Uncertainty of Outcome

What is (Match) Uncertainty of Outcome

Rottenberg (1956) noted

> "a more or less equal distribution of talent is necessary if there is to be uncertainty of outcome; and that uncertainty of outcome is necessary if the consumer is to be willing to pay admission to the game"

Closeness of contest; each teams likelihood of winning.

The contest between 1st placed and n^{th} placed teams should be close.

Measuring Match Uncertainty of Outcome

Betting odds captures past and future information; efficient use of (public and private) information

Odds are converted into probabilities which are then used to derive a measure of uncertainty of outcome

Most uncertain match in theory will have an equal chance of a home win, a draw and an away win. Each with $\frac{1}{3}$ probability

When there are only two outcomes (many *American* sports), the probabilities of a home win and an away win will each be 0.5

Converting Odds to Probabilities

Bookmaker Data and Uncertainty of Outcome

Date	Time	Home Team	Away Team	B365H	B365D	B365A
13/08/2021	20:00	Valencia	Getafe	2.55	3	3.1
14/08/2021	18:30	Cadiz	Levante	2.8	3.25	2.6
14/08/2021	18:30	Mallorca	Betis	3.3	3.4	2.2
14/08/2021	21:00	Alaves	Real Madrid	7	4.75	1.44
14/08/2021	21:00	Osasuna	Espanol	2.25	3.2	3.4
15/08/2021	16:30	Celta	Ath Madrid	4.2	3.4	1.9

# Converting Bookmaker's Odds into Probabilities

1. For odds O_i, unadjusted probability is $\frac{1}{O_i}$ where i is home win, draw or away win

2. Therefore, home, draw and away odds unadjusted probabilities are $\frac{1}{O_h}$, $\frac{1}{O_d}$ and $\frac{1}{O_a}$

3. Accounting for overround (bookmakers' predicted profits), $\sum \frac{1}{O_i} > 1$

4. To adjust the probability we use $\dfrac{\frac{1}{O_i}}{\left(\frac{1}{O_h} + \frac{1}{O_d} + \frac{1}{O_a}\right)}$

Bookmaker Data and Uncertainty of Outcome

Date	Time	HomeTeam	AwayTeam	B365H	B365D	B365A	Prob H	Prob. D	Prob A	sum	Adj Prob H	Adj Prob. D	Adj Prob A	Sum
13/08/2021	20:00	Valencia	Getafe	2.55	3	3.1	0.39	0.33	0.32	1.05	0.37	0.32	0.31	1.00
14/08/2021	18:30	Cadiz	Levante	2.8	3.25	2.6	0.36	0.31	0.38	1.05	0.34	0.29	0.37	1.00
14/08/2021	18:30	Mallorca	Betis	3.3	3.4	2.2	0.30	0.29	0.45	1.05	0.29	0.28	0.43	1.00
14/08/2021	21:00	Alaves	Real Madrid	7	4.75	1.44	0.14	0.21	0.69	1.05	0.14	0.20	0.66	1.00
14/08/2021	21:00	Osasuna	Espanol	2.25	3.2	3.4	0.44	0.31	0.29	1.05	0.42	0.30	0.28	1.00
15/08/2021	16:30	Celta	Ath Madrid	4.2	3.4	1.9	0.24	0.29	0.53	1.06	0.22	0.28	0.50	1.00

A Spreadsheet Detour?

Interpretation
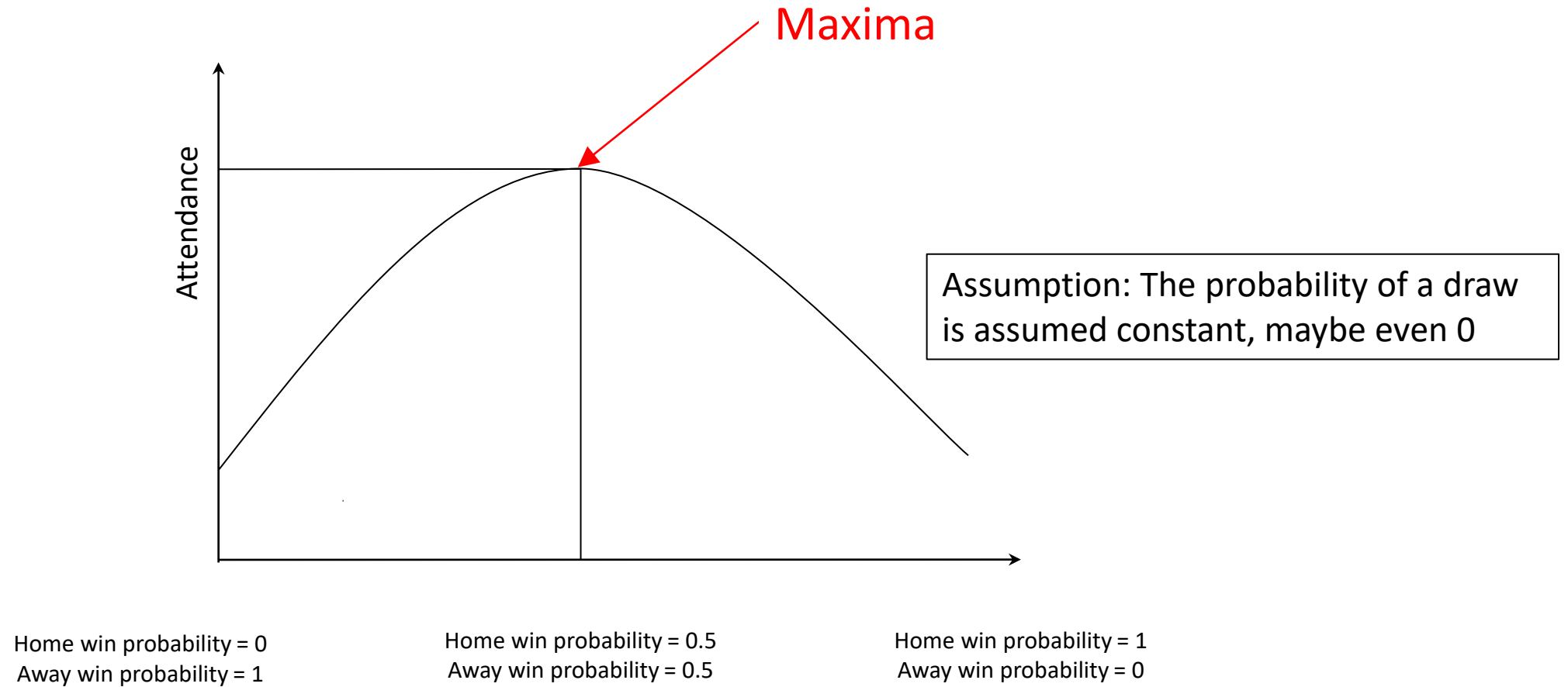
Knowles et al. (1992)

Make use of regression analysis. The dependent variable is (log) attendance.

The model has a number of *control* variables

>   Game quality, weekend, evening, population, unemployment, income per capita, distance between home team and visitors

Variable of interest is

>   probability of home win

Having controlled for a number of factors, what do the authors find?

Knowles et al (1992) in Major League Baseball

home:away=0.6:0.4

Attendance

Home win probability = 0
Away win probability = 1

Home win probability = 1
Away win probability = 0

MLB conforms to the theory

There is a slight bias in favour of the home team

Stadium fans would like a home win but not so it completely dominates the away team(s)
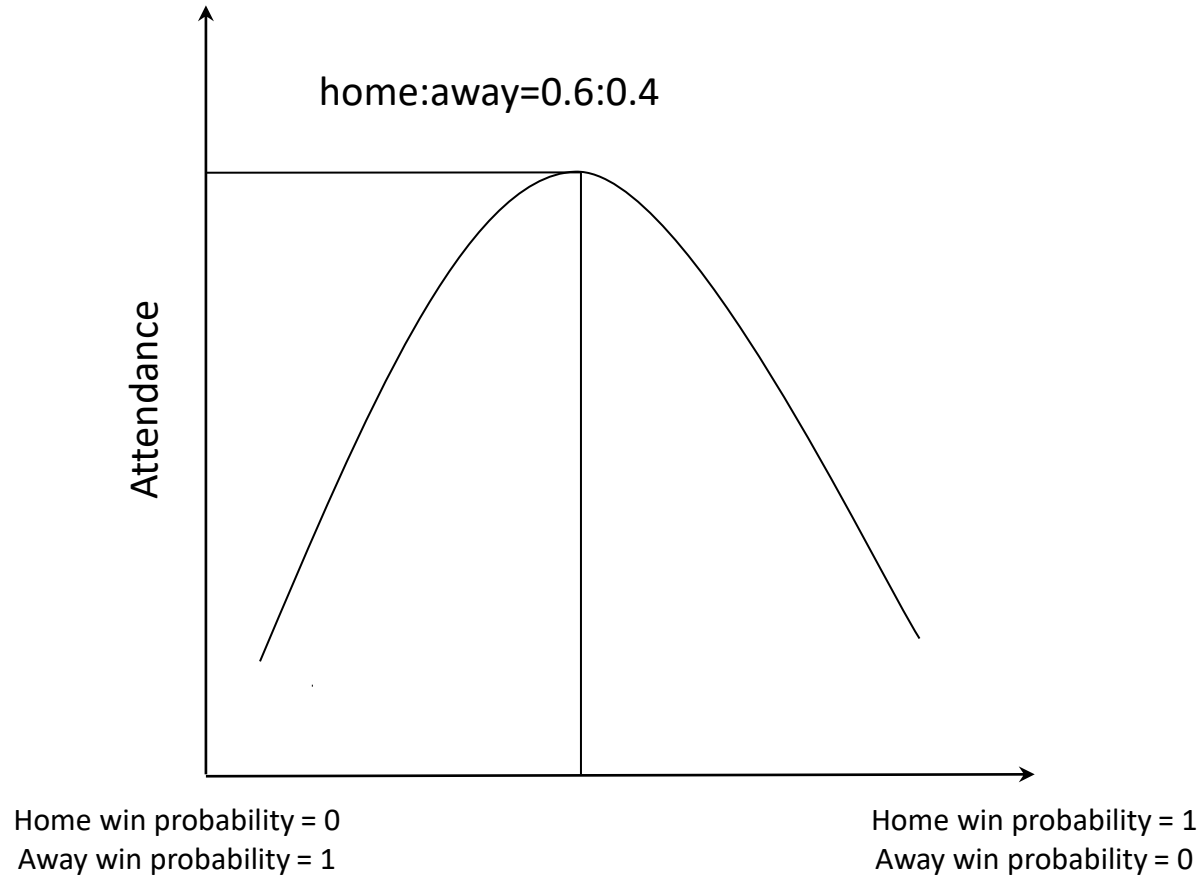
Do Sports Fans Really Value Outcome Uncertainty? Evidence from the English Premier League

Abstract

After controlling for a number of plausible influences on matchday attendance in the English Premier League, and with appropriate recognition of the censoring problem in stadium capacities, we find clear evidence that an increase in uncertainty of outcome is associated with reduced gate attendance. The conventional uncertainty of outcome hypothesis proposes precisely the opposite effect. We interpret this as suggesting that fans at EPL games, who are predominantly supporters of the home team, prefer to see their team play a much inferior team (and beat that team) rather than attend a game that is predicted to be close in score. Essentially, home fans prefer to see their team win rather than watch a draw or see the home team defeated.

Keywords: attendance, outcome uncertainty, tobit

Do Sports Fans Really Value Outcome Uncertainty?

Buraimo and Simmons (2008) in the *International Journal of Sport Finance*. We examine English Premier League football

As well as home probability as a measure of uncertainty of outcome, we use the Theil Measure. Different metric but qualitatively similarly interpretation.

What are the implications for league organisers and administrators?

Study is based on six seasons of league football in the PL; 2,120 observations

Modelling deals with capacity constraint (Tobit model deals with truncation)

The Results

Table 2. Random Effects Tobit Model for EPL, 2000-01 to 2005-06.

Dependent variable is Log attendance

Explanatory variable	Coefficient	t statistic	Coefficient	t statistic
Previous home attendance	0.504	14.84	0.506	15.02
Previous away attendance	0.095	7.01	0.094	7.00
Home points per game	0.054	5.34	0.057	6.12
Away points per game	0.025	2.61	0.022	2.61
Home relative wage	0.047	2.24	0.050	2.38
Away relative wage	0.040	2.51	0.035	2.85
Derby	0.064	2.84	0.062	2.79
Distance	2.0×10^{-4}	-4.18	2.0×10^{-4}	-4.17
Public holiday not televised	0.071	3.72	0.071	3.73
Weekday not televised	-0.045	-4.00	-0.045	-3.98
Sky Sunday	-0.052	-3.85	-0.053	-3.93
Sky Monday	-0.096	-5.54	-0.097	-5.59
Sky other	-0.022	-1.21	-0.023	-1.24
Sky public holiday	0.016	0.40	0.015	0.38
Home team's exposure on Sky Television	-0.008	-2.61	-0.008	-2.54
Probability home win	-0.653	-3.29		
Probability home win squared	0.939	4.44		
Theil measure			-0.306	-4.57
Constant	4.137	11.16	4.344	11.70
Home team fixed effects		Significant		
Month dummies		Significant		
Season dummies		Significant		
Number of observations		2120		
Constrained observations		1227		

How should these be interpreted?

Negative relationship between uncertainty and attendance