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Abstract

A growing body of research examines the effect of loss aversion (LA) on consumers' decisions to watch or attend sporting events. Much of this research focuses on live game attendance. In contrast to the predictions of uncertainty of outcome hypothesis (UOH), loss-averse consumers prefer watching either potential upsets, or dominant performances by strong favorites, to events with uncertain outcomes. We test for LA vs. UOH effects in television viewing audience data for free over-the-air broadcasts of 304 Spanish football matches from 2008/09 to 2015/16. This setting generates substantial variation home team win probabilities because of the presence of two dominant teams (Real Madrid CF and FC Barcelona). The results support the importance of LA/upset preferences: audience size for matches when home teams are large underdogs and when heavily favored are larger than for matches with uncertain outcomes, even when controlling for observable and unobservable factors affecting the number of viewers.

JEL Codes: Z21, L82, L15

Keywords: loss aversion; upset preference; consumer decisions; television audience; football

Highlights

- we test for loss aversion versus uncertainty of outcome effects in sports television viewing audience size
- sample period covers eight Spanish *La Liga* seasons and includes 304 football matches
- the results support the importance of loss aversion/upset preferences

Loss aversion, upset preference, and sports television viewing audience size

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1. Introduction

Television (TV) viewing represents a substantial daily activity for many people worldwide and remains the most popular method of consuming live sports. The continual increase in television broadcasts contributes to the growing popularity of sports around the world. As of 2015, an estimated 1.57 billion households around the world owned at least one TV set and the worldwide average daily television viewing time was estimated at 221 minutes (Statista, 2017). In terms of sports broadcasts, there were more than 127,000 hours of programming available on broadcast and cable TV in 2015 and, in total, more than 31 billion hours spent viewing sports (Nielsen, 2017).

Preferences for sports vary in different regions -- table tennis would be the most popular televised sport in Asia, while NFL games attract the largest TV audiences in the United States – making identification of the most popular sport on TV difficult, but it seems clear that football (called soccer in the United States) has more TV viewers than any other sport worldwide, and the FIFA World Cup is by far the most watched sports competition in the world. In terms of domestic football competitions, the Spanish *La Liga* is one of the three most popular football competitions in the world (the English Premier League and the German Bundesliga would be the other two).

This paper analyses consumers' decisions to watch sporting events, in particular, the effect of outcome uncertainty on TV viewing audience size in the top Spanish football league, *La Liga*. While many previous studies focus on live game attendance, little research has focused on patterns in TV consumption of sporting events. In general, consumer demand for live sporting events depends critically on uncertainty about the outcome of the events.

The "classical" uncertainty of outcome hypothesis (UOH) predicts that consumer demand for live sporting events, either in-person or through some media, increases with uncertainty of outcome of the event. Recent UOH research emphasizes the importance of loss-aversion in the decision to consume live sports, predicting that consumers either prefer potential upsets, or events with a strong favorite, to events with uncertain outcomes (Coates, Humphreys and Zhou, 2014). Osborne (2012) notes that fans take great pleasure when low-probability outcomes like highly favored teams lose games occur.

An analysis of the effect of potentially low probability events on consumer demand for TV viewing requires a setting where specific events are unlikely to occur, but could, in rare conditions, be observed. Football matches in *La Liga* represent one such setting. This football

league contains two dominant teams, Real Madrid CF (Real) and FC Barcelona (Barca), which have enjoyed unparalleled success in domestic and pan-European competitions for a long period of time. Another *La Liga* team beating either Real or Barca would be considered rare events, but these teams attract the largest TV audiences in *La Liga*.

Estimates from reduced form empirical models of the determination of TV viewing audiences for free-to-air La Liga broadcasts in Spain over the 2008/09 through 2015/16 seasons show clear evidence of TV viewer preferences for watching games that could result in a rare upset, and for games where a dominant team is expected to win. After controlling for general team popularity, the relationship between the probability that the home team wins a match and the size of the TV audience has a clear U-shape. Games with a very low or very high probability of a home team win have larger TV audiences than games with an uncertain outcome, casting further doubt on "classical" outcome uncertainty as an important component of consumer demand for sport.

2. Context: Theory and existing literature

Early research on the effect of outcome uncertainty on consumption of sports (live game attendance, television viewing) focused on the idea that consumer demand increases with the degree of uncertainty associated with a sporting event, called the *Uncertainty of Outcome Hypothesis* or UOH. While the UOH was the dominant motivation for a substantial body of empirical research, it lacked a firm theoretical basis, despite the existence of a number of widely-used models of consumer choice under uncertainty.

Coates, Humphreys and Zhou (2014) developed a formal economic model of consumer choice of consumption of sports under uncertainty to motivate the UOH. The model assumed that consumers possess reference dependent preferences (RDP) for sporting events. In RDP models, consumers get both standard utility or consumption benefits from watching a game on TV and "gain-loss" utility that depends on their expectation of the experience of watching a game. This "gain-loss" utility can be positive or negative depending on whether the experience exceeds or fails to meet their expectation or reference point. The model also allows the marginal utility from gains relative to the reference point to differ from marginal utility from losses, like in prospect theory.

While the UOH emerges as a special case in the model, when the marginal utility of gains exceed the marginal utility of losses relative to the reference point. However, if consumer preferences include loss aversion, in that the marginal utility from unexpected losses exceeds the marginal utility from unexpected wins, then the model predicts that sporting events with

more outcome uncertainty will have lower consumer demand, because of the lost utility associated with experiencing a loss when the consumer expected the team to win. This generates both home win preference – the idea that consumer demand for sporting events increases with the subjective probability that a team will win a contest – and preferences for upsets. This prediction stands at odds with the UOH, which predicts that consumers lose interest in contests with relatively certain outcomes, reducing consumer demand for these contests.

The model developed by Coates, Humphreys and Zhou (2014) generates another key prediction: RDPs generate substantial positive gain-loss utility when consumers expect a team to lose a contest and the fan experiences the team actually winning the contest. The larger the difference between the consumer's reference point and the actual game outcome, the larger the increase in gain-loss utility associated with this outcome. This potential increase in utility can cause fans to watch a match that would otherwise be uninteresting. This aspect of the model is in line with the theory of the utility of witnessing the improbable (Osborne, 2012) and implies that consumers exhibit upset preferences. Consumer demand will increase for contests where one team is expected to have an extremely low probability of winning, because of the remote, but potentially utility enhancing, possibility of experiencing an unexpected positive outcome generates consumer interest in the game. If the consumer expects the team to lose a contest and the team actually loses, then the reduction in RDP gain-loss utility is small, because the outcome was expected. But if the consumer expects the team to lose a contest and the team actually wins, then the increase in RDP gain-loss utility is substantial. Consumer demand will increase for contests when a team is a heavy underdog, and fall when the outcome of a contest is expected to be a toss-up.

For example, consider the match between Getafe and FC Barcelona played at Getafe in November 2011 at Getafe. At the time the match was played, Barcelona was second on the league table and Getafe 15th. Based on the betting market odds, the home team had just a 7% chance of winning the match. The TV audience was 3.76 million, far above the average of 2.1 million in our sample. Why would a large number of viewers watch a game that Barcelona was expected to dominate?

This model predicts that viewers watch because they know that should Getafe, against all odds, defeat Barcelona, they would get substantial gain loss utility from watching this epic upset. In this case, viewers were rewarded with this additional utility. Getafe upset Barcelona 1-0.

The model generates clear predictions that can be tested with readily observable data. Given a measure of consumer demand for sport, either live game attendance or television viewing audience size, and an empirical proxy for consumer reference points for contest uncertainty, the UOH version of the model implies a concave, hill-shaped relationship between the probability a team will win a contest and the expected utility generated by the contest; the LA version of the model implies a convex, U-shaped relationship between the probability a team will win a contest and the expected utility generated by the contest. This convex relationship features upset preference at low probabilities a team will win a contest and home win preference at high probabilities.

Home win preference clearly affects decisions to attend games. Home win preference could also affect decisions to watch games on television. One reason is that the home team is listed first when matches are advertised in the media. Anchoring effects could lead television viewers to fixate on the first team listed as the preferred team. A second reason is the well-established existence of home advantage in sports. Home teams win games more often, even among evenly matched teams. The presence of home advantage could lead casual fans watching on television to expect, and prefer, that the home team should win.

The existing empirical literature contains two primary branches: tests of the relationship between outcome uncertainty and sports consumption using live attendance data, and tests using data on television viewing data. The literature using live attendance data is extensive; Coates, Humphreys and Zhou (2014) contains a detailed survey of this literature that concludes most of the existing evidence supports the LA version of the model.

A smaller body of empirical research examines the relationship between contest outcome uncertainty and television viewing audiences. Since watching a sporting event on TV can be less costly than attending, TV audience size may depend on different factors than live attendance. Cox (2015) surveys this literature. Only a handful of papers analyze the relationship between outcome uncertainty and TV audience size; the papers surveyed by Cox (2015) all contain evidence that games with higher outcome uncertainty draw lager audiences, other things equal. Cox (2015) also develops evidence that viewers of English Premier League football matches prefer to watch games with uncertain outcomes, although this evidence does not come from a model including a nonlinear function of home win probability.

Salaga and Tainsky (2015) analyze the relationship between betting market outcomes and TV audience size in US college football. This paper uses data from the second half of contests and point spreads. Salaga and Tainsky (2015) find evidence that television viewers prefer games with certain outcomes in some cases, and games with uncertain outcomes in other

cases. This evidence does not come from a model including a nonlinear function of the outcome uncertainty measure, point spreads in football games.

Paul and Weinbach (2015) analyze the relationship between point spreads and US National Football League TV audience size and find no impact of outcome uncertainty on TV audience size. Chung, Lee and Kang (2016) analyze the relationship between betting odds and US Major League Baseball TV audience size and find that TV audiences are higher in games with uncertain outcomes. These settings do not contain teams as dominant as Real and Barca, which implies reduced potential upset effects.

The closest paper to ours is Buraimo and Simmons (2009) who also analyze TV audience size in *La Liga* based on data from 151 TV broadcasts on free-to-air and subscription channels over the 2003/04 to 2006/07 seasons. The paper reports evidence of larger TV audiences for *La Liga* matches with more uncertain outcomes. However, this paper does not use a quadratic function of the probability that a home team wins the match as a proxy for outcome uncertainty, making it difficult to compare the UOH-TV audience relationship to the existing literature. This paper also analyzes a pooled sample of free-to-air and subscription broadcasts that may reflect viewing decisions. We analyze only free-to-air broadcasts using a quadratic measure of expected match outcomes.

3. Data description

3.1. Football matches' TV audience (number of viewers)

As explained in Pérez, Puente and Rodríguez (2015), since 1997 one *La Liga* football match can be viewed each week for free throughout the regular season and any Spanish TV channel can acquire the rights to broadcast this match through a bidding process. Subject to some restrictions described in detail below, the broadcaster with the rights to televise this free-to-air match has priority regarding selection of the match to be broadcast, so the matches broadcast free-to-air are not randomly assigned.

The sample period covers eight *La Liga* seasons, from 2008/09 to 2015/16. Seasons typically begin in late August and finish in early May the following year. Each season contains 38 rounds and one free-to-air match is broadcast in every round of the season; the remainder of the matches can be viewed through pay-per view or on subscription satellite channels.

The 304 football matches included in this analysis were broadcast on five different free over-the-air televisions channels in Spain. From 2008/09 to 2011/2012 the Spanish nationwide channel *La Sexta* broadcast one free-to-air match every Saturday night (n=175). Since the 2012/13 season the free-to-air match has been broadcast by different TV stations. *Marca TV*, a

Spanish sports television channel that ceased broadcasting as of July 31, 2013, broadcast 23 matches during the 2012/13 season and since February 21, 2015 the free-to-air match was broadcast by *Cuatro* (n=73) and *Energy* (n=13), two Spanish TV channels owned by *Mediaset España Comunicación*. The flagship television channel of Spanish public broadcaster *Radiotelevisión Española* took over the free-to-air match broadcast in the 2015/16 season (n=22).

In Spain, TV audience size data are provided by *Kantar Media*. The tool that Kantar Media uses to estimate the number of viewers is the people metre. These devices are placed in households all over the country and take into account the number of family members, age, social class, etc. and constitute a representative sample of the Spanish population. Moreover, only viewers who are tuned into a TV show for one minute or more are considered in the sample.

In this paper we analyse consumers' decision to watch a particular football match. This is proxied by the average number of viewers who watch each match throughout the entire broadcast. The dependent variable reflects the mean number of television sets tuned to the channel broadcasting the match during each minute of each match and represents viewer interest in the entire match. If many viewers switch to another channel, or turn off the television, late in a match, this variable will reflect this decision.

La Liga schedules matches throughout each weekend, including the free-to-air match. Over 65% of the matches in the sample period were broadcast on Saturday. However, for midweek *La Liga* fixtures (n=25) the free-to-air broadcast took place on Wednesday (from 2008/09 to 2011/12) or Thursday (from 2012/13 to 2015/2016). Finally, between 2012/13 and 2014/15 the free-to-air weekend match moved from Saturday to either the previous Friday or the following Monday.

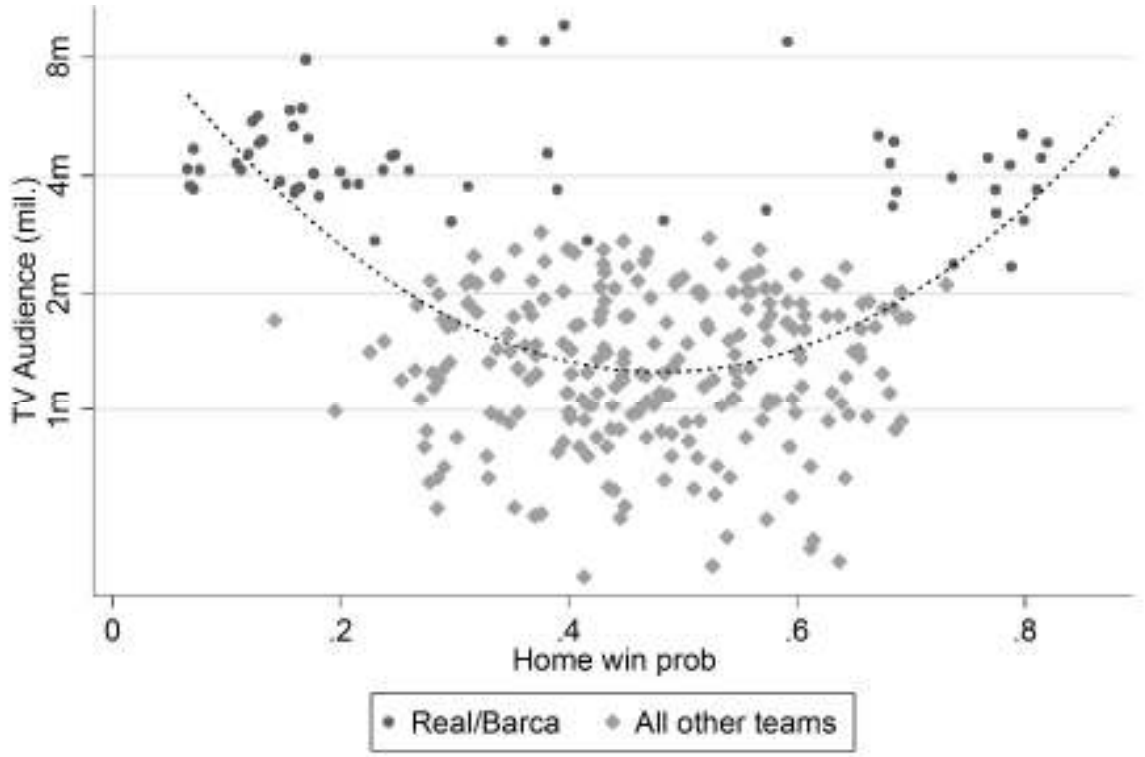
Between 2008/09 and 2011/12, any *La Liga* match -- including one "El Clásico" match per season -- was eligible for the free-to-air broadcast, so all matches had similar probabilities to be selected as the free-to-air broadcast. "El Clásico" -- contests between Real Madrid CF and FC Barcelona -- is the most popular football match in Spain. After 2012/13 the rules that regulate the choice of the match to be broadcast free-to-air changed. Real and Barca are no longer eligible for the free-to-air match and some other limitations were established with respect to other Spanish teams playing in European competitions such as the UEFA Champions League or the Europe League.

3.2. Betting odds

We augmented data on the size of the television audience for each match with information about the form of each team, their position on the league table, and other team-level variables. In order to estimate an objective probability of expected match outcomes, we collected betting market data in the form of decimal odds on full time results (home win, draw, away win), set by five bookmakers - Bet365 (B365), Bet & Win (BW), Ladbrokes (LB), William Hill (WH) and VC Bet (VC) – for the 304 Spanish First Division matches in the data set. These betting odds can be used to calculate an implied probability for each full time result for each match.

Figure 1 summarizes the key relationship between match outcome uncertainty and television viewing audience in these data. The vertical axis shows the log of the television viewing audience for each match and the horizontal axis the estimated probability that the home team will win the match based on betting odds data. The dashed line represents the filled values from a quadratic regression model where the probability of the home team winning and the probability squared are explanatory variables. The fitted quadratic values show a clear U-shape consistent with the loss aversion form of the consumer choice model under uncertainty developed by Coates, Humphreys and Zhou (2014).

Figure 1: TV audience and home win probability



On Figure 1, matches involving either Real or Barca as the home or away team are represented by small black dots; matches involving all other *La Liga* teams are shown as grey diamonds. Football matches involving these two teams clearly draw larger television audiences than matches involving other teams. Since these two teams are generally the dominant teams in the league, the estimated home winning percentages are very high when the two teams play at home, and the estimated home winning percentages are very low when these teams play away from home. This wide variation in expected home winning percentages makes *La Liga* an excellent setting for an empirical analysis of the effect of outcome uncertainty on consumer decisions to watch football matches. Table 1 contains summary statistics for the key variables of interest.

Table 1: Summary statistics

	(1) Full sample	(2) Real/Barca	(3) All other teams
Viewers (mil)	2.03 (1.504)	4.51 (1.529)	1.41 (0.566)
Home win prob	0.45 (0.165)	0.38 (0.273)	0.47 (0.120)
Draw prob	0.26 (0.039)	0.21 (0.052)	0.27 (0.026)
Away win prob	0.29 (0.154)	0.41 (0.252)	0.26 (0.101)
Home position on table	9.20 (5.438)	5.70 (5.094)	10.08 (5.170)
Away position on table	8.81 (5.274)	4.49 (4.739)	9.89 (4.837)
Observations	304	61	243

[a] Means with standard deviation in parentheses

The first column on Table 1 shows summary statistics for the full sample. Column 2 shows summary statistics for matches involving Real and Barca. Column 3 shows statistics for matches involving all other teams. Real and Barca draw much larger TV audiences on average and are clearly dominant, based on the average position on table variables. Smaller numbers mean the teams involved in the match are higher on the league table at that point in the season.

4. Empirical model

Following Coates, Humphreys and Zhou (2014), we estimate the parameters of a least squares dummy variable (LSDV), or OLS fixed effects regression model of consumers' decisions to watch free-to-air football matches on television. This model relates the number of viewers for individual football matches to the probability that one team will win the match and other factors that affect television viewing. The empirical model takes the form

$$\log TV_{ijt} = \gamma_1 PW_{ijt} + \gamma_2 PW^2_{ijt} + \beta X_{ijt} + \alpha BC_{ijt} + HT_i + AT_j + S_t + Y_t + D_t + e_{ijt} \quad (1)$$

where l*ogTV*$_{ijt}$ is a measure of the size of the television viewing audience of a televised football match between home team *i* and visiting team *j* at time *t*. PW_{ijt} is a proxy for the probability that a team will win the match. X_{ijt} is a vector of variables reflecting characteristics of the match between home team *i* and visiting team *j* at time *t*. HT_i is a home team fixed effect capturing unobservable time-invariant heterogeneity in home teams, BC_{ijt} is a vector of indicator variables reflecting the television station that broadcast the football match played between home team *i* and visiting team *j* at time *t*. AT_j is a visiting team fixed effect capturing unobservable time-invariant heterogeneity in visiting teams.

S_t is a game-of-season effect for matches played at time *t* capturing unobservable heterogeneity in matches within a season. S_t takes the value 1, 2, … , 38 for each season, reflecting the 38 match weeks played over the course of each season. This assumes that the effect of the progression of the season on television viewing audiences is linear. Y_t is a season fixed effect capturing heterogeneity in factors affecting viewing interest in matches played in different seasons. D_t is a vector of day-of-week indicator variables for each match. e_{ijt} is an unobservable error term that reflects other factors that affect the viewing audience for football matches. We assume that e_{ijt} is a mean zero, constant variance random variable. γ_1, γ_2, β, α, HT_i, AT_j, S_t and Y_t are unobservable parameters to be estimated. We estimate the unobservable parameters of Equation (1) using the ordinary least squares (OLS) estimator.

Coates, Humphreys and Zhou (2014) show that the reduced form parameters $\gamma_1$and γ_2 are directly related to the relative effects of loss aversion and preference for outcome uncertainty associated with consumers' utility maximizing decisions to watch football matches. If $\gamma_1 < 0$ and $\gamma_2 > 0$ then consumers' expected utility function for watching a football match has an inverted U shape, first increasing with the expected probability that one team will win and then decreasing, and consumer preferences are consistent with the UOH. Under these

conditions, the model predicts that television audiences will be larger for matches with relatively uncertain outcomes; matches where the expected probability of a home win is close to 0.5.

If $\gamma_1 > 0$ and $\gamma_2 < 0$ then the expected utility function for watching a football match has a U shape, first decreasing with the expected probability that a team wins the match and then increasing, and consumer preferences are consistent with the presence of loss aversion. Under these conditions, the model predicts that television viewing audiences will be relatively larger for football matches where one team is heavily favored to win. Fans of the home team will watch in large numbers because of home win preference; other fans will watch in large numbers because of their interest in watching upsets.

Identification of a causal link between outcome uncertainty and TV viewing audience requires that the proxy for the probability that the home team wins the match, PW_{ijt}, is uncorrelated with unobservable factors that affect the size of the TV viewing audience for each match. Equation (1) contains home team, visiting team, season, and week-of-season fixed effects terms that control for some correlation between PW_{ijt} and unobservables. In addition, PW_{ijt} depends on betting odds set at the time the match was played, while the match televised each week was determined before the season started, long before the current form of the teams involved is known. This temporal disconnect between the point in time the game to be televised was determined and the point in time when the outcome uncertainty proxy is measured should also reduce correlation between PW_{ijt} and unobservable factors affecting the size of the TV audience.

5. Results

Table 2 shows the results of estimation of Equation (1) using OLS. Estimated standard errors are robust to general heteroscedasticity and clustering at the team level. In all four specifications, the dependent variable is the log of the number of television viewers for each free-to-air football match in the sample. Note that all specifications include fixed effects for home team, away team, season, week-of-season, and broadcaster. The first and fourth columns use the home team win probability as the measure of outcome uncertainty. The second column uses the away team win probability as the measure of outcome uncertainty. The third column uses the probability of the home team to get a positive result (win or draw) as the measure of outcome uncertainty.

From Column (1), observed variation in the size of television viewing audiences is consistent with the loss aversion form of the model developed by Coates, Humphreys and Zhou

(2014) when the measure of match uncertainty is the probability that the home team will win the match. The estimated parameter on the home win probability proxy variable, γ_1, is negative and statistically different from zero; the estimated parameter on this variable squared, γ_2, is positive and significantly different from zero. Television viewing audiences tend to be larger for both matches where the home team has a relatively small probability of winning, because of consumers' interest in watching upsets, and for matches where the home team has a relatively large probability of winning, because of home win preference. TV-sports consumers have less interest in watching matches with relatively uncertain outcomes, in terms of the home win probability, because of loss aversion; some fans get negative "gain-loss" utility from watching matches where the home team may or may not win, and avoid watching these matches.

Table 2: OLS/Dummy Variable regression results, viewing audience model

	(1) log(viewers)	(2) log(viewers)	(3) log(viewers)	(4) log(viewers)
Home win prob	-1.561***			-2.768**
	-3.56			-3.54
Home win prob^2	1.283**			2.873**
	2.81			3.70
Round of season	0.002*	0.002*	0.002*	0.002
	2.08	2.08	2.08	0.67
Sum of team ranks	-0.001	-0.001	-0.001	-0.008
	-0.74	-0.73	-0.73	-1.50
El Classico	0.272**	0.219*	0.219*	0.000
	2.80	2.58	2.58	.
Away win prob		0.062		
		0.15		
Away win prob^2		0.592		
		1.32		
Result prob			-1.246*	
			-2.27	
Result prob^2			0.592	
			1.32	
Home/Away FE	Y	Y	Y	Y
Season FE	Y	Y	Y	Y
Week-of-season FE	Y	Y	Y	Y
Broadcaster FE	Y	Y	Y	Y
Real/Barca only	N	N	N	Y
Observations	304	304	304	61
R^2	0.951	0.950	0.950	0.944

[a] Parameter estimates/estimated t-statistics. Significance: * 5%; ** 1%; *** 0.1%. Robust standard errors.

Recall that, from Figure 1, most of the matches with both relatively large home win probabilities and relatively small home win probabilities involve either Real or Barca, the two dominant teams in *La Liga*. Many fans may simply want to watch matches involving these two dominant, high-quality teams, no matter what the expected match outcome. The empirical models contain fixed effect variables for all home and away teams in the sample. These team-specific fixed effects capture the effect of the popularity of both Real and Barca on football viewing audiences, as both home and away teams, to the extent that this popularity does not change from season to season. The results in Column (1) are robust to controls for the overall popularity of these two teams among Spanish viewers.

The results in Column (1) suggest that matches between Real and Barca, *El Clásico* matches, tend to draw substantially larger television viewing audiences. Removing this variable from the sample does not affect the parameter estimates on the home win probability variables. There is also weak evidence that television viewing audiences increase as the season progresses; the estimated parameter on the round-of-season parameter is positive, but borderline significant.

The results in Columns (2) and (3) use the probability of an away team win, and the probability of a home team to get a positive result (draw or win) as the proxy for match outcome uncertainty respectively. The probability of a win or draw is an important robustness check. In football, a win earns the victor three points and a draw earns each team one point, so fans likely interpret a draw as a successful outcome, especially against dominant teams like Real and Barca.

The parameter estimates on the away win probability proxy variables are not statistically different from zero. Television audience size does not vary systematically with the expected probability that the away team will win.

Several behavioral explanations exist for this pattern in parameter estimates. The home team is listed first in the *La Liga* fixture, and on ads for the television broadcasts. The expected home team win percentage could matter because of anchoring, to the extent that the first team listed on the fixture takes precedence in the mind of the consumer when deciding whether or not to watch the match.

Alternatively, this may reflect recall bias in consumer decision making. A potential television viewer, when confronted with a match played in a city she is unfamiliar with, or by a home team she is unfamiliar with, cannot easily recall an example of a match played by that team, or in that city. Instead, she substitutes a more relevant example, a match played by her

team in her city, when deciding to watch the match on television. This would tend to make the perceived home team win probability more salient than the away team win probability.

When considering the probability of a home team to get a positive result (win or draw), a negative and statistically significant estimate of γ_1 is reported. However, the parameter estimate of γ_2 is not statistically different from zero. Clearly, the television viewing audience may decrease with the expected probability of a home team not losing. This may simply reflect the expectation that the match will be relatively uninteresting. Such matches might have relatively little interest for television viewers, who can easily switch to a more interesting program on anther channel.

Estimating separate intercepts for matches involving Real and Barca may not fully correct for the influence of these teams on television viewing audiences. As a robustness check to account for this, Column (4) contains results for a restricted sample containing only the 61 matches that involved one of these teams, and *El Clásico* matches. Like in Column (1), the results reported in Column (4) feature a negative and statistically significant estimate of γ_1 and a positive and significant estimate of γ_2. Even when the sample is restricted to only matches involving the two dominant teams in the league, observed patterns in television viewing audience size are consistent with the importance of loss aversion and interest in watching potential upsets in consumer choice in this setting. A similar result is obtained when removing *El Clásico* match from the sample. While people expect Real and Barca to win, the viewing patterns suggest that consumers decide to watch because they want to see these teams lose.

Note that both the full and restricted samples contain wide variation in the expected home win probability. The existing literature on outcome uncertainty and television viewing contains mixed results. Some studies report results consistent with the UOH while others report results consistent with loss aversion. In many other settings, including sports leagues in North America, the closed and static league design, coupled with entry drafts, salary caps, luxury taxes, and limited free agency affects the distribution of talent across teams in those leagues. This might also limit variation in the estimated home win probability, compared to different settings like Spanish football. Limited variation in estimated home win probabilities could make it difficult to obtain precise estimates of the parameters on the home winning probability proxy variables. This setting, which features wide variation in estimated home win probabilities, is ideal in terms of generating substantial variation in an explanatory variable of interest in empirical UOH research.

Humphreys and Zhou (2015) discuss a potential identification problem when estimating models like Equation (1) using attendance as a dependent variable and home win probability

and its square as explanatory variables. This identification problem stems from unobserved home win preference on the part of local fans attending games. This identification problem should not be present in TV audience data, since fans of both teams can watch the game on free-to-air television.

6. Robustness Checks

The results reported above indicate that variation in home winning percentage explains variation in the size of the television audience for La Liga games in the sample. Other factors beside the home winning percentage could explain why many fans watch games involving FC Barcelona and Real Madrid other than this outcome uncertainty measures.

The presence of star players on the rosters of Barca and Real could also affect TV audience size. The presence of many star players on the rosters of these two teams could be correlated with home winning percentages and bias estimates of the effect of home winning percentage up.

Table 3: Robustness Checks – Inclusion of Star Players

	(1) log(viewers)	(2) log(viewers)	(3) log(viewers)	(4) log(viewers)
Home win prob	-1.752***	-1.486***	-1.752***	-1.622***
	-3.75	-3.40	-3.75	-3.72
Home win prob^2	1.429**	1.189*	1.429**	1.327**
	3.09	2.58	3.09	2.94
Round of season	0.002*	0.002*	0.002*	0.002*
	2.09	2.11	2.09	2.10
Sum of team ranks	-0.001	-0.001	-0.001	-0.001
	-0.79	-0.70	-0.79	-0.76
El Classico	0.268**	0.305*	0.268**	0.292**
	2.99	2.59	2.99	3.01
Star Variable	#>30 Goals	#>20 Goals	#>10 Goals	#Ballon D'Or
Home/Away FE	Y	Y	Y	Y
Season FE	Y	Y	Y	Y
Week-of-season FE	Y	Y	Y	Y
Broadcaster FE	Y	Y	Y	Y
Day-of-week FE	Y	Y	Y	Y
Observations	304	304	304	304
R^2	0.957	0.957	0.957	0.957

Parameter estimates/estimated t-statistics. Significance: * 5%; ** 1%; *** 0.1%. Robust standard errors.

Star players can be identified by a number of criteria. We identified star players on the rosters of FC Barcelona and Real Madrid in each season by 4 different criteria: players who scored more than 30 goals in a season; players who scored more than 20 goals in a season;

players who scored more than 10 goals in a season; and players nominated for the Ballon D'Or award (i.e. finished in 1st, 2nd, or 3rd in the voting for the award) in each season. We calculated the number of players on Barca and Real in each season that met each criterion and added these variables to the base regression model, Equation (1).

Table 3 shows the results for each of these four models. Model (1) includes the number of players who scored more 30+ goals on each team's roster in each season. Model (2) includes the number of players who scored 20+, Model (3) includes the number of players who scored 10+ goals. Model (4) includes the number of Ballon D'Or finalists on each team's roster in each season. Again, all models include the full set of fixed effects as were reported on Table 2 and all estimated standard errors are robust to heteroscedasticity and clustering at the team level.

The parameter estimates on the variables for the number of star players on each team in each season were positive and statistically different from zero in all models. We have not reported the results for these variables. All results in terms of the impact of home win percentage and home winning percentage squared were unchanged by the addition of variables reflecting the number of stars on the rosters of FB Barcelona and Real Madrid in each season. While the presence of star players in these rosters affected TV audience size, including variables for the presence of star players did not diminish the impact of outcome uncertainty on TV audience size.

The presence of two persistently dominant teams, FC Barcelona and Real Madrid, in this sample contributes to the novelty of this paper. Few other leagues have two persistently dominant teams over long periods of time. These two teams contribute substantial variation to the key explanatory variables reflecting outcome uncertainty in this setting. In particular, the presence of these two dominant teams creates an environment where the possibility of an upset involving one of these teams is more remote than in other settings, which increases the importance of upset preferences in terms of television audiences.

We demonstrate the importance of dominant teams in generating the results by estimating several alternative models using subsamples of data. The first subsample omits all matches involving Barca and Real. The second and third use only data from 2008/9 through 2011/12 seasons, when Barca and Real appeared in free to air broadcasts and data from 2012/13 through 2015/16 seasons when Barca and Real did not appear on the free-to-air broadcasts. Results appear on Table 4. Column (1) omits matches involving Barca and Real, Column (2) uses the 2008/09-2011/12 subsample and Column (3) the latter subsample. All models include the full set of dummy variables and robust standard errors.

Table 4: Subsamples With and Without Barca and Real

	(1) log(viewers) No Barca/Real	(2) log(viewers) 2008/9-2011/12	(3) log(viewers) 2012/13-2015/16
Home win prob	-1.280	-1.666**	-1.862
	-1.60	-2.92	-1.64
Home win prob^2	0.886	1.770**	1.255
	1.07	3.15	1.06
Round of season	0.001	0.002	0.001
	1.03	1.47	0.63
Sum of team ranks	-0.000	-0.004	0.002
	-0.21	-1.12	0.55
El Classico	---	0.345**	---
		3.20	
Observations	243	152	152
R^2	0.896	0.948	0.878

Parameter estimates/estimated t-statistics. Significance: ** 1%; models include all fixed effects. Robust standard errors.

The results on Table 4 support the idea that the inclusion of matches involving Barca and Real generate the main results in the paper. All models show the same pattern of a negative estimated parameter on the home win probability variable and a positive estimated parameter on the home win probability squared variable, but in the subsamples for Columns (1) and (3) these parameters are not estimated very precisely.

This loss in precision reflects the importance of matches involving Barca and Real in generating variation in the key explanatory variable. The elimination of Barca and Real from the sample substantially reduces variation in the home win percentage variables. From Table 1, the standard deviation of the home win percentage variable for the full sample is 0.165 and for the sample excluding Real and Barca it is 0.120. Variation in the key explanatory variable of interest drops by about 25% in the restricted subsample.

This effect is magnified because the square of this variable also appears in the regression model. For the full sample, the standard deviation of the home win probability squared variable is 0.150. When Barca and Real are removed, the standard deviation drops to 0.113 and the standard deviation of the home win probability squared variable for matches involving Barca and Real is 0.251. Reduced variation in these explanatory variables increases the estimated standard errors.

7. Conclusions

Understanding the dimensions of upset preference in determining consumer demand for sporting events requires presence of persistently dominant teams in a league to generate win probabilities over 0.7 and/or under 0.2. The presence of such dominant teams, Real Madrid CF and FC Barcelona, in the Spanish football league makes *La Liga* an excellent setting for an empirical analysis of the importance of LA/upset preference on consumer decisions to watch football matches.

The results show that variation in TV audience size for *La Liga* is not consistent with UOH and accordingly support that, even controlling for the presence of star players, popularity and dominance, TV audience is higher when home win probability is lower. In line with a theory of the utility of witnessing the improbable, this is compatible with the idea of some additional consumers watch because they want to see "historic" upset of dominant teams. In any case, the presence of dominant teams increases the size of the viewing audience.

This result differs from others in the literature, which indicate that events with more uncertain outcomes draw larger TV audiences. The difference here may lie in the dominance of Real and Barca in *La Liga* matches. These two teams are more dominant that the best teams in many other leagues, and the presence of two dominant teams generates substantial variation in the probability that home teams will win matches. This increased variation in the key explanatory variable may help to identify consumer interest in watching upsets and dominant performances.

Contrary to common belief, TV-sport consumers of football matches in Spain do not care only about watching games with balanced outcomes; their decisions are consistent with home win preference and upset preference. In order to maximize the audience, TV channels should take this into account when acquiring the rights to broadcast sports games (particularly football matches). From the point of view of a sports league, this may be relevant also in making the season schedule up. To keep the interest of the fans, the league may try to decide how frequently upsets should happen.

To give generality to these empirical findings, future research should focus on outcomes in other leagues with extremely dominant teams. For example, the Scottish Premier League and the German Bundesliga have been dominated by a few teams over a large number of seasons.

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