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How Sensitive are Sports Fans to Unemployment?

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Tinbergen Institute Discussion Paper

How Sensitive are Sports Fans to Unemployment?

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How Sensitive are Sports Fans to Unemployment?

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May 18, 2021

Abstract

We analyze attendance of professional football matches in England finding that it is related to unemployment over a very long period of time. More unemployment leads to lower attendances. Distinguishing between leagues, we find that the relationship is larger for lower leagues, i.e. attendance of lower quality football events are more sensitive to fluctuations in unemployment.

JEL Classification: C23, Z21, D12.

Keywords: Stadium attendance, football, unemployment

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1 Introduction

The choice to pay to attend a social event is based on a number of factors. Most primarily, the likely entertainment value provided by the event matters. Equally, however, as with any consumption decision, income constraints must play a role. Sport, and football in particular, is a highly popular activity in the United Kingdom, and hence can be found all around the country. Almost every town has a football stadium, with a team likely playing in one of the country's professional leagues. On any given day, many thousands of fans will attend the matches of such football teams.

Football has long history in England.¹ In October 1863 the Football Association (FA) was established. The principle of professionalism was accepted by the FA in July 1885. Attendance data on football events are available from 1888 onward when the Football League (FL) began. We analyze the extent to which economic conditions in particular influence attendance at such events.

Our study aims at investigating whether national unemployment rates affect stadium attendance at the league level. Our focus is guided by the observation that for the period after the second World War football attendance first hit its all-time high whilst unemployment was very low in the post-war rebuild, but subsequently achieved its post-war low in the 1980s when the English economy entered its deepest recession. Obviously, the possible relationship between unemployment and football attendance was noted but has rarely been empirically examined.

We exploit the long history of attendance being recorded and the depth of the structure of these events, looking at the many competitions taking place in England over the years. As most competitions are hierarchical, this allows us to consider the different quality of sporting events on offer.

Our paper is set-up as follows. In section 2 we provide background information

¹There is an equally rich history in the other nations in the United Kingdom, most notably Scotland, but as our data is based on England we focus on England in this paper.

discussing previous studies on stadium attendance. Section 3 presents our data and research methodology. In section 4 we present the main findings of our study. Section 5 concludes.

2 Background

Attendance at sporting events has been very commonly studied; not least because data on attendance numbers are widely published. Studies on football stadium attendance vary in the type of data used in the analysis: match club-level, seasonal club-level and seasonal league-level. Usually but not always match club-level studies use data on a limited number of seasons while the seasonal type of analysis is based on long time series. Each type of study may investigate different potential determinants.

When analyzing match-level data potential determinants are loss aversion, quality of the opponent, weather conditions, recent performance of the home team, home advantage and the possibility to win a prize (championship, qualifying for a European tournament) or avoid relegation. When seasonal averages are used at the club level, many match-specific determinants disappear since they cancel out or become irrelevant. If seasonal averages at the league level are analyzed the focus can be on socioeconomic determinants, cultural developments and changes in the football industry like increased televising of matches.

Among the studies using long term data is Bird (1982) who analyzes 32 seasons concluding that football attendance is an inferior good. However, this finding is likely to be the result of spurious correlation as during the period of analysis attendances were declining while real income was increasing. Bird also investigates hooliganism finding no effects and the increased public interest in football from the second half of the 1960s onward because of England winning the World Cup in 1966.

Long-term studies using seasonal attendance data do not always capture the effects of

changing economic conditions. [Dobson and Goddard \(1995\)](#) for example analyze stadium attendance for professional football in England and Wales over a period of more 65 years. They are interested in the distribution of attendances between clubs eliminating calendar time effects by standardizing attendances for every season. Similarly, [Reade \(2020\)](#) analyzes 130 years of match-level attendances from English football removing cyclical information by introducing seasonal fixed effects.

Unemployment may have a direct effect on stadium attendance because football supporters who lose their job will have less money to spend. Furthermore, unemployment is a well-known indicator for cyclical fluctuations in the economy. Therefore, unemployment may also have an indirect effect through its association with economic recessions, decline real wages and fears of future job loss accompanied by reduced consumer spending. This may affect stadium attendance since a ticket, especially a seasonal ticket, may be a relative big expenditure.

Only a few studies investigate the relationship between unemployment and stadium attendance. These studies mostly investigate cross-regional variation in unemployment rates but some take economic developments into account. [Jennett \(1984\)](#) analyzes six seasons in the Scottish Premier League in the late 1970s finding that more half of the decline in mean attendance can be attributed to the influence of unemployment. [Simmons \(1996\)](#) analyzes attendances for 19 large urban-based English football league clubs over a period of 30 years from the early 1960s to the early 1990s. He argues that it is difficult to distinguish the effects of changes in real income from changes in unemployment. Because of this difference he ignores potential effect of unemployment finding that for five clubs the income effect is significantly positive and elastic indicating that for these clubs football attendance is a luxury good. The results of cross-sectional studies on the effects on unemployment are not always informative. [Baimbridge et al. \(1996\)](#) for example find a significant positive effect of regional unemployment rates on stadium attendance

which they attribute to spurious correlation of more popular clubs being located in high unemployment areas.

There are two studies that explicitly focus on the relationship between unemployment and stadium attendance. [Van Ours \(2021\)](#) considers a number of top European leagues, including the Premier League in England. Analyzing data from the early 1960s to the late 2010s, he finds evidence of a strong negative relationship between attendance and unemployment. [Buraimo et al. \(2021\)](#) consider lower league English football in and around the Financial Crisis and Great Recession, finding that attendances in these leagues went down substantially.

By focusing on unemployment we ignore several potential determinants of long-term stadium attendance. However, there are clear reasons for that. Admission prices influence demand but it is not always the case that these are exogenous to attendance. For a long time real admission prices did not change but in the early 1980s real prices were increased to compensate for falling attendances and in the 1990s prices were further raised because increasing popularity made it possible to do so ([Dobson and Goddard \(2001\)](#)). We also did not take possible effects of hooliganism into account ([Jewell et al. \(2014\)](#)). Previous studies suggest that hooliganism is responsible for developments of stadium attendance in the 1970s and 1980s but none of these studies provide empirical evidence due to the lack of available data. We also ignore that in the course of the 1990s, many stadiums were renovated or new stadiums were build to provide spectators with more comfort and greater safety. This made stadium attendance more attractive ([Jakar and Szymanski \(2019\)](#)). As time goes by clubs have to persuade new generations of football supporters to visit their stadiums. There is some discussion on whether football attracts more middle-class spectators than it used to do but since there is little evidence to support this ([Malcolm et al. \(2000\)](#)) we also ignored that. Finally, we ignore the effects of alternative ways to watch a football match, i.e. broadcasting through television or

internet. Although we ignore all these potential determinants, as we will show variations in national unemployment go a long way in explaining fluctuations in average attendances at the league level.

3 Data and Methodology

3.1 Data

Our data is collected from two sources. We use attendance data from the website 11v11, and we collect unemployment data from the Bank of England's 'Millennium of Macroeconomic Data' dataset. The developments of average attendances per season in English football since 1888 are presented in Figure 1. Clearly, in the Premier League, there are substantial fluctuations over time.² From the late 19th century there is an increase in average attendance up to the First World War. After the Second World War initially attendances are substantially higher than in the inter war period but after that there is a steady decline up to the mid-1980s. From the late 1980s onward there is a strong increase in stadium attendance. These main developments are present also for lower leagues though less pronounced. Figure 1 also shows stadium attendance at Cup matches. In the early decades, Cup matches on average attract more attendants than matches in the Premier League, the Championship and the lower leagues. These higher attendances for Cup matches are present until the late 1950s. Then, up to the early 1980s average attendances at Cup matches are similar to those in the Premier League. In later years Cup matches attract fewer attendants than the Premier League, following the pattern of attendances of the Championship. Figure 1 also shows the developments in the unemployment rate which by and large are a mirror image to attendances.

²The names of the leagues have changed over time. We use the current names. We also combine Division 3 North with Division 4, and Division 3 South with Division 3, motivated by the remarkable similarity of the two series before and after the regional distinctions were abandoned in 1959.

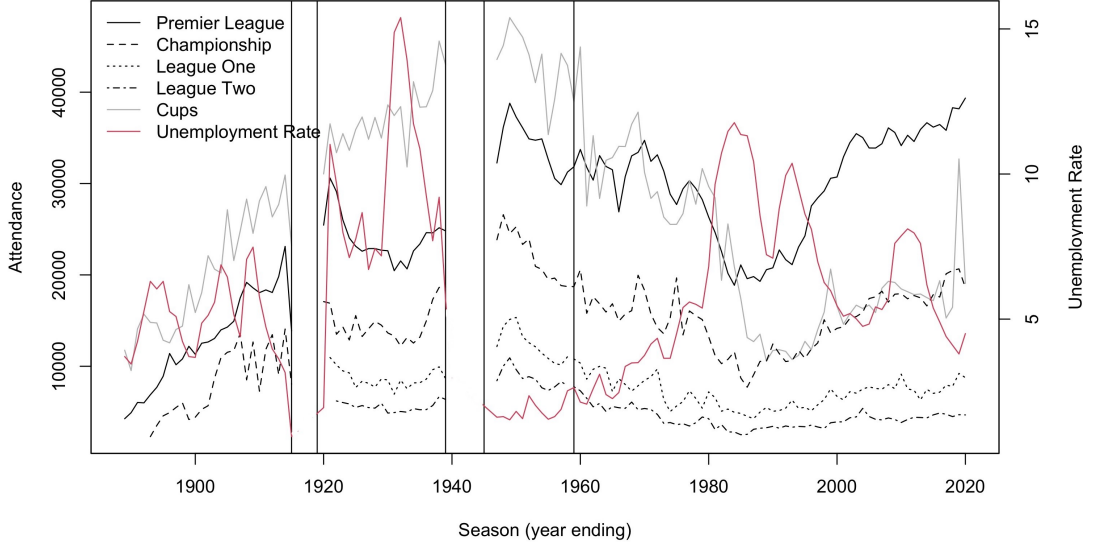


Figure 1: Average attendances per season in English football and the unemployment rate; 1888/89-2018/19.

3.2 Methodology

We use a simple regression of the log of attendance A in competition i in season t on the log of the unemployment rate U at time t :³

$$\log(A_{it}) = \alpha + \beta \log(U_t) + e_{it}, \quad (1)$$

While appealing on an intuitive level, equation (1) may be misspecified. Not least, attendances from Figure 1 have strong serial dependence, but in addition it may be that also the unemployment rate is non-stationary and trending. The likelihood of spurious significance (Granger and Newbold, 1974) leads us to add in equation (1) – in the main text – lags of both attendance and the unemployment rate:

$$\log(A_{it}) = \alpha_0 + \alpha_1 \log(A_{i,t-1}) + \beta_0 \log(U_t) + \beta_1 \log(U_{t-1}) + v_{it}. \quad (2)$$

³Unemployment rates are averages for calendar years. We assume that attendance in season $t/t + 1$ is influenced by unemployment in year t .

This revised model can be rearranged to nest equation (1) within it as the long-run relationship:

$$\Delta \log(A_{it}) = \beta_0 \Delta \log(U_t) + \tilde{\alpha} (\log(A_{i,t-1}) - \kappa_1 - \kappa_2 \log(U_{t-1})) + v_{it}. \quad (3)$$

Here, $\tilde{\alpha} = \alpha_1 - 1$, $\kappa_1 = \alpha_0/(1 - \alpha_1)$ and $\kappa_2 = (\beta_0 + \beta_1)/(1 - \alpha_1)$. Commonly these are estimated via the least squares regression in equation (1) as the estimates are super consistent despite the potential non-stationarity of both variables. This approach is often referred to as the Engle-Granger method (Engle and Granger, 1987).

It allows us to consider both formally via testing, and less formally via graphical plots, the possibility of a long-run relationship between unemployment and football attendance. We are also able to consider the extent to which attendances adjust when this relationship is in disequilibrium, via the $\tilde{\alpha}$ coefficient.

4 Results

4.1 Long run relationship

In panel a of Table 3 we present the results from estimating equation (1) for the Premier League, the Championship and the Cup matches for which we have the longest time series. All coefficients on unemployment are negative and significant (Premier League at a 10% significance level). The coefficient values are decreasing in general with the quality of the football; that is, for the Premier League the coefficient is 0.123, while this is 0.227 for the Championship and 0.235 for Cup matches.

Panel b of Table 3 shows parameter estimates for the period from 1921/22 onward for which there is also information about League One and League Two. Now, all parameter estimates are significant at a 1% level where the magnitude for League Two is the largest.

Table 1: Parameter estimates stadium attendance; equation (1)

	Premier League (1)	Champion ship (2)	League One (3)	League Two (4)	Cup matches (5)
a. 1888/89–2018/19					
$\log(U_t)$	−0.123* (0.072)	−0.227*** (0.065)			−0.235*** (0.070)
Adjusted R ²	0.016	0.091			0.081
Observations	118	113			118
b. 1921/22–2018/19					
$\log(U_t)$	−0.226*** (0.026)	−0.296*** (0.028)	−0.286*** (0.037)	−0.367*** (0.040)	−0.309*** (0.069)
Adjusted R ²	0.449	0.547	0.386	0.476	0.173
Observations	93	93	92	91	93

Note: A = Attendance, U = Unemployment rate; constants not reported; standard errors in parentheses; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

4.2 Unit roots and cointegration

In Panel a of Table 2 we present unit root tests for the unemployment rate and average seasonal attendances for the various competitions and the two periods of analysis. The p-value of the Augmented Dickey-Fuller (Dickey and Fuller, 1979) is presented, and as the null hypothesis is non-stationary, we can conclude that indeed each of these series is non-stationary.

Table 2: Unit root testing and cointegration testing

	U-rate	Premier League	Champion ship	League One	League Two	Cup matches
a. Unit Root						
1888/89–2018/19	0.293	0.375	0.333			0.199
1920/21–2018/19	0.163	0.182	0.697	0.525	0.476	0.313
b. Cointegration						
1888/89–2018/19		0.010	0.010			0.010
1920/21–2018/19		0.026	0.049	0.010	0.010	0.010

Note: Reported are the p-values of the Augmented Dickey-Fuller tests. Panel a shows the unit root test for the separate series; panel b shows the test results for the residuals of regressions for equation (2) presented in Table 3

An important step to making sense of the representation in (3) is to check that the long run relationship from equation (1) is actually stationary. We check this in Panel b of Table 2, again reporting the p-value from an ADF test. This time the test is carried out on the residuals from the regressions estimated for equation (2) and reported in Table 3. We find that all of these residuals can be concluded to be stationary, as the test rejects in each case at a 1% level of significance.

The parameter estimates of equation (2) are presented in Table 3. The coefficients, being distributed across lags, are harder to interpret here, but the impact of the unemployment rate remains clear, suggesting that the relationship between the two variables is not spurious. Notably, despite the lag of attendance, a highly persistent variable, being included, unemployment remains significant in most regressions.

From equation (3) we understand the long-run relationship between attendance and unemployment, but also the adjustment to disequilibrium in that relationship, represented by $\tilde{\alpha} = \alpha_1 - 1$. The first row of coefficients on panels a and b, $\log(A_{t-1})$, gives estimates of α_1 and hence $\tilde{\alpha}$. All are negative, as would be expected if attendances adjust to correct for disequilibrium. The adjustment is largest for Cup matches, at -0.287 , and Championship matches (-0.222), and smallest for League Two matches (-0.089).

4.3 Actual and predicted developments

Our model relating stadium attendance to unemployment only is amazingly simple. Therefore, it is likely that not all fluctuation in attendance will be captured. Nevertheless, as shown in Figure 2 the relationship between the actual developments and the predicted stadium attendance according to the long run relationship (equation 1) is quite strong. Apparently many of the fluctuations in attendance are driven by fluctuations in unemployment and related socioeconomic developments.

Rather than comparing predictions and actual developments, it can be illustrative to

Table 3: Parameter estimates equation (2)

	Premier League (1)	Champion ship (2)	League One (3)	League Two (4)	Cup matches (5)
a. 1888/89-2018/19					
$\log(A_{t-1})$	0.912*** (0.020)	0.809*** (0.040)			0.696*** (0.062)
$\log(U_t)$	0.112*** (0.034)	0.046 (0.058)			0.097 (0.103)
$\log(U_{t-1})$	-0.143*** (0.034) (0.209)	-0.096 (0.058) (0.400)			-0.217** (0.104) (0.655)
Adjusted R ²	0.948	0.812			0.584
Observations	118	113			118
b. 1920/21-2018/19					
$\log(A_{t-1})$	0.844*** (0.048)	0.778*** (0.068)	0.810*** (0.059)	0.911*** (0.044)	0.713*** (0.059)
$\log(U_t)$	-0.033 (0.032)	-0.109** (0.043)	-0.112* (0.065)	-0.155*** (0.051)	-0.192* (0.108)
$\log(U_{t-1})$	-0.014 (0.031)	0.042 (0.043)	0.054 (0.063)	0.128** (0.050)	0.048 (0.109)
Adjusted R ²	0.876	0.815	0.810	0.912	0.692
Observations	93	93	92	91	93

Note: A = Attendance, U = Unemployment rate; constants not reported; standard errors in parentheses; *p<0.10; **p<0.05; ***p<0.01

plot the residuals of the long-run relationships through time. Based on the parameter estimates of panel b of Table 3, this is done in Figure 3. The residuals should be centered around zero, when the two variables are in equilibrium. If positive, it indicates that attendance is too high for a given level of unemployment, whereas if they are negative, then attendance is too low for a given rate of unemployment. The relationships are all moving around zero. Notably Cup attendance is too high given unemployment in the inter-war years and too low in recent decades. Szymanski (2001) argues that in FA Cup matches over time competitive balance dropped a lot and therefore stadium attendance decreased. In the second half of the 1960s attendance is higher than expected. This could

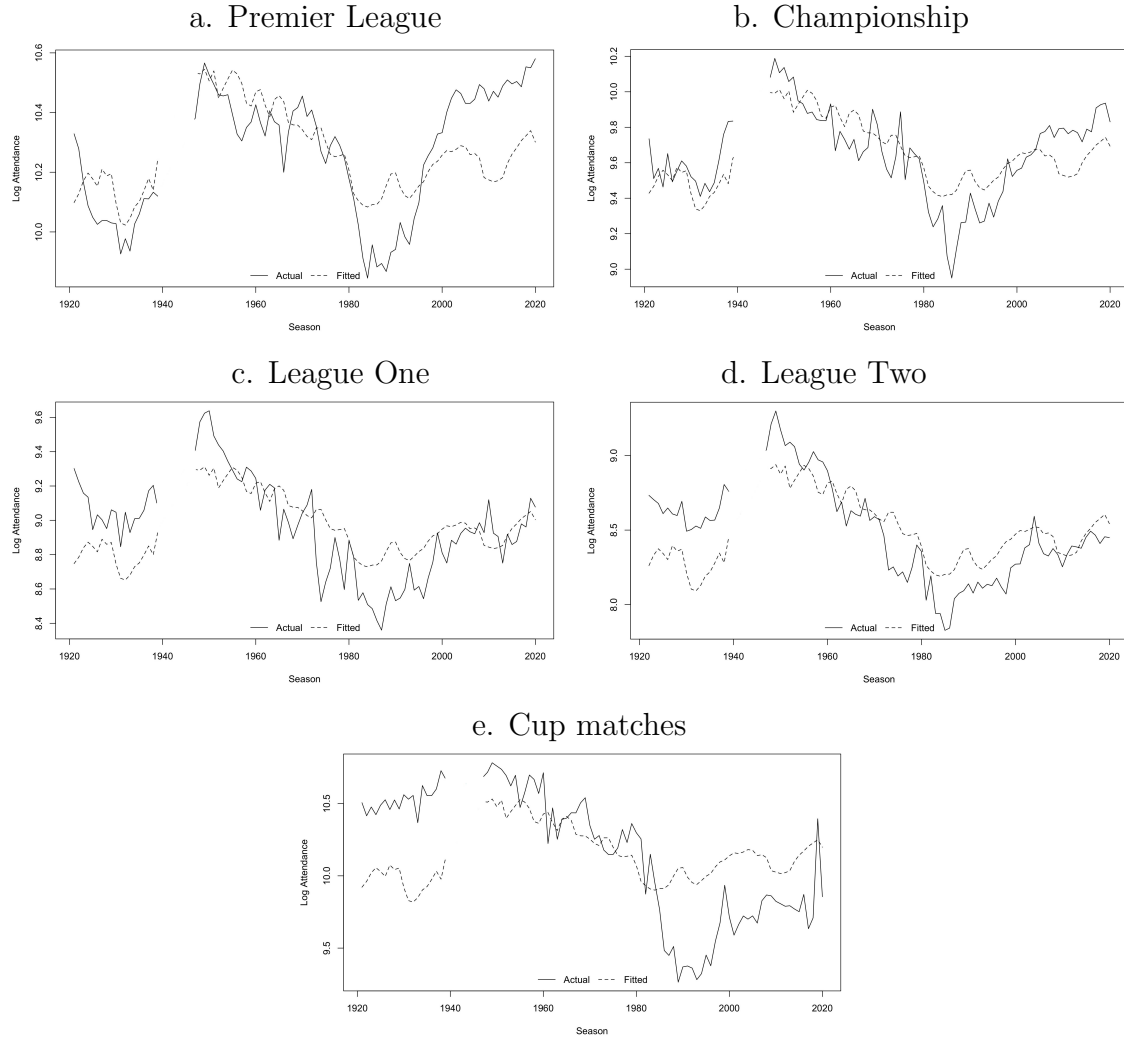


Figure 2: Predicted and actual developments in attendance; 1921/22-2018/19.

be attributed to England winning the World Cup in 1966. In the 1980s attendance was lower than expected given the unemployment rate. This may have to do with negative attendance effects of hooliganism. Since the late 1990s, Premier League attendances have been higher than would be expected given unemployment rates. The same holds in the past decade for attendances of Championship matches.

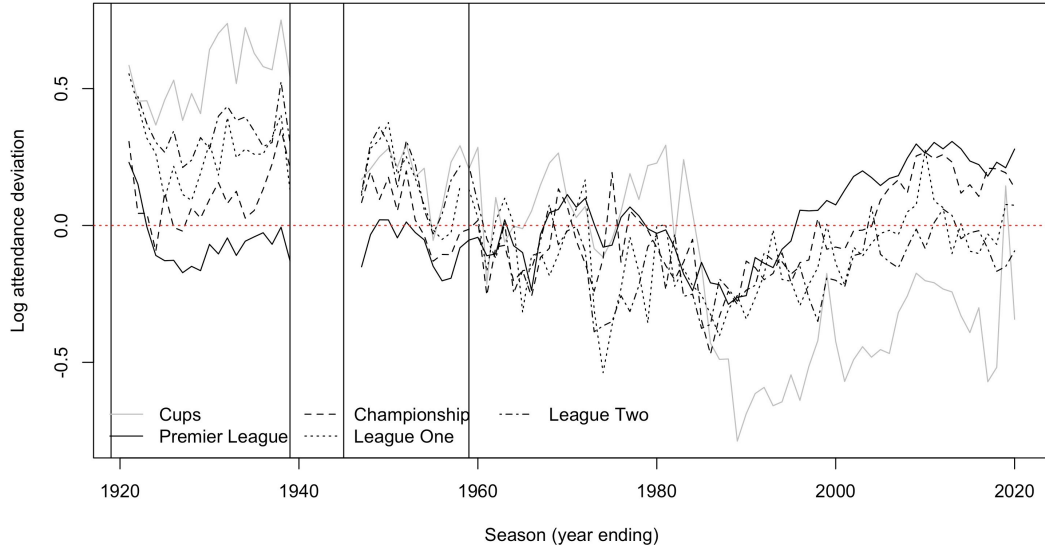


Figure 3: Long run relationships between average seasonal attendance in different English football competitions and the unemployment rate; 1920/21-2018/19.

Note: Vertical axis: residuals = $\log(A_{it}) - \hat{\alpha} - \hat{\beta} \cdot \log(U_t)$.

5 Conclusions

We describe a long-run relationship between attendances at social events, football matches, and unemployment conditions. We separate our analysis between different competitions, most of which sit within a hierarchy of quality. With higher quality events, the responsiveness of attendance to unemployment is lower. Clearly, a model with national unemployment rates as the only explanatory variable cannot explain fluctuations in stadium attendance in great detail. Nevertheless, our analysis shows that a simple model can go a long way in describing the sensitivity of sports fans to changing economic circumstances.

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