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The authors introduce the concept of consumer options and empirically validate it in the context of event ticket pricing. They demonstrate that consumer options can protect consumers from the downside related to uncertain outcomes and enhance seller profits by enabling superior market segmentation and increasing consumer willingness to pay. The authors examine the newly proposed ticket pricing mechanism in sports markets, in which there is uncertainty about the teams that will play in a final event (e.g., the National Collegiate Athletic Association Final Four basketball tournament). Fans who want to attend the game *after* knowing which teams will play are often disappointed because tickets typically sell out in advance. The authors propose that a fan can buy an option on a ticket before this uncertainty is resolved. Later, he or she can decide whether to exercise the option. The authors present a simple analytical model of consumer options in this setting. Then, they empirically demonstrate that profits under option pricing can exceed those from (1) advance selling and (2) pricing after uncertainty is resolved. The analysis and findings of this article lay a foundation for future work on consumer options in marketing.

Keywords: option pricing, advance selling, pricing under uncertainty, event tickets, consumer options

Consumer Options: Theory and an Empirical Application to a Sports Market

Sports markets are lucrative. The National Collegiate Athletic Association (NCAA) received more than $500 million in revenues during 2005–2006, with Division I men's basketball tickets alone accounting for more than $27 million (Alesia 2006). Depending on the events considered, estimates of the total annual market size for sports and event tickets vary from $7 billion to $60 billion (Happel and Jennings 2002).

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Most sports markets feature elimination-style tournaments in which individuals and/or teams compete. For example, "March Madness" hits college campuses across the United States toward the end of the NCAA basketball season every year as university teams compete to reach the Final Four tournament. In this setting, there is considerable uncertainty about which competitors (i.e., the teams) will eventually make it to the final stages of the tournament. For example, of the 28 teams that made it to the men's Final Four tournament in the last seven years, only 6 teams have made it there more than once (i.e., it was the first appearance in the Final Four for 22 teams). Likewise, of the 20 teams that made it to the National Football League (NFL) Super Bowl in the last ten years, only 4 teams (New York Giants, New England Patriots, Pittsburgh Steelers, and St. Louis Rams) have appeared more than once. Of the 24 teams that have made it to the Soccer World Cup semifinals in the last 20 years, only 5 teams have appeared more than once. Consumers (i.e., the fans) have uncertain future valuations for tickets to these late-stage games because they do not know which teams will be playing until the tournament unfolds.

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Today, the firm (i.e., the league) sells tournament tickets at the beginning of the season, well ahead of when the final games take place. Thus, the league's current behavior is consistent with "advance pricing" (Geng, Wu, and Whinston 2007; Shugan and Xie 2000, 2004, 2005; Xie and Shugan 2001). Unfortunately, this practice means that many fans who would like to attend a final game after knowing which teams are playing will be disappointed because the tickets are typically sold out in advance.

In this article, we propose an alternative pricing mechanism—consumer options—whereby the league can earn greater profits than under its current practice of advance selling. Much like a real option or a financial option, a consumer option confers on the buyer the right, but not the obligation, to follow through on some future course of action (Amran and Kulatilaka 1999). The literature on real options deals with the situation in which a firm strategically creates future flexibility for itself. For example, investing in developing dual technologies can allow the firm to delay committing to one technology until more information is revealed (e.g., Amran and Kulatilaka 1999; Luehrman 1998). The literature on financial options addresses how firms can manage risks related to their financial assets and currency holdings by designing option contracts that protect against these risks.

In contrast, the concept of consumer options involves a firm designing and pricing an option in markets in which heterogeneous consumers are faced with uncertain valuations about the market outcome. With consumer options, the firm uses estimates of consumers' expected valuations to decide on the "option" and "exercise" prices before the final outcome is known. Given these prices, a consumer can then take an option by paying the option price before the uncertainty is resolved. Later, after the final outcome is revealed, the consumer can choose to exercise the option by paying the exercise price. If he or she does not exercise the option, it expires, and the firm retains the option price.[1]

As do financial and real options, consumer options create flexibility. However, our conceptualization of consumer options differs from financial and real options along multiple dimensions, including the decision makers involved, the source of uncertainty, the mechanism through which the option creates value, and the solution methodology. We outline the key differences in Table 1.

To illustrate our concept, consider a simple, stylized example. Suppose that there are two (risk neutral) fans in the market, and each has the same favorite team. Assume that the probability of this favorite team playing in the final game is .5. Furthermore, for one fan, the value of attending the final game is $200 if his or her favorite team is playing and $170 if it is not (i.e., the event is still "the best party in town"). For the other fan, the value is $250 if the favorite team makes it to the game, but this fan will not attend (i.e., this fan's valuation is $0) if his or her favorite team suffers an early defeat. It is straightforward to calculate the expected valuations: For the first fan, it is $185, and for the second fan, it is $125. If the tickets are sold at the beginning of the season, we assume that each fan will purchase the ticket when the expected value equals or is greater than the

[1]Similar to two-part tariffs, the concept of consumer options involves two distinct prices. However, unlike most two-part tariffs (e.g., Lambrecht, Seim, and Skiera 2007; Lambrecht and Skiera 2006), consumer options do not involve a lump-sum fee and a per-unit charge.

Table 1

A COMPARISON OF FINANCIAL, REAL, AND CONSUMER OPTIONS

Dimension	*Financial Options*	*Real Options*	*Consumer Options*
Decision maker	•Firm	•Firm	•Firm and consumer
Source of uncertainty	•Future stock price, interest rate, or currency exchange rate.	•Future price or potential of a "real" asset, such as a natural resource.	•Future quality of a market offering, (e.g., the attractiveness of a tournament game depends on the teams that ultimately play).
Key assumptions	•Frictionless financial markets with no arbitrage opportunities. •Value of underlying financial asset (often the price of a stock) follows a random walk. •Uncertainty evolves as a Wiener process (Brownian motion); change in uncertainty follows a lognormal distribution.	•Same assumptions as for financial options, except that they are applied to nonfinancial (or real) assets.	•Heterogeneous consumer segments with differential preferences for final outcomes. •Probabilistic uncertainty about final outcome states.
Core valuation principle	•If two investment strategies (stock and option) have the same payoffs, they must have the same initial value as well, or else there would be arbitrage. Using an estimate of the exercise price, the theoretical value of the option can be determined.	•A firm values the option based on an estimate of what its incremental investment would trade for in the capital market. •The managerial flexibility to wait, abandon, or expand on an investment opportunity is captured in a real option.	•The firm sets the option and exercise prices after determining how these prices will influence the behavior of different consumer segments in terms of (1) purchasing the option, (2) exercising the option, and (3) abstaining from the market. •Option and exercise prices are then set to maximize expected firm profits.
Pricing	•Exercise price is exogenously specified; it is an input into the Black–Scholes option pricing model. Option is then valued.	•Exercise price is assumed. •Options are valued using financial option models.	•Option price and exercise price are simultaneously determined.
Exercise decision	•Firm decides to exercise the option as a function of the price of the asset at any time on or before the expiry date ("U.S. option") or on the exercise date ("European option").	•Real options are mostly U.S. options; their exercise can be triggered by the high price of a commodity or good market conditions.	•Consumers decide whether to exercise the option after uncertainty about the outcome is clarified. •Depending on their preference, some consumers may exercise the option and others may not.

offered price. With advance selling, the league will, at best, generate profits of $250 by pricing the ticket at $125 so that both fans will purchase the ticket. If the league sets prices after it has full information about the outcome, it can charge $200 if the favorite team plays in the final (so that both fans will buy a ticket) and $170 otherwise (only the first fan will buy a ticket), leading to expected profits of $285.

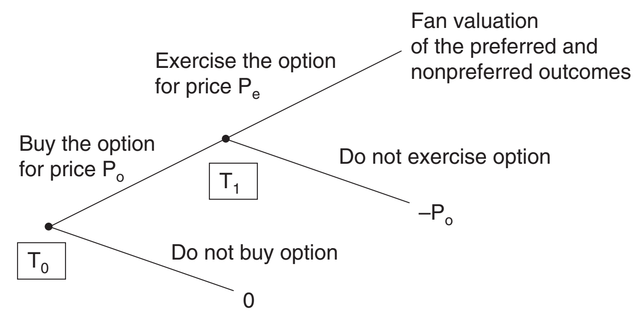
Now, consider pricing with consumer options, as we show in Figure 1. Here, fans can purchase a nonrefundable option ticket by paying $65 (the option price, P_o) well before the playing teams are revealed. Later, after the matchups are known, each fan can decide whether he or she wants to pay an additional $120 (the exercise price, P_e) to attend the final game. In this case, the first fan, who has a positive valuation for either outcome, will buy the option and exercise it because his or her expected valuation is the same as the expected ticket price (yielding profits of $185). The other fan will buy the option (yielding profits of $65) and exercise it only if his or her favorite team is playing. Thus, there is a 50% chance that this fan will also end up buying a ticket (yielding another $60 in expected profits). Therefore, the expected total profits for the league are $310. In this simple example, the league is able to completely extract the entire consumer surplus from both fans. Therefore, at least in the two-fan case, option pricing is weakly better than any other pricing scheme.

The extant literature on advance selling assumes that all consumers have positive valuations for both the preferred and the nonpreferred outcomes. However, the existence of fan heterogeneity in the preceding example implies that some fans are particularly sensitive to the outcome; their valuation for the nonpreferred outcome might be very low or even zero. In this case, additional profits can be earned by offering consumer options. If all fans have similar preferences, option pricing offers no advantage over advance selling. However, at worst, option pricing can do as well as advance selling. The league could always set the option price to be equal to the price under advance selling and the exercise price to be zero. Therefore, advance selling is a special case of option pricing.

We first consider the profitability of consumer options from the league's perspective in the next section. A simple model involving two fans with different valuations for the final game enables us to identify the conditions under which pricing with consumer options can indeed generate higher profits for the league. We demonstrate that heterogeneity in fan preferences is a necessary condition for consumer options to be valuable to fans and the league. We also briefly discuss multiple model extensions.

Following that, we empirically explore fan responses to consumer options for a (real) ticket to one game in the NCAA Division I men's Final Four tournament. Encouragingly, fans in the sample find the concept of consumer options easy to understand. Moreover, in general, fans believe that a consumer option constitutes a "fair" pricing mechanism, even if they end up choosing not to exercise the option ticket. In agreement with the insights from the analytical model, we find that some, but not all, fans have zero valuation for a ticket to a Final Four game that does not feature their preferred team, suggesting that fans are indeed heterogeneous in their preferences. Furthermore, because some basketball fans are willing to pay more for the flexibility that options afford, especially when the uncertainty about the teams playing in the final game is high, option pricing contributes to a higher consumer surplus. Overall, the empirical findings indicate that consumer options can create a win–win situation: They generate more profits for the league than advance selling, and at the same time, they increase fan surplus.

Figure 1
A DECISION TREE FOR CONSUMER OPTIONS



Notes: T_0 = outcome is unknown, T_1 = outcome is revealed, and P_0 and P_e are set by the firm at T_0.

We conclude by discussing the potential benefits of consumer options to the sports leagues given the institutional constraints under which they operate. We also outline promising directions for further research.

MODEL AND ANALYSIS

In sports markets, competition between popular, powerhouse teams usually generates the highest demand for tickets. Currently, most major sports leagues use a lottery to sell tickets to the public well in advance of any final championship game. The natural question that arises is, Given the uncertainty about the teams that will play in the final game, why does the league not set ticket prices after the matchups are known? First, given the possibility that less popular teams may end up playing, pricing and selling tickets in advance could be less risky for the leagues. For example, demand for the 2006 NCAA men's Final Four event dropped when it was known that nontraditional, "Cinderella" teams would be playing (Drew 2006). Second, leagues may be subject to "fairness constraints" (Kahneman, Knetsch, and Thaler 1986). Specifically, the league could be viewed as an unfair hoarder if it priced and sold tickets right before the game. Accommodating fan sentiments is important because, apart from ticket sales, a sizable fraction of the leagues' revenue accrues from nonticket income, including broadcasting rights. For example, the NCAA's current 11-year contract with CBS Sports brought in $6 billion—one of the largest contracts in U.S. sports history (Baade and Matheson 2004). Without loyal fans, television networks would lose viewers, and leagues would lose bargaining power over broadcast stations. Therefore, the leagues do not want to upset the fans. The NFL's position is consistent with this reasoning. Greg Aiello, the NFL's vice president for public relations, states that the league tries to set a "fair, reasonable price" to maintain an "ongoing relationship with fans and business associates" (Krueger 2001b, p. 25). Researchers argue that this is why leagues price tickets before the uncertainty has been resolved (Happel and Jennings 1995; Krueger 2001a). Accordingly, unlike some models of event ticket pricing that allow tickets to be priced and sold both before the season begins and after uncertainty has been resolved (Courty 2003), we keep with current practice and price tickets only at the beginning of the season. Therefore, in our model, we set both the option and the exercise price before the uncertainty regarding the teams is resolved.

The concept of consumer options is relatively new to the academic marketing literature. However, it is noteworthy that some enterprising (third-party) firms have begun implementing related pricing mechanisms for sports tickets. For example, FirstDibz.com (formerly TicketReserve) sells "forward" tickets that are tied to a specific team making it through the tournament—if this team loses early, the forward expires. With forwards, the third-party seller not only would earn the exercise price from the fans whose favorite team makes it to the big game but also would collect the initial forward price from multiple fans who believe that there is a reasonable likelihood of their team playing in that game. We believe that because of the potential for fan backlash, the NCAA would be hesitant to directly sell ticket forwards. Conversely, it may be more open to the idea of directly selling consumer options—tickets that do not expire if a particular team exits before the final game.

Finally, we note that leagues such as the NCAA are aware of the problems fans face when dealing with scalpers should they delay their ticket purchase. Because scalpers charge exorbitant prices or deal in counterfeit tickets, fans are often irate at the league for not doing anything about the situation (Coates 2003; Harrison 2009). Not surprisingly, the NCAA has recently implemented a review committee to consider alternative pricing mechanisms. We hope that the findings of this study inform its deliberations.

The Model

We now present a stylized model of the league's ticket pricing decision. Using this model, we identify the key conditions under which consumer options yield higher profits than advance selling and full information pricing. To make our points as clearly and simply as possible, we consider the behavior of just two fans, each having different valuations for attending a game in the Final Four tournament about which some uncertainty exists. Consistent with current practice, we assume that tickets (options) are sold only at the beginning of the season. We assume that the favorite team is common across fans and that, in the spirit of vertical differentiation, both fans prefer a game in which the favorite team is playing (the preferred game) to one in which it is not (the nonpreferred game). However, one fan—the team-based fan—has zero utility for the final game if the preferred game does not occur (i.e., if the favorite team is not playing). This team-based fan is willing to pay $U_T^+ > 0$ for a game involving the favorite team and 0 otherwise. The second fan—the game-based fan—gains positive utility from attending the game regardless of whether the favorite team is playing in it. This game-based fan is willing to pay U_G^+ for the preferred game and U_G^- for the nonpreferred game ($U_G^+ > U_G^- > 0$). Both fans maximize their expected utility. This assumption reflects a conservative approach; if fans are risk averse (which we consider in the next section), the value of an option ticket would be even higher than that derived in this section.

We assume that the probability of the preferred game occurring, γ, is derived from expert forecasts and is known to both the fans and the league. Early in the season, comparing men's college basketball rankings from sources such as the Associated Press Poll, Coaches Poll, and ESPN Poll, we find that experts typically provide similar estimates of which teams will make it through the tournament. This is because most experts use the same information—namely, the team's previous performance and the updated team composition (including player exits and new picks)—to predict future performance. For our analysis, it is not necessary that these beliefs be perfectly aligned across market participants—broad agreement is sufficient. The general findings are robust to perturbations of these beliefs.

Given this notation, the expected valuation of the team-based fan for the game is $EV_T = \gamma U_T^+$ and that of the game-based fan is $EV_G = \gamma U_G^+ + (1 - \gamma)U_G^-$. Finally, we assume that there are no incremental fixed or variable costs associated with consumer options; with the advent of ticket sales on the Internet, these costs have fallen sharply in recent years. In the remainder of this article, we focus on the situation that is most noteworthy in both theoretical and practical contexts—namely, the one in which the league sets ticket prices so that both types of fans participate in the market.[2]

Option Pricing

If $EV_G > EV_T$, we show that the league can employ consumer options to induce different behaviors from the two fans and obtain higher profits from consumer options than from advance selling. There are two cases to examine: one in which the utility of the team-based fan for the preferred game is higher than that of the game-based fan, and vice versa.[3]

Case 1: $U_T^+ > U_G^+ > U_G^- > 0$. In this case, the league sets the sum of the option and (expected) exercise prices equal to the expected valuation of each fan: $P_o + P_e = \gamma U_G^+ + (1 - \gamma)U_G^-$ and $P_o + \gamma P_e = \gamma U_G^-$. Simultaneously solving these two equations yields the following:

$$P_o^* = \frac{\gamma}{1-\gamma}\left\{U_T^+ - \left[\gamma U_G^+ + (1-\gamma)U_G^-\right]\right\}, \text{ and}$$

$$P_e^* = U_G^- - \frac{\gamma}{1-\gamma}\left(U_T^+ - U_G^+\right).$$

Note that as the utility of the game-based fan for the nonpreferred game (U_G^-) increases, the value of protecting against the downside decreases. Therefore, the price of the option decreases. Furthermore, because the utility of the team-based fan is higher than that of the game-based fan for the preferred game (i.e., $U_T^+ > U_G^+$), it is clear that the exercise price is lower than the utility of the game-based fan for the nonpreferred game (i.e., $P_e^* < U_G^-$). This ensures that the game-based fan will always exercise the option. Given that

[2]Analyses of the other possibilities, as well as an analytical demonstration that the league optimizes its profits by serving both fans, are available on request.

[3]Setting optimal prices as we have done is akin to maximizing the expected profit function: $\pi_o = (P_o + P_e)I_G + (P_o + \gamma P_e)I_T$, where π represents expected profit and I_G (I_T) is an indicator for a game-based (team-based) fan's purchase. The expected profits are given by $\pi_o = 2P_o + (1 + \gamma P_e)$, depending on whether the preferred game occurs.

the game-based fan will purchase the option and always exercise it whereas the team-based fan will purchase the option but exercise it only if the preferred game occurs, expected league profits are as follows:[4]

$$\pi_o^* = 2P_o^* + (1+\gamma)P_e^* = \gamma U_T^+ + \gamma U_G^+ + (1-\gamma)U_G^-. \quad (1)$$

With these prices, the league can set the option and exercise prices to balance between extracting the higher surplus of the team-based fan when the preferred game occurs and the positive surplus of the game-based fan when the nonpreferred game occurs. Therefore, the league can extract the expected surplus of both fans completely.

For example, consider the scenario we presented previously: The utility of the game-based fan is \$200 for the preferred game and \$170 for the nonpreferred game, and the team-based fan's utility for the preferred game is \$250. Assuming that the probability of the favorite team making it to the final game is .5, the expected valuations of the game-based fan and team-based fan are \$185 and \$125, respectively. The league can obtain the optimal option and exercise price by solving the two equations: $P_o + P_e = \$185$ and $P_o + \gamma P_e = \$125$. This results in an optimal option price of \$65 and an optimal exercise price of \$120; the expected profits of the league equal \$310, and the expected surplus of each fan is completely extracted.

Case 2: $U_G^+ > U_T^+ > U_G^- > 0$. In this case, the utility of the game-based fan is higher if the preferred game takes place *and* if the nonpreferred game occurs. Therefore, it is impossible to set option and exercise prices to completely extract the expected surplus of both fans; the game-based fan will always retain some surplus. Instead, the league will set the option and exercise prices so that the individual rationality constraint of the team-based fan is satisfied: $P_o + \gamma P_e = \gamma U_T^+$. To ensure that the game-based fan always exercises the option, the league sets the exercise price equal to the game-based fan's willingness to pay (WTP) for the nonpreferred game: $P_e^* = U_G^-$. Solving these two conditions for the optimal option price yields $P_o^* = \gamma(U_T^+ - U_G^-)$. Given that the game-based fan will purchase the option and always exercise it whereas the team-based fan will purchase the option but exercise it only if the preferred game occurs, expected league profits are follows:

$$\begin{aligned} \pi_o^* &= 2P_o^* + (1+\gamma)P_e^* = 2\gamma(U_T^+ - U_G^-) + (1+\gamma)U_G^- \\ &= 2\gamma U_T^+ + (1-\gamma)U_G^-. \end{aligned} \quad (2)$$

As an example, consider the case in which the game-based fan's utilities remain the same as in Case 1 (\$200 for the preferred game and \$170 for the nonpreferred game) but the team-based fan's utility for the preferred game is lower (\$190). Assuming again that the probability of the favorite team making it to the final game is .5, the expected valuations of the game-based fan and the team-based fan are now \$185 and \$95, respectively. The optimal exercise price equals \$170, which equals the utility of the game-based fan for the nonpreferred game. Accordingly, the optimal option price is set at \$10 to extract all surplus from the team-based fan. This results in profits of \$275 for the league.

Advance Selling

The profits from option pricing can be compared with those from advance selling. When $EV_G > EV_T$, the league sets the optimal advance price equal to the team-based fan's expected valuation ($P_{AS}^* = \gamma U_T^+$), generating profits of

$$\pi_{AS}^* = 2\gamma U_T^+. \quad (3)$$

Keeping in mind that $[\gamma U_G^+ + (1-\gamma)U_G^- = EV_G] > (\gamma U_T^+ = EV_T)$ in this case, we find that expected profits from consumer options (from Equations 1 and 2) are always greater than profits from advance selling.

This simple two-fan model provides some insights into how option pricing helps discriminate between the two types of fans. Option pricing is advantageous when the optimal option and exercise prices induce distinct behaviors from the two fans. Specifically, the fan with the low valuation for the nonpreferred game must purchase the option but not exercise it if the nonpreferred game occurs. Extrapolating these findings from the two-fan model to the level of the market with many fans, the following hypothesis describes the conditions that lead option pricing to yield higher profits than advance selling:

H_1: The higher profitability of option pricing compared with advance selling is driven by the presence of a significant fraction of fans who have both (a) a low, or zero, valuation for the nonpreferred game and (b) a lower expected valuation for the game than fans who have a relatively high valuation for the nonpreferred game.

Intuitively, H_1 ensures the presence of fans who are hurt when the nonpreferred game occurs—they value the protection from the downside that the option offers. However, these fans must not have a disproportionately high valuation for the preferred game either; if they do, they will be willing to pay substantially under advance pricing as well. This is because the expected upside associated with the preferred game would adequately compensate these fans for the expected downside. This lowers the attractiveness of the protection from the downside that the option offers.

Full Information Pricing

As we noted previously, the league is averse to the notion of pricing tickets after the identity of teams that will be playing in the final game is known. However, profits under such full information pricing can still serve as a useful theoretical benchmark. When $U_T^+ > U_G^+ > U_G^- > 0$, the league can implement full information pricing as follows: If the preferred game occurs, the league sets the price equal to the game-based fan's WTP for the preferred game (U_G^+), and if the nonpreferred game occurs, it sets the price equal to the game-based fan's WTP for the nonpreferred game (U_G^-). Because the team-based fan will purchase the ticket only if the preferred game occurs, the expected profits are as follows:

$$\pi_{FI}^* = 2\gamma U_G^+ + (1-\gamma)U_G^-. \quad (4)$$

Comparing Equations 1, 2, and 4, we find that when $U_T^+ > U_G^+ > U_G^- > 0$, profits from consumer options can be higher

[4]If $EV_T > EV_G$, the league will set price equal to EV_G to ensure that the game-based fan will purchase a ticket. Here, the advance selling price is equal to the option price and profits are equal across the pricing mechanisms. If $U_G^+ > U_G^- > U_T^+ > 0$, the league will implement advance selling.

than profits from advance selling *and* from full information pricing.

If $U_G^+ > U_T^+ > U_G^- > 0$, the league sets the price equal to the team-based fan's WTP for the preferred game if the preferred game occurs. If the nonpreferred game occurs, the league sets the price equal to the game-based fan's WTP for that game. Here, expected profits are as follows:

$$\pi_{FI}^* = 2\gamma U_T^+ + (1-\gamma)U_G^-. \quad (5)$$

These profits are identical to the profits from options in Equation 2. Therefore, depending on the fans' utility ordering, profits from option pricing may exceed or equal profits under full information pricing, even though prices under the latter mechanism are set after uncertainty is resolved. Intuitively, the league can employ options to protect fans from the downside and charge a premium for such protection.

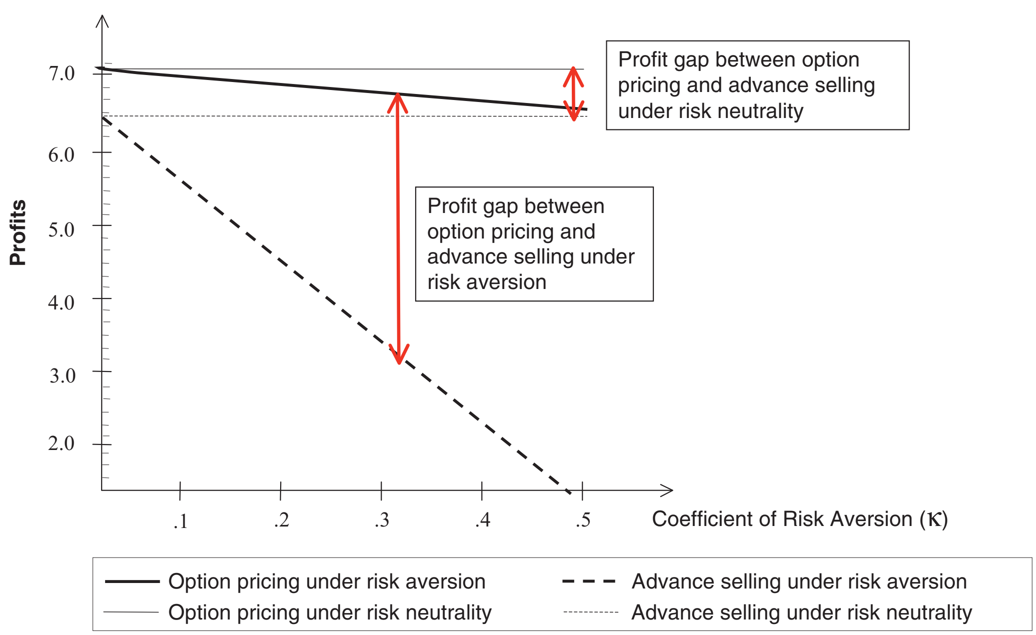
To summarize, our analytical findings thus far indicate that consumer options can indeed generate more profits for the league than the current practice of advance selling. The league can always mimic advance selling using option pricing by setting the option price equal to the advance selling price and the exercise price equal to zero. Therefore, option pricing can always do at least as well as advance selling. H_1 summarizes the key requirements for expected profits from consumer options to dominate profits from advance selling. Intuitively, as the game-based fan's gap in utility between the preferred and the nonpreferred outcomes increases, the need for protection from the downside is stronger; accordingly, the value of the option increases. Furthermore, as the probability of the preferred team making it to the final game decreases, the profit gap between option pricing and advance selling increases. This speaks to the value of option pricing in the presence of uncertainty. Option pricing yields higher profits by (1) protecting fans against the downside and (2) enabling superior price discrimination.

Model Extensions

Risk-averse fans. Thus far, the fans in our model are risk neutral. Because options offer fans protection from uncertainty, we posit that their relative advantage over advance selling will be enhanced when fans are risk averse. To test this expectation, we model the case of risk-averse fans in Web Appendix A (http://www.marketingpower.com/jmrjune10). We employ a mean-variance utility function to capture the certainty equivalent of risk-averse fans (e.g., Pulley 1981, 1983). That is, a risk-averse fan maximizes $\mu - \kappa\sigma^2$, where μ represents the mean utility, κ represents the risk-aversion coefficient, and σ^2 represents the variance of the utility. To compute the variance of a binary random variable (in our case, the net utility corresponding to the preferred and nonpreferred game), we use the formula $\Sigma_{i=1}^n p_i(x_i - \mu)^2$, where p_i represents the probability of outcome i (the preferred or nonpreferred game), x_i represents the random variable (the net utility under each pricing option corresponding to the preferred or nonpreferred game), and μ represents the mean utility. We find many noteworthy results.

We find that the option price charged by the firm when fans are risk averse is lower than that charged when fans are risk neutral (for details, see Web Appendix A). Intuitively, the risk-averse fan would like to pay a smaller price up front when he or she is unsure of the outcome. Additional insights are revealed when we compare profits under option pricing and advance selling under risk aversion and risk neutrality. Profits under advance selling and option pricing are analytically derived, and we plot them as a function of the risk-aversion coefficient κ in Figure 2 (assuming $\gamma = .65$, $U_G^+ = 4$, $U_G^- = 3.5$). As we expected, profits under both advance selling and option pricing decrease when fans are risk averse, compared with when they are risk neutral. This is intuitive because risk-averse fans are willing to pay less

Figure 2
PROFIT DIFFERENCES UNDER RISK AVERSION AND RISK NEUTRALITY



under each pricing mechanism on account of lower expected utility from participating in the risky outcome. In addition, however, the profit difference between option pricing and advance selling increases as risk aversion increases. This indicates that, all else being equal, as risk aversion increases, fans are willing to pay a higher premium for the protection offered by options than what they are willing to pay under advance selling. This yields a second relationship that can be examined in our empirical analysis:

> H_2: Risk-averse fans have a stronger preference for option pricing relative to other pricing mechanisms than do non-risk-averse fans.

Unexercised options. A possible concern in the context of option pricing is related to the disposal of unexercised options (if any). Xie and Gerstner (2003) suggest that by making it easier for fans to cancel advance tickets, firms can profit from the resale of those tickets. However, getting fans to inform the league of their cancellations of tickets that have been purchased in advance is challenging, even if such cancellation is made easy. Conversely, under option pricing, the league owns the seat until the exercise price is paid. The league can, should it choose to, resell the options that remain unexercised beyond a set deadline.

We extend our model to consider the resale of unexercised tickets options in Web Appendix B (http://www.marketingpower.com/jmrjune10). In our model, unfilled seats can arise for the nonpreferred game, which occurs with probability $(1 - \gamma)$, because the team-based fans will not exercise their options. We extend our model by including a second team-based fan who prefers to attend the game that the first team-based fan deems "nonpreferred." We determine the conditions under which the league prices the option exactly as in the basic model but can then fill the stadium if the nonpreferred game occurs by spot-selling seats corresponding to the unexercised options to the second type of team-based fans. When seats corresponding to the unexercised options can be resold as we described previously, we find that profits under option pricing continue to exceed those under advance selling.

A market-level model. We employ a model with just two fans to develop and present the intuitions in a simple and transparent manner. However, it is important to note that the key intuitions derived from the two-fan model endure in the context of an aggregate, market-level model with general demand functions. We analyze such an aggregate model and detail the parallels between the two models in Web Appendix C (http://www.marketingpower.com/jmrjune10).

AN EMPIRICAL STUDY

In this section, we empirically examine the face validity of our analytical conditions and demonstrate that expected profits from consumer options are higher than those under other pricing mechanisms. To do this, we explore fans' WTP for different types of tickets—corresponding to consumer options, advance pricing, and full information pricing—to an NCAA Final Four men's basketball game under various probabilities of the favorite team making it to the game. We use a Final Four game as the stimulus because of its relevance to the student population (94% of the respondents were familiar with the Final Four games). To elicit accurate WTP measures, we offered fans the opportunity to enter a drawing to buy a real ticket to the championship game based on their stated WTP for a ticket.[5]

Data and Measures

A total of 155 undergraduate students from a large university were recruited to participate in a 20-minute computer study in return for $5. In a within-subject design, each participant provided information about his or her WTP under each of the three pricing conditions. The within-subject design ensured that the option concept was contrasted with the more familiar advance ticket. Pretests indicated that fans were not overwhelmed with the three pricing conditions because their responses simply involved evaluating and clicking on the dollar amounts that captured their WTP under each pricing condition. At the beginning of the study, these respondents (i.e., fans) were asked to indicate their favorite men's college basketball team (more than 90% of respondents listed the home university as their favorite team). Subsequent questions were then automatically adjusted so that they were pertinent to that particular team. To be included in our study, fans needed to answer a set of questions designed to test their understanding of the options concept; four students were dropped because they did not pass this screen, which resulted in a final sample size of 151 fans.

Fans indicated their WTP for tickets to a game in the Final Four tournament (the final game) under three pricing conditions: (1) advance selling, (2) consumer options, and (3) full information pricing. To better focus on the effect of these pricing mechanisms, we offered fans the same broad range of prices ($0–$400, in increments of $20) across the pricing conditions. In the advance selling condition, fans indicated their WTP for an advance ticket given three different probabilities of their favorite team making it to a Final Four game (γ = .25, .50, and .75). On the basis of extensive pretesting, in the option pricing condition, we fixed the levels of the option price (P_o) at $20, $40, and $60. Given an option price, fans indicated the exercise price they were willing to pay (P_e) at three different probabilities of their favorite team making it to the final game.[6] In the full information condition, fans indicated their WTP for a ticket after they were informed about whether their favorite team had actually made it to the final game. Importantly, we allow for a "no-choice" decision by fans, who were informed that they could choose not to buy a ticket for a given probability under any pricing condition by indicating a WTP of $0.

Because this is a within-subject design, we counterbalanced the presentation order of tickets to control for possible order effects. We found no significant order effects in any of the analyses. To control for differences in payment timing across the pricing conditions (e.g., under option pricing, fans pay an exercise price in the future, whereas they pay in the present under advance selling), we asked fans to indicate their WTP for the exercise price in the present

[5]Of the fans in our study, 63% participated in the drawing. Participants were informed that if they won, they needed to buy the ticket by paying a randomly chosen WTP estimate they indicated in the study. Ultimately, the winner paid us $200 for the game ticket.

[6]We do not allow fans to choose both the option and the exercise price, because we want to obtain their WTP without confounding the measures with individual differences in risk preferences. Subsequently, we examine how risk aversion independently affects fans' WTP for consumer options.

should their favorite team make it through the tournament. To control for the notion that WTP may be influenced merely because choices become unavailable in the future (e.g., Ariely and Shin 2004), we asked fans to assume that both option and advance tickets were available only at the start of the season, before uncertainty was resolved.

Finally, because we also wanted to better understand the behavioral determinants of fans' WTP under the pricing mechanisms, following Padmanabhan and Rao (1993), we measured fans' risk preferences according to their responses to a lottery question (fans who are willing to pay less for the lottery than its expected value are considered risk averse; these fans represent 81% of our sample).

Findings

We first discuss fans' subjective evaluations of option pricing and the types of fans in our sample. We then examine how fan WTP varies as a function of fan type, pricing condition, probability of the favorite team making it to the final game, and interactions between these factors. We also discuss how fans' aversion to risk affects their WTP for the different pricing mechanisms. Following that, we detail how the league's profits—computed from the WTP estimates—vary across pricing mechanisms. Furthermore, we examine the implications of each mechanism for total fan demand and the mix of fans who ultimately participate in the market. Finally, we discuss the implications of the pricing mechanisms for fan surplus.

Fan reactions to consumer options. To better understand fans' perceptions of consumer options, we obtained open-ended feedback. Overall, 90% of our sample thought that the consumer options were simple to understand, and 88% deemed the pricing mechanism to be fair. For example, one respondent thought the option ticket was fair "because it allows you to risk a small amount to gain something of much larger value." Furthermore, we asked a separate sample of 40 fans about whether they thought the option ticket constituted a fair pricing mechanism *after* it was known that their favorite team was not going to be in the final game. We find that fans continued to view the option as a fair pricing mechanism *ex post*, even if their favorite team did not make it to the final game.[7]

Fan heterogeneity. Figure 3 shows the frequency distribution of fans' WTP values for the final game without their favorite team. These WTP values are based on responses to the full information condition when the final outcome is known with certainty. In the context of H_1 from our analytical model, a significant fraction of respondents have low, or zero, valuations for the game that does not feature their favorite team. Fans who have zero valuation for such a game represent 29% of our sample. Consistent with our model, we define these fans with zero valuation as team-based fans. Furthermore, although game-based fans have a positive valuation for both the preferred and the nonpreferred game, 47 game-based fans value the nonpreferred game at less than \$50. Figure 4 displays the distribution of fans' valuations for the preferred game. Team-based fans are willing to pay an average price of \$102 for a ticket to the game when it is known with certainty that their favorite team is playing, whereas game-based fans are willing to pay an average price of \$179; this difference is statistically significant ($t = 5.07$, $p < .01$). Furthermore, in the context of H_1 from our model, an examination of Figures 3 and 4 reveals that the average game-based fans' expected valuation for the game is significantly higher than the average team-based fans' expected valuation for any given probability of the favorite team making it to the final game.[8] This indicates that the conditions are aligned for consumer options to be a profitable pricing mechanism. However, for H_1 to hold, it remains to be shown that the presence of team-based fans is

[7]In particular, when γ is relatively small, a repeated measures analysis of variance indicates that fans believe that consumer options are significantly more fair than advance tickets, even if they eventually do not exercise the option ($F(2, 40) = 4.26$, $p < .02$).

[8]At $\gamma = .25$, .50, and .75, the t-values associated with these differences are 10.08, 8.04, and 6.30, respectively. This ordering of expected valuation continues to hold even when some game-based fans who have a low valuation for the nonpreferred game are grouped with the team-based fans.

Figure 3
FAN VALUATIONS FOR THE NONPREFERRED GAME UNDER FULL INFORMATION

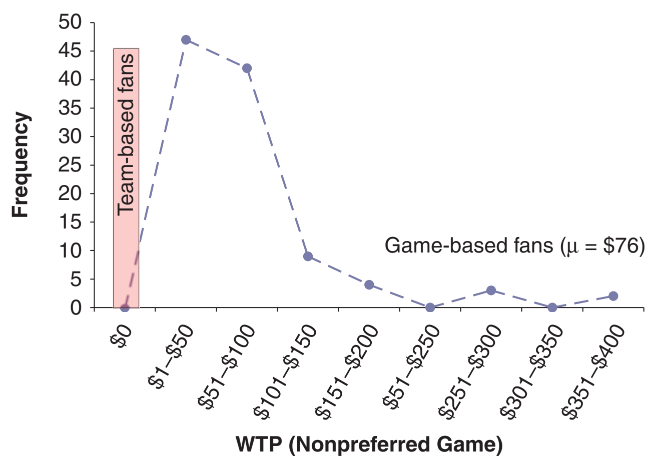
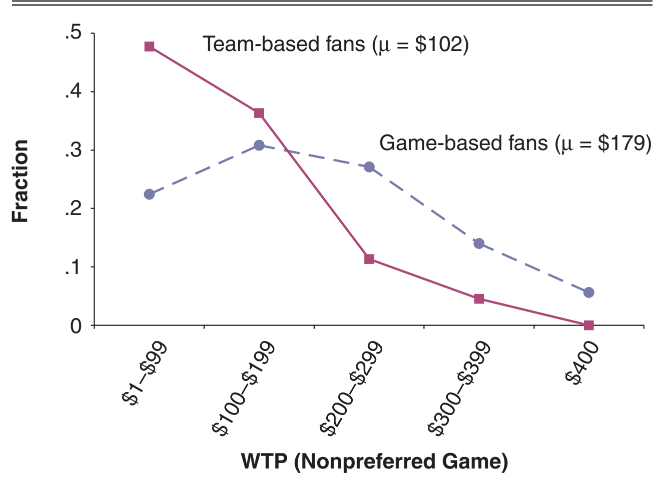


Figure 4
FAN VALUATIONS FOR THE PREFERRED GAME UNDER FULL INFORMATION



an important driver of the profitability of consumer options; we return to this task subsequently.

Fan WTP. For each of the three probabilities that the favorite team makes it to the final game (25%, 50%, and 75%), we calculated fans' WTP under each of the pricing mechanisms. Fan WTP is a measure of the maximum profit the league can extract from the fan if it could offer customized prices under first degree price discrimination for each fan under a given pricing mechanism.

Under advance selling, each fan's WTP is simply the maximum price he or she is willing to pay for an advance ticket for a given probability of the favorite team making it to the final game. Under full information pricing, we first note the maximum prices a fan is willing to pay when it is known for sure (1) that his or her favorite team is going to play in the final game and (2) that his or her favorite team is not going to play in the final game. For each condition, the fan's expected WTP is then calculated by weighting these values by the *ex ante* probabilities that the favorite team would or would not play in the final game (i.e., 25%–75%, 50%– 50%, and 75%–25%).

For each probability of the favorite team making it to the final game, we compute each fan's WTP under options pricing by examining his or her willingness to purchase and exercise the option for each combination of option price (this was set at three levels; i.e., $20, $40, or $60) and exercise price (this varied from $0 to $400 in increments of $20, yielding 21 levels of the exercise price), for a total of 63 price combinations. The study design was programmed to be efficient; we did not need to ask fans about their behavior under each of the 63 price combinations. In calculating each fan's WTP, we account for the possibility that at a given price combination, a fan can purchase the option ticket but not exercise it if the preferred team does not make it to the final game. Provided that a fan is willing to purchase the option at a given combination of the option and exercise price, the fan's WTP at that price combination is then calculated as the sum of (1) the option price the fan was willing to pay, (2) the probability-weighted exercise price in case the favorite team made it through, and (3) the probability-weighted exercise price if the favorite team did not make it *and* the fan was still willing to exercise the option and attend the game. Finally, by comparing the fan's WTP across all combinations of the option and exercise prices, the fan's maximum WTP can be calculated.

For each probability of the favorite team making it to the final game, we then calculated the average WTP across fans for each of the pricing conditions; we report these averages in Table 2. We detail the results from the associated 3 × 3 repeated measures analysis of variance (pricing conditions × probability levels) in Table 3 and summarize them as follows:

1. The main effect of pricing condition and probability level is significant. This implies that fans are willing to pay different amounts for the ticket depending on the pricing mechanism and the probability that their favorite team will make it to the final game.
2. The significant interaction between pricing condition and probability level implies that, in general, fans are willing to pay more for option pricing when the likelihood of their favorite team making it through is low (i.e., when γ is small). Intuitively, the protection offered by the option is most valuable when there is a substantial potential downside associated with the final outcome.
3. The significant interaction between pricing condition and fan type indicates that team-based fans are willing to pay more for options than game-based fans. Intuitively, team-based fans are much more sensitive to the identity of the teams playing in the final game than game-based fans; therefore, they place greater value on the role of the option in protecting them from the downside.
4. Finally, the three-way interaction involving pricing condition, probability level, and fan type is significant. This implies that team-based fans are willing to pay more for consumer options at every probability level, whereas game-based fans are most interested in consumer options when the probability of their favorite team playing is low.

From Points 3 and 4, it is also clear that the behavior of the team-based fans, who need the most protection from the downside, will drive the profitability of options. This supports H_1.

Fan risk aversion and WTP. Fans are classified as risk averse if they are willing to pay less for a lottery than its expected value. In Figure 5, the average WTP across the probability levels for each of the three pricing mechanisms is displayed for (1) fans who are risk averse and (2) those who are not. Risk-averse fans who dislike being exposed to uncertainty find consumer options particularly desirable. The interaction of pricing condition (advance selling, option pricing, full information) with the risk-aversion measure (risk averse or non–risk averse) is significant ($F = 12.28$, $p < .001$).

Table 2

AVERAGE FAN WTP UNDER ALTERNATIVE PRICING MECHANISMS

	Game-Based Fans	*Team-Based Fans*
Full Information		
$\gamma = .25$	$101.8	$25.6
$\gamma = .50$	$127.4	$51.1
$\gamma = .75$	$152.9	$76.7
Advance Selling		
$\gamma = .25$	$89.0	$27.7
$\gamma = .50$	$110.1	$48.2
$\gamma = .75$	$136.3	$67.7
Consumer Options		
$\gamma = .25$	$116.8	$64.6
$\gamma = .50$	$125.1	$82.3
$\gamma = .75$	$129.3	$111.6

Table 3

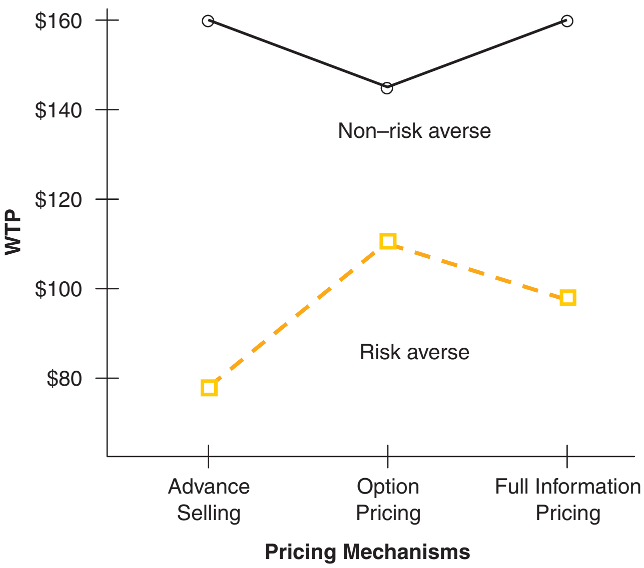
REPEATED MEASURES ANALYSIS OF VARIANCE (WITH FAN TYPE AS A BETWEEN-SUBJECT FACTOR)

Source	*Type III Mean Square*	*F-Statistic*
Pricing condition	60,113.1	18.35 (.000)
Probability level	161,362.5	128.42 (.000)
Pricing condition × probability level	3694.2	5.36 (.000)
Pricing condition × fan type	36,501.3	11.14 (.000)
Probability level × fan type	2009.7	1.60 (.204)
Pricing condition × probability level × fan type	4209.7	6.11 (.000)

Notes: Significance level is in parentheses; n = 151.

Figure 5

RISK AVERSION AND AVERAGE FAN WTP ACROSS PRICING MECHANISMS



Considering risk aversion (in Web Appendix A) enables us to strengthen the ties between the empirics and the theory. As Figure 5 shows, fans with a higher risk aversion are willing to pay more under option pricing than under the other two pricing mechanisms, whereas fans who are not risk averse are not willing to pay more under option pricing. This supports H_2.

Firm profits. The findings regarding consumer options so far are encouraging. However, consumer options must ultimately deliver higher profits to be of interest from the viewpoint of the firm. To empirically verify the profitability of consumer options, for each level of probability that the favorite team will make it to the final game, we use the individual-level WTP information to calculate the market demand for tickets at various prices across the three pricing mechanisms.

Under advance selling, we directly use the WTP of fans to compute demand under all prices for each level of probability (25%, 50%, and 75%) that the favorite team makes it to the final game. At a given advance price and a fixed probability, a fan with a WTP higher than that price would purchase the ticket. Accordingly, we calculate the total profits generated at each price level and demarcate the price that maximizes total profits. Likewise, for pricing under full information, we calculate fan demand and profits under various prices for two separate scenarios: (1) the favorite team makes it to the final game and (2) the favorite team does not make it to the final game. We choose the two (distinct) prices that maximize profits in each of these scenarios. We then calculate total (expected) profits under full information pricing by weighting these profits with the *ex ante* probabilities of the favorite team making it or not making it to the final game.

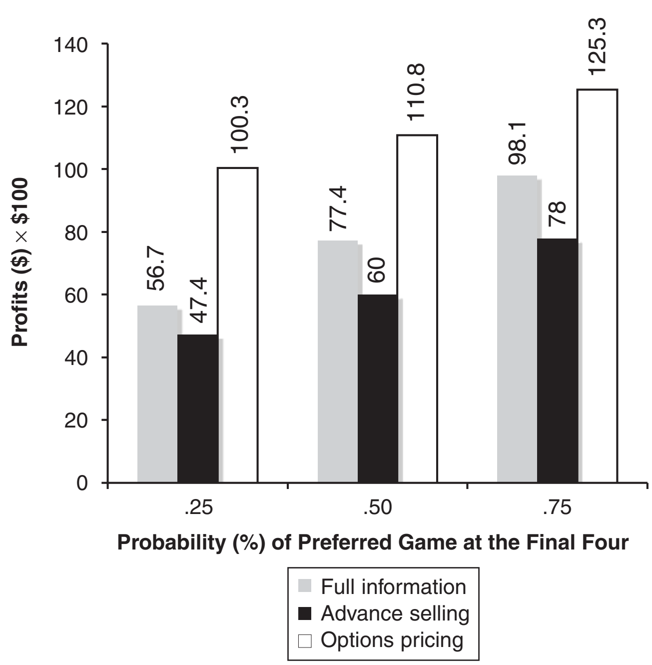
For option pricing, at each probability level of the favorite team making it to the final game, we similarly compute the demand for options using the obtained WTP values for each combination of the option price and the exercise price. As we noted previously, in calculating the profits corresponding to each of the 63 possible price combinations, we account for some fans purchasing the option ticket but not exercising it when the preferred team does not make it to the final game—these behaviors can be readily inferred from the WTP information described previously. Finally, at each probability level, we identify the specific combination of option price and exercise price that maximizes the profits of the league.[9]

Figure 6 shows optimal profits across the three pricing mechanisms. Profits from consumer options are consistently higher than those from advance selling and full information pricing. Moving from left to right in Figure 6, we note that as the probability of the favorite team making it to the final game increases, the profits from each pricing mechanism increase. This is the main effect of the increased utility that fans associate with the preferred game. A more subtle effect is that the gap between profits under option pricing and advance selling is the highest when the probability of the team making it to the final game is the lowest (at $\gamma = .25$). This highlights the enhanced value of the option in environments in which the downside related to an uncertain outcome is prominent. Specifically, the option protects the fan from having to make a substantial investment up front when there is a low chance of the favorite team making it to the final game. Furthermore, profits from options are higher than those under full information pricing, which indicates that the league can benefit by proactively designing, and

[9]For $\gamma = .25$, .50, and .75, optimal advance ticket prices are \$60, \$80, and \$100, respectively; optimal prices under consumer options are $P_o = \$60$, and $P_e = \$20$, \$40, and \$40, respectively.

Figure 6

PROFITS ACROSS PRICING MECHANISMS



charging a premium for, a pricing mechanism that protects fans from the downside associated with the final game.

We also compute the average per-fan profit across the 151 fans in the sample under advance selling and option pricing (see Table 4). As we expected, per-fan profits under option pricing are considerably higher than those under advance selling. Furthermore, the per-fan profit premium from options pricing over advance selling is much higher for team-based fans than for game-based fans. This further supports H_1 and is consistent with the finding that team-based fans are, on average, willing to pay more for consumer options than game-based fans (see Table 2).

Demand effects. Some of the additional profits from option pricing are due to the fans' WTP for the flexibility that the option provides relative to an advance ticket. However, option pricing also expands demand. For example, even when the probability of the favorite team making it to the final game is high ($\gamma = .75$), more fans (54 fans in our sample) will only participate when offered consumer options than those who will only participate when offered an advance ticket (1 fan in our sample). Notably, the fans who participate under option pricing (but not under advance selling) have a low valuation for the nonpreferred game—on average, they are willing to pay only $24.40 for the nonpreferred game, whereas the remaining fans are willing to pay $72.10. Team-based fans constitute 29% of our sample, but they make up 43% of the fans who will only purchase the (optimally priced) consumer option. Therefore, option pricing is effective at attracting team-based fans. This outcome has some implications for the mix of fans in the stadium. In particular, fans are likely to derive some positive externality from the presence of additional team-based fans, as explained in the comments of one perceptive fan in our study: "The option ticket is fair because only loyal fans will pay in advance to reserve a seat. As a fan, I would be upset if the arena was full of people who did not care about the outcome of the game and just came there because they got the ticket for a good price."

Fan surplus. The findings indicate that options can enhance the league's profits, but how will fans fare under options compared with the current practice of advance selling? To calculate the surplus of each fan under advance selling, we subtract the optimal price for an advance ticket under a given probability of the preferred team making it to the final game from the fan's WTP at that same probability. Fans who did not participate obtained a zero surplus. We then add the surplus across the game-based and team-based fans and divide the computed surplus in each case by the number of game-based and team-based fans, respectively, to arrive at the average per-fan surplus by fan type.

Under option pricing, at the optimal option and exercise prices corresponding to a given probability of the preferred team making it to the final game, we first separate out fans according to their WTP into those who would not purchase the option, those who would purchase it but attend only the preferred game, and those who would purchase it and attend either game. Again, fans who do not participate (fans in the first group) obtain no surplus. For the remaining fans, we calculate the surplus as the difference between their expected utility (as measured by their WTP for the option and exercise price—this depends on whether they would attend only the preferred game or either game) and their expected payment (i.e., $[P_o + \gamma P_e]$ if they would exercise the option only if the preferred team played and $[P_o + P_e]$ if otherwise). As was done with advance selling, the surplus is added across the game-based fans and the team-based fans. We then divide the computed surplus in each case by the total number of game-based and team-based fans, respectively, to yield the average surplus by fan type (see Table 5).

Some noteworthy findings emerge in this context. First, average surplus is always higher under consumer options than under advance selling (the surplus premium or ratio of surplus per fan from options to advance selling is always greater than one). Second, the gain in surplus under options is higher, on average, for team-based fans. Third, the surplus premium for team-based fans is the highest when the downside associated with the outcome looms large (i.e., when γ is small). Thus, options do not unreasonably exploit fans' higher WTP even when the option ticket is most valuable.

Given that option pricing is more profitable than advance selling, how does option pricing result in more fan surplus as well? The profit difference between option pricing and advance selling is the highest when the probability of the preferred game is the lowest. Although option pricing can extract more surplus than advance selling, the optimal price under option pricing does not increase enough to capture all the increased WTP. This is because under option pricing, both option and exercise prices are set early in the season. If the league was to go against the institutional constraints we discussed previously by setting the exercise price later in the season, it could potentially extract the fan's surplus more effectively. This implies that under lower probabilities, fans have an enhanced WTP for an option ticket that is not completely extracted by the optimal prices, leaving them with

Table 4
AVERAGE PROFIT PER FAN UNDER ALTERNATIVE PRICING MECHANISMS

	Advance Selling	*Consumer Options*	*Profit Premium from Consumer Options*
Game-Based Fans			
$\gamma = .25$	$39.3	$71.5	1.8
$\gamma = .50$	$48.6	$81.7	1.7
$\gamma = .75$	$62.6	$88.9	1.4
Team-Based Fans			
$\gamma = .25$	$12.3	$54.0	4.4
$\gamma = .50$	$18.2	$53.2	2.9
$\gamma = .75$	$25.0	$68.6	2.7

Table 5
AVERAGE SURPLUS PER FAN UNDER ALTERNATIVE PRICING MECHANISMS

	Advance Selling	*Consumer Options*	*Surplus Premium (Ratio) from Consumer Options*
Game-Based Fans			
$\gamma = .25$	$40.2	$54.2	1.4
$\gamma = .50$	$45.4	$59.8	1.3
$\gamma = .75$	$53.3	$83.2	1.6
Team-Based Fans			
$\gamma = .25$	$3.6	$12.3	3.4
$\gamma = .50$	$6.8	$14.3	2.1
$\gamma = .75$	$10.0	$29.0	2.9

more surplus than under advance selling. Under higher probabilities, fans are willing to pay more for the ticket under both advance selling and option pricing; this is the main effect associated with an increased likelihood of the preferred outcome. However, because the uncertainty is low under higher probabilities, the value of the option is also low. Correspondingly, the optimal price charged under option pricing is lower than the advance selling price. Therefore, across the probabilities, surplus from option pricing remains higher than that under advance selling. Furthermore, this surplus increase is particularly strong when the downside looms large.

Together, these findings suggest that consumer options create a win–win situation for the league and fans. Pricing with consumer options generates more profits for the league than advance selling and more surplus for fans. Therefore, even if the league is not solely focused on maximizing profits (e.g., if enhancing fan surplus is desirable), consumer options will likely outperform advance selling.

DISCUSSION

In this article, we model and empirically validate the concept of consumer options in a sports market setting. We compare the profitability of three pricing mechanisms: (1) advance selling, in which the league sets the price before uncertainty regarding the teams that will play in a game in the NCAA Final Four tournament is resolved; (2) full information pricing, in which the league sets prices after this uncertainty is resolved; and (3) option pricing, in which the league charges an up-front option price that offers fans the right but not the obligation to see the game and an exercise price that fans who purchased the option can choose to pay after the uncertainty is resolved. To do this, we develop a simple two-fan model to explore how consumer options can enhance profits by offering fans protection from the downside that a nonpreferred team will play in the final game and allowing the league to effectively price discriminate across fan segments. This analysis enables us to identify conditions under which profits from option pricing exceed those from advance selling and full information pricing.

We then empirically study fan behavior in a simulated market for a Final Four basketball game and verify that option pricing can indeed yield higher profits than advance pricing and full information pricing. Although option pricing is more profitable than other pricing mechanisms across a range of probabilities of the favorite team making it to the Final Four game, the profit advantage is the highest when this probability is the lowest. This highlights the role of an option in protecting fans from the downside associated with an uncertain outcome. Furthermore, we find that risk-averse fans are willing to pay more under option pricing than fans who are non–risk averse. Apart from delivering higher profits, options also expand market demand. Fans who had not considered buying a ticket before because of the uncertainty of whether their favorite team would attend the game might find it worthwhile to purchase an option on a ticket. Therefore, option pricing could be more profitable than advance selling as a result of both (1) the premium pricing the league can charge from consumers and (2) increased demand in terms of market expansion. Overall, the findings suggest that consumer options can be an effective and profitable pricing mechanism.

The existence of distinct fan segments with different valuations for the uncertain outcome underpins the enhanced profitability of option pricing. Without these differences, advance selling would be just as profitable as option pricing. However, fans are heterogeneous, and when expected valuations vary, option pricing is more profitable than advance selling. Furthermore, option pricing can always do at least as well as advance selling; therefore, advance selling is a special case of option pricing. Next, we discuss some practical issues related to implementing the option pricing concept by sports leagues.

Implementing Consumer Options

Market information required by the league. To set option and exercise prices, a sports league such as the NCAA requires information about the prospects of the teams that could play in the final games and fans' WTP under various prices. Information about team prospects can be collected from sports networks, such as CNNSi and ESPN, or from consensus estimates derived from surveys of experts, and WTP information must be collected from fans.

In many market research situations, people who are surveyed are wary about revealing information. In contrast, the sports fans we studied were eager to share their team-related preferences and related information. Discussions about sports are naturally exciting and, in general, nonthreatening. Therefore, we expect that collecting information from sports fans in the real world would be easier than collecting typical product preference information.

For the league, an easy way to classify fans into different groups would be to ask if fans would be willing to attend any game in which their favorite team is not playing; if their WTP is zero, we presume that they are team-based fans. Although deducing specific WTP information can be challenging, one advantage in this context is the league's ability to fulfill any incentive-compatible contract that is proposed as part of the research process.[10] For example, for each pricing mechanism, the league could conduct a Vickery (second-price sealed-bid) auction for a representative fan sample and collect WTP information from that sample. Specifically, given a certain likelihood of the team making it to the final game, as estimated by the league, the fans would bid for an advance ticket, a full information ticket, and an option-based ticket. In the case of the full information ticket, the payment would be returned if the focal team did not make it to the final game. In the case of the option-based ticket, the league collects information about both the option price and the exercise price that were bid by the fans. Using this information, the league can set option and exercise prices for each team.

To simplify the process, the league could decide to set common option and exercise prices across groupings of teams. For example, the teams that were seeded in the top ten and a few perennial favorites could share a common option and exercise price.

Timing of the option sale. Practically speaking, the league could begin selling options for the NCAA Final Four games across teams during the "off-season" (i.e., after the previous season finishes) and continue selling options until the first few games of the next season. We recommend that the

[10]We thank the editor for bringing this to our attention.

league sell options during this time because it is when the uncertainty regarding which teams will make it through to the final game is the highest.

Option exercise deadline. To avoid empty seats in the stadium, the league could set a deadline before which the option needs to be exercised. This "exercise-by" date would be known to fans when they purchase the option. For example, in the context of the Final Four games, the exercise-by date could be in the week before the final tournament begins. In this last week, the teams that are playing in the Final Four are known, and the fans can make their exercise decision. Beyond the exercise-by date, the league would have a precise idea of how many empty seats are available to be allocated. As we explained previously, the league could then resell those tickets.

Scalping. Option pricing provides team-based fans, who would like to wait to purchase their tickets, with a viable alternative to scalpers. Fans who pay the option price up front do not need to approach scalpers to purchase a ticket after the uncertainty about the game is resolved. Profits from scalping do not flow into the league's coffers. Therefore, option pricing can help shore up profits and lessen the league's vulnerability to scalping. Furthermore, because a key feature of option pricing is that the league owns the ticket until the option is exercised, the league can simply insist that the same credit card be used or some other proof of identity be provided at the time the option is exercised. This naturally curbs scalper activity compared with advance selling and provides genuine fans the ability to make the appropriate exercise decision after uncertainty is resolved. There remains the residual concern that after a person exercises the option and obtains the entry ticket, he or she could then sell the ticket in the open market. However, this is a matter of "policing at the entry gate" on the day of the game—an issue that applies across pricing mechanisms.

Season tickets. Option pricing could also be applied to season tickets that are sold in advance and cover all, or a fixed subset of, the games in a season. Fans typically buy season tickets because they fear that tickets may become unavailable for the games they would like to attend. A consequence of this situation is that fans who may not want to attend all the games could end up reselling the tickets in the secondary market or leaving their seats empty for the game. In contrast, under option pricing, fans could buy an option that covers all the games but selectively exercise the option to buy tickets for the games they care to, or are able to, attend. However, if the option for a particular game is not exercised before a preset date, the league could resell that seat in the open market.

Conclusion

The concept of consumer options can be extended, with appropriate modifications, to other markets in which consumers face some uncertainty, but the firm may find it difficult to set prices after the uncertainty is resolved. For example, consumers who want to protect themselves against the risk of sold-out flights to Florida could buy a flight ticket option that reserves seats on a particular flight for a particular date ("travel date"). This option would expire on a preset expiry date, ahead of the travel date. For example, if the weather in Florida was predicted to be unpleasant around the travel date, the consumer could choose not to exercise the option. The firm could vary the option price depending on the consumers' need for flexibility. For example, if the consumer is willing to exercise the option one week before the travel date, the price of the option could be lower than if he or she is willing to exercise it only three days before the travel date.

Likewise, consider the market for high-definition television sets (HDTVs). Consumer uncertainty about the variety of programming available in HD format has been a key impediment to the growth of HDTV sales (Bryant 2007). This uncertainty suppressed market prices and sales for large-screen, non-HDTV sets because consumers did not want to be saddled with a large, sunk investment in outdated technology. Rather than having consumers wait on the sidelines, an enterprising television manufacturer could have encouraged the purchase of a conventional large-screen television along with an option. The option, which would expire at a certain point in time, would allow consumers to pay an exercise price to buy a new HDTV-capable set at a reduced price. Consumers who did not think that there was sufficient HD programming available to make the exercise of the option worthwhile would have let it expire, whereas others would have exercised it.

Our analysis has some limitations, some of which can be addressed in further research. First, we do not consider hybrid pricing strategies that simultaneously offer a mix of option, advance selling, and full information pricing. Further research might consider the design of an optimal menu of pricing mechanisms, which may yield higher profits than any of the mechanisms implemented on a stand-alone basis. Second, researchers could expand our analysis to formally include a secondary market with scalpers. As we argued previously, we would expect to find that options reduce the vulnerability of the sport leagues to scalping activity. Third, the fans we studied were comfortable with the concept of consumer options. However, consumers may be unable to accurately predict their long-term reactions to consumer options; instead, they are likely to learn about their feelings through experience. Further research could study fans' long-term reactions to option pricing. Finally, our analysis can be extended to include the case of fans being horizontally differentiated in terms of preferences for many games occurring in the tournament. A formal extension of our model to incorporate multiple market settings could accommodate such horizontal differentiation, with team-based fans in each market exercising their options only if their own favorite team made it to the final game.

This article is a first step toward examining the performance of consumer options from a theoretical and empirical perspective. In our empirical study, the majority of respondents believed that option pricing was a good idea—one that was fair and easy to understand. Both analytically and experimentally, we demonstrated that option pricing can yield higher profits than existing pricing mechanisms. We hope this article catalyzes further research and managerial interest in the area of consumer options.

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