponsorships that were currently still active at the beginning of 2018, which results in a total of 102 of the 677 total observations indicating that the event has been experienced (given that 102 of the 136 historical sponsorships have ended).

Data Analysis Overview

There are three key concepts that are essential to data analysis via survival analysis, and will be used as recommended alternatives to the utilization of an aggregated measure of central tendency (i.e., the renewal rate) in forecasting future sponsorship revenues. To begin, the Kaplan-Meier (1958) survivor function estimate, $S(t_{ij})$, is defined by Singer and Willett (2003, 334) as the "probability that individual i will survive past time period j." For this to occur, the individual i cannot experience the event occurrence in the jth time interval, and survives to the end of time period j. In other words, the random variable for time (T_i) for individual i exceeds j. The survivor function is defined by the formula below:

$$S(t_{ij}) = \Pr[T_i > j]$$

Of arguably more utility than the survivor function in survival analysis is the hazard function, or hazard rate. The hazard rate is defined as the rate in which the duration or event ends (i.e., the event has been experienced), given that the target event or the duration has not ended prior to that particular time interval (Box-Steffensmeier & Jones, 1997). One can easily see why furthering an understanding of the conditional probability of a sponsorship ending during a particular time period would be very appealing for sport organizations. Given that T_i represents the time period T for individual i, according to Singer and Willett (2003) the discrete-time hazard function can be represented as follows:

$$h(t_{ij}) = \Pr[T_i = j | T_i \geq j]$$

The median lifetime is defined by Singer and Willett (2003, p. 337) as "that value of T for which the value of the estimated survivor function is .5." In the example of this study, the median lifetime is the point in which exactly half of the sponsorships have ended and half have survived. To determine the exact median lifetime, the formula provided by Miller (1981) can be utilized to linearly interpolate the exact median lifetime when a survivor function of 0.5 falls between two values of $S(t_j)$. Miller's (1981) formula involves letting m represent the last time interval in which the survivor function is above 0.5, letting $\hat{S}(t_m)$ equal the survivor function in that particular interval and letting $\hat{S}(t_{m+1})$ equal the survivor function for the next interval. The formula is as follows:

$$m + \left[\frac{\hat{S}(t_m) - .5}{\hat{S}(t_m) - \hat{S}(t_{m+1})} \right] ((m + 1) - m)$$

Results

The first data analysis step in survival analysis is the construction of a life table, which was developed for NCAA bowl sponsorships and is depicted in Table 2. Singer and Willett (2003) recommended the construction of life tables as the first step in any survival analysis in which the duration of time before the event in question is of interest. The life table includes a compilation of how many of the observations enter each time interval and how many experienced the target event during each interval (in this case, how many of the sponsorships ended). The life table also includes the previously defined survivor and hazard functions for each period, and is necessary to compute the median lifetime of the sponsorships.

Survivor Function

As indicated in Table 2, there have been a total of 136 historical bowl sponsorships, with just 15 ending after the first year. Therefore, a total of 121 bowl sponsorships "survived" past the first time interval, while 8 are censored (i.e., still ongoing). Per Table 2, the survivor function for the first year for bowl sponsorships is 0.8897 (*SE* = .0269). This function can be interpreted as the conditional probability that a bowl sponsorship will continue past the first quadrennial is 88.97%. Conversely, the failure function, or the probability that the sponsorship will end, can also be computed. In this example, it is 0.1103, or 11.03%. As indicated in Table 2, after another year 113 of the 136 sponsorships have survived, equating to a survivor rate of 0.7716 (the conditional probability of surviving past the second year is 77.16%). The standard error for the second survivor function for bowl sponsorships is 0.0367.

A total of 96 sponsorships survived past the third year, with 21 ending at this juncture, which consequently adjusts the survivor function to 0.6028 (*SE* = .0434). At this point, an average of 17 sponsorships have ended at the conclusion of the first, second, and third years. An additional 14 sponsorships ended after the fourth year. This equates to an updated survivor function of 0.4872 (*SE* = .0447). This is a significant development, as it indicates that more than one half of all bowl sponsorships end after four years. An additional 10 ended after an additional year, equating to a survivor function of .3917 after five years (*SE* = .0450). At this point, the rate of dissolution begins to slow considerably, as only five sponsorships end after both six and seven years, and only six end after eight. Then, of the 17 sponsorships to survive past the eighth year, only one ended at this point. This pattern is repeated after 10, 11, 12, and 13 years, when only 1 or 2 sponsorships end after these time periods. These results above are reflected in the graph of the survivor function for these sponsorships (Figure 1). The graph indicates a fairly steep drop through the first six to eight years, as a larger percentage of partnerships end. The function then flattens out with much smaller drops through the next several intervals, as fewer and fewer of the surviving sponsors experience the event occurrence of interest (the end of the sponsorship).

Hazard Function

The life table for bowl sponsorships (Table 2) also includes the previously defined hazard function, during each individual time interval. The hazard function for the sponsorship's first year is 0.1138, given that only 15 of the 136 sponsorships ended after one year. The hazard function for the second quadrennial increases to .1327, given that an additional 15 sponsorships that survived the first time interval ended at this point. The hazard function continues to increase

during the first three years, culminating at .2188 after three years. This result indicates that there is a conditional probability of 21.9% that bowl sponsorships will end during the third year. The hazard function then holds steady for the next two years, moving from .1918 to .1961 after five years. The function then steadily increases again, from .1219 after the sixth year, to .1429 after the seventh, to .2222 after the eighth. It is at this point, after eight years, that the hazard function is at its highest. We then see a pattern in which the function is at its lowest, as the probability of dissolution is only .0588 after nine years and .0625 after 10. In several of the upcoming years, such as after the 14th, and 16th years, none of the sponsorships to reach this point ended after these years.

Similar to the approach utilized by Ampaw and Jaeger (2012), it is possible to graphically depict the hazard rate of a sponsorship ending over time. For these bowl sponsorships (Figure 2), the hazard rate of a sponsorship ending decreases as a function of time in a fairly linear fashion, particularly after the eighth year. The overall shape of the graph can be interpreted that the longer a sponsorship continues, the probability that the sponsorship will end also decreases, particularly if the sponsor stays past the third and eighth years. Also of interest is the overall, cumulative hazard function for the entire history of these sponsorships. As an aggregated measure, the inverse of this function is precisely equivalent to the previously defined renewal rate. As reflected in Table 2, it is 0.1507. This function is interpreted that the probability that a bowl sponsorship will end during any particular year is 15.07%.

Median Lifetime

After a life table (including the survivor and hazard functions for each year) has been constructed, it is possible to then compute the median lifetime for the sponsorships. As stated, the median lifetime is the point in time where exactly half of the observations have experienced the event, while half have not, or the point in time at which the survivor function is exactly 0.5 (Singer & Willett, 2003). The process starts by examining the survivor functions in Table 2. The survivor function for the fourth time interval is under .5 (0.4872), while the function for the third interval is above .5 (.6028). This indicates that half of bowl sponsorships end somewhere between the third and fourth year. Plugging these values into the aforementioned equation from Miller (1981) results in a median lifetime of 3.89 years.

Discussion

In terms of this study's context, the preceding analysis of the hazard rates, survivor functions, and median lifetime for NCAA bowl sponsorships yields several interesting insights for those in the intercollegiate athletics industry who are tasked with selling and managing sponsorships of non-profit organizations, such as bowl events. The analysis also demonstrates the superiority of applying such advanced methodological approaches, compared to the use of standard measures of central tendency. The aggregated renewal rate tells us that given a rate of 84.93, managers should budget and prepare for the possibility in any given year that 15% of the title sponsors of bowl events will end the relationship.

While helpful, this analysis is the totality of what is available when applying traditional measures of central tendency to sponsorships. Several additional insights are available when applying survival methods to examine trends related to each individual time period, and describing the duration of sponsorships utilizing the median lifetime approach. First, the trends

are evident when graphing the survivor and hazard functions (Figures 1 and 2), allowing one to clearly see that the vast majority of bowl sponsorships end during the first eight years. This analysis also demonstrates that if a sponsor can be convinced to continue on after this initial period of eight years, likely two renewal periods of four years each, it is highly likely that they will remain a sponsor for another 4-8 years, and potentially beyond.

Meanwhile, hazard rates during specific time periods indicate that the probability of a bowl sponsorship ending is highest during the third (.2188) and eighth (.2222) years. After the eighth year, the hazard rate is reduced considerably, to .0588 during the ninth and .0625 during the 10th (given that only two of remaining sponsorships ended after the ninth and 10th years). These results indicate that bowl event managers should devote considerably greater resources towards ensuring sponsors are reaching their stated objectives during the early years of a sponsorship, if they hope to increase the probability of the relationship continuing for years to come.

Finally, the median lifetime (which takes into account censored observations, or sponsorships that are currently ongoing) for these sponsorships was 3.89 years. It should be noted that while the nomenclature used to describe this unit of measurement suggests that this is yet another measure of central tendency (i.e., similar to a mean or median), it is in fact a precise measurement denoting the exact time in which the survivor function equals 0.5. Given this finding, the result of analyzing the durations of more than 136 different sponsorships dating back 30 years, it would be unwise for those in the business of managing similar intercollegiate athletic sponsorship programs to expect (and more importantly, budget and forecast for) many bowl sponsorships to last beyond four years. While many in the early stages of these marketing relationships may remain hopeful that their partnership will continue long into the future, these data suggest that it is unlikely. In total, 91 of the 136 sponsorships ended during the first eight years, while 28 were still ongoing (i.e. censored). This study's theoretical lens of exchange theory suggests that this initial 4-8 year period is crucial for both sides to understand each other's capabilities and resources, and that ultimately a decision is made during this 4-8 year window whether the two will remain in a long-term partnership. In addition, the obvious precipitous drop that occurs during these crucial periods, as indicated in Figure 2, demonstrates the importance of focusing on best servicing sponsors early on in the relationship.

Methodological Implications

In order to properly analyze the methodological implications of applying these approaches to the duration of sponsorships, it is helpful to review results utilizing less sophisticated methods, and comparing the results. For example, if the survival analysis methodology was not utilized to investigate the historical duration of sponsorships, standard estimates of central tendency would be utilized. However, how would the sponsorships whose durations were not finalized be handled? In one approach, since the final duration of censored observations (in this study, sponsorships that were currently ongoing) is yet unknown, these sponsorships of unknown duration could simply be omitted from the analysis. This was the approach utilized by Abedi and Benkin (1987) and Siegfried and Stock (2001) in their analysis of the time for which it took doctoral students to earn their PhD. One can easily see how students who earn a doctorate may be different than those who failed to do so, and how the results of these studies are therefore skewed based on the exclusion of those students who have yet to receive their doctorate, as well as those who never finished.

If one were to utilize the approaches of Abedi and Benkin (1987) and Siegfried and Stock (2001), these datasets would be restricted to just those sponsorships that have ended (similar to their analysis of only those who completed their degree). Any current sponsorships would simply be omitted from the sample, given that their final duration is yet unknown. As indicated in Table 1, if this approach were utilized to examine the durations of bowl sponsorships, there would be a loss of 34 of the 136 historical sponsorships. This approach would also result in the omission of some of the longest-running sponsorships, including Outback (21 years), Chick-fil-A (20 years), AutoZone (13 years), San Diego Credit Union (12 years), Allstate (10 years), and Valero (10 years). Calculating the mean lifetime of these sponsorships omitting the censored observations, rather than the median lifetime, would result in a mean duration of 4.68 years.

Given that it is unwise to omit observations from a sample, a more widely-used approach is to simply truncate the duration of censored observations at a point in time, such as the present day. For sponsorships, this approach would involve assigning a duration for the sponsorships that are currently ongoing equal to the time they possess at the end of data collection (which for this study is the beginning of 2017). This was the approach utilized by Frank and Keith (1984) in their study of differences in the abilities of teachers who continue in the special education field for up to five years, compared to those who do not. Their study simply assigned a career duration of five years for those teachers who were still teaching (i.e., censored) after the five-year period. The application of this approach yields a mean lifetime of 4.98 years.

In the end, the calculation of sponsorship durations utilizing three different approaches results in significantly different measures, with vast managerial implications. When compared to the median lifetime of 3.89 years, these approaches result in significantly longer durations, whether one is utilizing the approach of omitting censored observations and or truncating at present day. The first approach (omitting observations) yields a duration of 4.68 years. The second, more common, approach of truncating results in a duration of 4.98 years. Thus, the difference between the most common approach of letting present day serve as the final duration for censored observations, compared to the median lifetime computed using the survival analysis methodology, is more than one year (1.18 years to be exact). A difference of one time interval may not seem like much. However, consider that in several instances, bowl sponsors pay $20 million per year or more to place their brand front and center in the event, for premier bowls included in the rotation for the College Football Playoff (Barretta, 2016; Schrotenboer, 2016). Therefore, the difference in the median lifetime computed using survival approaches compared to truncating the duration at the present day (1.18 years), for just one sponsor, equates to a difference in revenue of approximately $23 million. For the New Year's Six bowl events, this difference in durations would equate to more than $141 million in total revenue for broadcast rightsholder ESPN and the non-profit sports commissions and convention bureaus that own and operate the bowl events. These figures illustrate the implications of determining the most accurate method for computing the historical lifetime for bowl sponsorships, as revenue forecasts using these divergent methods would result in a differential of more than $141 million across the six events.

Theoretical Contribution

This study's results are consistent with the principles of exchange theory, and prior research that has applied it to understand buyer-seller relationships (e.g., McCarville & Copeland, 1994). Thus, this paper's quantitative measurement of sponsorship lifetimes helps to

extend the literature applying exchange theory to the study of sponsorship partnerships in the sport industry. In addition to helping to provide theoretical support for this study's findings, analyzing sponsorship relationships through the lens of exchange theory helps to inform the perspective that only after understanding each side's objectives and capabilities can partners determine whether to engage in a longer term relationship. In this context, exchange theory is helpful in explaining and confirming the forces that led to the study's results, an important consideration in quantitative research (Zhang, Kim, & Pifer, 2015).

When viewed in the light of exchange theory, the results provide evidence that partners in the intercollegiate athletics industry utilize these crucial first several years (in this context, first 4-8 years) to educate one another on their capabilities and the resources that each side can contribute to the relationship, prior to ultimately deciding whether to continue for the long term. During this timeframe, exchange theory would suggest that some level of trust is developed between both sides, with one or both ultimately developing the requisite level of trust that enables them to move forward for the long term. Alternatively, many partnerships did end after this time, as evidenced by the median lifetime of just under four years for NCAA bowl sponsorships. This result suggests that some partners did not feel an equitable exchange from both sides was taking place. However, there are several instances, including Allstate, AT&T, Chick-fil-A, Federal Express, Outback, Tostito's, and Toyota, where both sides developed a mutually beneficial partnership that proved to stand the test of time. Based on the theoretical foundation of exchange theory, it would be assumed that such partnerships feature an exchange of resources that benefits both parties. Further, the resources received by both sides of the relationship are at least equal to or exceed the resources offered in exchange. As an illustration, the longest-running bowl sponsorship in history, that of Tampa-based Outback and the bowl event located in the same city, has perfected a symbiotic relationship in which both sides participate in an exchange of resources. For example, each bowl participant features more than 100 young student-athletes who are away from home and need to be fed copious amounts of food. Outback Steakhouse hosts each participating team at one of its restaurants prior to the event, where each team devours more than 2,000 pounds worth of Outback meals, including steaks, ribs, shrimp, and potatoes (Hinnen, 2014). While this may seem extreme, the event helps the sponsor (Outback) communicate its brand image and personality as being able to satisfy even the most voracious appetites, and position itself as the place to be for hungry college football fans. On the other hand, the event is presumably able to feed both event participants for free, resulting in a valuable and worthwhile exchange of resources for both sides.

Given the fact that it is impossible to quantify the exact amount of monetary resources provided by each sponsor due to the confidential nature of sponsorship costs (Jensen et al., 2016), it would be helpful if future research applying exchange theory to sponsorship could analyze the various resources that each partner in the aforementioned longer-term partnerships bring to bear. Identifying the specific types of resources that lead parties to long-term relationships could help both sport organizations and sponsored properties identify potential partners that would help each realize their long-term objectives for such partnerships.

Limitations and Future Research

It is important to understand some inherent limitations of studies utilizing survival analysis. Singer and Willett (2003) identified several limitations to median lifetimes that researchers utilizing the methodology must acknowledge. First, given that it is a median value, it is fairly insensitive to extreme values. It is also important to keep in mind that the median

lifetime does not reveal much about the distribution of the risk of event occurrence over time. Examining hazard functions (and to a lesser extent survivor functions) is a much more effective way to examine changes in risk over the lifetime of the sponsorship's duration. This fact illustrates the importance of graphing both hazard and survivor functions (as illustrated in Figures 1 and 2) in order to visually depict how the functions change over time.

Perhaps most importantly, one must understand that the median lifetime does not inherently indicate when the risk of experiencing the event is highest. For example, in their study of the durations of careers of female Congresswomen, Singer and Willett (2003) utilized this approach to determine a median lifetime of exactly 3.5 terms. However, the researchers found that the risk for event occurrence was not particularly strong during the fourth term. In the example of bowl sponsorships, we also found differing results. As noted in Table 2, the hazard rate was highest after the eighth time interval (.2222). This means that bowl sponsorships have the highest probability of ending during the eighth year of the sponsorship. However, the median lifetime indicated that the time period during which half of the sponsorships survived and half failed was between the third and fourth intervals (given the median lifetime of 3.89 years). Based on this analysis, it is evident that to view a clear picture of the history of durations, researchers must analyze not just the median lifetime, but all of the various metrics in their totality, an approach advocated in this study.

While this paper's results support that applying survival-based approaches to time-to-event durations are a more accurate representation than typical measures of central tendency, it is important to acknowledge that this paper focuses solely on describing the duration of bowl sponsorships utilizing such approaches. The results included within provide no information about what factors actually influence these metrics. The next recommended step in the application of survival analysis modeling approaches in this context is to determine the influence of independent variables, or covariates, on the hazard functions (i.e, the probability of event occurrence). This approach would help determine not just the nature of the time-to-event durations in question, but answer additional questions related to which factors might either increase or decrease the hazard of event occurrence (i.e., the conditional probability that the sponsorships ends). Once a dataset is constructed for survival analysis utilizing the procedures outlined in this study, it is relatively straightforward to take the next step of modeling the hazard rate based on a variety of different covariates. In the context of sponsorships, these may include factors related to the sponsoring brand, such as brand equity (which ostensibly would decrease the hazard of event occurrence), congruence (or the fit between the brand and the sponsored entity), or whether the sponsor decision-maker is located in the same market as the event. For the sponsored property, market-related factors such as the prestige of the event or the level of sponsorship offered could play a role. Finally, there may be external factors, such as economic conditions within the sponsor's home country, which may serve as a time-varying covariate (i.e., a covariate whose value that can change over time) that may influence whether a sponsorship continues or is dissolved.

There are many other potential applications of this methodology in sport marketing, including relationships beyond that of the sponsorship buyer and seller. Data are now available to assist managers who are tasked with convincing consumers to renew season tickets (e.g., Warren, 2015). Given the longitudinal nature of the relationship between a season ticket holder and sport organizations, this methodology can be applied to understand when such relationships are most susceptible to dissolution, and appropriately assess their ultimate duration. In addition, covariates such as the actual use of tickets (which using today's technology can be tracked in real

time) and demographic information about the ticket holder (i.e., age, gender, education, employment, and geography) can be utilized to determine whether these variables are statistically significant predictors of the dissolution of the relationship between the consumer and the organization.

Another potential application could involve the analysis of the relationship between donors and intercollegiate athletic departments (i.e., Gladden, Mahony, & Apostolopoulou, 2005). In addition to determining when the relationship is most likely to end, covariates such as the distance of the donor from campus, whether or not the donor was a student-athlete, employment information, years since graduating, and the number of times contacted by the athletic department could be inserted into the model in an attempt to isolate factors that may predict the end of the donor's relationship with a university.

Conclusion

Given the advancement in the use of data analytics across the sport industry over the past decade, this paper suggests the application of such approaches in the forecasting of revenue from an increasingly important source for sport organizations, corporate sponsorship. Rather than a reliance on an aggregated measure of central tendency, the renewal rate (Irwin, Zwick, & Sutton, 1999), this study applied survival analysis methods in order to better understand when sponsorships in the intercollegiate athletics industry are most susceptible to dissolution and suggest a more accurate approach to determining their ultimate duration, while properly taking into account sponsorships that are still ongoing. An analysis was undertaken of the survivor and hazard functions, as well as median lifetimes, of more than 130 sponsorships of non-profit NCAA bowl events. Consistent with exchange theory, which would suggest that the initial stages of the relationship between the seller and buyer in any sponsorship is crucial for both sides to understand each other's capabilities and resources, results found that sponsorships were less likely to survive and most susceptible to dissolution in the first 4-8 years. Results also demonstrated that the final duration of these sponsorships differed considerably based on the traditional approaches of either omitting or truncating the durations of sponsorships that were still ongoing vs. the survival analysis approach of computing the median lifetime. Revenue forecasts based on the various durations across the New Year's Six bowl events resulted in differentials of more than $140 million, based on the renewal or end of just six bowl sponsorships. These results provide yet another application of advanced quantitative methodologies that can assist those in intercollegiate athletics who rely on sponsorship as an increasingly important funding mechanism.

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Table 1.
History of bowl title sponsorships (1986-2017)

Sponsoring Firm	Year Begun	Market
Academy Sports + Outdoors*	2017	Houston
AdvoCare	2009	Shreveport
AdvoCare	2014	Houston
Allstate*	2007	New Orleans
American General	1998	Nashville
AT&T	1999	Pasadena
AutoNation*	2015	Orlando
AutoZone*	2004	Memphis
AXA/Equitable	1997	Memphis
Bad Boy Mowers*	2017	St. Petersburg
Battlefrog	2015	Phoenix
BBVA Compass	2011	Birmingham
Beef O'Brady's	2009	St. Petersburg
Belk*	2011	Charlotte
Bell Helicopter	2006	Dallas
Bitcoin	2014	St. Petersburg
Blockbuster	1990	Miami
Bridgepoint Education	2010	San Diego
Bridgestone	2003	Nashville
Brut/Idelle Labs	2006	El Paso
Buffalo Wild Wings	2012	Tucson
Buffalo Wild Wings	2014	Orlando
Builders Square	1993	San Antonio
California Raisins	1988	Fresno
Camping World	2015	Shreveport
Camping World*	2017	Orlando
Capital One	2001	Orlando
Capital One*	2014	Miami
Carquest	1994	Miami
Champs Sports	2004	Orlando
Cheribundi Tart Cherry*	2017	Boca Raton
Chick-fil-A*	1997	Atlanta
Citi	2004	Pasadena
CompUSA	1994	Orlando
ConAgra Foods	2002	Honolulu
Continental Tires	2002	Charlotte
Crucial Technology	1999	Boise
Culligan	1998	San Diego
Diamond Walnut	2002	San Francisco
Discover	2010	Miami
Dollar General*	2016	Mobile
Domino's Pizza	1990	Tucson

Duck Commander	2014	Shreveport
DXL*	2017	Frisco, TX
EA Sports	1999	Las Vegas
EagleBank	2008	Washington, DC
EV1.net	2002	Houston
FedEx	1989	Miami
Ford/Quick Lane*	2014	Detroit
Foster Farms*	2014	San Francisco
Franklin American*	2010	Nashville
Gallery Furniture.com	2000	Houston
Gaylord Entertainment	2002	Nashville
Geico	2016	Las Vegas
Gildan*	2011	Albuquerque
GMAC	2000	Mobile
GoDaddy	2010	Mobile
Goodyear*	2014	Dallas
HomePoint.com	1999	Nashville
Hyundai*	2010	El Paso
IBM OS/2	1993	Phoenix
Idaho Potato*	2011	Boise
Insight Enterprises	1997	Tucson
John Hancock	1987	El Paso
Konica Minolta	2008	Jacksonville
Kraft Foods	2010	San Francisco
Little Caesars	2009	Detroit
Lockheed Martin*	2015	Dallas
MAACO	2009	Las Vegas
magicJack	2008	St. Petersburg
MainStay	2001	Shreveport
MasterCard	2002	San Antonio
Mazda	1986	Jacksonville
Mazda	2002	Orlando
Meineke Car Care	2005	Charlotte
Meineke Car Care	2011	Houston
Micron PC	1998	Miami
Mobil	1989	Dallas
Motel 6	2015	Tucson
MPC Computers	2004	Boise
National Funding	2015	San Diego
National University	2013	San Diego
New Era*	2010	New York
Nokia	1996	New Orleans
Northrup Grumman*	2010	Washington, DC
Northwestern Mutual*	2014	Pasadena
Norwest Bank	1996	El Paso

Nova Home Loans*	2014	Tucson
OurHouse.com	2000	Orlando
Outback	1992	Jacksonville
Outback*	1996	Tampa
Overton's*	2017	Orlando
Pacific Life	2002	San Diego
Papa John's	2006	Birmingham
PetroSun	2006	Shreveport
Pioneer	2004	Las Vegas
PlainsCapital	2003	Dallas
PlainsCapital	2012	Dallas
PlayStation2/Sony	2003	Pasadena
PlayStation/Sony*	2016	Phoenix
Plymouth	1995	San Diego
Popeye's	2014	Bahamas
Poulan/Weed Eater	1990	Shreveport
Progressive	2011	Jacksonville
R&L Carriers*	2006	New Orleans
Raycom Media*	2014	Montgomery
Roady's	2007	Boise
Royal Purple	2013	Las Vegas
Russell Athletic	2012	Orlando
San Diego Credit Union	2005	San Diego
San Diego Credit Union*	2017	San Diego
Sanford	1998	Shreveport
Sea World	1986	San Diego
Sega	2001	Las Vegas
Sheraton	2003	Honolulu
Southwestern Bell/SBC/AT&T	1997	Dallas
St. Jude	1993	Memphis
Sunkist	1986	Phoenix
Sylvania	1999	San Antonio
Taxslayer.com*	2012	Jacksonville
Thifty Car Central	1991	San Diego
TicketCity	2010	Dallas
TicketCity	2014	Tucson
Tostito's	1996	Phoenix
Toyota	1995	Jacksonville
uDrove	2010	Boise
USF&G	1988	New Orleans
Valero*	2007	San Antonio
Vitalis	2004	El Paso
Vizio	2011	Pasadena
Vizio	2014	Phoenix
Walk-On's*	2017	Shreveport

Weiser Lock	1992	Tucson
Wells Fargo	1999	El Paso
Wyndham International	2002	New Orleans
Zaxby's*	2014	Dallas

* Denotes sponsorships currently ongoing (i.e., censored)
Source: NCAA (2014)

Table 2
Life table describing durations of bowl sponsorships

Period	Time interval	Beginning total	Ended during period	Censored at end of period	Hazard function	Survivor function
0	[0, 1)	136	---	---	---	1.0000
1	[1, 2)	136	15	8	.1103	.8897
2	[2, 3)	113	15	2	.1327	.7716
3	[3, 4)	96	21	2	.2188	.6028
4	[4, 5)	73	14	8	.1918	.4872
5	[5, 6)	51	10	0	.1961	.3917
6	[6, 7)	41	5	1	.1219	.3439
7	[7, 8)	35	5	3	.1429	.2948
8	[8, 9)	27	6	4	.2222	.2293
9	[9,10)	17	1	0	.0588	.2158
10	[10,11)	16	1	0	.0625	.2023
11	[11,12)	15	2	2	.1333	.1753
12	[12,13)	11	1	1	.0909	.1594
13	[13,14)	9	2	0	.2222	.1240
14	[14,15)	7	0	1	.0000	.1240
15	[15,16)	6	1	0	.1667	.1033
16	[16,17)	5	0	0	.0000	.1033
17	[17,18)	5	1	0	.2000	.0826
18	[18,19)	4	1	0	.2500	.0620
19	[19,20)	3	0	0	.0000	.0620
20	[20,21)	3	0	0	.0000	.0620
21	[21,22)	3	1	1	.3333	.0413
22	[22,23)	1	0	1	.0000	.0413
Overall hazard rate					.1507	

Note: Survivor function is calculated over full data and evaluated at indicated times; it is not calculated from aggregates shown at left.
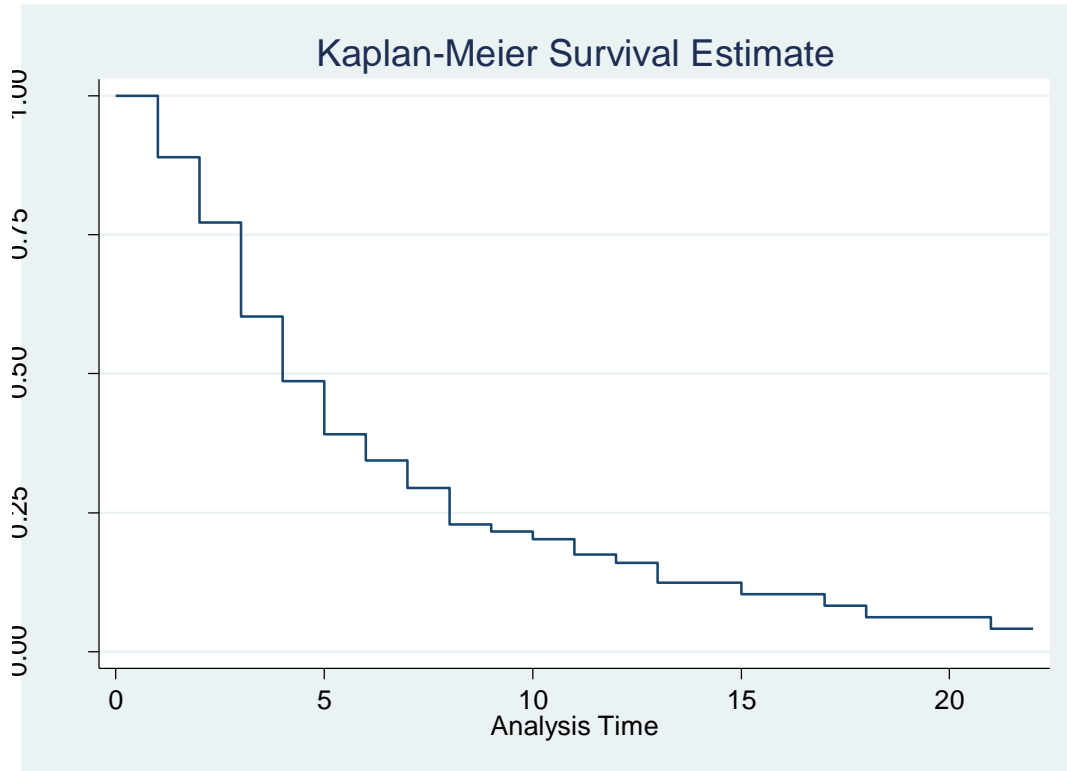
Figure 1. Graph of survivor function for bowl sponsorship survival over time
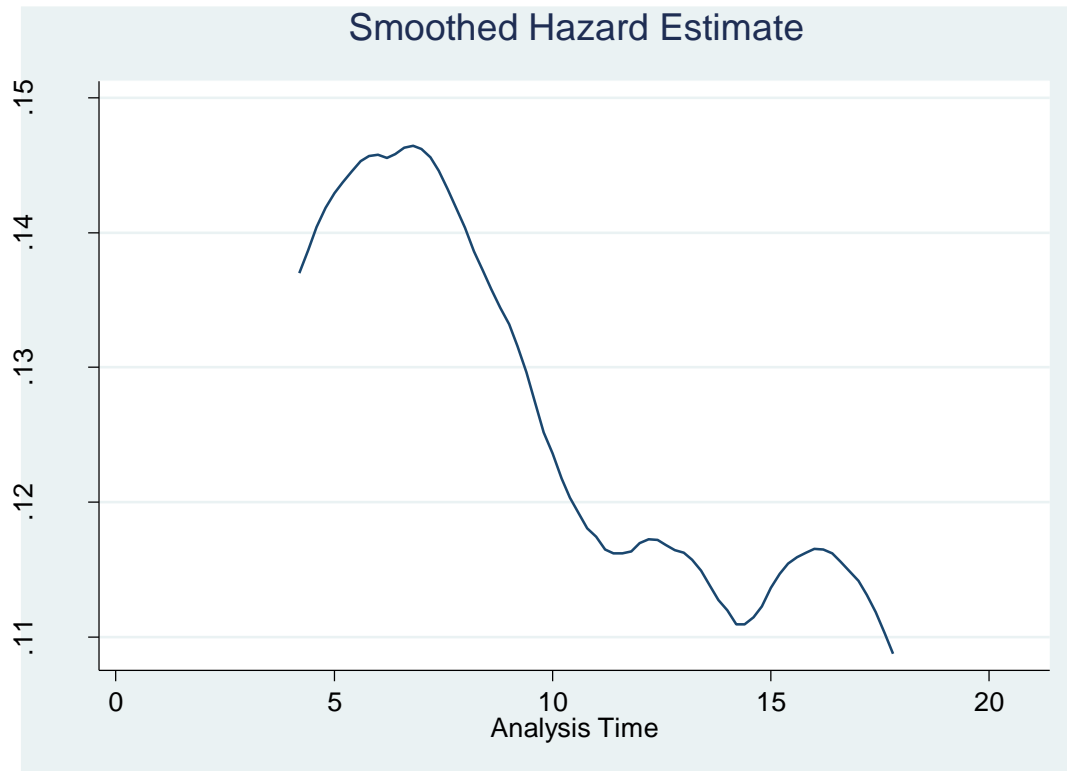
Figure 2. Graph of smoothed hazard function for bowl sponsorship survival over time