

Goal! Profit Maximization Versus Win Maximization in Soccer

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Abstract In this paper we estimate the best responses of soccer clubs to the choices of other clubs in Spanish and English leagues over the period 1994–2004. We find that choices are more closely approximated by win maximization than by profit maximization in both leagues. We examine club characteristics that might explain variations in choices between Spanish clubs.

Keywords Club owners' objectives · Profits · Sport performance

JEL Classification L21 · L82 · J24 · J31

1 Introduction

After many decades of debate within the economics profession and outside, the profit maximization hypothesis remains controversial. Few today would argue that profit maximization is a literal description of what *all* managers in firms pursue. In a world where some managers may maximize profits and other may not, debate is largely focused on arguments associated with natural selection. Going back as far as [Alchian \(1950\)](#), some economists have argued that firms in which decisions most closely resemble profit maximizing decisions will be more likely to survive in a competitive

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environment, and hence we can safely assume that industry outcomes are consistent with profit maximization, regardless of the actual motives of individual managers.

Because intentions may no longer matter, natural selection arguments are often hard to rebut. The idea that natural selection favors profit maximization has been widely challenged, perhaps most notably by [Nelson and Winter \(1982\)](#). Theoretically, [Dutta and Radner \(1999\)](#) show that profit maximization leads to certain bankruptcy of the firm, while alternative strategies have a positive probability of long-term survival. However, this is in the context of a specific general equilibrium model, and different general equilibrium models might produce different results.

There is evidence from experimental economics showing that many, if not most, individuals do not always select profit maximizing strategies (see, e.g., [Rubinstein 2006](#)). However, experimental results may not give an accurate reflection of how people behave in ‘real world’ contexts, and natural selection may still favor profit maximizers, even if they are in a minority. In the animal kingdom there is evidence that various species pursue close to optimal strategies when searching for food, and evolutionary biologists attribute the prevalence of optimal foraging to natural selection (e.g., [MacArthur and Pianka 1966](#)). But in a human context, ‘optimal’ need not be equivalent to ‘profit maximizing’.

Empirical work on profit-maximizing choices tends to be restricted to a narrow range of settings where it is feasible to infer behavior from choices. Examples include bidding in electricity markets (e.g., [Hortacsu and Puller 2008](#)) and the wine industry ([Scott Morton and Podolny 2002](#)). The advantage of these settings is that profit-maximizing strategies can be identified and choices can be evaluated against this benchmark.

In this paper we examine player expenditure choices by soccer clubs in Spain and England. (For the avoidance of ambiguity we use the term soccer to refer to the game of Association football, as distinct from American football. However, it should be noted that proper names usually use the word ‘Football’).¹

Given the structure of competitive interaction in a soccer league, we are able to identify profit-maximizing best responses to the choices of other teams in the league. We find that actual choices differ significantly from this benchmark, and that the behavior of clubs can be better understood by a strategy of win maximization subject to a budget constraint. We explore reasons that might explain this strategic bias, and find evidence to support the idea that soccer club executives may find it in their best interests to pursue this strategy. Hence, in this market, selection may favor win maximizers over profit maximizers.

2 Testing Profit Maximization and Sports Leagues

Sports leagues are often thought of as natural testing grounds for many theories (see, e.g., [Kahn 2000](#)). One reason is the ready availability of performance and productivity

¹ Many Europeans take offence at the use of the word ‘soccer’ to describe what they call generally ‘football’ (except the Italians who call it ‘calcio’), imagining it to be an Americanism. In fact, the first use of the term soccer recorded by the Oxford English Dictionary is in 1891, and it was commonly used in England until the 1970s, when Americans started to become more familiar with the game.

data; another is that the strategy space can usually be very clearly defined given the known structure of the game. Testing for mixed strategies in tennis (Walker and Wooders 2001) and penalty taking in soccer (Chiappori et al. 2002; Palacios-Huerta 2003) are perhaps two of the best known examples that confirm behavior consistent with maximizing choices by contestants. By contrast, Romer (2006) examined the choices of American football coaches and found that they were systematically inconsistent with maximizing behavior.

Deciding whether teams in leagues maximize profits, however, is more important than simply corroborating economic arguments about natural selection. Professional sports leagues are unique in the sense that the competitors on the field engage in economic cooperation off the field. Teams cooperate by setting the rules of the game, but in practice go much further than this, engaging in labor market restraints (e.g., rules on the allocation of players, roster limits, salary caps) and product market restraints (e.g., exclusive territories, revenue sharing, collective selling) whenever they are permitted to do so by the competition authorities (for a review of such practices and their legal treatment, see Szymanski 2003).

Many economists have argued that these restraints do little more than raise profitability when engaged in by profit maximizers (e.g., Fort and Quirk 1995; Vrooman 1995). However, following from the earlier work of Sloane (1971), Késenne (1996; 2000) has argued that, in the world of European soccer, clubs can be treated as win maximizers (subject to a profit constraint) rather than profit maximizers, leading to different conclusions about competitive restraints. For example, if profit maximizers share gate revenues, the incentive to invest in players is diminished, since each team receives a smaller marginal return on its own investment. If win maximizers share revenues, spending incentives are not affected, since teams are expected to spend everything that they receive. Thus the nature of objectives has significant implications for policy prescriptions.

American economists have expressed some skepticism about the feasibility of identifying whether teams are profit maximizers. Fort and Quirk (2004) suggest that without detailed information on revenue functions it is hard to make comparisons about profit or win maximizing choices, while Zimbalist (2003a) finds little convincing evidence distinguishing profit maximizing behavior from any other, and concludes that “owners maximize global, long-term returns” (p. 510). However, some empirical studies exist. Atkinson et al. (1988) found that wage rates for players in the NFL exceeded their estimates of marginal revenue products, and concluded that owners were pursuing utility maximizing rather than profit maximizing strategies. Ferguson et al. (1991) tested ticket-pricing behavior in the NHL and found that choices were consistent with profit maximization. Alexander (2001) addresses the same issue based on pricing rules and price elasticity. Nevertheless, as pointed out by some authors, these attempts are not entirely convincing given that in many theoretical models the pricing rule of a win-maximizing club is the same as that of a profit-maximizing club.

Our approach is to start by estimating a statistical model of revenues and costs for teams in the top two divisions of Spain’s Liga Nacional de Fútbol Profesional (LFP) and the top two divisions of the English leagues (the FA Premier League and the top division of the Football League, currently known as The Championship). There

is a well-established relationship in soccer leagues between team success and player spending, and between team success and team revenues (see, e.g., [Szymanski and Smith 1997](#); [Forrest and Simmons 2002](#)). As is natural in a competitive environment, these relationships depend in part upon the choices of the other teams in the league. They also imply that there exists an expected level of profitability for any given league position achieved by a team, conditional on the choices of all the other teams. We are thus able to test whether the choices of each team are closer to best responses implied by profit maximization or by win maximization.

We find consistent evidence of win maximizing behavior in both the Spanish and the English leagues. We then examine factors that might account for differences in behavior between Spanish clubs. These can be separated into factors connected with the history and organizational structure of the teams, and factors connected to the background of the current club presidents. In the case of Spanish associative clubs, the president is elected by the club members, who number in the tens, if not hundreds, of thousands. Instead, if the legal status of the team is that of Sociedad Anonima Deportiva (SAD), a special form of limited liability corporation, the appointment of the president is controlled by those retaining the largest share of the social capital. We find that teams that have been more successful in the league historically tend to be more oriented toward profit maximization rather than win maximization, as are clubs where the share capital is more closely controlled. The industry background of the club president also matters. In particular, club presidents from the construction industry are notably more oriented toward winning. This may be associated with an increased likelihood of gaining planning permission for local construction projects when the local soccer club is doing well.

The rest of the paper is structured as follows: in the next section we provide some background information on the leagues and clubs, and discuss the data. Section 4 presents our theoretical framework, and Section 5 reports the results of the analysis relating league position to wages and revenues. Section 6 discusses the implications for profit and win maximization and looks at the factors explaining variations in objectives. Sections 7 and 8 conclude.

3 The Spanish and English Professional Soccer Leagues

The English Football League was founded in 1888 as a competition among elite clubs that employed professional players. About this time most of the member 'clubs' transformed themselves into limited liability companies. Under English law such a company must issue share capital and set down its broad objectives in the articles of association. It must appoint a board of directors to manage the day-to-day business. By 1922 there were 88 clubs that belonged to the Football League, organized into four divisions, connected via the institution of promotion and relegation. Under this system the worst performing teams in any division, measured by points won in competition, are replaced automatically at the end of the season by the best performing teams in the immediately junior division (see [Noll \(2002\)](#) and [Szymanski and Valletti \(2005\)](#) for an economic analysis of this system). Membership of this structure has been remarkably stable, and almost all of the 88 clubs are still participants today.

In 1992 the top division formally separated itself to become the FA Premier League (FAPL), primarily so that the biggest clubs could retain control of TV broadcast income. However, the promotion and relegation system has been preserved intact, and each team in the FAPL owns one share, on the understanding that a relegated team surrenders its share and passes it on to a promoted team. The development of TV broadcasting has drastically enlarged the inequalities between teams in different divisions (see e.g. [Szymanski 2001](#)), so that the economic consequences of relegation from the FAPL are dramatic.

League soccer started in Spain in 1927, and the dominant league today is the Liga Nacional de Fútbol Profesional (LFP), which consists of two divisions of 42 teams (20 in the top division and 22 in the second).² Since its inception league soccer in Spain has been dominated by three clubs and by politics. The three clubs are Real Madrid, Barcelona, and Athletic de Bilbao, and the political issues have concerned the relationship between the Castilian majority, the Catalans, and the Basques, whom each team is frequently deemed to represent. The political significance of these teams was further enhanced during the Franco era.

During the 1950s and 1960s Real Madrid dominated European soccer and was one of the first teams to adopt a policy of hiring international stars. During this era support for a soccer team was perceived to be one of the few ways of openly expressly opposition to the nationalist regime, and games between Barcelona or Athletic de Bilbao and Real Madrid were of great political significance. Following the death of Franco, the adoption of democracy, decentralization, and entry into the European Union, soccer has been, to a degree, depoliticized, but traditional rivalries remain.

Traditionally the Spanish soccer clubs were also ‘clubs’ in a legal sense, with members who pay an annual subscription and a club committee elected by the members for a term of office (usually four years). These clubs were typically ‘multi-sport’ organizations, running teams in basketball and other sports as well as soccer, and providing facilities for members to play as well as watch sport. Frequently they would also receive subsidies from local governments, which saw them as providing a service to the community.

During the 1980s most of these clubs ran up large financial deficits, mostly as a result of hiring expensive players for the soccer team. To address this financial crisis the government passed a law in 1992 obliging them to adopt the status of Sociedad Anonima Deportiva (SAD). A SAD is essentially a limited company, with all the associated obligations, but with some special concessions for their sporting status.

The principal purpose of the reform was to force the clubs to behave like ordinary businesses and balance their books (see, e.g., [Ascari and Gagnepain 2006](#)). The clubs did not want to do this, preferring a soft budget constraint on the theory that the local authority would never be able to close them down and that their deficits would always be covered out of public funds; however, the government made acceptance of SAD status a condition for bailing out the clubs. Four clubs (Barcelona, Real Madrid, Athletic de Bilbao, and Osasuna), having fulfilled some demanding financial requirements,

² Seasons 1996 and 1997 had 22 teams in the First division and 20 in the Second division of the LFP.

Table 1 Operating profits in the 'Big Five' European soccer leagues

Profits (million €)	1996	1997	1998	1999	2000	2001	2002	2003	2004
English Premiership	77	129	143	104	80	121	125	185	223
Spanish 1 ^a Liga	-23	19	-124	-170					
Spanish 1 ^a Liga *	-21	17	-101 ^a	-143 ^a	-152 ^a	-295 ^b	-511 ^b	-302 ^b	
Italian Serie A	-3	8	-36	-114	-46	-216	-404	-381	-341
German Bundesliga		37	27	47	35	87	100	138	52
French Ligue 1	5	-7	-46	-70	36	-41	-98	-61	-102

Source: Deloitte & Touche Annual Review of Football Finance (2003, 2005)

*Authors' calculations from clubs accounts. Out of the 20 teams competing in the LFP, we mark with 'a' the seasons in which 19 clubs' accounts were used, while 'b' implies that only 15 or 16 team' accounts were available

were able to persuade the government to exempt them from the reform and hence continue to this day under their traditional club structure.

Within the traditional structure the role of the elected president has always shaped the development of the soccer club. During elections candidates make promises about their plans to invest in attracting players, often using their own financial resources.

Data on English soccer are plentiful, thanks to the peculiarity of British accounting laws, which requires all limited companies to lodge annual accounts for public inspection. Moreover, because English soccer clubs, unlike major league teams in America, have never been absorbed into larger corporations (although the acquisition of Manchester United by the Glazer family in 2005 may start a trend), income statements accurately reflect both income from team activities and expenditure on players. Since 1994 the accounting firm Deloitte LLP has published these data annually, and this has become the standard data source; data prior to this were assembled by Szymanski and published in [Szymanski and Kuypers \(1999\)](#). Since Spanish clubs adopted SAD status, financial data have also become available for most of the Spanish clubs. Hence, we restrict our analysis to the period 1994–2004 for which we have data.

There has been much talk in recent years of a financial crisis in European soccer caused by excessive spending on players.³ To set this in context, Table 1 shows the aggregate operating profits of clubs in the 'big 5' leagues. Only the English and German leagues consistently report an operating profit, while the Italian, French, and Spanish leagues report deficits. In general the data need to be interpreted with caution. American major leagues have tended to report accounting deficits, while economists on inspection have identified ways in which economic profits are concealed (see, e.g., [Quirk and Fort 1992](#); [Zimbalist 2003b](#)). Nonetheless, it is reasonable to suppose that the promotion and relegation system, absent from the US major leagues, places additional pressure on the clubs to spend on players.⁴

³ For a country-by-country discussion, see the special edition of the Journal of Sports Economics, 2006.

⁴ For a comparison of the closed American league system and the open European system, see [Hoehn and Szymanski \(1999\)](#). The fact that most soccer teams do not generate positive profits is taken as a fact on which some previous papers have built upon (see [Garcia-del-Barrio and Pujol 2007](#)).

Table 2 Average revenues and average wages (as % of the revenues) by season

Year	Spanish Soccer				English Soccer			
	N	1 ^a division	N	2 ^a division	N	PremierLeague	N	Championship
<i>AvRev(Euros)</i>								
1994	1	4,268,892	1	3,044,909	18	19,630,924	17	6,638,792
1995	5	9,225,842	1	2,686,473	18	24,614,092	16	6,356,702
1996	19	15,620,150	4	2,509,873	18	27,062,053	15	6,815,186
1997	20	24,263,940	5	4,008,501	18	35,646,941	14	8,796,836
1998	18	29,149,850	9	6,243,958	16	50,280,071	16	12,717,063
1999	19	30,519,530	10	4,883,988	18	53,990,072	14	11,092,033
2000	19	34,147,940	11	6,611,016	17	63,663,877	14	13,653,991
2001	16	35,665,650	12	7,079,504	18	74,059,982	16	14,030,414
2002	15	41,772,720	11	5,564,037	19	86,449,068	16	19,887,189
2003	15	48,769,060	11	3,889,198	20	91,877,205	16	16,047,064
2004	11	58,988,410	1	4,143,813	18	100,987,045	18	18,812,340
<i>%AvWage</i>								
1994	1	73%	1	48%	18	43%	17	60%
1995	5	68%	1	94%	18	42%	16	65%
1996	19	55%	4	68%	18	48%	15	75%
1997	20	45%	5	91%	18	47%	14	67%
1998	18	54%	9	72%	16	49%	16	70%
1999	19	55%	10	102%	18	55%	14	73%
2000	19	55%	11	82%	17	59%	14	94%
2001	16	70%	12	104%	18	58%	16	98%
2002	15	73%	11	138%	19	61%	16	73%
2003	15	70%	11	140%	20	61%	16	90%
2004	11	63%	1	85%	18	61%	18	71%

The records for the English leagues have been converted to Euros at the April 2006 exchange rate (1GBP = 1.47 Euros)

N: indicates the number of teams for which the financial information was available each season

Table 2 presents some data on average revenues and spending by division in England and Spain. What stands out from this table is the extraordinary increase in income and spending over the period: around five-fold in England, and nearly fifteen-fold in Spain between 1994 and 2004. This reflects the explosion of broadcast rights values associated with increased competition in the broadcasting industry and the advent of new technologies. The table also shows that, on average, teams have tended to spend a relatively stable share of total revenue on players. For the top Spanish division the average is 62%, and for the Premier League the average is 53%. For the Spanish second tier the average is 93%, and for England it is 76%. Both revenue and wage expenditure are somewhat higher in the English leagues, but the difference is not substantial.

4 The Sensitivity of Revenue to Performance and Performance to Wages

Competition in a sports league is essentially a kind of [Tullock \(1980\)](#) contest. Fans generate revenues, and they are typically attracted by the success of a team. Thus teams that achieve high league positions tend to attract more income. Successful teams are the ones that have the best players. In a sense this is tautological, since the teams that win are usually defined to be the best, but the market for players creates a behavioral link. Teams compete to hire players, and players sell their services in a market. Players can move from one team to another, either within contract, when the move usually entails a transfer fee paid by the acquiring club to the selling club, or as a free agent when a contract expires.

Prior to 1995 there existed some restrictions on cross-border transfers, but the 1995 Bosman judgment of the European Court of Justice upheld the right of players to move freely between clubs in the European Union. Hence it is not surprising if we observe that the best players tend to command the highest wages. The importance of the insight from contest theory is that it is not absolute spending that determines performance, but spending relative to one's rivals. For example, in 1994 an average performance in the top Spanish league could be achieved by the average spending level, which was €3.1 million. To achieve the same average performance in 2004 required a wage expenditure of €37.1 million. Of course, this is not an auction where the highest bidder wins with probability one. Luck plays a significant role in the outcome of sporting contests, as may related factors such as injuries to key players, loss of form, unexpectedly strong performances by rivals and so on. Clearly, the biggest spending team does not always win. Moreover, factors other than performance may affect revenues (e.g. history, location, size and wealth of the fan base). This is primarily an empirical issue.

Our theoretical model (following [Szymanski and Smith 1997](#)) is grounded on a revenue equation and a performance equation. The revenue equation can be defined as

$$\ln \left(\frac{R_{it}}{\bar{R}_t} \right) = \alpha + \beta_i + \gamma \cdot \ln \left(\frac{X - P_{it}}{P_{it}} \right), \quad (1)$$

where R_{it} is the revenue of club i in season t , and $\bar{R}_t$ is the average revenue of the clubs in the league in season t . This is assumed to depend on a club-specific fixed effect β_i (which may reflect the history of the club) and the log odds of league position P_{it} achieved in the season.⁵ Accordingly, to account for the potential existence of elements of individual heterogeneity, we estimate the fixed effects (FE) model in addition to ordinary least squared (OLS) estimations.

In expression (1), X is equal to the number of effective positions in the league plus one: 43 for the Spanish Liga (20 in the first division and 22 in the second division league), and 45 if the English league is considered instead (20 in the EPL, 24 in the Championship). The odds transformation works particularly well since the implication

⁵ Note that we treat position as a continuous variable and rank positions in the second divisions as if they were a continuation of the top divisions. For example, we give the rank 21 to first place in the Spanish second division, 22 to the second place and so on.

is that there are increasing returns to performance when team position is below the league average and decreasing returns when team position is above the league average.

In this paper we use league position as the measure of performance. In studies of competition in American leagues the convention is to use the win percentage, but in fact the correlation between win percentage and league position is typically greater than 0.9. Our performance equation is

$$\ln \left(\frac{X - P_{it}}{P_{it}} \right) = a + b_i + c \cdot \ln \left(\frac{W_{it}}{\bar{W}_t} \right), \quad (2)$$

where W_{it} is the wage expenditure of club i in season t , and again we allow club-specific fixed effects. Clubs also spend considerable sums of money on transfer fees, but in general a club's net transfer spending is small relative to its total wage bill. Moreover, net transfer spending relates to long-term investment in players rather than expenditures on the current season, and for this reason tends to be poorly correlated with team success.⁶

Using Eqs. (1) and (2) we can define profits as a function of league position, average wage expenditure, average club revenues and the exogenous parameters:

$$\pi(P_{it}) = \bar{R}_t \left(\frac{X - P_{it}}{P_{it}} \right)^\gamma e^{\alpha + \beta_i} - \bar{W}_t \left(\frac{X - P_{it}}{P_{it}} \right)^{\frac{1}{c}} e^{-\frac{a + b_i}{c}} - F + I. \quad (3)$$

In this expression, F accounts for the fixed expenses while I represents the fixed income. Equation (3) implies that league position is a choice variable although, absent match fixing, this is not the case. It is more natural to think of teams' choosing wage expenditure consistent with a target league position, and in this model these two approaches are in fact equivalent. Thus, for given expenditure and revenues for rival teams, there is a unique level of wage expenditure associated with each possible league position. Maximizing (3) with respect to P_{it} we can identify the profit maximizing performance for the team:

$$P_{it}^* = \frac{X}{1 + \exp \left(-\frac{a + b_i + c(\alpha + \beta_i) + c \ln \bar{R}_t - c \ln \bar{W}_t + c \ln(c\gamma)}{c\gamma - 1} \right)}. \quad (4)$$

⁶ It might be argued that both Eqs. (1) and (2) could be subject to reverse causation. For Eq. (1) it might be argued that revenue can cause success, but this in turn must depend on what the revenues are spent on. Equation (2) measures this effect through wage spending, but it could be argued that other factors, such as stadium size and quality, can cause better performance of the team at the home ground. However, as the empirical results below will show, wage spending is far and away the single most important factor in determining league performance. Could league performance cause wage spending? If teams pay bonuses for winning, then causation can run in the opposite direction, but in fact performance bonuses are relatively small, since competition among the clubs to hire the best players typically leads them to offer high fixed wage contracts. Besides, even in the presence of reverse causation the process would be predetermined. As we have already stated: past, not current, revenues may affect current performance. Similarly: past, not current, performance may affect current wages. Hall et al. (2002) considered the hypothesis of reverse causation in English soccer and found no evidence to support it.

We approximate the win maximizing position as one where variable income from league performance equals variable cost. If we assume that there is a zero budget constraint this is equivalent to assuming $F = I$. This may overstate the win maximizing expenditure relative to the profit maximizing level, but for given parameters the profit maximizing position will always be lower. In our formulation the win maximizing choice of position is given by

$$\hat{P}_{it} = \frac{X}{1 + \exp\left(-\frac{a+b_i+c(\alpha+\beta_i)+c \ln \bar{R}_t - c \ln \bar{W}_t}{c\gamma-1}\right)}, \quad (5)$$

where $\hat{P}_{it}$ is defined as the position that corresponds to non-negative profits.

The model may be thought of as a reduced-form contest model, where some theoretical constraints are ignored. First, we do not impose an adding-up constraint to ensure that the sum of league positions won must equal the actual sum of league positions available. Second, we do not impose any constraints to ensure that the average revenues (wages) of teams in the league equal the sum of profit or win maximizing revenues (wages). Thus Eqs. (4) and (5) can be thought of as ‘best responses’ to the choices of other clubs, and we seek to identify whether the actual choices of teams tended on average to be closer to their profit or their win maximizing best response. If we were aiming to test whether teams were close to equilibrium, these constraints would need to be explicitly accounted for. However, our aim is only to test whether the choices of each team in each season is closer to a profit maximizing or win maximizing best response, and there is no theoretical requirement for these choices to be consistent.

A third underlying constraint is the threat of entry. One possibility is that teams choose to pay high wages in order to deter or pre-empt competition from rivals in lower divisions, who are able to compete thanks to the system of promotion and relegation (*deter*, in the sense that the expected profitability of competition in the top division is lower; *pre-empt* in the sense that top teams may acquire all the best players, so their rivals cannot assemble a competitive team). Thus an equilibrium that accounts for the entry threat may involve higher wages under profit maximization than those implied by (4). Once again, our aim is only to compare best responses under profit and win maximizing assumptions, rather than identifying equilibrium.⁷

5 Estimation

The focus of our interest is in the best response of teams to the choices of their rivals. We now define the model in dynamic form. Thus, the empirical analogue of Eq. (1) is:

$$\ln\left(\frac{R_{it}}{\bar{R}_t}\right) = \alpha + \beta_i + \gamma \cdot \ln\left(\frac{X - P_{it}}{P_{it}}\right) + \delta \cdot \ln\left(\frac{R_{it-1}}{\bar{R}_{t-1}}\right) + \varepsilon_{it}, \quad (6)$$

⁷ Note also that entry would be likely to change parameter values such as b_i and β_i , since new teams would attract fans and players not just on the basis of their success but also because of their proximity.

Table 3 Revenues and league position

Unbalanced panel (1994–2004)			
<i>Spanish LFP</i>	(1) OLS	(2) fixed effects	(3) IV fixed effects
LogRank	0.295 (9.75)	0.240 (6.06)	0.241 (5.94)
logRelRev(−1)	0.636 (14.3)	0.338 (4.91)	0.333 (3.08)
Constant	−0.412(−8.83)	−0.499(−9.64)	−0.501(−7.53)
Instruments	no	no	wages(−1)
R ²	0.867	0.862	0.861
F-statistic*	736.6	36.97	385.7
No teams	37	37	37
No obs.	189	189	189
<i>English Soccer</i>	(1) OLS	(2) fixed effects	(3) IV fixed effects
LogRank	0.184 (10.1)	0.183 (12.9)	0.173 (11.7)
logRelRev(−1)	0.698 (20.6)	0.477 (13.1)	0.561 (11.9)
Constant	−0.150(−9.10)	−0.215(−13.0)	−0.189(−9.89)
Instruments	no	no	wages(−1)
R ²	0.913	0.909	0.913
F-statistic*	2812	242.6	1217
No teams	57	57	57
No obs.	432	432	432

Dependent variable: $\log\text{RelRev} = \log(\text{Rev}/\text{AvRev})$. OLS results using robust standard errors. (t-statistics) in parenthesis. * Chi-2, instead of F-statistic, for model (3)

where we allow lagged revenues to influence current revenues and assume a white noise error term. One interpretation of the lagged dependent variable is that it allows for an adjustment process in the face of short-term errors. In the Data Appendix we report some summary statistics for the variables entering the regressions of this section. We report our estimates in Table 3.

We estimate three versions of the model, ordinary least squares (OLS) with robust standard errors (1), the fixed effects (FE) estimator (2), and the instrumental variables (IV FE) fixed effects estimator (3).⁸ Our estimates are based on Spanish and English club data over the period 1994 to 2004. The data set consists of an unbalanced panel, which is richer for England than for Spain, as the description in the Data Appendix discloses.

⁸ In model (2) the lag of the dependent variable is directly used as a regressor. Column (3) is estimated using the instrumental variables approach. This technique is prescribed in the presence of fixed effects, to avoid the systematic multicollinearity between the element of individual heterogeneity (which does not change along with time) and the lagged dependent variable. In particular, as an instrument for the lagged logarithm of the relative revenues we use the lagged relative wages. The multicollinearity provokes inefficiency and possibly bias in the estimations. For the instruments to be suitable, they must be highly correlated with the instrumented variable while not presenting multicollinearity either with other regressors or with the error term (Cf. Greene 2003, p. 80). The latter condition is at best dubious in our case, but no better instruments were available.

Table 4 League position and wage expenditure

Unbalanced panel (1994–2004)			
<i>Spanish LFP</i>	(1) OLS	(2) fixed effects	(3) IV fixed effects
log(Wage/AvW)	0.706 (6.86)	0.618 (3.09)	0.634 (3.10)
logRank(-1)	0.357 (6.27)	0.189 (2.97)	0.177 (2.47)
Constant	0.734 (7.27)	0.798 (6.60)	0.812 (6.40)
Instruments	no	no	Win%(-1) & Div(-1)
R ²	0.643	0.639	0.637
F-statistic*	173.3	15.73	190.0
No teams	40	40	40
No obs.	236	236	236
<i>English Soccer</i>	(1) OLS	(2) fixed effects	(3) IV fixed effects
log(Wage/AvW)	0.963 (9.67)	1.032 (6.17)	0.889 (5.14)
logRank(-1)	0.512 (9.75)	0.324 (5.82)	0.414 (6.68)
Constant	0.211 (3.89)	0.273 (4.91)	0.223 (3.85)
Instruments	no	no	Win%(-1) & Div(-1)
R ²	0.744	0.739	0.743
F-statistic*	608.3	76.31	181.6
No teams	57	57	57
No obs.	432	432	432

Dependent variable: $\log\text{Rank} = -\log(\text{leaguePosition}/(X - \text{leaguePosition}))$. OLS using robust standard errors. (t-statistics) in parenthesis. * Chi-2, instead of F-statistic, for model (3)

The similarities in terms of magnitudes and significance are striking.⁹ Moreover, the explanatory power of the regressions is very high. However, since league competition is run according to rules laid down by the international governing bodies (UEFA and FIFA), and given that the players sell themselves in what is essentially a single European market, the similarities are perhaps not so surprising as they seem at first. In any case this gives us some confidence that the same competitive forces are at work in each league and that we can make meaningful comparisons across leagues.

The empirical analogue to Eq. (2) is:

$$\ln\left(\frac{X - P_{it}}{P_{it}}\right) = a + b_i + c \cdot \ln\left(\frac{W_{it}}{\bar{W}_t}\right) + d \cdot \ln\left(\frac{X - P_{it-1}}{P_{it-1}}\right) + u_{it}. \quad (7)$$

Our estimates are reported in Table 4, which is structured similarly to Table 3.

Again, we find a remarkable degree of consonance between the results for the two leagues and a very high level of explanatory power. We conclude this section by

⁹ The results for England are also similar to those reported by Szymanski and Smith (1997) for the period 1974–1989.

observing that the business of soccer seems relatively easy to understand: performance generates revenue, and wages generate performance. Beyond these two relationships, there is relatively little scope for clubs or managers to influence outcomes.

6 Profit Maximizing and Win Maximizing Behavior

We now use the fixed effect estimates (column 2) to identify the league position that each team would have achieved had it chosen either a profit maximizing or win maximizing best response to the choices of the other teams.¹⁰ In any given season a team might find itself a long way from its best response due to good or bad luck (e.g., injuries). Thus we focus on the average best responses over the sample period for each team and compare it with the average league position actually achieved. We consider essentially *short-run* best responses, i.e. we take lagged values as given. In the working paper version we also considered an ‘equilibrium’ solution, in the sense that lagged values equal current values (details available upon request). However, this is problematic since the derivation of the steady state does not necessarily respect the adding up constraints and so cannot truly be an equilibrium. In our short-run model there is no presumption that best responses respect the adding up constraint. The results for each team are reported in Table 5.

By inspection it is apparent that teams in the both the Spanish and English leagues are relatively close to their win maximizing positions. Note that there is a high correlation between the actual positions, win maximizing positions, and profit maximizing positions, so that both assumptions work well in terms of the *relative* ranking of teams. However, the win maximizing model works much better in terms of the *absolute* actual positions achieved, as shown in Table 6.

On average, the Spanish teams were 12 places *above* their profit maximizing position over the sample period, but less than half a place *below* their win maximizing position. Similarly, the English teams are nearly 16 places *above* their profit maximizing position, but nearly four places *below* their win maximizing position.

The same conclusion is obtained by computing statistical tests of the difference between means. The results of the corresponding tests for Spanish and English soccer are reported in Table 7.

The hypothesis that the difference between the mean of the variable ‘real position’ (p) and the mean of ‘winning maximization position’ ($\hat{p}$) is zero cannot be rejected (P -value = 0.2427); but the hypothesis of zero difference between ‘real position’ and the variable ‘profit maximization position’ (p^*) can be rejected.

Note that for each club, these positions represent a best response, given the choices of the other clubs. Clearly, if the other clubs had made different choices, then the best response would also have been different. Thus one cannot interpret these positions as equilibrium choices - to do that would require all clubs simultaneously to be choosing their best response, so that these responses constituted a Nash equilibrium.

¹⁰ All three sets of estimates are broadly similar. We prefer to include the fixed effects’ since they are significant.

Table 5 Profit maximizing and win maximizing positions in the soccer leagues

English League Average 1993–2004	(1) Real Position	(2) Max Wins	(3) Max Profit	Spanish LFP Average 1994–2005	(4) Real Position	(5) Max Wins	(6) Max Profit
Manchester United	2	5	23	Real Madrid	3	6	17
Arsenal	3	9	29	Barcelona	3	5	15
Liverpool	4	11	33	Valencia	5	6	18
Chelsea	6	9	30	Celta	7	6	18
Newcastle United	7	8	29	Deportivo La coruña	8	9	21
Aston Villa	8	12	33	Athletic de Bilbao	8	10	24
Leeds United	8	12	34	Valladolid	10	12	26
TottenhamHotspur	11	12	33	Real Sociedad	10	10	24
West Ham United	12	14	35	Mallorca	10	12	26
Southampton	13	14	35	Málaga	10	13	27
Blackburn Rovers	13	19	38	Bétis	11	8	21
Everton	14	16	36	Alavés	12	14	28
Fulham	14	20	39	Español	12	12	26
Leicester City	14	14	35	Atletico de Madrid	13	12	25
Middlesbrough	15	17	37	Zaragoza	14	15	29
Wimbledon	15	15	36	Oviedo	16	15	29
Sunderland	20	14	35	Racing de Santander	16	18	32
Bolton Wanderers	20	14	35	Sevilla	17	16	30
Charlton Athletic	20	16	37	Rayo Vallecano	19	15	30
Coventry City	21	19	38	Villarreal	19	16	30
Derby County	21	20	39	Tenerife	21	18	32
Manchester City	22	18	37	Recreativo de Huelva	22	22	34
Ipswich Town	22	18	37	Sporting de Gijón	23	23	35
Sheffield Wednesday	22	19	38	Las Palmas	24	18	32
Birmingham City	22	19	39	Salamanca	24	24	36
Nottingham Forest	23	20	39	Getafe	27	30	38
Crystal Palace	25	18	38	Compostela	27	25	37
Wolverhampton Wander	27	18	37	Numancia	27	25	36
Barnsley	27	20	39	Albacete	28	25	37
Bradford City	28	19	38	Levante	28	22	35
Sheffield United	29	22	40	Lleida	31	30	39
Norwich City	30	20	39	Logroñés	34	31	39
Queen's Park Rangers	30	26	41	Leganés	34	27	38
West Bromwich Albion	30	15	36	Córdoba	35	31	39
Preston North End	32	23	40	Murcia	35	25	37
Watford	32	24	40	Hercules	41	37	41
Portsmouth	32	25	40				
Stoke City	33	20	38				
Millwall	34	24	40				

Table 5 continued

English League Average 1993–2004	(1) Real Position	(2) Max Wins	(3) Max Profit	Spanish LFP Average 1994–2005	(4) Real Position	(5) Max Wins	(6) Max Profit
Tranmere Rovers	34	23	40				
Burnley	34	23	40				
Gillingham	35	18	38				
Huddersfield Town	35	27	41				
Port Vale	37	25	41				
Stockport County	37	25	41				
Oxford United	38	30	42				
Reading	38	29	42				
Southend United	38	23	40				
Crewe Alexandra	38	22	40				
Grimsby Town	39	28	42				
Oldham Athletic	39	24	41				
Walsall	40	24	41				
Swindon Town	41	26	41				
Luton Town	41	22	40				
Bury	42	31	43				

Table 6 Deviations from the profit-maximizing and win-maximizing position

Variable	Spanish LFP (unbalanced)			English leagues (unbalanced)		
	N	Mean	Sum	N	Mean	Sum
$(p^* - p)$	189	12.12		392	15.55	
$(\hat{p} - p)$	189	-0.48		392	-3.61	
$((p^* - p)^2)/N$	189		190.62	392		368.75
$((\hat{p} - p)^2)/N$	189		39.11	392		140.47

$(p^* - p)$ is the difference between the profit-maximizing position and the real one

$(\hat{p} - p)$ subtracts the actual position from the win-maximizing (or zero-profit) position

Of course, profit maximization and win maximization subject to a zero profit constraint are just two points along a spectrum of possible objectives. Clearly, however, the evidence suggests that the behavior of clubs in our sample conforms quite closely to short run win maximization.

7 Explaining Deviations from Profit Maximization

In the previous section we showed that clubs tend to deviate systematically from profit maximization, and that behavior is systematically closer to win maximization. From Table 4 we know that wage expenditures are major determinants of a team's actual league position, and so win maximizing behavior amounts to spending lavishly on playing talent in order to acquire a higher league standing. We now try to account for

Table 7 Statistical test of the difference between means

Variable	Spanish LFP (unbalanced)			English leagues (unbalanced)		
	N	Mean	Std.Dev	N	mean	Std.Dev
p	189	15.74	10.38	392	21.14	12.55
$\hat{p}$	189	15.20	7.35	392	17.52	6.57
p*	189	27.81	7.03	392	36.69	4.56
		t-stat	P-value		t-stat	P-value
mean ($\hat{p}$ –p)	189	–1.1720	0.2427	392	–6.33	0.0000
mean (p*–p)	189	24.8241	0.0000	392	27.28	0.0000

In Spanish soccer, the hypothesis that the difference between the mean of winning maximization position ($\hat{p}$) and the mean of the real position (p) is zero cannot be rejected (P-value = 0.2427), whereas the opposite can be stated for the difference between p* and p. For English soccer equality of the means can be statistically rejected for both measures

deviations from profit maximization (which we equate with excessive player expenditure) by constructing a variable (LeagPositPurch), which is the number of positions realized by a team in excess of the profit maximizing level.

We conjecture that the willingness of clubs to buy positions will be influenced by the following factors:

- The historical status of the club and the expectations of fans
- The legal status of the team (whether the team has SAD or ‘club’ status)
- The motivations of the senior executives
- The concentration of the control in the decision making of the club
- The threat of relegation

Testing this requires gathering detailed information about the institutional structure of the clubs, a task that we have so far undertaken only for Spanish clubs. The set of explanatory variables are fully described in Table 8, but we discuss them briefly here.

Our data set comprises teams from both the first and second division league and we use a dummy variable to control for the teams that compete in the second division league (SecondDivision). Another variable (HistoricalStatus) is included to rank the teams according to the historical cumulative points obtained in the 74 editions of 1^a division LFP, until 2005. We deal with the risk of being relegated using Relegation-Risk, a dummy for teams that, on average in the period, find themselves within 4 positions from the relegation-promotion positions (namely, between position 16 and 24 or between 38 and 46). Regarding institutional and legal issues, AssociativeClub is a dummy for the four clubs that are not shareholders companies. Another dummy (ControlConcentr) captures the degree of control concentration in ownership; this dummy took a value of one if the proportion of shares controlled by the same owner or entrepreneurial group is above 80% of the total capital (see Barajas (2005), Table 4.2, p. 121).

We also considered whether financial rewards to company directors played a role in the choice of objectives; we use the dummy (DirectorReward) for teams that recorded making payments to members of its board of directors as of 30/6/2000 (Barajas (2005), Table 4.3, p. 124). HomeGrown% is a variable measuring the percentage

Table 8 Factors explaining deviations from the profit maximizing position

Dependent variable	
LeagPositPurch the difference between the profit maximizing position and the actual position achieved by the team	
Explanatory variables	
SecondDivision	dummy gathering the teams in the second division league.
HistoricalStatus	ranking of the teams as indicated by the historical cumulative points obtained in the 74 editions of 1 ^a division LFP, until 2005.
RelegationRisk	dummy for teams that, on average in the period, find themselves within 4 positions from the relegation-promotion positions (namely, between position 16 and 24 or between 38 and 46).
AssociativeClub	dummy for the clubs that are not shareholders companies (namely: Barcelona, Real Madrid, Athletic de Bilbao and Osasuna).
ControlConcentr	dummy for teams with a high degree of control concentration (the proportion of shares controlled by the same owner or entrepreneurial group is above 80% of the total capital). Based on Barajas (2005), Table 4.2, p. 121.
DirectorReward	dummy for teams that generally reward the members of its board of directors. Source: Barajas (2005), Table 4.3, p. 124. (1: teams that pay; 0: do not pay. Teams for which this information was not available were given value zero).
AthleticBilbao	dummy for the Athletic Club de Bilbao.
HomeGrown%	percentage (or share) of home-grown players for each team and season.
YearsPresident	years in which the same president is running the club.
Businessman	dummy for teams whose president is a businessman.
Constructor	dummy for teams whose president is a manager in a construction company.
Economist	dummy for teams whose president is an economist.
Lawyer	dummy for teams whose president is a lawyer.
MedicalDoctor	dummy for teams whose president is medical doctor.

of home-grown players in each team and season; YearsPresident specifies the tenure of the current president of the club. Finally, there are a number of dummy variables to account for the specific profession of the president of the team. Presidents were classified among the following jobs: construction, generic businessmen, economists, lawyers, engineers, medical doctors, and a residual 'other'. Other professions were not relevant enough or did not represent significant numbers of individuals.

Table 9 reports some descriptive statistics for these variables.

The expected sign of the ranking of HistoricalStatus is ambiguous. Better records of past performance may reflect that the club is traditionally prone to overspend in wages (thereby deviating from maximizing profits), but if success is recent, pressure to achieve sporting results may relax, permitting greater focus on economic profitability. Similarly, we do not have clear *a priori* expectations on the role that the legal status of a club may play here. In Section 3 we described the legal and economic reasons behind the decision to require most of the Spanish soccer clubs to adopt SAD status. In part the government's motivation was to force the clubs to exercise tighter financial control, so by implication the government would have expected that SAD status would imply league positions closer to profit maximization. As is customary, in the estimations we chose the most commonly occurring status category as our reference group, which is SAD status. Thus the SAD dummy is not incorporated directly into

Table 9 Summary statistics of the principal variables

Variable	N	Mean	SD	Min	Max
LeagPositPurch	189	7.0212	7.8388	−15	29
SecondDivision	189	0.2857	0.4530	0	1
HistoricalStatus	189	1.3628	1.0280	0	3.34
RelegationRisk	189	0.2011	0.4019	0	1
AssociativeClub	189	0.1217	0.3278	0	1
ControlConcentr	189	0.2169	0.4133	0	1
DirectorReward	189	0.2910	0.4554	0	1
AthleticBilbao	189	0.0370	0.1894	0	1
HomeGrown%	189	0.2180	0.1634	0	0.75
YearsPresident	189	5.9630	5.3638	1	25
Constructor	189	0.1905	0.3937	0	1

the regressions and the dummy *AssociativeClub* represents the few clubs that managed to avoid becoming an SAD (Real Madrid, FC Barcelona, Athletic de Bilbao, and Osasuna). If we accept the government's theory, we would expect these teams to be closer to win maximization than are their more tightly governed rivals.

While all club presidents want their team to win, it is possible that their commitment to winning may be affected by their background, and so we use information on the business sector from which club presidents originate. We also allow for the possible effect of the concentration of share ownership in the SAD's. In particular, we explore the possibility that politics and sports interact through the mixed interests of clubs' managers. If the president of a club is also the chief executive of a construction company, we anticipate two effects. On the one hand, the team may get funds from the local authorities, on the grounds that it is a way to promote the economic development of the city or region. As we mentioned in the historical description of Sect. 3, receiving subsidies from the local governments has been a common practice in the past. On the other hand, the president of a well-established club might take advantage of such a position for seeking personal goals of economic and entrepreneurial nature. The club might overspend on sporting talent (thereby deviating from profit maximization for the club) in order for its president to gain public notoriety and recognition, as well as achieving planning permissions from the local authorities for his construction company. In either case, the sign of the dummy controlling for presidents constructors is expected to be positive. We expect a negative sign for the variable capturing the number of years in a row that the same president is head of the club, on the grounds that presidents tend to overspend in the early years of their tenure.

Other studies (see, e.g., [Frick and Simmons \(2007\)](#), for the Bundesliga) have analyzed the influence of head coach quality to explain systematic deviations from production frontiers. However, when we included the identity of the coaches, we did not obtain any statistically significant result. Finally, relegation threats often provoke increased spending on success, so that teams that persistently find themselves in the relegation zone are likely to spend up to their financial limits and possibly even beyond those limits.

Table 10 Estimation of the model explaining deviations from profit maximizing behavior

Variables	Spanish LFP (1 ^a and 2 ^a Division)			Spanish LFP (1 ^a Division)		
	Coeff.	t-stat	P-value	Coeff	t-stat	P-value
SecondDivision	-11.75**	-12.82	0.000			
HistoricalStatus	-1.43**	-2.66	0.009	-1.33*	-2.18	0.031
RelegationRisk	2.74**	2.98	0.003	3.18*	2.55	0.012
AssociativeClub	-0.98	-0.59	0.559	-1.58	-0.88	0.380
ControlConcentr	-0.45	-0.52	0.603	-0.39	-0.38	0.705
DirectorReward	-0.64	-0.74	0.461	-0.07	-0.08	0.939
AthleticBilbao	1.89	0.86	0.393	3.61	1.62	0.108
HomeGrown%	3.53	1.28	0.201	1.42	0.46	0.646
YearsPresident	-0.19**	-3.08	0.002	-0.26**	-2.70	0.008
Businessman	2.80*	1.99	0.048	3.69	1.43	0.156
Constructor	4.49**	2.76	0.006	7.54**	2.60	0.011
Economist	-2.52	-0.84	0.402	-3.82	-0.75	0.454
Lawyer	2.69	1.50	0.136	4.37	1.55	0.123
MedicalDoctor	2.47	1.20	0.232	4.74	1.51	0.134
_cons	14.76**	9.14	0.000	13.83**	5.14	0.000
No obs.	189			135		
R ²	0.59			0.22		
F-statistic	18.2**			2.69**		
Cook-Weisberg			0.791			0.809
Shapiro-Wilk			0.127			0.030

** Indicates significant at 1% and * at 5%

We estimate the model for both the two Spanish divisions combined and for the first division alone. The results, shown in Table 10, are broadly similar, although the coefficient on the second division dummy variable in the combined model suggests that second division teams are less likely to overspend on talent and winning. Instead, they are closer to their profit maximizing position than are first division teams, which may reflect either a natural sorting of teams by ambition or tighter budget constraints for poorly performing teams (since deficits cannot forever be justified by glory).¹¹

Perhaps the most interesting result is that the historical status variable has a negative rather than positive coefficient, suggesting that past performance is a substitute for current performance. This makes some sense, since teams that have never experienced success may become desperate to meet the demands of the fans. We also find that teams facing relegation risk tend to increase their spending relative to the profit maximizing position. The fact that teams struggling for promotion or against relegation display a more substantial willingness to buy performance improvements is quite intuitive.

¹¹ For the position variable, smaller numbers mean higher (better) league positions. Hence, when the deviation of the profit maximizing decision from the actual position (our dependent variable) is positive, then the club has higher league position than is predicted by profit maximization. A positive regression coefficient is thus associated with better than profit maximizing league performance.

We now turn to the legal and institutional factors. Note that the coefficients of the dummy variables can be interpreted as the number of places nearer to or further away from profit maximization that are implied by a given status. The coefficient for the variable *AssociativeClub* (a dummy variable for the teams retaining club status) is statistically insignificant and the wrong sign, rejecting the government's view that the regulations would impose tighter financial constraints on clubs. We included a separate dummy variable for Athletic de Bilbao, perhaps the most politically motivated of all the clubs. To this day the club persists in a policy of hiring only Basque players, although there is no evidence that this behavior has a significant impact on their apparent preference for winning.

Finally, we analyze a group of variables related to ownership and decision-making authority. In the case of the shareholder owned team (SAD) we found that teams that were tightly controlled, generally by a family group,¹² were likely to be closer to profit maximization, but again the variable was not significant. We also consider whether the club President has any influence on the inclination to maximize profits. Presidents who were businessmen were statistically more likely to buy league positions than were other professionals, and among businessmen those in the construction industry were even more likely to pursue winning. It is plausible that businessmen are better able extract financial advantage in their professional life from team success. Moreover in the construction industry, where planning permission from local government is so often the key to financial gain, the benefits of investing in civic pride associated with the success of the local soccer team are likely to be pronounced. We also find that the clubs drift toward profit maximization as the tenure of the president increases. This is consistent with the observation that presidential elections are like auctions where the members vote for the candidate who promises to bring the best players to the club, thereby leading to stronger win maximizing behavior in the years immediately after appointment.

8 Conclusions

This paper has used data on the performance of soccer clubs in Spain and England to estimate whether behavior is better approximated by profit maximization or win maximization. We find that choices in both the Spanish and English leagues seem to closely approximate win maximization subject to a zero profit budget constraint. The economic environments in each league are quite similar, in the sense that revenues derive primarily from ticket sales and the sale of broadcast rights, while both leagues hire players from the same markets. It seems that similar environments produce similar kinds of behavior.

One rationalization for our findings is that decision makers are maximizing profits, but in a broader context. This explanation has some weight in the American context, where major league clubs tend to belong to larger commercial enterprises. However, all of the clubs in our sample are free-standing enterprises with no significant activities outside of soccer. It may be the case that some of the principal shareholders are willing to tolerate losses that might be compensated through returns in some other business

¹² Details of the ownership distribution are provided in Barajas (2005).

interest. However, while we did find a significant difference between clubs where the president would be likely to have such interests, the difference was not large. Even when a president was not likely to have such an interest, behavior was still better explained by win rather than profit maximization.

The question remains as to whether this behavior is likely to persist over the longer term. It might be argued that long-run competitive constraints preempt other forms of behavior. Any team that adopted profit maximization would be likely to be relegated, leading to a significant loss of future profit opportunities (ironically, this argument follows Alchian's competitive logic, but leads to the contrary conclusion, namely that profit maximizing behavior will not survive). However, the descriptive statistics show that the period 1994–2004 has been one of significant change, with income and expenditure increasing around five-fold in the top divisions over the decade (this was due to the emergence of competition in broadcasting and increased demand due to media exposure). It would be implausible therefore to treat behavior in this period as equilibrium behavior, and one might expect clubs to pursue a win maximizing strategy over such a period with a view to obtaining a dominant position and higher profit in the longer term.

While this kind of hyper-competition might be expected to emerge during a period of rapid income growth, it may not last. If clubs were truly profit maximizers, they might be expected to collude in order to reduce competition (competition, in this case, amounts to little more than business stealing). Collusive conduct appears characteristic of the closed U.S. major leagues, given that restraints such as salary caps and revenue sharing limit economic competition and help to generate financial surpluses. Clubs in European leagues have been noticeably unsuccessful at negotiating similar restraints.

This raises a number of issues for future research: First, is the support that we find for the win maximization hypothesis simply an artifact of the period under consideration or, as is often claimed, a typical characteristic of European soccer? Research on other leagues in other periods would help to shed light on this issue. Second, if clubs are controlled by win maximizers, is there some kind of evolutionary explanation for what we observe? Are win maximizing strategies within a league stable in an evolutionary sense? In the last few years a number of sports franchise owners from North America have bought clubs in the English Premier League (the Glazer family bought Manchester United; Randy Lerner bought Aston Villa; Tom Hicks and George Gillett bought Liverpool). Could profit maximizers successfully invade a population of win maximizers (and vice versa)? These research questions indicate future topics that can be fruitfully studied in the sports economics laboratory.

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Appendix: Data Description

Table 11 shows the distribution of the observations in our sample among the various divisions in each league. Note that '1' in England refers to the Premier League. Table 12 describes the data used in the regression results found in Tables 3 and 4.

Table 11 Distribution of available data on teams by division

Divisions	Spanish Soccer Unbalanced panel	English Soccer	
		Balanced panel	Unbalanced panel
1	160	198	282
2	76	172	311
3	—	98	265
4	—	82	210
Total	236	550	1068

Table 12 Distribution of the data used in the regressions of Table 3 and Table 4

Divisions	Spanish Soccer Unbalanced panel	English Soccer Unbalanced panel
1	160	223
2	76	249
Total	236	472

Table 13 Summary statistics of the principal variables in the estimations of Table 3 and Table 4 (English soccer)

Variable	N	Mean	Std. Dev.	Min	Max
Revenues (£,000)	472	21,237	26,181	1,696	173,001
Wages (£,000)	472	12,916	14,039	974	115,565
logRelatRev	472	−0.4069	0.9022	−2.4787	1.8591
logRelatWage	472	−0.2636	0.7525	−2.1928	1.5666
Winning %	472	0.5028	0.1106	0.1973	0.8421
logRank	468	0.0576	1.6039	−3.7841	3.7841
Position	472	22.2542	12.7537	1	44

Table 14 Summary statistics of the principal variables in the estimations of Tables 3 and 4 (Spanish LFP soccer)

Variable	N	Mean	Std. Dev.	Min	Max
Revenues (€,000)	236	23,874	33,869	1,258	234,622
Wages (€,000)	236	15,331	21,597	871	139,170
logRelatRev	236	−0.4388	0.9154	−2.7392	1.9260
logRelatWage	236	−0.5477	1.0534	−2.7682	1.9162
Winning %	236	0.3740	0.1046	0.1315	0.6666
logRank	236	0.6414	1.4028	−3.0204	3.7376
Position	236	16.4025	10.7590	1	41

Tables 13 and 14 provides descriptive statistics for the main variables (wages, revenues and league position) and the transformations used in the estimation.

References

- Alchian, A. (1950). Uncertainty, evolution and economic theory. *Journal of Political Economy*, 58, 211–221.
- Alexander, D. L. (2001). Major league baseball: monopoly pricing and profit-maximizing behavior. *Journal of Sports Economics*, 2(4), 341–355.
- Ascari, G., & Gagnepain, P. (2006). Spanish football. *Journal of Sports Economics*, 7(1), 76–89.
- Atkinson, S., Stanley, L., & Tschirhart, J. (1988). Revenue sharing as an incentive in an agency problem: an example from the National Football League. *Rand Journal of Economics*, 19(1), 27–43.
- Barajas, A. (2005). *El Valor Económico Del Fútbol*. Radiografía Financiera Del Fútbol Español. Pamplona: Ediciones Universidad de Navarra.
- Chiappori, P. A., Levitt, S., & Grosseclouse, T. (2002). Testing mixed-strategy equilibria when players are heterogeneous: the case of penalty kicks in Soccer. *American Economic Review*, 92(4), 1138–1151.
- Dutta, P., & Radner, R. (1999). Profit maximization and the market selection hypothesis. *Review of Economic Studies*, 66(4), 769–798.
- Ferguson, D. G., Jones, J. C. H., LeDressay, A., & Stewart, K. G. (1991). The pricing of sports events: do teams maximize profits? *Journal of Industrial Economics*, 39, 291–310.
- Forrest, D., & Simmons, R. (2002). Team salaries and playing success in sports: a comparative perspective. *Zeitschrift für Betriebswirtschaft*, 66, 221–237.
- Fort, R., & Quirk, J. (1995). Cross subsidization, incentives and outcomes in professional team sports leagues. *Journal of Economic Literature*, XXXIII(3), 1265–1299.
- Fort, R., & Quirk, J. (2004). Owner objectives and competitive balance. *Journal of Sports Economics*, 5(1), 20–32.
- Frick, B., & Simmons, R. (2007). The impact of managerial quality on organizational performance: evidence from German Soccer. AIES-IASE Working Papers Series, Paper No. 07-08.
- García-del-Barrio, P., & Pujol, F. (2007). Hidden monopsony rents in winner-take-all markets. Sport and economic contribution of Spanish soccer players. *Managerial and Decision Economics*, 28, 57–70.
- Greene, W. (2003). *Econometric analysis* (5th ed.). New York: Prentice Hall.
- Hall, S., Szymanski, S., & Zimbalist, A. (2002). Testing causality between team performance and payroll: the cases of Major League Baseball and English soccer. *Journal of Sports Economics*, 3(2), 149–168.
- Hoehn, T., & Szymanski, S. (1999). The Americanization of European Football. *Economic Policy*, 28, 205–240.
- Hortacsu, A., & Puller, S. (2008). Understanding strategic bidding in multi-unit auctions: A case study of the Texas electricity spot market. *The RAND Journal of Economics*, 39(1), 86–114.
- Kahn, L. (2000). The sports business as a labor market laboratory. *Journal of Economic Perspectives*, 14(3), 75–94.
- Késenne, S. (1996). League management in professional team sports with win maximizing clubs. *European Journal for Sport Management*, 2(2), 14–22.
- Késenne, S. (2000). Revenue sharing and competitive balance in professional team sports. *Journal of Sports Economics*, 1(1), 56–65.
- MacArthur, R. H., & Pianka, E. R. (1966). On the optimal use of a patchy environment. *American Naturalist*, 100, 603–609.
- Nelson, R., & Winter, S. (1982). *An evolutionary theory of economic change*. Cambridge, Massachusetts: Harvard University Press.
- Noll, R. (2002). The economics of promotion and relegation in sports leagues: The case of English football. *Journal of Sports Economics*, 3(2), 169–203.
- Palacios-Huerta, I. (2003). Professionals play minimax. *Review of Economic Studies*, 70(2), 395–415.
- Quirk, J., & Fort, R. (1992). *Pay dirt: the business of professional team sports*. Princeton N.J.: Princeton University Press.
- Romer, D. (2006). Do firms maximize? Evidence from professional football. *Journal of Political Economy*, 114, 3.
- Rubinstein, A. (2006). A Sceptic's comment on the study of economics. *Economic Journal*, 116(510), C1–C9.
- Scott Morton, F., & Podolny, J. (2002). Love or money? The effects of owner motivation in the California wine industry. *Journal of Industrial Economics*, 50(4), 431–456.
- Sloane, P. (1971). The economics of professional football: The football club as a utility maximizer. *Scottish Journal of Political Economy*, 17(2), 121–146.

- Szymanski, S. (2001). Income inequality, competitive balance and the attractiveness of team sports: some evidence and a natural experiment from English Soccer. *Economic Journal*, 111, F69–F84.
- Szymanski, S. (2003). The economic design of sporting contests. *Journal of Economic Literature*, XLI, 1137–1187.
- Szymanski, S., & Kuypers, T. (1999). *Winners and losers: The business strategy of football*. London: Viking Books.
- Szymanski, S., & Smith, R. (1997). The English football industry, profit, performance and industrial structure. *International Review of Applied Economics*, 11(1), 135–153.
- Szymanski, S., & Valletti, T. (2005). Promotion and relegation in sporting contests. *Rivista di Politica Economica*, 95(5/6), 3–39.
- Tullock, G. (1980). Efficient rent seeking. In J. Buchanan, R. Tollison, & G. Tullock (Eds.), *Toward a theory of rent seeking society* (pp. 97–112). Texas: A&M University Press.
- Vrooman, J. (1995). A general theory of professional sports leagues. *Southern Economic Journal*, 61(4), 971–990.
- Walker, M., & Wooders, J. (2001). Minimax play at Wimbledon. *American Economic Review*, 91(5), 1521–1538.
- Zimbalist, A. (2003a). Sport as business. *Oxford Review of Economic Policy*, 19(4), 503–511.
- Zimbalist, A. (2003b). *May the best team win: Baseball economics and public policy*. Washington: Brookings Institute.