The Economic and Labour Relations Review Vol. 23 No. 2, pp. 69–82

Uncertainty of Outcome and Attendance in College Football: Evidence from Four Conferences

Rodney Paul*
Brad R. Humphreys**
Andrew Weinbach***

Abstract

The relationship between the uncertainty of outcome hypothesis (UOH), where fans prefer games that are expected to be closely contested, and attendance is investigated in four non-AQ football conferences. The teams in these smaller conferences play games against each other and against bigger, more prominent schools in the elite AQ conferences. Using the betting market point spread as a proxy for uncertainty of outcome, two key points concerning the UOH emerge: college football fans in these conferences prefer less uncertainty of outcome both when their team is a home favorite and when their team is a home underdog.

JEL Codes: L83, D12

Keywords

Attendance demand; NCAA football; uncertainty of outcome hypothesis.

Introduction

Understanding the determinants of demand for live attendance at sporting events receives significant attention in the sports economics literature. Standard models of consumer theory, with the important addition of the uncertainty of outcome hypothesis (UOH), motivates much of this literature. The uncertainty of outcome hypothesis — the idea that consumer demand for live attendance at sporting events also depends on the expected closeness of the contest — represents a demand shift variable not found in settings outside sport. In addition to outcome uncertainty, a large empirical literature exists that examines the effect of ticket prices, concession prices, transportation costs, team quality, venue

* Department of Sport Management, David B. Falk College of Sport and Human Dynamics, Syracuse University, Syracuse, New York, USA
** Department of Economics, University of Alberta, Edmonton, Canada
*** Faculty of Economics, Coastal Carolina University, South Carolina, USA

https://doi.org/10.1177/103530461202300206 Published online by Cambridge University Press

characteristics, income, market characteristics like population, and the presence of promotions. This research has been carried out in a large number of settings around the world, for both professional and amateur sports.

We analyse the determinants of attendance at US college football games. College football games represent an interesting setting for analysing attendance demand. There are major differences across the 120 Football Bowl Subdivision (FBS) teams — the largest National Collegiate Athletic Association (NCAA) classification of football teams — in terms of quality of play, resources devoted to the football program, size of the universities, and size and other characteristics of the market that these teams play in. These differences provide a significant amount of variation in the factors that affect demand that can be exploited by empirical researchers.

The 'major' programs in college football play in the automatic qualifier (AQ in NCAA Football jargon) conferences: the Southeastern Conference (SEC), PAC 10 (Pacific 10) (now PAC 12), Big 10, Big 12, Associated Catholic Colleges (ACC), and Big East. The champion of each of these conferences gains an automatic entry into the premier Bowl Championship Series (BCS) games at the end of the season. Many of the top teams in these conferences sell out every home game in the regular season, so their attendance is limited only by the size of their stadiums. Excess demand clearly exists in these markets, but capacity constraints in terms of stadium size limits the variation in attendance and makes empirical modeling of attendance in these settings challenging.

In the smaller, non-AQ, conferences, however, wide variation in game and season attendance regularly occurs because the quality of the teams, market characteristics, and university size lead to excess capacity in stadium size. Sell outs of games are far less frequent, making the capacity constraints and truncation of data much less of an issue for economic researchers. We believe that smaller conference, non-AQ NCAA football games represent an interesting and under examined environment for empirical research on the determinants of attendance demand. Specifically, the importance of factors like the uncertainty of outcome hypothesis can be investigated in a setting where there are often large differences in the quality of teams, especially when a smaller-conference team hosts a powerhouse team from an AQ-conference, as well as more variation in game attendance. In addition, small conference college football games offer the opportunity to investigate the impact of institution and local market attributes, as well as traditional determinants such as the day of the week and point in the season of contests.

The primary focus of this article is to examine game attendance in four non-AQ conferences, the Mountain West, Western Athletic Conference (WAC), Mid-American Conference (MAC), and Sun Belt, taking into account the effect of the uncertainty of outcome hypothesis on attendance. The UOH focuses on the doubt (or lack thereof) about the outcome of games and how this affects demand. The UOH is important in sports economics because it motivates research on competitive balance, but UOH research differs from competitive balance research

in several important ways. Competitive balance[1] measures typically involve ex-post calculations based on factors such as the standard deviation of teams' winning percentage at the end of one or more seasons or measures of the overall distribution of wins or championships such as GINI coefficients or HHIs (use of the Herfindahl-Hirschman Index of market concentration). Uncertainty of outcome measures are strictly ex-ante, since they must reflect expectations, not outcomes. Therefore, use of prediction markets data such as point spreads and betting odds are ideal for estimating the uncertainty of outcome for a particular contest before the game is played.

The use of betting market point spreads or odds as a measure of uncertainty of outcome in games is not new, as it was used in attendance studies of baseball (Knowles et al. 1992; Rascher 1999), professional football (Coates and Humphreys 2010), rugby (Owen and Weatherston 2004), Australian Rules football (Borland and Lye 1992), and soccer (Forrest and Simmons 2002). In betting markets where the margin of victory is usually greater than a single point, such as college football, point spreads replace betting odds as prices in these simple financial markets.

The relationship between uncertainty of outcome and fan attendance is unclear, despite the prediction of the UOH. Empirical evidence has not uniformly supported the key prediction of the UOH. This may stem from the difficulties in determining what fans actually prefer when deciding to attend a game and from the fact that all games are not created in equal. For example, in the sample of college football games we analyse, fans may enjoy seeing their team win at home, which may or may not be a function of how close the game is expected to be. If fans prefer more certainty of outcome, as the point spread on the home team increases, attendance would be expected to increase. Alternatively, if fans strictly prefer close games, smaller point spread contests should be more popular than high point spread contests. In addition, there exists the possibility that many powerhouse programs in AQ conferences have large fan followings at road games. This, coupled with home team fan interest in seeing a potential upset (or simply desiring to see the powerhouse team come to their area), could lead to big road favorites being popular with fans.

The goal of this article is to examine attendance in four non-AQ conferences: the Mountain West, Western Athletic Conference (WAC), Mid-American Conference (MAC), and Sun Belt, on a game-by-game basis, accounting for the effect of uncertainty of outcome. In addition, we investigate individual college attributes to determine what attracts fans to college football games. We find that uncertainty of outcome, as captured by the point spread on the game, does not increase attendance at games, contrary to the predictions of the UOH. We also find that institution- and game-related factors affect attendance in the way standard consumer theory predicts. The article is organised as follows: the attendance regression model is outlined in section II. Section III presents and outlines the regression results. Section IV discusses the implications of the results and summarises the article.

https://doi.org/10.1177/103530461202300206 Published online by Cambridge University Press

A Reduced-Form Attendance Model

We analyse the determinants of game attendance using a reduced form empirical model of the determination of attendance at college football games. This model can be motivated by a standard microeconomic model of consumer choice, where utility maximising consumers decide to attend games based on their preferences and budget constraint. The regression model for college football attendance that we use is defined in Equation (1):

$$\text{Attendance}_{i,t} = \alpha_0 + \beta_1 (\text{Enrolment})_{i,t} + \beta_2 (\text{Population})_{i,t} + \beta_3 (\text{Private})_i + \beta_4 (\text{Female})_{i,t} + \beta_5 (\text{Win Percentage})_{i,t} + \beta_6 (\text{Homecoming Game})_{i,t} + \beta_7 (\text{Home Favorite Point spread})_{i,t} + \beta_8 (\text{Visitor Favorite Point Spread})_{i,t} + \beta_9 (\text{Over/Under})_{i,t} + \Sigma\beta_m (\text{Months})_m + \Sigma\beta_d (\text{Days of Week})_d + \Sigma\beta_k (\text{Conference Dummies})_k + \beta_n (\text{Conference Game}) + \varepsilon_{i,t} \quad (1)$$

The dependent variable is per-game attendance at institution *i* at time *t*. Examination of a histogram of the dependent variable indicated that it appears to be normally distributed, suggesting that a log transformation was not necessary. The βs are unknown parameters to be estimated. ε is an unobservable equation error term that captures all other factors that affect game attendance. We assume that ε is an independent and identically distributed random variable with mean zero and constant variance. Teams in the four non-AQ conferences analyzed generally play five-to-six home games in each season. In our sample, some games are excluded due to missing information. Games against Football Championship Subdivision (FCS) opponents, the smaller of the two major NCAA football classifications, are excluded. Information on one of the independent variables in our model, the point spread, was not available for these games.The explanatory variables are organised by category. The categories include institution and local market variables, team performance and expectations variables, months and days of the week indicators, and conference and conference-game related indicator variables. To begin, we analyse the effects of the attributes of the institution itself and the local market conditions on game attendance. To capture these factors, we included independent variables reflecting the total enrollment at the institution, the population of the city, a private institution indicator variable, the percentage of the student body that is female, and an indicator variable for homecoming games.

Enrolment is the total number of full and part-time students enrolled in the university. We posit that a larger student-body is likely to result in higher attendance at college football games since larger schools have more potential fans to sell tickets to. The population of the local area is also included to account for the number of non-college-community consumers in the area, which may affect demand for tickets. The size of the local population could have a positive impact on local college football attendance, or it could have a negative impact, if larger metro areas offer more alternatives for entertainment (sports or otherwise), which could lead to lower attendance at games.

An indicator variable is included for whether the college is a private institution. Private institutions may attract wealthier students and parents, who may be more likely to attend college football games. The percentage of the student

https://doi.org/10.1177/103530461202300206 Published online by Cambridge University Press

body that is female is also included as an independent variable. If female students are less interested in college football than male students, this variable will have a negative effect on attendance. Homecoming weekend is often a quite popular game to attend as many alumni return to their college to support their team specifically for this game. If homecoming games increase attendance, estimated parameter on this variable will have a positive sign. Homecoming game dates were obtained from the team's web site.

The win percentage of the home team is also included as an explanatory variable in the regression model. We use the lag of the win percentage of the previous season as a proxy for the quality of the team. More successful teams are expected to attract more fans, as winning teams are generally more popular with sports fans than losing teams.

One of the key elements we wish to investigate in this study is the role of prediction/gambling market information as a proxy for game outcome uncertainty and how this affects decisions by fans to attend games. We include the point spread on each game as an explanatory variable. The point spread generally has been shown to serve as an optimal, unbiased forecast of game outcomes (Sauer 1998). For college football, Paul, Weinbach and Weinbach (2003) showed that, based on game and point spread outcomes, the null hypothesis of weak-form market efficiency cannot be rejected in the college football betting market, although some potential profitable strategies exist in the tails of the distribution, for example wagering on big underdogs — especially at home. We assume that the point spread on a game will reflect the uncertainty of outcome of the contest. Larger point spreads will identify games with a more certain outcome, other things equal.

The uncertainty of outcome hypothesis predicts that fans prefer games which are expected to be competitive — in other words, close games — to games which are not expected to be close, other things equal. The uncertainty of outcome hypothesis has been tested in multiple settings, without a clear consensus in the results. In some settings, fans appear to prefer close games, while in other settings, leagues, and sports, fans appear to prefer a greater certainty that the home team will win. In a recent working paper, Coates, Humphreys and Zhou (2012) develop a model of consumer behaviour under uncertainty to motivate the UOH that includes both decisions under uncertainty and reference-dependent consumer preferences that account for spectator's expectation of the closeness of the contest. The UOH emerges from this model only in the case when the marginal utility from seeing an expected win exceeds the marginal utility from seeing an expected loss. If consumers have loss aversion, as motivated by Prospect Theory, then the model predicts that fans will attend games with a relatively certain outcome, either a relatively certain win or loss by the home team. This article surveys the previous literature testing the UOH and finds significant evidence supporting both cases that emerge from the model. The uncertainty of outcome hypothesis has not been tested before in this setting, and we add to this growing literature with this study of game attendance in the Mountain West, WAC, MAC, and Sun Belt conferences.

The nature of these non-AQ conferences and college football in general presented some difficulties in modelling the effect of the point spread, a market-based proxy of the expected outcome of a game. The absolute value of the point spread would reflect the expected competitiveness of a given game, but fan demand for college football is likely to be much more nuanced than reflected by a simple measure of the competitiveness of a game. Using a positive or negative value for the point spread, based on whether the road team or home team was favored, has also been deployed in the literature, but again this appears to lack the ability to capture the possibility that fans like to see the home team win, but given these non-AQ conference teams, they also may desire to see games played against top AQ-conference opponents, where the home team is likely to be a big underdog, no matter their expectation of the game outcome.

To account for this, we include two point spread variables in our regression analysis: a home favorite point spread and a road favorite point spread. The home favorite point spread variable takes a positive value (the actual point spread) when the home team is a favourite and a value of zero otherwise. Likewise, the road favourite point spread value takes the positive value of the point spread if the home team is an underdog and a value of zero otherwise. We believe this classification will reflect the fan preferences we think exist in this setting; more fans will attend games when the home team is expected to win, but if the home team is not expected to win, they still desire to see a good high-quality opponent (which results in a big road favourite in the betting market in the case of non-AQ conference teams) in the hopes of seeing a big upset or because they follow and cheer for the major college football power their home team is playing.[2] We also estimate a model that contains indicator variables for visiting teams from AQ conferences to capture this effect.

We also included the Over/Under from the betting market on each game to capture the amount of offense that can be expected in each game. The Over/Under is an estimate of the total number of points that will be scored by both teams in a game generated in betting markets; bettors can wager on the proposition that the total points will exceed the Over/Under or the proposition that the total points scored will be less than the Over/Under. Fans may prefer to see higher scoring games, and games with a higher expected total score will have a higher Over/Under.

The reduced form attendance model does not include a ticket price variable, so it cannot be interpreted as a demand function. No systematic source for ticket prices to games played by these college football teams exists, so collecting these data would involve substantial time and effort. Attendance is relatively low at these games. In general, season tickets for all home game, individual tickets for single games, and student tickets are available for college football games. Students often pay no entrance fee for games, but instead pay an athletic fee that covers entrance to all university sporting events. For the purpose of this analysis, the key factor is the relationship between ticket prices and the uncertainty of outcome variables. If ticket prices vary systematically with outcome uncertainty, then the

https://doi.org/10.1177/103530461202300206 Published online by Cambridge University Press

results will suffer from omitted variables bias; if there is no correlation, then this will not be a problem. The general practice in college football is to price all tickets in a season at the same value. This should eliminate any within season correlation between ticket prices and the uncertainty of outcome measures.

Our sample consists of all home games played against FBS opponents in the, Mountain West, WAC, MAC, and Sun Belt conferences over the 2003–2009 seasons. The sample contains 1,238 games. Summary statistics for the non-binary variables in our regression model are shown on Table I.

Table I: Summary statistics

	Game Attendance	University Enrollment	Local Area Population	% Female	Abs. Value Point spread	Over/ Under
Mean	22,269	17,796	247,331	52	10.8	53
Median	18,923	17,861	109,500	53	8.0	53
Std. Dev	12,201	6,298	334,469	6.5	8.3	7.3

The average game attendance was about 22,200. The median attendance is lower than the average, suggesting that a small number of high attendance games lie in the right tail of the distribution. The standard deviation is quite large, so the variability of game attendance is high. The average enrolment at institutions in the sample is just under 18,000 and the average population of the local area about a quarter of a million, colleges and universities in these conferences are not in large cities. The average student body skews slightly female in the sample. The average point spread on games is 10.8 points and the average expected total points scored 53.

Results and Discussion

We estimated the parameters of the reduced form regression model, Equation (1), using OLS. Standard errors were corrected for heteroscedasticity using the standard White-Huber 'sandwich' correction. The column headed Model 1 on Table II contains the basic OLS regression results with per-game attendance as the dependent variable.

In describing the regression results, we discuss the individual parameter estimates by category of independent variables. The intercept of the regression was found to be slightly more than 41,000 and was found to be statistically significant at the 1 per cent level.

In terms of the attributes of the individual schools in the sample, each variable was found to have a statistically significant impact on game attendance. The enrollment at the institution was found to have a positive and significant effect (at the 1 per cent level); larger schools have higher attendance at college football games. The overall population of the local area, however, was found to have a negative and significant effect at the 10 per cent level. Colleges located in larger metropolitan areas were found to have lower attendance than those in smaller cities. This is likely due to increased availability of entertainment options (professional sports, concerts, shows, etc.) for residents of larger cities.

https://doi.org/10.1177/103530461202300206 Published online by Cambridge University Press

Table II: OLS attendance regression results, Mt. West, WAC, MAC, Sun Belt

	Model 1	Model 2
Enrolment	0.506***	0.500***
	(11.09)	(10.79)
Population	-0.002	-0.002
	(-1.64)	(-1.76)
Private Institution	15608***	15566***
	(12.41)	(12.23)
% Students Female	-387***	-381***
	(-10.71)	(-10.97)
Home team win %	13069***	12307***
	(10.15)	(9.39)
Homecoming Game	1613**	1774**
	(2.72)	(3.02)
Home favourite line	133***	148***
	(3.93)	(4.26)
Visitor favourite line	99.7	83.7
	(1.87)	(1.64)
Over/Under	133***	124***
	(3.79)	(3.56)
October games	-2133***	-1778**
	(-3.38)	(-2.82)
Nov/Dec games	-3042***	-2814***
	(-4.11)	(-3.93)
WAC game	-5095***	-5015***
	(-6.41)	(-6.35)
MAC game	-12163***	-12244***
	(-18.68)	(-19.51)
Sunbelt game	-10594***	-10359***
	(-13.86)	(-13.54)
Conference game	-2740***	-874
	(-3.91)	(-1.22)
PAC-10 opponent	---	8144***
		(4.02)
BIG-12 opponent	---	1760
		(1.23)
ACC opponent	---	4665***
		(3.45)
SEC opponent	---	4097**
		(2.94)
Big-10 opponent	---	8909**
		(2.94)
Independent opponent	---	3051
		(1.87)
Observations	1238	1238
R^2	0.617	0.632

*t statistics in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$*

https://doi.org/10.1177/103530461202300206 Published online by Cambridge University Press

Private universities draw about 15,600 additional fans per game (statistically significant at the 1 per cent level) than public universities. This may be due to wealthier students attending private universities (and their families), who may be more likely to attend college football games. Another possible reason for this result could be resources devoted to college football at private schools. The percentage of the student body that is female was associated with lower attendance at football games, suggesting that female college students appear to not have as much interest in attending college football games as male students.

Team win percentage has a positive and significant effect on game attendance. Fans of college football, like fans of many other sports, enjoy attending games played by winning teams, who play higher quality football, more than games played by losing teams. Team win percentage was found to have a positive and significant effect at the 1 per cent level. Homecoming games, with all their associated festivities, were also found to be popular, as an additional 1,600+ fans attended these games (significant at the 1 per cent level).

In terms of the gambling market outcome variables, expectations of game outcomes appear to play an important role in determining game attendance in this sample. When the home team is favoured, an increase in the point spread is associated with an increase in attendance, other things equal. For each additional point increase in the point spread when the home team is favoured, attendance increases by 133 fans (statistically significant at the 1 per cent level). The more likely the home team is to win, when they are the favourite, the more fans are interested in attending the game. When the opposing (road) team is favoured, however, the fans may also respond more favourably to larger point spreads, although the evidence is weaker; the t-statistic on the parameter estimate for the visiting team favourite line of 1.87 for Model 1 translates to a borderline significant p-value of 0.062. Based on this more generous significance level, for each additional point by which visiting teams are favoured, the number of fans in attendance increases by about 100 fans. This is likely a result of fans interest in seeing very good and popular teams come to town to play their school. The best teams in college football, teams from the large AQ conferences, are much more likely to be large road favourites (to overcome the implicit home field advantage and have enough of a talent differential to be a big road favourite). Some fans attending these games are likely fans of the road team (as many AQ-conference schools have fan bases who travel well) and other fans of the home team may want to be there to see if their school can pull off one of the major upsets that seem to occur a few times each year in college football. This possibility is explored in Model II, which is described below. Note that a formal hypothesis test rejects the null hypothesis that the estimated parameter on the home favourite point spread variable is equal to the parameter on the visiting team favourite point spread variable at conventional significance levels.

Both of these results, the estimated parameter on both the home favourite and road favourite point spreads, contradict the predictions of the uncertainty of outcome hypothesis. Fans appear to be more willing to purchase tickets and attend games when the home team, or road team, are bigger favourites and are more likely to win the game (often by a large margin as evidenced by market

efficiency found in college football gambling studies). The UOH predicts that attendance would be higher at games with a small point spread, other things equal. Expected scoring, the total in the betting market, was found to have a positive, and statistically significant, effect on game attendance. Each additional point of expected scoring was associated with an increase in attendance of 133 spectators.

In terms of the months of the season and days of the week indicator variables, attendance declined as the season wears on, from September to November and December. Relatively few games are played in August (1.5 per cent of the games in the sample) and December (2.1 per cent of the games in the sample), so we included games played in August and September in a single category and games played in November and December in a single category. Compared to the omitted month, games played in August and September, games in October, November, and December had lower attendance. This probably reflects the colder weather in the later months. The model included indicator variables for the day of the week the game was played on; these results are not reported on Table II, but are available by request from the authors. For the days of the week, compared to the omitted day of Saturday (the most common day for college football games), Friday night games were shown to increase attendance (by over 3,000 fans — significant at the 1 per cent level), but Thursday night games were shown to significantly decrease attendance (2,700 fewer fans in attendance — significant at the 5 per cent level). Friday night games may be more popular due to many fans not having work on Saturday, while Thursday night may be unpopular for the same reason. Thursday nights may not be as popular of a night for these smaller conference teams, as ESPN often has AQ-conference teams playing in a nationally televised contest on Thursday nights.

The conference dummy variables, compared to the omitted conference (the Mountain West), were all found to have negative and significant effects. The Mountain West had the highest attendance figures for the conferences studied, while the MAC and Sun Belt conferences each had over 10,000 fewer fans than Mountain West conference games. Note that these conference dummy variables capture quality differences in play across the conferences. The final independent variable presented, conference games, were shown to have a negative and significant effect on attendance. Within-conference games led to nearly 4,800 fewer fans in attendance for these conferences compared to non-conference games. This further illustrates the popularity of the non-AQ conference teams hosting AQ-conference teams as fans of both the smaller home school and bigger road school attend these games in great numbers.

In addition to outcome uncertainty, observed variation in attendance could be explained by demand for higher quality competition. Consumer demand clearly increases with the quality of play, other things equal. One approach to controlling for the quality of play is to include the winning percentages for each team in the regression model (Meehan et al. 2007). Equation (1) already contains the winning percentage of the home team, so the quality of the home team is controlled for in Model I on Table II. However, the quality of opposing teams, especially the quality of the visiting teams from AQ conferences, is only

https://doi.org/10.1177/103530461202300206 Published online by Cambridge University Press

captured by the point spread variable, to the extent that these visiting teams from AQ conferences are typically large favourites when playing on the road against the teams in this sample. To assess the effect of the quality of the visiting team on attendance, and to control for the large number of fans of AQ conference teams that might travel to road games at nearby schools in the non-AQ conferences analysed here, we added a vector of indicator variables for visiting teams from five AQ conferences (PAC-10, Big-12, ACC, SEC and Big 10) and major independents (in this context this variable primarily identifies the University of Notre Dame). These results are reported in the column labelled Model 2 on Table II.

Adding these opposing team identifiers does not change the signs or significance of the parameter estimates in Equation (1) much. The primary change is that the p-value for the parameter estimate on the road team favourite point spread variable goes from 0.062 to 0.10. The effect of big home underdogs is diminished. The parameter estimates on the AQ opponent variables are generally positive and significant, except for the Big-12 conference which does not overlap geographically with the non-AQ conferences analysed here. The largest effect is for the Big-10 conference, which contains a significant number of large universities and also shares a geographic footprint with the MAC conference.

Note that the results on Table II are robust to the inclusion of season-specific indicator variables. These seasons-specific indicator variables would capture any systematic heterogeneity in attendance across seasons that affect all teams in the sample. These effects could include the business cycle and rule changes that affect the perceived quality of college football.

Conclusions

Data from four non-AQ conferences in college football were analysed to determine the relationship between game attendance and uncertainty of outcome, in addition to other factors known to affect demand for college football game attendance. Using a sample of games from smaller NCAA football conferences, we find that fans in these conferences do not behave as predicted by the uncertainty of outcome hypothesis. Using the betting market point spread as a proxy for uncertainty of outcome, fans prefer less uncertainty of outcome when their team was a home favourite and also prefer less uncertainty of outcome when their team was a home underdog. The latter result is relatively weak, as it is based on a p-value of 0.062 for the parameter estimate of interest. In short, games with larger favourites attract more fans to college football games, in direct contrast to the predicted outcome based on the UOH.

These findings are likely a result of two factors directly relating to smaller NCAA FBS conferences. First, fans of the home team prefer to see their team win when they attend games, resulting in greater attendance at games when the home team is a bigger favourite. Second, fans of the home team prefer to see the best teams from the biggest (AQ) conference teams come to play in their stadium. When these big-name college football teams visit these non-AQ conference schools, the home team is typically a large underdog. Even though the home team is expected to lose (likely by a large margin), fans turn out in abundance to attend these games. This likely stems from three possible reasons.

https://doi.org/10.1177/103530461202300206 Published online by Cambridge University Press

One, home fans want to see the home team pull off a major upset. Two, home fans like to see the best teams in the country, even if they defeat the home team. Three, the road team fans travel to see their team play on the road, resulting in higher-than-normal attendance figures at the smaller school.

These different estimated effects of outcome uncertainty on demand at college football games contradict the predictions of the uncertainty of outcome hypothesis, but support the predictions in the model developed by Coates, Humphreys, and Zhou (2012) with reference dependent preferences and loss aversion. More college football fans choose to attend games when the game outcome is more certain, other things equal. Although fans attending college football games in person may have these preferences, their desires may be vastly different when choosing to watch college football games on television, where the cost of attending, and of leaving the game, are much lower.

The other findings of this article indicate that various attributes of college campuses (and surrounding areas) are important determinants of college football game attendance. College enrolment and the school being a private university were shown to positively impact game attendance. The size of the local population and the percentage of the student body that is female were shown to negatively impact attendance. Further research on attendance at college football games may help to explain the reason for these effects, and assess the robustness of these results across different sports at the college level.

Notes

1. Many papers exist on competitive balance. An excellent review of the topic is Sanderson and Siegfried (2003) and Fort (2003). These papers explore the concept and measures of competitive balance in a special issue of the *Journal of Sports Economics.* Humphreys and Watanabe (in press) recently surveyed this literature.
2. Many AQ-conference teams have large fan followings that will travel to road games. A Big 10 team traveling to play a MAC school, for instance, often will have a large faithful following that will purchase tickets to the MAC home game. There appear to be many cases, where road games become extended 'home' games for these teams as their fans may dominate the local fan base at the game.

References

Borland, J. and Lye, J. (1992) 'Attendance at Australian Rules football: A panel study', *Applied Economics*, 24(9), pp. 1053–1058.

Coates, D. and Humphreys, B. (2010) 'Week to week attendance and competitive balance in the National Football League', *International Journal of Sport Finance*, 5(4), pp. 239–252.

Coates, D., Humphreys, B. and Zhou, L. (2012) 'Outcome uncertainty, reference-dependent preferences and live game attendance', *University of Alberta Working Paper* 2012-6.

https://doi.org/10.1177/103530461202300206 Published online by Cambridge University Press

Forrest, D. and Simmons, R. (2002) 'Outcome uncertainty and attendance demand in sport: The case of English soccer', *The Statistician*, 51(2), pp. 229–241.

Fort, R. (2003) 'Thinking (some more) about competitive balance', *Journal of Sports Economics*, 4(4), pp. 280–283.

Humphreys, B. and Watanabe, N. (2012) 'Competitive balance', in L. Kahane and S. Shmanske (eds) *The Oxford Handbook of Sports Economics*, Volumes I, Oxford University Press, New York.

Knowles, G., Sherony, K. and Haupert, M. (1992) 'The demand for Major League Baseball: A test of the uncertainty of outcome hypothesis', *American Economist*, 36(2), pp. 72–80.

Meehan, J., Nelson, R. and Richardson, T. (2007) 'Competitive balance and game attendance in Major League Baseball', *Journal of Sports Economics*, 8(6), pp. 563–580.

Owen, P. and Weatherston, C. (2004) 'Uncertainty of outcome and Super 12 Rugby Union attendance,' *Journal of Sports Economics*, 5(4), pp. 347–370.

Quirk, J. and Fort, R. (1992) *Paydirt: The Business of Professional Sports*, Princeton University Press, Princeton, NJ.

Paul. R., Weinbach, A. and Weinbach, C. (2003) `Fair bets and profitability in college football gambling,' *Journal of Economics and Finance*, 27(2), pp. 236–242.

Rascher, D. (1999) 'A test of the optimal positive production network externality in Major League Baseball' in J. Fizel, E. Gustafson, and L. Hadley (eds) *Sports Economics: Current Research*, Westport, CT, Praeger.

Sanderson, A. and Siegfried, J. (2003) 'Thinking about competitive balance', *Journal of Sports Economics*, 4(4), pp. 255–279.

Sauer, R. (1998) 'The economics of wagering markets,' *Journal of Economic Literature*, 36(4), pp. 2021–2064.

About the Authors

» **Professor Rodney Paul** works in the Department of Sport Management, David B. Falk College of Sport and Human Dynamics, Syracuse University. His research interests are Economics and finance of sports, macroeconomics and international economics. He can be contacted at rpaul01@syr.edu.

» **Dr Brad Humphreys** is a Professor and Chair of the Economics of Gaming, Department of Economics, University of Alberta. His research interests in sports economics include the economic impact of professional sports teams and facilities, the effect of social regulations like Title IX on intercollegiate athletics, the economic determinants of participation in physical activity, and the financing of professional sports facility construction. He can be contacted at brad.humphreys@ualberta.ca.

» **Dr Andrew Weinbach** is an Associate Professor at the Faculty of Economics, Coastal Carolina University, South Carolina, USA. His research interests include Applied microeconomics, sports economics, industrial organisation and financial economics. He can be contacted at aweinbac@coastal.edu.

https://doi.org/10.1177/103530461202300206 Published online by Cambridge University Press