Journal of Sport Management, **(Ahead of Print)**
https://doi.org/10.1123/jsm.2020-0322

Human Kinetics
ARTICLE

Stadium Giveaway Promotions: How Many Items to Give and the Impact on Ticket Sales in Live Sports

Jeffrey Cisyk — Charles River Associates
Pascal Courty — University of Victoria

Although stadium giveaways are the most common type of promotion used in Major League Baseball to increase demand, most teams supply fewer giveaway items than there are tickets sold. This study argues that giveaway availability is a major component of teams' promotion strategies and has been largely overlooked in the literature. The authors document the choice of giveaway availability across all Major League Baseball teams over an 8-year period and demonstrate that attendance increases with giveaway availability up to the point where there are enough giveaway items to serve 40% of a stadium's capacity. Roughly two thirds of teams set giveaway availability in a fashion that is consistent with the standard price discrimination rationale for promotions found in the economic and marketing literatures. The remaining teams exhibit levels of high availability, indicating an additional investment into fan lifetime value, which is corroborated by these teams' unique fan relationships.

Keywords: bobblehead, giveaway availability, Major League Baseball, paid attendance

Major League Baseball (MLB) teams, not unlike all sports teams, have long offered promotions to entice consumers to attend games throughout their lengthy season. In recent years, it has become standard to feature fireworks, concerts, or—most frequently—to offer free giveaway items distributed to fans upon arrival at the stadium as often as every third game. Although many studies have investigated the effectiveness of different types of promotions in sports (e.g., Boyd & Krehbiel, 2003; Kappe, Stadler Blank, & Desarbo, 2014; McDonald & Rascher, 2000), a key decision of stadium giveaways has been largely overlooked in the literature: how many of the items should be distributed to fans?

Interestingly, a common misconception about stadium giveaways is that a ticket to a sporting event is a guarantee to the promoted free item. Rather, the ticket only grants its proprietor the chance to redeem the giveaway as the number of items distributed is often less than the number of tickets sold. Typically, as ticket holders enter the stadium, each is given a single item while supplies last: all guests thereafter remain empty handed.[1] This limited supply of giveaways has led to stories of exorbitantly long queues in order to secure a highly prized item: fans in 2001 camped overnight in rainy Seattle for the chance to secure an Ichiro Suzuki bobblehead (only 20,000 early arriving fans received the bobblehead while more than 25,000 did not; Neyer, 2001). We term the *availability* of a giveaway as the ratio of the number of giveaway items distributed to the stadium capacity and our primary concerns are to document how teams set availability and to investigate whether these decisions are consistent with optimizing attendance.

Although giveaway availability varies greatly across teams, we find that each team unilaterally sets its own availability in a remarkably consistent way across types of stadium giveaway items offered in a season, across games in a season, and, to a large extent, across seasons. Thus, most of the variation in availability across the league's games and seasons is explained by teams pursuing distinct availability strategies. Teams can then be roughly sorted into two groups based on whether stadium giveaway items are scarcely or widely available.

We complement this supply-side analysis with an estimation of a standard demand response model to measure the impact of giveaway availability on fan attendance from eight MLB playing seasons spanning 2012 to 2019. We find that home-game attendance at giveaway games initially increases with giveaway availability, plateaus for availability levels around 40% of stadium capacity, and finally increases again from 80% and above. Surprisingly, we find that increasing the availability of giveaway items between 40% and 80% of stadium capacity has a small negative marginal effect on attendance. Finally, the increase in attendance from giveaways is not caused by consumers substituting away from the games that take place immediately before or after the giveaway game, although we find some evidence that the attendance response decreases as the number of giveaway games within a season increases.

Overall, the evidence suggests that all MLB teams use giveaways to attract fans that would not attend a game otherwise, although teams may differ in the number of giveaways they supply. Most teams use giveaways to pursue a short-term attendance-maximizing strategy by limiting availability to 20–50% of capacity—sometimes resulting in a contest between fans for the giveaways (Burstin, 2020; Kalra & Shi, 2010)—in order to minimize the number of items given away beyond what is necessary to achieve a desired attendance increase. However, a few teams make giveaways largely available to all attendees, which we argue is consistent with investing in fan lifetime value. As expected, this second set of teams have unique fan relationships: they are more likely to offer a fan appreciation day and have above-average fan devotion.

Prior Research

Because the live sports industry relies heavily on its in-game attendance revenue, significant marketing effort is invested into

Cisyk is with Charles River Associates, Chicago, IL, USA. Courty is with the University of Victoria, Victoria, British Columbia, Canada. Cisyk (jcisyk@uvic.ca) is corresponding author.

the understanding of (a) the determinants of attendance—and repeat attendance—with an interest in consumer characteristics that help refine market segmentation (Lera-López & Rapún-Gárate, 2007); (b) the features of sports events—such as new stadium features or star players—that define the product offered (Fullerton & Merz, 2008); and (c) how marketing instruments—such as sponsorship, pricing, and promotions—influence demand (Shannon, 1999). The literature has tried to identify factors that affect attendance of live sporting event (e.g., Kim, Magnusen, Kim, & Lee, 2019), yet these factors can vary widely across sports or even across leagues within the same sport.[2]

While categories (a) and (b) above can help managers making long-term strategic decisions such as audience targeting and product positioning, the factors in the third category can be adjusted on a game-by-game basis to optimize individual game revenues. It is therefore not surprising that managerially controllable variables such as sponsorship (e.g., Speed & Thompson, 2000), pricing (e.g., Courty & Davey, 2020), and promotions (e.g., McDonald & Rascher, 2000) have received much attention in the sports marketing literature. Promotions are one of the two managerially controlled variables identified in the list of eight determinants of MLB attendance (Kappe et al., 2014).

This study focuses on the promotions of MLB in North America while acknowledging that promotions are used across professional baseball, such as Minor League Baseball in North America (Cebula, 2013; Cebula, Toma, & Carmichael, 2009; Tainsky, Mills, Hans, & Lee, 2020). Moreover, this baseball literature is not limited to North America, as professional baseball from other countries has also received its own attention (e.g., Japan's Nippon Professional Baseball, Leeds & Sakata, 2011; South Korea's Korean Professional Baseball, Jung, Moon, & Sung, 2020). More generally, promotions are common in many sports and leagues around the globe (Irwin, Sutton, & McCarthy, 2008).

The MLB offers a unique data laboratory to study the impact of marketing actions on attendance. Each of the 30 MLB teams uses a variety of promotions to attract fans to its 81 home games each season. A well-established literature has studied over the past 40 years how marketing teams plan and design promotion to relentlessly increase attendance and revenue (e.g., Hill, Madura, & Zuber, 1982; Lemke, Leonard, & Tlhokwane, 2010). The literature has shown that promotions are effective with estimates suggesting a 10–20% increase in game-day attendance (Boyd & Krehbiel, 2003) and with a small set of papers measuring increases in gate revenue (e.g., Cebula, Coombs, Lawson, & Foley, 2013). Major contributions include McDonald and Rascher (2000) illustrating that the impact of promotions decreases as more promotions are offered within a season by the same team; Boyd and Krehbiel (2003) demonstrating that combining multiple promotions for a single event can be beneficial; and DeSarbo, Stadler Blank, and McKeon (2012) suggesting that teams can optimize revenues by considering the mix of promotion type over the length of the season, while others have looked at the impact of promotion budgets. However, no paper to date has accounted for the variability in giveaway availability—an important component of a team's promotion strategy.

The typical approach in predicting attendance is to estimate a demand equation where the attendance of an event is a function of socioeconomic conditions, product characteristics, and marketing mix (Borland & MacDonald, 2003). The branch of this literature that studies the impact of promotions on demand must address significant challenges in (a) coding promotions (e.g., giveaways, fireworks, concerts, and child/family entertainment[3]); (b) accounting for interactions between promotion scheduling and game characteristics (e.g., day of week, opponent, etc.); and (c) allowing for intertemporal demand response effects (Kappe et al., 2014; McDonald & Rascher, 2000). This study takes these three sets of challenges seriously, all while focusing on a feature of giveaway promotions that has been overlooked in the literature: the number of giveaway items that are made available at a given game. Ignoring giveaway availability in empirical estimations results in an omitted variable in the demand equation, which may bias any estimated impacts.

This study focuses on bobblehead giveaways because of their frequency (accounting for about 20% of all promotions), commonality across teams and seasons, and their recognition as highly prized collectible items. Moreover, our unique data set, the likes of which has not yet been explored, covers all bobblehead giveaways for all MLB teams over eight continuous seasons making it, to the best of our knowledge, the largest panel used to estimate promotion responses. While previous research has focused on either a longitudinal approach (Kappe et al., 2014) or a cross-sectional approach (e.g., Barilla, Gruben, & Levernier, 2008; Boyd & Krehbiel, 2003, 2006; Bruggink & Eaton, 1996; Hill et al., 1982; Marcum & Greenstein, 1985; McDonald & Rascher, 2000), we make use of the variation across both time and team.[4] Our panel data set makes use of time fixed effects to control for factors that impact all teams alike (e.g., year, month, day of week) and team fixed effects to control for factors that are relatively constant for a given team (e.g., socioeconomic status of the home city, local support of the team, etc.). Consistent with the demand estimation literature, we include team-specific, time-variant variables that control for non-managerially controllable factors, such as team standing or opponent, as well as managerially controllable variables, such as the number of bobbleheads per promotion and number of bobblehead games per season.

Our final contribution to the literature is our description of heterogeneity in the choice of giveaway strategies. Although past research has shown that teams differ systematically in their approach to revenue management (Courty & Davey, 2020), we are not aware of any work that documents heterogeneity in team promotion strategies. Showing that distinct strategies coexist over long periods of time suggests that there may not be a one-size-fits-all marketing solution in sports. This also implies that studies based on a single team (e.g., Kappe et al., 2014) or a small number of teams (e.g., Boyd & Krehbiel, 2006) may offer only a partial view of promotion practices within a given sport. We also relate team heterogeneity to variables that describe team behavior. Specifically, we borrow from the marketing literature the notion of goodwill (Gupta et al., 2006) that has been applied to sports marketing, along with the concept of fan lifetime value—the positive attitude a consumer has toward the team, expressed as a consumer's future purchase intentions (Dees, Hall, Tsuji, & Bennett, 2010)—to describe a group of teams that invest in a long-term fan relationship.

Research Questions

We study team choice of bobblehead availability and the impact of bobblehead availability on attendance. We divide the analyses into a supply analysis of team decisions and a demand analysis of fan response to giveaway availability. The final section of this study concludes by putting the two sides together to explain team decisions and draw managerial recommendations.

Team Giveaway Availability

Each MLB team announces and widely publicizes its promotion schedule typically in February, several weeks before the regular season commences. The promotion schedule details the dates and description of the promotions for the entirety of the upcoming season. These schedules are officially announced on individual teams' and MLB websites, as well as through other marketing channels. For each stadium giveaway, the promotion schedule describes the item, the total number of items offered, and how the items will be distributed.

As mentioned above, a ticket does not necessarily provide a guarantee to the stadium giveaway item. In fact, few teams promise enough giveaways to serve the stadium capacity, let alone even attempt to target expected occupancy (which we assert can be estimated accurately at the time the promotion schedule is released). Instead, the availability of giveaways in our sample is on average about half of the stadium's capacity and can be as low as a mere 13%. Giveaways are distributed according to a first-come, first-served basis. Our first objective is to systematically describe promotion giveaway availability across all 30 MLB teams and over 8 years, answering the following two research questions (RQs):

> RQ1: (Intra-team) Do teams consistently set giveaway availability within each season, across seasons, and/or across giveaways?

> RQ2: (Inter-team) Do systematic differences exist across teams in giveaway availability?

The answers to RQ1 and RQ2 shed light on the possibility that teams pursue different giveaway strategies. There are advantages and disadvantages to increasing giveaway availability as not all fans seek out giveaways and stadium occupancy rates vary greatly across teams and games. Thus, producing enough giveaways for the entire stadium may not be wise, at least once production costs and limited promotion budgets are considered. Conversely, rationing giveaways (i.e., setting availability less than expected attendance) may backfire if doing so creates disappointment among fans.

A team may pursue a generous giveaway strategy if it wants to increase its fan base, increase the fan's intention to purchase, or, to make use of marketing terminology, increase the index of a fan's lifetime value. This latter strategy would be consistent with the prevailing view that many teams price in the inelastic portion of the demand curve (thereby not maximizing short-term profits), which has been interpreted as teams investing in fan goodwill (Dees et al., 2010). But valid counterarguments weigh in favor of having few giveaways: scarcity increases perceived value all the while incentivizing fans to arrive early and consume additional ancillary goods (i.e., concessions; Neyer, 2015).

Demand Response to Giveaway Availability

While we follow the promotion literature in estimating the demand response to promotion, our contribution is to investigate the impact of bobblehead availability on demand response. We ask two main questions:

> RQ3: What is the attendance response to bobblehead giveaway promotion?

As discussed above, several studies have looked at MLB attendance response to promotion, some specifically to giveaway promotion (e.g., Boyd & Krehbiel, 2006; Lemke et al., 2010). The novel contribution of this work is to study the role of availability, answering the following:

> RQ4: Does the attendance response to bobblehead giveaways depend on bobblehead availability?

While the literature has demonstrated that giveaways increase demand by 10–20% (depending on the teams and seasons within the sample), we investigate whether this impact depends on bobblehead availability. Under a standard rational expectation utility model, one may expect the attendance response to increase with availability, simply because it decreases what marketers call the "prize-to-effort ratio" (Burstin, 2020). However, behavioral considerations such as loss aversion may suggest a more complex—possibly non-monotonic—attendance response to availability.

Finally, promotions may have intertemporal effects on adjacent games or display satiation levels as the number of giveaway games within a season increases. We evaluate this hypothesis by investigating the origin of the additional attendance caused by promotions.

> RQ5: Is the attendance response to bobblehead promotions explained by intertemporal demand substitution or satiation effects?

The goal of this study is to use the findings from RQ1 through RQ5 to explore why teams pursue different giveaway strategies under the assumption that the number of giveaways is maximized to obtain the desired demand response.

Methods

We collect two novel data sets to address RQ1 through RQ5: the first data set is a cross section of all promotions across all teams in the 2019 season. The second data set covers a large panel of bobblehead availability across all teams and for eight consecutive seasons, 2012–2019, supplemented with matching attendance data and similar control variables used in the attendance literature. For a full discussion on the data collection, assumptions, and so forth, see the Data Appendix.

For each giveaway game, we define the giveaway availability as the total number of items promised to ticket holders divided by the stadium's capacity, as this normalization corrects for the fact that stadium size varies among MLB stadia. We have considered other normalizing denominators, but each had its own limitation, and all pointed to similar conclusions.[5] We begin the analysis by reviewing a prototypical team that exemplifies the promotion decision patterns observed in the panel data set and complement this case study with a cross-sectional data set to further describe the availability decision.

Turning to the attendance response analysis, we estimate the impact of bobblehead availability while controlling for standard factors impacting attendance. We estimate Equation 1 below, with A denoting the paid attendance[6] of a regular season MLB game:

$$\ln(A) = f(a) + \beta X + \varepsilon \quad (1)$$

where $f(a)$ is an additive and separable function of bobblehead availability, and the vector X represents the standard set of control variables used in previous sports demand estimation (day of the week, month, team, and year fixed effects, and features of the game such as the prominence of the home and away teams). Interpreting $f'(a)$ as the causal impact on attendance of marginally increasing

availability above level a, requires a weak identification assumption that availability is not correlated with unobserved demand factors after controlling for all variables included in vector X.[7]

Results

Table 1 reports statistics for the 2019 promotion schedules of the 30 MLB teams.[8] We focus for now on the first column. Across all teams, roughly every third game features a promotion, giving an average of 27 promotion games per team. More than two-thirds of promotion games utilize giveaways making it the most frequent type of promotion and nearly one-fifth of promotion games feature a bobblehead.[9] Overall, 5.3% of all games had a bobblehead giveaway promotion.

Regarding giveaway availability, five teams (listed on Table A1) ensure that all fans receive a giveaway for the plurality of their games. These teams do not appear to treat availability as a strategic decision. For the remainder of the teams, giveaways are available on average to less than half of the stadium's capacity and such a choice on the availability level appears to be a decision of heightened consequence—a decision we explore next.

Empirical Analysis of Team Giveaway Availability (RQ1–RQ2)

In our parsing through both sets of data, we find no unified strategy on promotion availability. Instead, each team adopts its own distinct strategy that remains largely consistent throughout the seasons in the sample period. To illustrate this point, we start by considering the Detroit Tigers. Figure 1 displays the number of bobblehead promotions in each season (the count of horizontal dashes) and the availability of bobbleheads for each promotion (the level of each dash). The Detroit Tigers offer three bobbleheads in five of the eight seasons, two bobbleheads in two seasons, and five in one season. The team always offers 10,000 bobbleheads, or 24% of the approximately 41,000 seats of its stadium, with a lone exception in 2014.

Table 1 Summary of Promotion Schedules, 2019

Measure	All teams	Low-availability teams	High-availability teams
Teams	30	22	8
Promotion games	27	27	27
Giveaway games	19	19	20
Average giveaway availability	52%	42%	79%
Bobblehead games	5	5	5
Percentage of teams with fan appreciation day	53%	45%	75%
Fan devotion average (2012–2019)	432	415	480
Average attendance	28,296	25,985	34,651
Capacity	42,207	42,249	42,094
Capacity utilization	67%	62%	81%

Note. Each team is scheduled to play approximately 81 home games. Promotions exclude price promotions, items that require ancillary purchases, and gender-specific giveaways. See Data Appendix for Fan Devotion Average calculation. See Table A1 for more information.

While Figure 1 demonstrates intertemporal consistency in bobblehead availability, this consistency generalizes to other non-bobblehead giveaways, and to other teams. To start, Table A1 illustrates that the Detroit Tigers use a similar availability strategy for bobbleheads and for other giveaways: the team has 17 giveaway games in 2019, and for all but three, the item was made available for 24% of capacity. This pattern holds for many teams, as shown in Column 6 of Table A1, which sorts teams by the percentage of giveaway promotions that use the team's modal availability. Five teams offer the same availability for all giveaways, and 30% of the teams have the same availability for at least 90% of giveaway games.

Table A1 suggests that each team uses a distinct giveaway strategy from which it rarely deviates. To formalize this, we use the panel data set of 1,025 bobblehead games from 2012 to 2019, employing ordinary least squares to compute the coefficient of determination (R^2) from five different regression models (adjusted for the number of fixed effects used in the model). Each row in Table 2 corresponds to a regression model that uses a set of binary variables (fixed effects) to explain the availability variable, while the R^2 reported in Column 3 represents the percentage of explained variations in bobblehead availability. The day of the week, month, season, or opponent each explain no more than 6%, demonstrating that there is no consensus among teams on how to set availability within and across seasons. Promotion availability does not depend on factors that are common to all teams and that influence game demand (day of the week, season, and business cycle). The decision by teams in offering consistent availability levels, often in the face of fluctuating demand, is consistent with the Detroit Tigers in Figure 1 and with the finding in Table A1 that availability shows little variation within a team.

The team fixed effects, however, explain over three quarters of the variation in bobblehead availability and team-year fixed effects explain 94%. This generalizes the finding from Table A1 that teams

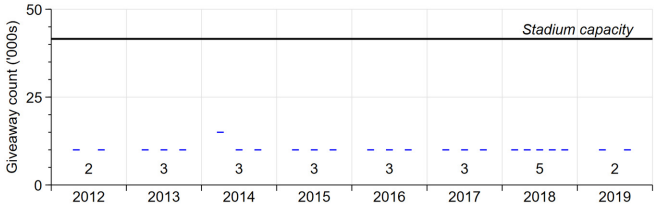

Figure 1 — Detroit Tigers Bobblehead Availability, 2012–2019.

Table 2 Coefficient of Determination of Regression on Bobblehead Availability Using Fixed Effects

Set of fixed effects	Degrees of freedom	Adjusted R^2
Day of week	6	.05
Month[a]	5	.01
Year	7	.01
Opponent	29	.06
Team	29	.76
Team year[b]	231	.94
Observations	1,025	

[a]Due to their low observation count, March games are treated as April and October games are treated as September. [b]Eight team-year pairs have zero bobblehead observations.

pursue distinct strategies that are largely consistent within and across seasons, with a few deviations, leading to the finding:

> Finding 1: Teams are remarkably consistent in availability for giveaways. Most of the variation in availability is explained by an individual team's unilateral behavior, not league trends, business cycle, seasonal, or day-of-the-week effects.

It appears from Table A1 that some teams pursue a high-availability strategy, while others target a middling approach. We ask whether the availability choice is related to the amount of unused stadium capacity (i.e., the number of free seats). For each team and season, we calculate the average counterfactual capacity utilization, that is, the attendance had the team not featured a bobblehead giveaway. This is calculated as the ratio of predicted attendance, absent the promotion, to stadium capacity.[10] Figure 2 plots giveaway availability against predicted capacity utilization. Two categories of teams clearly appear on the figure. This is confirmed by the *k*-means clustering method (using the elbow approach to determine the optimal number of clusters) resulting in two groups of teams (k = 2). Each group is represented by a hollow square or diamond in Figure 2 with the centroids of each group denoted by a star.

> Finding 2.1: There are two distinct groups of teams that differentiate themselves by giveaway availability.

Although availability divides the teams into two groups, capacity utilization does not. Teams do not systematically offer a different number of bobbleheads because they have more, or fewer, empty seats.

Returning to Table 1, the second and third columns separate the teams into the two groups identified in Figure 2. The two groups display similar values for all variables but giveaway availability and three measures of fan loyalty: capacity utilization, fan appreciation days, and Fan Devotion Average[11]: capacity utilization is 81% for high-availability teams versus 62% for low-availability teams; 75% of high-availability teams have a fan appreciation day versus only 45% of low-availability teams; and the Fan Devotion Average is 480 for high-availability teams versus 415 for low-availability teams. Despite both sets of teams having similar numbers of games with promotions, giveaways, and bobbleheads, we find:

> Finding 2.2: High-availability teams have a higher capacity utilization, are more likely to have a fan appreciation day, and have above-average fan devotion.

Demand Response Model (RQ3–RQ5)

Equation 1 is estimated and the results are reported in Table A2.[12] We check for model misspecification using the Breusch–Pagan test and reject the hypothesis that the error term is homoskedastic. Following previous literature regarding heteroskedasticity (Angrist & Pischke, 2008), each column of Table A2 reports robust (heteroskedasticity consistent) standard errors. Other forms of standard errors were considered (such as clustering by team year, team series,[13] opponent, etc.), none of which had a discernible difference in results.

Promotion and bobblehead availability impact. Column 1 of Table A2 estimates the promotion impact as a binary variable, thus ignoring information about bobblehead availability, in order to replicate past results. The control variables each have the expected sign and significance, such as opening day (+74.6%), interleague game (+7.9%), and divisional game (+1.3%).[14] Attendance increases by 1.1% for each additional expected team win. Fixed effects for the day of the week, the month, home team and season, and the opponent are used to control for demand cycles, and the model explains 78% of the variation in attendance. Bobblehead games are associated with a 9.8% higher attendance, which falls on the low range of past studies (Boyd & Krehbiel, 2003; Kappe et al., 2014).

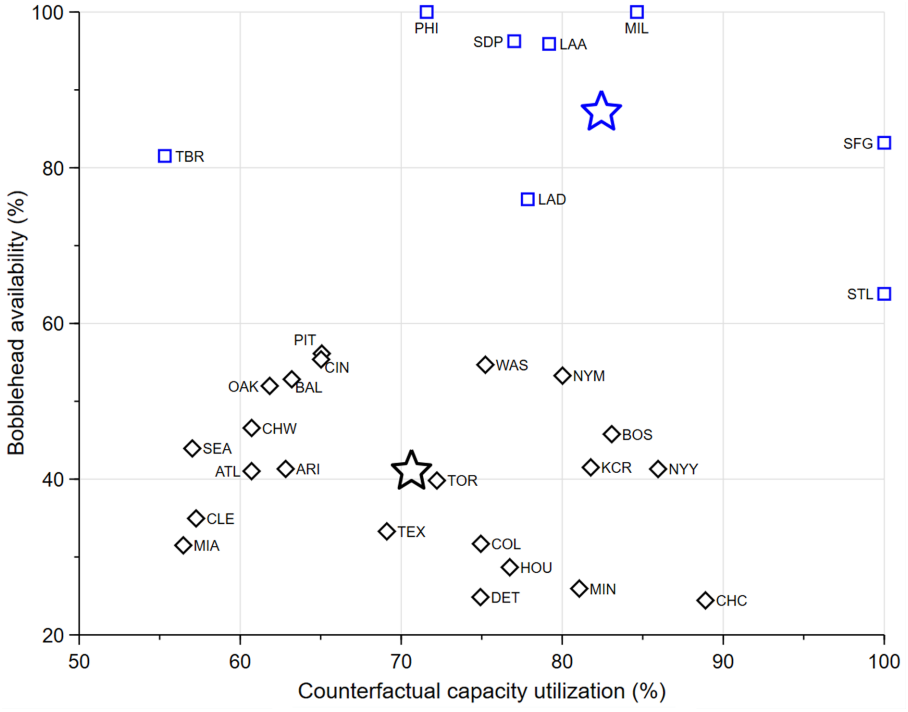

Figure 2 — Availability and Counterfactual Capacity Utilization. See Table A1 for full list of team acronyms.

Finding 3: On average, giveaways increase attendance by 10 percent.

Through trial and error of parametric and nonparametric candidate functional forms, we find that a cubic function of giveaway availability, $f(a) = \gamma_0 + \gamma_1 a + \gamma_2 a^2 + \gamma_3 a^3$, has the best explanatory power.[15] Column 2 shows this cubic fit and, for ease of interpretation, Figure 3 plots the estimated effect across the range of availability levels observed in our sample. We see that home game attendance on giveaway days initially increases with giveaway availability and reaches a plateau at around 40%,[16] surprisingly decreases slightly over range 40–80%, and increases again thereafter.

Finding 4: The attendance response peaks at a giveaway availability of approximately 40 percent.

This finding may suggest caution in comparing past estimates of attendance response to giveaway promotion because availability both varies greatly over teams and influences the attendance response. This is problematic for studies that use a single team, or a selected number of teams that do not pursue similar promotion strategies, as results may not be externally valid. Another issue with the prior literature is that a promotion's availability is treated as an omitted explanatory variable in the attendance regressions.

Decomposing the promotion bump. Although giveaway promotions increase game demand, it is important to understand where this additional demand originates. Previous literature (Van Heerde, Leeflang, & Wittink, 2004) casts each additional consumer as one of three possible types: category expansion (new consumers who enter the market), interbrand substitution (consumers shifting from a substitute product to a promoted one), and intertemporal substitution (consumers shifting their timing of a purchase).

Of the three types, firms are typically concerned about intertemporal substitution (also known as cannibalization), as such responses do not change the firm's overall sales. In the context of sports marketing, cannibalization would see fans substituting nonpromotion games in favor of promotion ones. Columns 3 and 4 of Table A2 test for this effect. Column 3 looks at the week of a bobblehead game (a range of two games before and after a bobblehead game) and reports no evidence of intertemporal substitution siphoning demand for the surrounding games. Column 4 allows for different responses in games that take place slightly before and after the promoted game. This specification addresses the issue of positive carryover as documented by Kappe et al. (2014) in a study of a single team attendance. Across all 30 MLB teams, we find no systematic evidence of a positive carryover effect from bobblehead games to subsequent games.[17]

Our data also allow, albeit in a limited manner, to test for the possibility of interbrand substitution. Five pairs of MLB teams reside within approximately 60 km (40 mi) of one another.[18] Fans in these select markets are able to substitute between teams, and such a decision may be influenced by many game attributes, including promotions. As expected, Column 5 of Table A2 shows that a team experiences a 4% decline in attendance on days in which its matched team is also hosting a game. However, this decline is not amplified when the matched team offers a promotion, thus ruling out interbrand substitution. Because we find no evidence of intertemporal substitution in addition to no evidence of interbrand substitution, we attribute the entire promotion impact to category expansion.

Finding 5.1: There is no evidence of intertemporal or interbrand substitution.

Finally, we consider the effect of not only bobblehead availability within a game but the total count of bobblehead games within a year to assess the marginal return to having more promotions in a season. This addresses the possibility that fans tire of too many promotions and fan satiation reduces the impact of promotion on attendance. While Column 6 reports the estimated coefficient, Figure 4 provides a graphical depiction of the satiation effect. As illustrated by the negative slope in the figure, we observe some evidence of diminishing returns, consistent with past work by McDonald and Rascher (2000) (although our estimated coefficient is not discernible from zero).

Finding 5.2: There is some evidence of satiation to promotion count within a season.

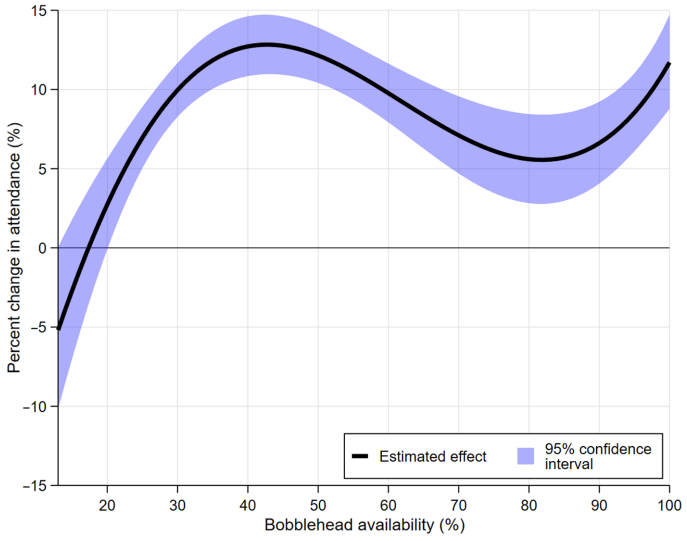

Figure 3 — Attendance Impact Across Giveaway Availability, 2012–2019.

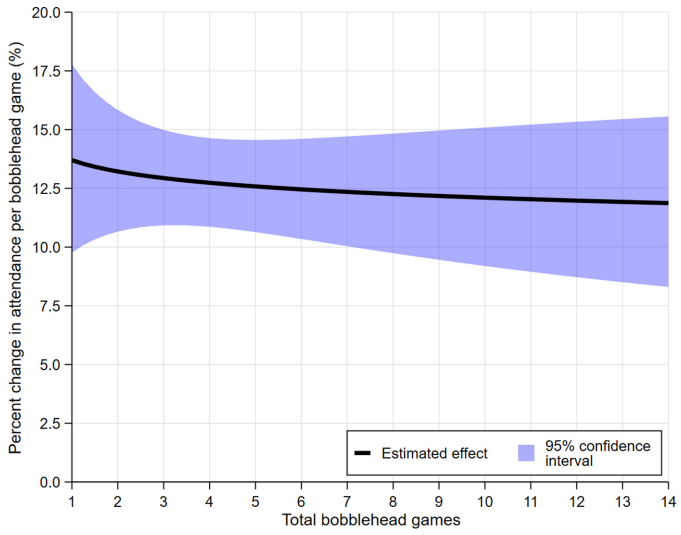

Figure 4 — Attendance Impact Across Giveaway Availability, 2012–2019.

Discussion and Managerial Implications

We interpret the results considering the large existing body of marketing and economics literature that analyze promotions within the context of price discrimination theory (Gedenk, Neslin, & Ailawadi, 2010; Hendel & Nevo, 2013). A novel aspect of giveaways rests in the fact that teams decide the availability of the item. The standard model of price discrimination can then be extended to explain how the availability decision is designed to maximize the attendance response. However, this rationale alone cannot explain why some MLB teams offer wide availability, and thus, we refer to the notion of fan lifetime value and present additional evidence consistent with this latter interpretation.

Price Discrimination

According to the standard theory of promotions, giveaways are used to serve a fan segment that would not attend otherwise. This simple point is best demonstrated with a stylized argument with two types of fans, the first of which being those who attend the game regardless of giveaways, who we call unconditional fans (e.g., season ticket holders). In addition to this first group, there are conditional fans: bargain hunters who find regular games too expensive but would attend if a promotion offered some additional benefit.

The argument applies to all sports promotions but with some nuances. Any promotion—be it a giveaway, a special event, or a price discount on a gate or nongate item—adds to the benefits of attending a game. Yet giveaways as promotions are differentiated from others as there is no obligation to supply the promotion benefit to all attendees. While it is impossible to exclude a ticket holder for some promotions (e.g., free concert) and some promotions can be perfectly exclusionary (e.g., personalized email coupon), giveaways reside somewhere in between and can be partially exclusionary as teams can design queuing mechanisms that favor the fans who are willing to arrive early and wait.

According to the market segmentation hypothesis, a team should target the conditional fans to receive giveaways, paradoxically attempting to reward its least loyal fans. In practice however, some unconditional fans may also fancy the giveaway item. Thus, the goal to channel giveaway items toward conditional fans can be achieved by rationing giveaways using a distribution mechanism, which is not unlike a contest or sweepstake (Kalra & Shi, 2010). The success of rationing giveaways becomes dependent on whether conditional fans are willing to arrive early and potentially wait in line to obtain the item. This explains why many teams offer bobbleheads to only a small fraction of attendees (Finding 2.1); why there is a significant response to bobblehead promotions (Finding 3); and why attendance responds little to giveaways in the range of 40–80% availability (Finding 4).

Given an average league giveaway availability of approximately 50% of capacity and a mean attendance response to giveaways of 10%, we can say that teams have to offer on average about eight bobbleheads for each additional attendee.[19] That being said, less than two of every three attendees receive a giveaway, *ex post*.[20] Although giveaways items likely end up in the hands of unconditional fans, conversely, many attendees—presumably unconditional fans included—do not receive any.

In summation, a team's strategy for giveaway promotions must be two-pronged. First, it must ensure that conditional fans are likely to obtain the giveaway. Second, it must supply giveaways up to the point where any additional availability only marginally increases attendance, or stated alternatively, the point where there is no net increase in profits after accounting for the cost of the giveaway item. Producing a limited number of giveaways, as is the case for many teams observed in Table A1 for example, works likely because some unconditional fans do not care enough for the giveaways to bother to wait in line.

Fan Lifetime Value

The high-availability teams offer more bobbleheads than what is necessary to bring in the bargain fans (Finding 2.1), consistent with the notion of fan lifetime value (FLV). Because scarcity may disappoint unconditional fans and decrease FLV, some teams prefer to make bobbleheads available to all fans to reduce the possibility of demand withholding by antagonized fans. The satisfaction–loyalty model, for example, specifies that perceived value in a gift determines the level of customer satisfaction and future repurchase loyalty (Gupta et al., 2006). High-availability teams may give additional bobbleheads as a gift to unconditional fans to increase future purchase intentions (Bodur & Grohmann, 2005). Recall that the teams that offer wide availability also have a higher capacity utilization rate, care about long-term fan loyalty, and have more loyal fans (Finding 2.2).[21]

The low- and high-availability teams differ on other dimensions. High-availability teams experience a lower attendance increase than low-availability teams (6.4% vs. 11.2%; see Column 7 of Table A2) and this is despite offering more giveaway items. In fact, high-availability teams end up giving 16 items per new attendee against six for low-availability teams.[22] Given this striking difference, it is not inconceivable that giveaway promotions may only have a positive short-term impact on profit for the low-availability teams. High-availability teams care about the impact on long-term profits, which is captured by the notion of FLV.

In summation, all teams use promotions to attract conditional fans, yet it is the high-availability team that also considers its unconditional fans under the fan goodwill hypothesis, explaining why such a team appears to oversupply giveaways.[23] While all teams care about market segmentation, a team that invests in FLV offers more giveaways than what is necessary to attract just the conditional fans under a price discrimination rationale.

Managerial Implications

Why are promotions used in only one-third of all games? In marketing, the standard rationale as to why supermarkets have temporary price reductions (lasting for a limited period) is to attract the consumers who are willing to bargain-hunt, wait, or stockpile, all the while attempting to minimize the cannibalization of a product's ordinary demand. Yet, in MLB, we find no evidence of cannibalization for promotion-adjacent games and no evidence of interbrand competition (Finding 5.1). Rather, it seems more plausible that promotion satiation is what limits the number of promotions offered in a season (Finding 5.2). The conditional fans introduced earlier may only want to attend a limited number of games within a season and offering too many promotions may have little incremental effect on attendance. This is consistent with the logic that teams first target games, and types of promotions, that have the largest impact on attendance, thus making the marginal impact of each subsequent promotions lower. This also explains why promotions are widely advertised far in advance: the main concern with sports promotions is not to curtail substitution but to make the information available as widely as possible.

If the concern with promotions is that satiation limits the attendance response of conditional fans, a team should design a

mix of promotions that caters to a wide variety of fan preferences. This is consistent with the observation that teams mix the types of promotions (e.g., fireworks, bobblehead, other giveaways, family, etc.) that are offered throughout the season (DeSarbo et al., 2012). In addition, we find no evidence that teams use giveaway availability as a demand management tool (i.e., a means to increase attendance for an otherwise low-demand game).

The issue of heterogeneity in team availability strategies is an important finding that has been largely overlooked in the literature and that has important managerial implications. Teams must decide whether to vary giveaway availability within and across seasons. Because team heterogeneity matters, a team must treat a small and large change in promotion strategies differently. Within a cluster displayed on Figure 2, a marketing team can tweak the team's giveaway strategy, as is occasionally observed in the data. But switching between clusters is a decision that is more difficult to reverse and, as such, it should happen less frequently. In fact, the Boston Red Sox may be the only team to have enacted such a significant change in our sample: prior to the 2016 MLB season, it offered high availability in its giveaways, covering 100% of its capacity. As of 2019, this number dropped to 20%. A front office member of the Boston Red Sox intimated to the authors that during this period, the organization assessed it was able to achieve the same attendance response with fewer giveaways per night (recall the discussion surrounding Column 7 of Table A2 and the 16-to-1 ratio of bobbleheads-to-incremental fans for high-availability teams).

Conclusion

This study provides new insights into a previously overlooked aspect of giveaway promotion in the sports marketing literature by studying stadium giveaway availability decisions for MLB teams. While each team is remarkably consistent in its own strategy, each can also be broadly categorized into one of two camps based on high- or low-giveaway availability. Low-availability teams, which make up roughly three-quarters of the league, use giveaway promotions in a manner that is consistent with a pure price discrimination approach. These teams pursue strategies to maximize short-run attendance by enticing new consumers to purchase tickets who would otherwise not attend absent a stadium giveaway. While high-availability teams also attempt to lure new consumers, these teams give away roughly 10 more items per new attendee relative to low-availability teams, are more likely to have a fan appreciation day, and tend to have higher fan devotion, all of which we associate with the team's investment in fan lifetime value.

The conclusions contained herein are not without limitation, and some may be promising topics for future research such as studying the heterogeneity within giveaway promotions and, in particular, comparing the impact of sponsored and nonsponsored promotions. Another potentially interesting study could address the possibility that promotions increase average ticket price and measure the impact of availability on total season's gate revenues and profits. Finally, it would be interesting to revisit, for a different time period, league, or sport, the finding of the non-monotonic attendance-availability relationship and the two local maxima.

As noted in past research, much managerial effort goes into selecting the timing and mix of promotions to best achieve some desired attendance outcome throughout a sport's season. We add to this literature a new consideration relevant to stadium giveaway promotions. Should a team begin to be more dependent on, or decide to prioritize, ticket sales—such as might be the case post a labor-dispute work stoppage or a pandemic-driven stadium closure—it must understand that, while helpful, "the more, the merrier" rule of thumb does not necessarily apply to promotions or stadium giveaways. Instead, a team must reflect first on its overall approach (high or low availability), the trade-offs associated with the number of items given away in each game, and the total number of giveaway games per season, all while considering its promotion budget.

Notes

1. An alternative giveaway distribution model (often used in indoor stadia) has one item laid out on each seat prior to guests arriving.

2. For example, Bradbury (2020) identifies four main groups of variables (team performance, novelty effects, market demographics, and marquee players) for men's soccer in North America, while Valenti, Scelles, and Morrow (2020) identify five slightly different factors for the same sport in a European women's league (stage of competition, uncertainty of match outcome, competitive intensity, away club reputation, and weather conditions). Some of the differences may be attributed to league and market characteristics.

3. Price promotions (lowering the price of all tickets) have decreased in relevance in baseball largely because teams have abandoned fixed pricing in favor of variable and/or dynamic pricing (Courty & Davey, 2020; Jiaqi Xu, Fader, & Veeraraghavan, 2019). Some teams offer price discounts to selected customers (e.g., teen night or senior citizen day; Boyd & Krehbiel, 2006), but these promotions are somewhat uncommon. Other price promotions fall outside the scope of this analysis because they are available throughout the season. The rest of this study follows Kappe et al. (2014) in excluding all price promotions from the analysis.

4. Relatedly, both Siegfried and Eisenberg (1980) and Cebula (2013) make use of unbalanced panel data sets of Minor League Baseball attendance where unbalanced implies information is not available for all distinct team-year pairs.

5. Using realized (or *ex post*) attendance as the availability denominator is problematic because it is also influenced by the numerator (giveaway count) in the availability ratio; using some counterfactual attendance makes the result dependent on the method used to compute attendance in the absence of a promotion. Using stadium capacity avoids these problems.

6. See Data Appendix for more information.

7. See Data Appendix for full discussion on identification and endogeneity.

8. Table A1 presents the same information disaggregated by team. Both tables exclude price promotions (Footnote 3), promotions that require additional purchases (e.g., Colorado Rockies' $1 Hot Dog coupons for the first 10,000 fans on April 8, May 27, June 27, and July 30, 2019), and giveaways that are gender specific (e.g., New York Mets' Mother's Day scarf on May 13, 2019 for all mothers). Note that availability was not reported for every 2019 Oakland Athletics giveaway, and therefore information for the 2018 season is used instead.

9. Note that it is possible for multiple promotions to be offered during the same game. Of the 580 giveaway games in Table A1, there are 32 games (5.5% of giveaway games) that occur simultaneously with event promotions and eight games (1.4%) that occur simultaneously with family/child promotions. No game features all three promotions.

10. This is accomplished using an ordinary least squares model to predict attendance with the standard control variables while removing all observations of bobblehead games. We then use this model to predict

attendance for these now-out-of-sample bobblehead games. The resulting fitted values provide a rough counterfactual attendance estimate had the game not featured a bobblehead, which is then normalized by the stadium's capacity.

11. We look at each team's promotion schedule and search for any game or event that explicitly mentions "fan appreciation" and related terms. A fan appreciation day includes, for example, vouchers for future home games, discounted concessions and/or merchandise, or fireworks. The Fan Devotion Average is the average home-game attendance divided by total wins (Bauman, 2016). See Data Appendix for more information.

12. Information on variable definitions can be found in Table A3.

13. A home-away pair play in two to four consecutive games known as a "series."

14. Calculating the effect with a log-transformed dependent variable is approximately $\exp(\beta) - 1$. For example, the coefficient of interleague play is 0.074 and suggests an interleague game is expected to have a 7.9% larger attendance ($\exp[0.074] - 1 = 7.9\%$).

15. See discussion in Appendix regarding potential functional forms.

16. $\frac{1}{3\gamma_3}(-\gamma_2 - \sqrt{\gamma_2^2 - 3\gamma_1\gamma_3}) = 42.7\%$.

17. Although not shown in Table A2, we also check for the possibility that the consumer's primary concern is the day of the week (thereby substituting across weeks) by treating the same weekday in the preceding and succeeding weeks of a bobblehead game. Again, we see evidence of neither intertemporal substitution nor carryover.

18. New York Mets and New York Yankees (14.5 km/9 mi); Chicago Cubs and Chicago White Sox (16 km/10 mi); Oakland Athletics and San Francisco Giants (27 km/17 mi); Los Angeles Angels and Los Angeles Dodgers (50 km/31 mi); Baltimore Orioles and Washington Nationals (61 km/38 mi). Column 5 presents results using the entire sample: similar results follow when limiting the sample to the ten aforementioned teams.

19. This is approximated by taking the ratio of the average number of bobbleheads available (53% from Table A4 multiplied by the average capacity of 42,207 from Table 1) to the average bobblehead impact on attendance (9.8% from Column 1 of Table A2 multiplied by average attendance of 28,296 from Table 1).

20. The number of bobbleheads divided by the *ex post*, or realized, attendance, has a mean value of 62.6%. This figure is 52.7% and 88.0% for low- and high-availability teams, respectively.

21. Another explanation for full availability is that teams may also attempt to charge higher prices. We are not aware that games with high-availability giveaways have higher ticket prices than that of low-availability giveaways.

22. These numbers are computed using the estimated impact from Column 7 of Table A2 and following the method described in Footnote 19.

23. Teams may adopt different availability strategies because of historical reasons, differences in local population, team ownership preferences, or a combination of these, and finding out the ultimate rationale is beyond the scope of this work.

24. Baseball Reference. *MLB Stats, Scores, History & Records*. https://www.baseball-reference.com.

25. Exceptions include (a) games cancelled due to inclement weather may not be played if rescheduling is difficult and the games' outcome does not affect final league standings (one less game per occurrence; $N = 6$); (b) teams tied in the league standings after 162 games play a single additional game to break the tie if the games' outcome affects postseason playoff berths (one additional game per occurrence; $N = 4$); (c) games hosted in neutral sites as part of an MLB marketing initiative to promote the game to new audiences (one less game per occurrence; $N = 22$); and (d) extenuating circumstances (the Baltimore Orioles closed one game to the public on April 29, 2015 due to protests and civil unrest; the Houston Astros played the Texas Rangers three times in Tampa, Florida due to Hurricane Harvey; the Tampa Bay Rays played the New York Yankees three times in the stadium of the New York Mets due to Hurricane Irma; $N = 7$.)

26. One notable exception is, prior to 2018, the Miami Marlins included promotional, that is, free, tickets in their official boxscores: this is controlled for in the demand response model using team-year fixed effects.

27. Oakland Athletics Virtual Press Box. *MLB Media Guides*. https://pressbox.athletics.com/Publications/MLB%20Media%20Guides/.

28. Sportsbook Reviews Online. *Historical MLB Scores and Odds*. https://sportsbookreviewsonline.com/scoresoddsarchives/mlb/mlboddsarchives.htm.

29. See further discussion in Appendix surrounding Equation A4 and Equation A5 for more information.

30. Note that a single game resulted in a tie (Chicago Cubs at Pittsburgh Pirates on September 29, 2016). In this scenario, each team is given a value of 0.5 in the first summation.

31. See Acker, D. (June 3, 2018). *MLB Bobblehead History*. *Stadium Giveaway Exchange*. https://www.stadiumgiveawayexchange.com/mlb-bobblehead-history/; *The Cardboard Connection*. https://www.cardboardconnection.com/; and *Beckett*. https://www.beckett.com/news/.

32. The semi-parametric approach also controls for all the same covariates of Column 2 of Table A2.

33. Related to this last point, we cannot distinguish between types of promotions, for example, those that are sponsored by a third party. Thus, our coefficient estimates of the impact of availability should be interpreted as the average effect of availability across all types of bobblehead giveaway promotions (regardless of sponsorship).

References

Angrist, J.D., & Pischke, J.-S. (2008). *Mostly harmless econometrics: An empiricist's companion*. Princeton, NJ: Princeton University Press.

Barilla, A.G., Gruben, K., & Levernier, W. (2008). The effect of promotions on attendance at Major League Baseball games. *Journal of Applied Business Research, 24*(3), 1–14. doi:10.19030/jabr.v24i3.1337

Bauman, M. (2016, April 12). Fan Devotion Average measures loyalty. *MLB.com*. Retrieved from https://www.mlb.com/news/fan-devotion-average-shows-most-loyal-base-c171850246

Bodur, H.O., & Grohmann, B. (2005). Consumer responses to gift receipt in business-to-consumer contexts. *Psychology & Marketing, 22*(5), 441–456. doi:10.1002/mar.20067

Borland, J., & MacDonald, R. (2003). Demand for sport. *Oxford Review of Economic Policy, 19*(4), 478–502. doi:10.1093/oxrep/19.4.478

Boyd, T.C., & Krehbiel, T.C. (2003). Promotion timing in Major League Baseball and the stacking effects of factors that increase game attractiveness. *Sport Marketing Quarterly, 12*(3), 173–183.

Boyd, T.C., & Krehbiel, T.C. (2006). An analysis of the effects of specific promotion types on attendance at Major League Baseball games. *American Journal of Business, 21*(2), 21–32. doi:10.1108/19355181200600007

Bradbury, J.C. (2020). Determinants of attendance in Major League Soccer. *Journal of Sport Management, 34*(1), 53–63. doi:10.1123/jsm.2018-0361

Bruggink, T.H., & Eaton, J.W. (1996). Rebuilding attendance in Major League Baseball: The demand for individual games. *Baseball Economics: Current Research,* 9–31.

Burstin, A. (2020). 10 common mistakes businesses make with their giveaways. Retrieved from https://gleam.io/blog/giveaway-mistakes/

Cebula, R.J. (2013). A panel data analysis of the impacts of regional economic factors, marketing and promotions, and team performance on minor league baseball attendance. *The Annals of Regional Science, 51*(3), 695–710. doi:10.1007/s00168-013-0558-0

Cebula, R.J., Coombs, C.K., Lawson, L., & Foley, M. (2013). The impacts of promotions/marketing, scheduling, and economic factors on total gross revenues for minor league baseball teams. *International Advances in Economic Research, 19*(3), 249–257. doi:10.1007/s11294-013-9417-0

Cebula, R.J., Toma, M., & Carmichael, J. (2009). Attendance and promotions in minor league baseball: The Carolina League. *Applied Economics, 41*(25), 3209–3214. doi:10.1080/00036840903286323

Cisyk, J. (2020). Impacts of performance-enhancing drug suspensions on the demand for Major League Baseball. *Journal of Sports Economics, 21*(4), 391–419. doi:10.1177/1527002520906529

Courty, P., & Davey, L. (2020). The impact of variable pricing, dynamic pricing, and sponsored secondary markets in major league baseball. *Journal of Sports Economics, 21*(2), 115–138. doi:10.1177/1527002519867367

Dees, W., Hall, T., Tsuji, Y., & Bennett, G. (2010). Examining the effects of fan loyalty and goodwill on consumer perceptions of brands at an action sports event. *Journal of Sponsorship, 4*(1), 38–50.

DeSarbo, W.S., Stadler Blank, A., & McKeon, C.S. (2012). Proper mix of promotional offerings can produce for teams. *Sports Business Journal, 15*(5), 18.

Fullerton, S., & Merz, G.R. (2008). The four domains of sports marketing: A conceptual framework. *Sport Marketing Quarterly, 17*(2), 90–108.

Garcia, J., & Rodriguez, P. (2009). Sports attendance: A survey of the literature 1973–2007. *Rivista di Diritto e di Economia dello Sport, 5*(2), 112–151.

Gedenk, K., Neslin, S.A., & Ailawadi, K.L. (2010). Sales promotion. In M. Krafft& M.K. Mantrala (Eds.), *Retailing in the 21st century* (pp. 393–407). Berlin, Germany: Springer.

Gupta, S., Hanssens, D., Hardie, B., Kahn, W., Kumar, V., Lin, N., … Sriram, S. (2006). Modeling customer lifetime value. *Journal of Service Research, 9*(2), 139–155. doi:10.1177/1094670506293810

Hendel, I., & Nevo, A. (2013). Intertemporal price discrimination in storable goods markets. *American Economic Review, 103*(7), 2722–2751. doi:10.1257/aer.103.7.2722

Hill, J.R., Madura, J., & Zuber, R.A. (1982). The short run demand for major league baseball. *Atlantic Economic Journal, 10*(2), 31–35. doi:10.1007/BF02300065

Irwin, R.L., Sutton, W.A., & McCarthy, L.M. (2008). *Sport promotion and sales management*. Champaign, IL: Human Kinetics.

Jiaqi Xu, J., Fader, P.S., & Veeraraghavan, S. (2019). Designing and evaluating dynamic pricing policies for major league baseball tickets. *Manufacturing & Service Operations Management, 21*(1), 121–138. doi:10.1287/msom.2018.0760

Jung, H., Moon, C.G., & Sung, Y.T. (2020). Outcome uncertainty and demand for baseball: A single-game approach in the Korean Professional Baseball League. *International Journal of Sport Finance, 15*(1), 39–52.

Kalra, A., & Shi, M. (2010). Consumer value-maximizing sweepstakes and contests. *Journal of Marketing Research, 47*(2), 287–300. doi:10.1509/jmkr.47.2.287

Kappe, E., Stadler Blank, A., & Desarbo, W.S. (2014). A general multiple distributed lag framework for estimating the dynamic effects of promotions. *Management Science, 60*(6), 1489–1510. doi:10.1287/mnsc.2013.1856

Kim, Y., Magnusen, M., Kim, M., & Lee, H.W. (2019). Meta-analytic review of sport consumption: Factors affecting attendance to sporting events. *Sport Marketing Quarterly, 28*(3), 117–134. doi:10.32731/SMQ.283.092019.01

Leeds, M.A., & Sakata, S. (2011). Take me out to the Yakyushiai: Determinants of attendance at Nippon Professional Baseball Games. *Journal of Sports Economics, 13*(1), 34–52. doi:10.1177/1527002510394294

Lemke, R.J., Leonard, M., & Tlhokwane, K. (2010). Estimating attendance at Major League Baseball games for the 2007 season. *Journal of Sports Economics, 11*(3), 316–348. doi:10.1177/1527002509337212

Lera-López, F., & Rapún-Gárate, M. (2007). The demand for sport: Sport consumption and participation models. *Journal of sport Management, 21*(1), 103–122. doi:10.1123/jsm.21.1.103

Marcum, J.P., & Greenstein, T.N. (1985). Factors affecting attendance of Major League Baseball: II. A within-season analysis. *Sociology of Sport Journal, 2*(4), 314–322. doi:10.1123/ssj.2.4.314

McDonald, M., & Rascher, D. (2000). Does bat day make cents? The effect of promotions on the demand for Major League Baseball. *Journal of Sport Management, 14*(1), 8–27.

Neyer, R. (2001, July 28). Avoid getting burned by Bobblehead Fever. *ESPN*. Retrieved from https://www.espn.com/mlb/columns/neyer_rob/1232347.html

Neyer, R. (2015, July 3). The question? To bobble, or not to bobble …. *FOX Sports*. Retrieved from https://www.foxsports.com/mlb/just-a-bit-outside/story/bobblehead-giveaways-numbers-brewers-tigers-dodgers-policy-070315

Shannon, J.R. (1999). Sports marketing: An examination of academic marketing publication. *Journal of Services Marketing, 13*(6), 517–534.

Siegfried, J.J., & Eisenberg, J.D. (1980). The demand for minor league baseball. *Atlantic Economic Journal, 8*(2), 59–69. doi:10.1007/BF02299864

Speed, R., & Thompson, P. (2000). Determinants of sports sponsorship response. *Journal of the Academy of Marketing Science, 28*(2), 226–238. doi:10.1177/0092070300282004

Tainsky, S., Mills, B.M., Hans, Z., & Lee, K. (2020). On the road with minor league baseball externalities. *Journal of Sport Management, 34*(2), 120–129. doi:10.1123/jsm.2019-0136

Valenti, M., Scelles, N., & Morrow, S. (2020). The determinants of stadium attendance in elite women's football: Evidence from the UEFA Women's Champions League. *Sport Management Review, 23*(3), 509–520. doi:10.1016/j.smr.2019.04.005

Van Heerde, H.J., Leeflang, P.S., & Wittink, D.R. (2004). Decomposing the sales promotion bump with store data. *Marketing Science, 23*(3), 317–334. doi:10.1287/mksc.1040.0061

Appendix

Table A1 Summary of Promotion Schedules, 2019

Team	Games	Promotion games	Giveaways	Mode giveaway availability	% of promotions that use mode availability	Bobblehead games	Fan appreciation day	Fan devotion average (2012–2019)	Average attendance	Capacity
Seattle Mariners (SEA)	81	31	20	21%	40%	5	Yes	336	22,120	47,500
Cleveland (CLE)	81	25	21	27%	43%	3	Yes	314	22,056	37,488
New York Mets (NYM)	81	40	37	100%	43%	7		445	30,521	41,922
Colorado Rockies (COL)	81	18	13	30%	46%	3	Yes	459	36,954	50,144
Atlanta Braves (ATL)[a]	81	36	14	36%	50%	6		383	32,779	41,149
Washington Nationals (WAS)	81	25	16	60%	50%	8		411	27,889	41,376
Chicago White Sox (CHW)	81	39	29	25%	59%	4	Yes	370	21,371	40,615
Oakland Athletics (OAK)[b]	81	22	15	43%	60%	4	Yes	345	19,873	35,067
San Francisco Giants (SFG)	**81**	**25**	**23**	**48%**	**61%**	**5**	**Yes**	**605**	**33,429**	**41,314**
New York Yankees (NYY)	81	13	12	39%	67%	6		486	41,803	46,537
Milwaukee Brewers (MIL)	**81**	**18**	**18**	**100%**	**67%**	**6**	**Yes**	**485**	**36,091**	**41,700**
Chicago Cubs (CHC)	81	37	32	24%	69%	5		535	38,208	40,929
Houston Astros (HOU)	81	40	30	24%	70%	11	Yes	406	35,276	41,168
Kansas City Royals (KCR)	80	31	24	26%	71%	3	Yes	424	18,320	37,903
Texas Rangers (TEX)	81	17	16	31%	75%	9		416	26,333	48,114
St. Louis Cardinals (STL)	**81**	**43**	**39**	**68%**	**77%**	**5**	**Yes**	**528**	**42,968**	**44,383**
Cincinnati Reds (CIN)	79	42	18	47%	78%	8	Yes	409	22,473	42,319
Baltimore Orioles (BAL)	81	27	19	44%	79%	1		360	16,496	45,971
Arizona Diamondbacks (ARI)	81	15	10	41%	80%	2		341	26,364	48,405
Detroit Tigers (DET)	81	22	17	24%	82%	2		495	18,756	41,083
Minnesota Twins (MIN)	81	21	17	26%	82%	5	Yes	476	28,323	38,544
San Diego Padres (SDP)	**81**	**19**	**14**	**100%**	**93%**	**2**		**481**	**29,585**	**40,019**
Miami Marlins (MIA)	81	29	15	27%	93%	5		365	10,016	37,446
Toronto Blue Jays (TOR)	81	20	18	30%	94%	2	Yes	409	21,607	49,286
Pittsburgh Pirates (PIT)	81	36	19	52%	95%	5		398	18,612	38,747
Boston Red Sox (BOS)	79	9	9	20%	100%	6		550	35,518	37,755
Los Angeles Angels (LAA)	**79**	**31**	**22**	**66%**	**100%**	**3**	**Yes**	**502**	**37,765**	**45,517**
Los Angeles Dodgers (LAD)	**81**	**39**	**23**	**71%**	**100%**	**12**	**Yes**	**435**	**49,066**	**56,000**
Philadelphia Phillies (PHI)	**80**	**14**	**8**	**100%**	**100%**	**3**	**Yes**	**483**	**33,672**	**42,792**
Tampa Bay Rays (TBR)[c]	**81**	**23**	**12**	**100%**	**100%**	**3**		**323**	**14,637**	**25,025**
Averages										
Low-availability teams	81	27	19	38%	67%	5	45%	415	25,985	42,249
High-availability teams	**81**	**27**	**20**	**76%**	**84%**	**5**	**75%**	**480**	**34,651**	**42,094**
MLB-wide	81	27	19	48%	72%	5	53%	432	28,296	42,207

Note. Games played outside of the regular stadium of designated home team (i.e., "neutral-site" games) are excluded from the counts in the first column. Promotions exclude price promotions, items that require ancillary purchases, and gender-specific giveaways. See Data Appendix for Fan Devotion Average calculation. High-availability teams denoted in bold. FE = Fixed Effects; BH = Bobblehead.
[a]Capacity since 2017 (2012–2016 capacity: 49,586). [b]Based on 2018 Oakland Athletics promotion schedule (availability for all giveaways was not reported in 2019). [c]Capacity since 2019 (2012–2018 capacity: 31,042).

Table A2 Regression Results

	Replication	Core model	Intertemporal/ cannibalization		Inter-brand	Satiation	Low-/High-availability
Natural logarithm of attendance	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Bobblehead game	0.094***	–0.292***	–0.294***	–0.290***	–0.289***	–0.268***	
	(0.005)	(0.071)	(0.071)	(0.071)	(0.071)	(0.083)	
Bobblehead availability		2.339***	2.318***	2.330***	2.320***	2.246***	
		(0.447)	(0.447)	(0.446)	(0.448)	(0.477)	
Bobblehead availability^2		–4.168***	–4.128***	–4.140***	–4.135***	–3.989***	
		(0.829)	(0.829)	(0.826)	(0.831)	(0.891)	
Bobblehead availability^3		2.231***	2.209***	2.212***	2.215***	2.130***	
		(0.459)	(0.459)	(0.457)	(0.460)	(0.495)	
Week of bobblehead game			0.006				
			(0.004)				
Two days *before* BH day				–0.023***			
				(0.007)			
One day *before* BH day				0.019***			
				(0.006)			
One day *after* BH day				0.011*			
				(0.006)			
Two days *after* BH day				0.002			
				(0.008)			
Team in same market hosting game on same day					–0.041***		
					(0.010)		
Team in same market hosting game on same day *and* it is offering BH					0.019		
					(0.038)		
Natural logarithm of total BH games within team-year						–0.006	
						(0.011)	
Bobblehead game, low-availability teams							0.107***
							(0.006)
Bobblehead game, high-availability teams							0.062***
							(0.010)
Predicted season wins	0.011***	0.011***	0.011***	0.011***	0.011***	0.011***	0.011***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Divisional rival	0.013***	0.013***	0.013***	0.013***	0.013***	0.013***	0.013***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Interleague	0.076***	0.076***	0.076***	0.076***	0.076***	0.076***	0.076***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Opening day	0.557***	0.557***	0.557***	0.558***	0.557***	0.557***	0.557***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
Day of week × night FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Home team × year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Opponent FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,409	19,409	19,409	19,409	19,409	19,409	19,409
R^2	.777	.777	.777	.777	.777	.777	.777

Note. Heteroskedasticity-consistent *SE*s in parentheses. BH = Bobblehead; FE = Fixed Effects.
*$p < .1$. **$p < .05$. ***$p < .01$.

Table A3 Variable Definitions

Variable name	Definition
ln(attendance)	The natural logarithm of the games' paid attendance.
Bobblehead game	Takes a value of 1 for games featuring a bobblehead promotion giveaway, 0 otherwise.
Bobblehead availability	The ratio of the number of bobbleheads given out to the capacity of the stadium. Takes a value of 0 when Bobblehead game is 0.
Week of bobblehead game	Takes a value of 1 for games of the same home team within ±2 days of a bobblehead game, 0 otherwise.
Two days *before* BH game	Takes a value of 1 for games of the same home team two days *prior* to a bobblehead game, 0 otherwise.
One day *before* BH game	Takes a value of 1 for games of the same home team one day *prior* to a bobblehead game, 0 otherwise.
One day *after* BH game	Takes a value of 1 for games of the same home team one day *after* a bobblehead game, 0 otherwise.
Two days *after* BH game	Takes a value of 1 for games of the same home team two days *after* a bobblehead game, 0 otherwise.
Team in same market hosting game on same day	Takes a value of 1 for games when an MLB team within the same market is also hosting a game, 0 otherwise.
Team in same market hosting game on same day *and* it is offering BH	Takes a value of 1 for games when an MLB team within the same market is also hosting a game *and* the team within the same market is featuring a bobblehead promotion giveaway, 0 otherwise.
Natural logarithm of total BH games within team-year on BH days	The natural logarithm of the total number of games featuring a bobblehead promotion giveaway of the home team and year. Takes a value of 0 when Bobblehead game is 0.
Bobblehead game, low-availability teams	Takes a value of 1 for games featuring a bobblehead promotion giveaway *and* the home team is a low-availability team, 0 otherwise.
Bobblehead game, high-availability teams	Takes a value of 1 for games featuring a bobblehead promotion giveaway *and* the home team is a high-availability team, 0 otherwise.
Predicted season wins	The expected number of wins of the home team.
Divisional rival	Takes a value of 1 when the home and away teams are within the same division of the same league, 0 otherwise.
Interleague	Takes a value of 1 when the home and away teams are not within the same league, 0 otherwise.
Opening day	Takes a value of 1 for the first game of each team in a season, 0 otherwise.

Note. BH = Bobblehead.

Data Appendix

Cross-Sectional Data

As described in the body of the study, each team publicly releases its promotion schedule long before its first game of the regular season. We scraped each team's website in March 2019 to gather the information on its promotion schedule for the then-upcoming 2019 MLB season. We categorize each type of promotion as either a giveaway, feature, or child/family promotion, and record the promotion availability where applicable. There is no systematic pattern in the timing of promotions with the notable exception that the first and last games of the typical MLB team typically feature a giveaway for its season schedule (first game featuring a schedule for its current season and final game featuring a schedule for next year's season).

Panel Data

The primary source of the panel data comes from the official boxscores of all MLB games from the 2012 to 2019 playing seasons, collected from Baseball Reference.[24] Each of the 30 MLB teams typically play 162 games each year from April to September—eighty-one of which they are considered the home team (with few, notable exceptions[25]) providing 19,409 observations ($30 \times 81 \times 8 - 6 + 4 - 22 - 7$).

Each MLB boxscore contains game-specific information regarding the identity of the home and away teams, date, time, final score, and the official attendance for the game. It is this latter measure that serves as our dependent variable. Despite its implied definition, the official boxscore attendance is actually a measure of the paid attendance, or the number of tickets sold to a game.[26] While this metric has become the standard for demand estimation of MLB among other sports (Borland & MacDonald, 2003; Garcia & Rodriguez, 2009), often a superior metric would measure the physical attendance but there is not a significant loss of generality by using the somewhat imperfect paid attendance measure. In fact, given that the primary objective function of promotion is likely to increase ticket sales, paid attendance is arguable more advantageous.

Information on the capacity of each team's home stadium is collected from the official 2020 media guides, released by each individual team.[27] Previous years' versions of the media guides were used in instances when a team had an important change in capacity, that is, a movement to a new home stadium (Atlanta Braves in 2017, Texas Rangers in 2020) or large modifications to capacity in existing home stadium (Tampa Bay Rays in 2019).

The third source of data is the moneyline odds of each MLB game collected from Sportsbook Reviews Online.[28] The moneyline odds are used to calculate the implied win probability of each team within a game.[29] These probabilities are then used in combination with the actual outcomes of games to calculate a proxy for the quality of each team, termed the "predicted season wins," as developed by Cisyk (2020). This measures the expected number of wins of team t for season s, prior to playing a game i as follows:

$$\text{Predicted Season Wins}_{t,s,i} = \sum_{j=1}^{i-1}(1|\text{win}_{t,s,j} = 1) + \sum_{k=i}^{N} P(\text{win}_{t,s,k} = 1), \tag{A1}$$

where N typically equals 162. Stated alternatively, the metric "predicted season wins" is the actual number of wins of a team for the entire season prior to playing a given game plus the expected future number of wins in the remainder of the regular season.[30]

Finally, bobblehead events are compiled from three independent sources: Beckett Collectibles, Cardboard Connection, and Stadium Giveaway Exchange.[31] Table A4 reports that bobblehead games occur for 5% of the games within our sample. The average bobblehead availability on a bobblehead game is 53% and ranges from 13% to 100%.

Functional Form

As discussed in the text, numerous functional forms of giveaway availability were considered. Figure A1 below illustrates the cubic function used ("parametric approach") in comparison with a partially linear function ("semi-parametric approach").[32]

Table A4 Descriptive statistics

Variable	Mean	*SD*	Min	Max
Attendance	29,961.56	10,124.43	5,265.00	56,310.00
Bobblehead game	0.05	0.22	0.00	1.00
Bobblehead availability[a]	0.53	0.25	0.13	1.00
Predicted season wins	81.00	10.62	46.16	112.61
Divisional rival	0.46	0.50	0.00	1.00
Interleague	0.12	0.33	0.00	1.00
Opening day	0.01	0.11	0.00	1.00
Observations	19,409			

[a]Conditional on bobblehead game.

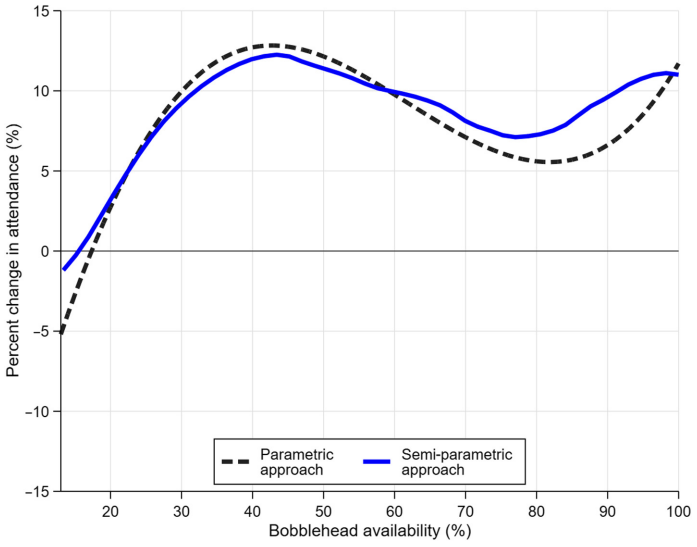

Figure A1 — Attendance Impact Across Giveaway Availability, 2012–2019

Both approaches mimic each other by increasing from 13% to 40%, declining between 40% and 80%, and increasing again thereafter. The use of a parametric function allows for an arguably easier interpretation and a function where one can calculate local minima and maxima.

Fan Appreciation Day and Fan Devotion Average

A fan appreciation day is defined as a reference of "fan appreciation day" or "fan appreciation weekend" within a team's promotion schedule. A fan appreciation day game includes, for example, vouchers for future home games, discounted concessions and/or merchandise, or fireworks.

As described by Bauman (2016), the Fan Devotion Average ($\tilde{\text{FDA}}_t$) is a mathematical approach to measure fan loyalty. Its intent is to measure the attendance while considering team productivity as is calculated as follows:

$$\tilde{\text{FDA}}_{t,s} = \frac{\bar{A}_{t,s}}{\text{wins}_{t,s}}, \tag{A2}$$

where $\bar{A}_{t,s}$ is the average home-game attendance and $wins_{t,s}$ is the total wins for team t in season s (simply stated as the average home-game attendance divided by the total season wins). We amend this measure by adjusting for the different size of MLB stadia and normalizing to a hypothetical 50,000-seat stadium as follows:

$$\text{FDA}_{t,s} = \frac{50,000 \times \tilde{\text{FDA}}_{t,s}}{c_{t,s}}, \tag{A3}$$

where $c_{t,s}$ is the capacity of the team's stadium within the season. We then take a simple average of the FDA across the years 2012–2019 for each team to avoid spurious results from unexpectedly high (or low) win totals for a given year.

Converting Moneyline Odds to Decimal Odds

The moneyline odds $M_{t,s,i}$ for game i of team t in season s are converted to pseudo-decimal odds as follows:

$$\tilde{P}(\text{win}_{t,s,i} = 1) = \begin{cases} \dfrac{M_{t,s,i}}{M_{t,s,i} - 100} & \text{if } M_{t,s,i} < 0 \\ \dfrac{100}{M_{t,s,i} + 100} & \text{if } M_{t,s,i} > 0. \end{cases} \tag{A4}$$

The sum of the pseudo-decimal odds is greater than one because of the bookmaker's margin. Therefore, the pseudo-decimal odds are adjusted as follows:

$$P(\text{win}_{t,s,i} = 1) = \frac{\tilde{P}(\text{win}_{t,s,i} = 1)}{\tilde{P}(\text{win}_{t,s,i} = 1) + \tilde{P}(\text{win}_{-t,s,i} = 1)}, \tag{A5}$$

where team $-t$ is the opponent of team t.

Correlation of Availability and Demand (Endogeneity)

Endogeneity may occur if the promotion decision is correlated with the error term conditionally on all the control variables (Table A3). We consider three scenarios under which this could be the case:

(a) Teams scheduling promotions shortly prior to games that have many unsold tickets. This is the least-likely scenario

given that the promotion schedule is set prior to the start of the season.

(b) Selection bias wherein a team selects promotion games based on known variables that influence demand, such as day of the week, month, opponent, and so forth. This type of correlation is not of great concern for the following reasons.

1. The analysis of the promotion decision has shown that many of the variables that are known to influence attendance had a very small explanatory power on the promotion decision. Table 2 in the Results section illustrates that fixed effects unilaterally have little explanatory power implying there is little evidence that bobbleheads games are systematically chosen in a non-random manner.
2. The estimated impact is conditional on many control variables that influence game demand. See the list of control variables used in Table A2, Column 2 and Table A3 for a precise definition of each variable.
3. Most importantly, the effect of a promotion and its availability does not change when we add control variables that are correlated with demand. Since the results are robust to commonly used control variables, it would be unusual that teams decide promotions based on information that: (i) is known a year in advance, (ii) influences demand, and (iii) is not observed by the econometrician.

(c) Correlation with other unobserved marketing actions wherein a giveaway game is correlated with other marketing actions that teams take during giveaway games. This is a possibility that we cannot rule out. Thus, our coefficient estimates are the net effect of promotion and these other team marketing interventions.[33]