Market forces in european soccer

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Market Forces in European Soccer[1]

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Abstract

Recent decades have witnessed major changes in the market for European soccer. The most profound were the Bosman ruling, which lifted restrictions in the European labor market for soccer talent, and the introduction of the Champions' League, a high-profile international competition that generates high revenues for participating clubs. This paper studies the effects of these changes on the closeness of national and international competitions, from both a theoretical and an empirical perspective. We show that competitive balance in national competitions has not been affected. International quality differences did increase, mainly as a result of the Bosman ruling.

1 INTRODUCTION

A 21st-century society without sports industries is unimaginable. Sports of all types have permeated modern societies. Amateur sporting clubs are all over the place, as are professional leagues of many different sorts. Clearly, the economic value of sports industries is not restricted to only sporting activities. After all, sporting activities generate much economic value in related industries, varying from publishing and media to health and retailing industries. The European Commission has estimated that trade in sports related activities now constitutes 3% of world trade (Szymanski (2001a)). Additionally, sports industries contribute indirectly to societal welfare by enhancing the population's health, by offering 'free' entertainment and by fostering national pride. This paper focuses on the analysis of the most popular sports of all: soccer, or 'non-American' football. Soccer's world championships for national teams are the second-biggest sporting events in the world, immediately following the Olympic Games. National leagues, professionally and non-professionally, flourish all over the globe, particularly in Europe and Latin America. Continents organize annual international leagues in which the nationally top-performing teams play for huge sums of prize, sponsor and television money.

The 'professionalization' of European soccer is unstoppable: rumours about the establishment of a competing European league, next to UEFA's Champions' League, abound, and one club after the next becomes listed on a stock exchange. Professional soccer clubs such as AC Milan, Ajax, Arsenal, Barcelona, Bayern München, Juventus, Manchester United, Olympique Marseille and Real Madrid are billion-generating figure heads of their national cultures. No wonder that government authorities, both nationally and internationally, are interested in soccer's well-being. Particularly in Europe, the European Union's and the UEFA's intervention policies are crucial determinants of the fates of clubs and leagues.

In this paper, we analyze the competitive consequences, in terms of national competitive balances and international quality differences, of two such intervention policies: the changes in European Union's player transfer rules (specifically the foreigner rule and the Bosman ruling, according to which players from the EU are free agents when their contracts expire) and the introduction of UEFA's Champions' League. By studying both regulatory events in European soccer's recent history, we hope to gain insight into the likely impact of future changes in the 'rules of the game' on the competitiveness of soccer, both nationally and internationally.

Although the soccer game has attracted the attention of analytical and empirical economists (see, e.g., Clarke and Norman (1995), Dobson and Goddard (2001), Koning (2000), and Szymanski and Kuypers (1999)), the study of 'non-American' football is still relatively undeveloped. In effect, the current state of the art in the economics (and management, for that matter)[1] of sports is heavily biased toward the big-four American professional team sports (see, e.g., Fort and Quirk's 1995 review article in the *Journal of Economic Literature*): American football, baseball, basketball and ice hockey. Although these US sports industries organize 'World Series', the national nature of the associated leagues ignores an issue that is of crucial importance in the context of soccer: cross-border player trade and international team leagues. So, while benefiting from

[1] There is a large (particularly US) management literature that seeks to deepen our understanding of the behavior and performance of sports players or teams. Two illustrative studies are Straw and Hoang (1995) and Bloom (1999). Clearly, this interesting literature focuses on lower levels of analysis (the individual player or team) while the current study deals with the aggregate industry.

the 'autarkic' US literature, we develop an empirical and theoretical analysis of international sports economics in the setting of European soccer. In this context, as said, this paper focuses on issues of competition. The reason for this is twofold.

First, the peculiar feature of sports industries in general and soccer leagues in particular is that competition is their very product. Sports leagues need to produce 'competitive excitement' to survive. Without competitive excitement, a sports league would be dull: after all, then there is not much that is attractive to customers (i.e., fans). This is in contrast with non-sports industries. The sports industries' uniqueness in the business world as a producer and seller of competition makes them particularly interesting from an antitrust perspective. The production of competitive excitement is unlikely to be a sustainable activity without any cartel-like arrangement at the industry (i.e., league) level. The industry's cartel function is to organize a competitive league and to stimulate competitive balance.

Second, and related to the above, sports industries tend to be associated with a conflict of interest at the policy level. Again, European soccer is an illuminating case in point. On the one hand, as explained above, the very 'product' of soccer is bound up with cartel-like arrangements, implying that the antitrust authorities must tolerate tailor-made anti-competitive soccer practices (such as the industry-level sharing rules as to television rights). On the other hand, much of European soccer's attractiveness derives from international competition among national club teams in UEFA leagues. However, such European leagues, like their national counterparts, must produce competitive excitement. This requires establishing and maintaining industry-level mechanisms that help to avoid the emergence of large international quality differences. In this context, many soccer experts argue that an international player transfer system that promotes the free movement of soccer players, which would be in line with the European Union's integration philosophy, is a death penalty for many European and national leagues. Hoehn and Szymanski (1999) argue that "single-league competition for the top clubs is the most plausible equilibrium for European football." Moving from the current European system to a more American structure, they argue, should be beneficial for clubs.

So, issues of national competitive balances and international quality differences in European soccer are at the very heart of key policy debates in the European Union and its member states. This paper's aim is to contribute to this debate by offering an in-depth analysis of the competitive consequences of earlier changes in the 'rules of the game' in European soccer, which may be instrumental in understanding what might be the impact of future policy interventions. Section 2 develops a model of national and international soccer competition that analyzes the competitive effects of promoting free international player trade and introducing a Champions' League for nationally top-performing teams. Subsequently, Section 3 explores these issues empirically by calculating proxies for national competitive balances and international quality differences for a number of European countries in the post-war period. Finally, Section 4 discusses our findings in relation to the current policy debate.

2 A Theoretical Model

2.1 The European Soccer Market

Sports leagues differ from regular industries. The demand for the product produced by a sports league industry depends not only on the absolute qualities provided by the different producers, but also on the difference between those

qualities. An exciting league, in which qualities of the teams are comparable, leads to greater fan interest. Fans favor competitive balance, which is associated with a not-too-uneven distribution of qualities of teams in a competition. Discussions about institutional features of international soccer suggest that fans, teams and policy makers also care about the overall quality level in a given national league. Therefore, people care not only about intra-league competitive balance, but also about inter-league competitive balance, or international quality differences.[2] When international quality differences increase, fans in countries with low-quality leagues are (even) worse off, as their leagues become less attractive, while fans in high-quality leagues are better off as their leagues become more attractive. International competitions, however, become less exciting.

The European soccer market differs fundamentally from sports markets in the US. While in the US leagues are (almost) always monopolists, national leagues compete in the European soccer market. They do so in two ways. First, the most successful teams in a national league play each other in international play-offs, such as the Champions' League or the UEFA cup. Second, national leagues, or rather teams within national leagues, compete for talent. In many US leagues, players effectively do not have the possibility to market their talent outside their own professional monopolistic sports league. European soccer players do have that possibility: they often move to competing foreign leagues. This limits the scope for collusion within a national league. Arrangements such as a salary cap, used in American professional basketball, are hardly viable in a national soccer league. The model we develop in this section captures these features of European soccer: the existence of international competitions, and the possibility for talent to move freely between national competitions.

Our model focuses on two issues: the introduction of the Bosman ruling and the Champions' League. First, in the past, clubs have tried to restrict the possibility of players moving across borders. Yet, with the Bosman ruling in 1995, these barriers have been lowered. Before this ruling, teams could ask for a transfer fee if a player left the club when his contract expired. After the ruling, a soccer player from the European Union (EU) is a free agent within the EU after his contract expires. Moreover, in this ruling it was also determined that teams within the EU are not subject to any restrictions on the number of EU-players they can field. For more information on the background and implications of the Bosman ruling we refer to Antonioni and Cubbin (2000). Second, the UEFA launched a prestigious international competition in 1990. For sure, international competitions already existed before 1990. However, the international prestige and, especially, the amount of money at stake were substantially lower then.

2.2 The Benchmark Model

Consider a single country that has a soccer league that operates in isolation. For future reference, we will denote this country as country a.[3] Players cannot be transferred to leagues in other countries. For simplicity, we assume that there are only two clubs. It is easy to extent the analysis to more clubs, but for our purposes two clubs suffice. We assume that clubs maximize profits. They will thus hire talent up to the point where the marginal revenues of do-

[2] For ease of discussion, in the remainder of this paper we will talk about national competitive balance if we mean intra-league competitive balance, and about international quality differences when we refer to inter-league competitive balance.

[3] Note that, for this subsection, we do not need the country index. We prefer to use it however, in order to have a consistent notation throughout this section.

ing so equal the marginal costs. The amount of talent in club j in country a is denoted t_{aj}. As a normalization, the total amount of talent in this country equals 1, thus $t_{a1} + t_{a2} = 1$. Revenues of a club consist of three components. The first is related to the club's own supporters. These sources of income include gate receipts, merchandising profit, local television contracts, et cetera. For simplicity, we refer to these as gate receipts, and denote them G_{aj} for club j. We assume

$$G_{aj} = \left(D_{aj} - kt_{aj}\right) t_{aj}.$$

Here, D_{aj} is a constant that differs among clubs, giving the exogenous drawing potential of a club. A club's drawing potential reflects the amount of revenues it can generate with a given amount of talent. This depends, for example, on the size of the city where a club is located, the popularity of soccer in that particular city, and the extent to which a club is successful in marketing itself. Weak-drawing clubs have low D, whereas strong-drawing clubs have high D. For the purposes of our paper, drawing potential is exogenously given. The parameter k is some exogenous constant, and does not qualitatively affect the analysis. We assume $k < 2D_{ij}\ \forall i, j$, i.e., gate receipts are globally increasing in the amount of talent a club has. Note that the above specification implies a linear downward-sloping marginal revenue curve, which is also assumed in, e.g., Fort and Quirk (1995). Admittedly, our specification is highly simplified. Yet, this specification allows for simple analytical solutions, and further complicating the function above will not affect the gist of the analysis.

The second component of a club's revenues is the prize money it receives when winning the league. This amount is exogenously given and equal to F_a. The third and final component is a lump sum based on, e.g., national television contracts. We do not take this into account in the further analysis. For simplicity, the only costs we consider are the costs of hiring talent. For team j, these are equal to ct_{aj}, with c the constant per-unit cost of talent, that is, the wage rate of talent. We assume that the probability that team j wins the league is given by

$$p_{aj} = \frac{1}{2} + \frac{1}{2}\left(t_{aj} - t_{a-j}\right) \tag{1}$$

with $j = 1, 2$ and where $-j$ denotes the team other than j. With this specification, when both teams have the same amount of talent, they both have a probability $\frac{1}{2}$ of winning. Also, the higher the amount of talent in a team, the higher its probability of winning the league. If a club has all the talent, then it wins with certainty. Finally, this specification satisfies the condition that probabilities should sum to one.

From the above analysis, total revenues of team j follow from

$$\begin{aligned} R_{aj} &= \left(D_{aj} - kt_{aj}\right) t_{aj} + p_{aj}F_a \\ &= \left(D_{aj} - kt_{aj}\right) t_{aj} + \frac{1}{2}\left(1 + t_{aj} - t_{a-j}\right) F_a. \end{aligned}$$

Since any club realizes that adding talent implies that the other club will have less talent, and since $t_{a1} + t_{a2} = 1$, this implies

$$R_{aj} = \left(D_{aj} - kt_{aj}\right) t_{aj} + t_{aj}F_a.$$

With the price per unit of talent given by c, profits are maximized by setting marginal revenue equal to c. Therefore, in equilibrium, marginal revenues of clubs are equal. Hence,

$$D_{a1} - 2kt_{a1} + F_a = D_{a2} - 2kt_{a2} + F_a. \tag{2}$$

From the above equality, and using $t_{a1} + t_{a2} = 1$, the equilibrium has[4]

$$t_{aj} = \frac{1}{2} + \frac{1}{4}\left(D_{aj} - D_{a-j}\right)/k. \tag{3}$$

Thus, in equilibrium, the club with higher drawing power attracts more talent. Without loss of generality, assume that this is club 1, so $D_{a1} \geq D_{a2}$. If we define competitive balance as the difference in winning probabilities, we have

$$cb_a = p_{a1} - p_{a2} = t_{a1} - t_{a2} = \frac{1}{4}\frac{D_{a1} - D_{a2}}{2k}. \tag{4}$$

With a competitive labor market, wages will be bid up to the point where clubs' profits are zero. Thus

$$c = \frac{1}{2}(D_{a1} + D_{a2}) + F_a - k. \tag{5}$$

2.3 Introducing International Trade

Now suppose that international trade in players is possible. We assume that there are two countries, a and b, which are both endowed with an amount of talent equal to 1. This may seem at odds with differences in population size, but we look at top soccer players, and the distribution of maximum talent varies slowly with the population size. Initially, there is no trade, so the market equilibrium is given by (3) through (5). Now markets open up, so talent can move freely from one country to the other. In Europe, international player trade has been allowed for a long time, but teams were severely restricted in the number and type of foreign players they could field. Since the Bosman-ruling, players from the European Union can be fielded with any team from a member state without restrictions.

Denote the total amount of talent that will end up in country a in equilibrium as t_a, and that in country b as t_b. Thus, $t_i \equiv t_{i1} + t_{i2}$, with $i = a, b$. Also, $D_i \equiv D_{i1} + D_{i2}$, with $i = a, b$. Total revenues of, for example, team 1 in country a are now given by

$$R_{a1} = (D_{a1} - kt_{a1})\, t_{a1} + \frac{1}{2}\,(1 + t_{a1} - t_{a2})\, F_a.$$

Again, teams realize that the amount of talent their competitor hires, is dependent on the amount of talent they hire: $t_{a2} = 2 - t_b - t_{a1}$. Therefore,

$$R_{a1} = (D_{a1} - kt_{a1})\, t_{a1} + \frac{1}{2}\,(2t_{a1} + t_b - 1)\, F_a.$$

Expressions for the other three clubs are similar. Marginal revenues for club j in country i now equal

$$\frac{\partial R_{ij}}{\partial t_{ij}} = D_{ij} - 2kt_{ij} + F_i, \tag{6}$$

with $i = a, b$ and $j = 1, 2$. In equilibrium, marginal revenues are necessarily equal for every club, since we now have a single international price for talent. Equating the sum of marginal revenues for clubs in country a with that for clubs in country b, we then have

$$D_a - 2kt_a + 2F_a = D_b - 2kt_b + 2F_b. \tag{7}$$

[4]Note that, for this solution to make sense, we need $k > |D_{a1} - D_{a2}|$.

Moreover, $t_a + t_b = 2$. Thus,

$$t_i = 1 + \frac{(D_i - D_{-i}) + 2(F_i - F_{-i})}{4k}, \tag{8}$$

where $-i$ denotes the country different from i. It seems natural to assume that the country with the higher drawing power also has the higher prize money: $\text{sgn}(D_i - D_{-i}) = \text{sgn}(F_i - F_{-i})$. The analysis then implies that, if international trade in players is allowed, talent will move from the weakest to the highest drawing country.

To determine equilibrium wages, we first need the distribution of talent within a given country. From (6), equating $\partial R_{i1}/\partial t_{i1}$ with $\partial R_{i2}/\partial t_{i2}$ implies

$$D_{i1} - 2kt_{i1} = D_{i2} - 2kt_{i2}.$$

Using (8) and $t_{i1} + t_{i2} = 1$, we have

$$t_{ij} = \frac{1}{2} + \frac{3D_{ij} - D_{i-j} - D_{-i} + 2(F_i - F_{-i})}{8k}. \tag{9}$$

With $D_{i1} \geq D_{i2}$, competitive balance in country i then equals

$$cb_i = \frac{D_{i1} - D_{i2}}{2k}. \tag{10}$$

Comparing this with (4), we see that competitive balance within a country does *not* change when international trade in players is allowed. That balance only depends on the relative drawing powers of domestic clubs, and is not affected by the extent to which talent flows to or from a particular country.

With a competitive labor market, wages are

$$\begin{aligned} c &= D_{a1} - 2kt_{a1} + F_a \\ &= \frac{D_a + D_b + 2(F_a + F_b)}{4} - k. \end{aligned} \tag{11}$$

From (5), this is equal to the average wage in the two countries before international trade was allowed. Allowing clubs to freely field foreigners will therefore not affect total wages. Wages in the weak-drawing country will go up, while wages in the strong-drawing league will go down, relative to a situation of autarky. Also, from the discussion of (8), teams in the strong-drawing country will now be stronger, and teams in the weak-drawing countries will be weaker. Thus, international quality differences increase. Yet, as said, competitive balance within a national competition is not affected.

2.4 Introducing a Champions' League

We now study the effects of the introduction in the benchmark model of a Champions' League: an international competition that fields the best teams of both national competitions against each other. A full analysis would require a two-period model: first, teams have some probability of reaching the Champions' League and, second, given that they do, they have some probability of winning it. We simplify by collapsing this into one stage by assuming that each team has some probability of winning the Champions' League that directly depends on the amount of talent the particular team has. We choose a specification that has the same properties as (1). That is, we require that the probability of winning the Champions' League increases in the amount of talent a team has; that the probabilities of winning are equal when clubs have equal talent;

and that a club that owns all talent wins with certainty. This implies that for team j in country i, the probability of winning the Champions' League is

$$p_{ij} = \frac{1}{4} + \frac{3}{8}\left(t_{ij} - \bar{t}_{-ij}\right) \tag{12}$$

where $\bar{t}_{-ij}$ denotes the average amount of talent of the other three teams.

We assume that winning the Champions' League yields prize money F_C.[5] The extra matches played also yield extra gate receipts. We assume that these equal

$$G_i = \gamma\left(D_i - kt_i\right)t_i,$$

with $\gamma \geq 0$. This is a flexible specification: if all the receipts of the Champions' League go to the organizing body, we have $\gamma = 0$. If the team can keep all the receipts to itself, we probably have that gate receipts from Champions' League matches outweigh those of regular competition matches, implying $\gamma > 1$. Total receipts of, say, team 1 in country a are

$$\begin{aligned} R_{a1} &= (1+\gamma)\left(D_{a1} - kt_{a1}\right)t_{a1} + \frac{1}{2}\left(1 + t_{a1} - t_{a2}\right)F_a \\ &\quad + \frac{1}{8}\left(2 + 3t_{a1} - t_{a2} - t_{b1} - t_{b2}\right)F_C. \end{aligned} \tag{13}$$

Without international trade, total talent in each country equals 1. Thus

$$R_{a1} = (1+\gamma)\left(D_{a1} - kt_{a1}\right)t_{a1} + t_{a1}F_a + \frac{1}{2}t_{a1}F_C.$$

Marginal revenues thus equal

$$\frac{\partial R_{a1}}{\partial t_{a1}} = (1+\gamma)\left(D_{a1} - 2kt_{a1}\right) + F_a + \frac{1}{2}F_C,$$

with similar expressions for the other teams.

Within each country, marginal revenues are equal. Hence,

$$D_{a1} - 2kt_{a1} = D_{a2} - 2kt_{a2},$$

and we are back to the same case as in (2). The equilibrium distribution of talent is therefore given by (3). With a competitive labor market,

$$\begin{aligned} c &= (1+\gamma)\left(D_{a1} - 2kt_{a1}\right) + F_a + \frac{1}{2}F_C \\ &= \frac{1}{2}(1+\gamma)\left(D_a - 2k\right) + F_a + \frac{1}{2}F_C. \end{aligned}$$

Comparing this to (5), it is obvious that wages have increased. Thus, the establishment of an international competition in the absence of cross-border trade in talent will not affect competitive balance within a national competition. Obviously, international quality differences are also unaffected, since talent cannot move between countries.

2.5 Introducing a Champions' League and International Trade

Now suppose there is a Champions' League, and international trade in players is allowed. Again, total revenues for club 1 in country a are given by (13). Yet,

[5] In practice, reaching the Champions' League but failing to win it, still implies substantial revenues. In our simplified model, we also abstract from that.

now the only restriction on the distribution of talent is that the total amount of international talent equals the available stock of talent: $t_{a1} + t_{a2} + t_{b1} + t_{b2} = 2$. Thus,

$$R_{a1} = (1 + \gamma)(D_{a1} - kt_{a1})\, t_{a1} + \frac{1}{2}(2t_{a1} + t_b - 1)\, F_a + \frac{1}{8}(1 + 4t_{a1})\, F_C.$$

Marginal revenues for this team now are

$$\frac{\partial R_{a1}}{\partial t_{a1}} = (1 + \gamma)(D_{a1} - 2kt_{a1}) + F_a + \frac{1}{2}F_C,$$

with similar expressions for the other teams. In equilibrium, marginal revenues are necessarily equal for each club. Equating the sum of marginal revenues for clubs in country a with that for clubs in country b then implies

$$(1 + \gamma)(D_a - 2kt_a) + 2F_a + F_C = (1 + \gamma)(D_b - 2kt_b) + 2F_b + F_C.$$

With $t_a + t_b = 2$, this yields

$$t_i = 1 + \frac{D_i - D_{-i}}{4k} + \frac{F_i - F_{-i}}{2k(1 + \gamma)}. \tag{14}$$

Note that, compared to (8), the Champions' League *reduces* the amount of talent that will end up in the strong-drawing country. The intuition behind this result is the following. By reaching the Champions' League, teams can earn more money, due to the fact that gate receipts will increase (as may prize money). Yet, these higher receipts are relatively more important for teams from weak-drawing countries, since their revenues from the national league are lower. As the incentives of teams have become more aligned, their quality differences will decrease. This is a general mechanism, also noted by Szymanski (2001b: F71/F72), albeit in a different context. Therefore, with the introduction of a Champions' League, the incentive of these teams to attract more talent increases more.

To see what happens to national competitive balance, equating $\partial R_{i1}/\partial t_{i1}$ with $\partial R_{i2}/\partial t_{i2}$ yields

$$D_{i1} - 2kt_{i1} = D_{i2} - 2kt_{i2}.$$

Using (14), this implies

$$t_{ij} = \frac{1}{2} + \frac{3D_{ij} - D_{i,-j} - D_{-i}}{8k} + \frac{(F_i - F_{-i})}{(1 + \gamma)\, 4k}.$$

Hence, retaining the assumption that $D_{i1} \geq D_{i2}$,

$$cb_i = t_{i1} - t_{i2} = \frac{D_{i1} - D_{i2}}{2k}.$$

Again, competitive balance within a competition has not changed.

2.6 Empirical predictions

In Europe, we virtually had a situation with no Champions' League and no Bosman ruling. Then, the Champions' League was established in 1990. After that, in 1995, the Bosman ruling came into effect. In terms of our model we thus started with the situation described in subsection 2.2, and then moved to the situation described in subsection 2.4. Now, we have the situation described in subsection 2.5. Comparing the expressions for international quality differences

	Strong-drawing countries	Weak-drawing countries	National competition
Champions' League	No effect	No effect	No effect
Bosman-ruling	Quality increases	Quality decreases	No effect

Table 1: Empirical predictions from the theoretical analysis

and domestic competitive balance, yields the testable implications listed in Table 1.

The theoretical model suggests five hypotheses which indicate that (1) the introduction of the Champions' League has no effect on international quality differences (Hypothesis 1) and no effect on national competitive balances (Hypothesis 2) and (2) the free movement of soccer players increases the quality of clubs from strong-drawing countries (Hypothesis 3), decreases the quality of teams from weak-drawing countries (Hypothesis 4) and leaves the national competitive balances unaffected (Hypothesis 5).

The model is informative about two additional issues. First, the model produces clear predictions about the impact of both types of measures upon player wages, too. However, regrettably, lack of data implies that we cannot test this part of the model's predictions. Second, a remark must be made about the order of institutional events in European soccer of the 1990s. Our hypotheses in Table 1 focus on the main effect of either the establishment of the Champions' League or the introduction of the Bosman ruling. However, as the Champions' League was introduced in 1990 and as the Bosman ruling came into effect in 1995, our natural experiment cannot reveal the model condition where only the free transfer of talent applies. The model in subsection 2.5–with a free movement of talent and the establishment of a Champions' League–suggests that international quality differences may decrease as the marginal revenue from both institutional changes in interaction is larger for clubs from weak-drawing countries than for their counterparts from strong-drawing leagues. We return to this issue below when introducing our econometric model specification.

3 Empirical Evidence

3.1 Data, Measures, and Methodologies

The empirical analysis of this paper is based on a dataset of soccer results in seven major competitions in Belgium, England, France, Germany (West-Germany before the unification), Italy, The Netherlands, and Spain, as summarized in Table 2. Professional soccer started at different dates in these countries. For the empirical analysis we only used data for seasons after 1945/46. Besides data on national competitions, we have also collected data on the results in all European tournaments (European Cup I, European Cup II, UEFA Cup, and Champions' League) from 1980/81 to 1999/00. This dataset comprises 2847 encounters. Most encounters consist of two games, one home game for either team. During this time period, teams from 51 different countries participated in these European tournaments.

National competitive balance is measured as the distribution of qualities of soccer teams in a competition. A competition is in perfect balance if the probability that a team wins from an opponent is independent of that opponent

Country	Time Period	Games
Belgium	1904/05-1999/00	20604
England	1888/89-1999/00	41450
France	1945/46-1999/00	19494
Germany	1963/64-1999/00	11264
Italy	1945/46-1999/00	15678
The Netherlands	1956/57-1999/00	13200
Spain	1928/29-1999/00	17746

Table 2: Data on national competitions.

(Koning (2000)). The quality of teams is measured by the model

$$GD_{ij} = h_i + \theta_i - \theta_j + \epsilon_{ij}, \tag{15}$$

with GD_{ij} the goals difference in a game between i (which plays home) and j (which plays away), h_i the home advantage of team i, θ_i the quality of team i, θ_j the quality of team j, and ϵ_{ij} a random error term that captures all determinants of the outcome that are not due to either home advantage or quality difference (e.g., injuries, fatigue due to an international game a few days earlier, et cetera). This parsimonious model of soccer results is known to have reasonable predictive ability. If there would be no home advantage, goals difference in model (15) is determined solely by the difference in θ's. Hence we interpret these parameters as quality measurements (see also Clarke and Norman (1995)). Of course, one can argue that quality of a team can also be measured by the wage bill of the team. We are not able to pursue this idea any further because detailed financial data on soccer teams are not available. The variation of the quality parameters θ provides a measure of competitive balance: if each team would be equally good, the θ's would be 0 and hence the spread of the θ's would be 0. Qualitatively similar results are obtained if we estimate equation (15) as an ordered probit model with 'home loss', 'draw', and 'home win' as the dependent variable (see also Koning (2000)).

Another measure of concentration of quality in professional soccer is the concentration ratio (Koning (2000)). This ratio is calculated as the number of points of the best k teams divided by the maximum number of points these teams could have obtained during the season. This is

$$CR_k = \frac{\sum_{i=1}^{k} P_{(i)}}{Wk(2N-k-1)}, \tag{16}$$

with $P_{(i)}$ the number of points obtained by the ith best team, W the number of points per game won (which is 3 in modern soccer), and N the number of teams in the competition. The ratio is 1 for the k best teams if each of these team wins all games against teams that are lower in the ranking. Roughly speaking, CR_k is the share the k best teams obtained from the maximum number of points they could have obtained. CR_k is an interesting measure of balance in a competition because it is believed that recently the top teams have improved so much over the lesser teams (for example, because of Champions' League revenues and because of better sponsor contracts) that they form a league of their own.

Alternatively, the dynamics in national soccer markets can be assessed by looking at variation of the year-to-year ranking. Year-to-year variation in ranking can be measured by calculating the number of changes in the ranking. Let

r_{kt} be the ranking of team k in year t, so that $r_{kt} = 1$ for the team winning the competition, et cetera. A measure of change between two seasons is then

$$DN_t = \sum_k |r_{kt} - r_{kt-1}|. \tag{17}$$

Note that this measure treats moves up and down identically. Of course, DN_t depends on the number of teams in a competition. If a league consists of two teams, DN_t is either 0 or 2, in a league of three teams DN_t is either 0, 2, or 4, et cetera. If a league has an even number of teams, the maximum of DN_t is $\frac{1}{2}n^2$, with n the number of teams. A normalized measure of dynamics in a league is now

$$DN_t^* = \frac{2}{n^2} \sum_k |r_{kt} - r_{kt-1}|. \tag{18}$$

It is more difficult to measure team quality and developments in team quality in an international context (like European competitions) than in a national setting. More than 600 teams have participated in the European tournaments during the last 20 seasons, which makes estimation of a model similar to model (15) infeasible. However, many soccer fans associate themselves with teams from their country, and hence the performance of individual teams in European soccer tournaments is not the only interesting measure of international success. Because of these considerations, we measure performance in international tournaments countrywise. More specifically, we define a measure ψ_c as the number of games played by all teams from country c divided by twice the total number of games played in all European tournaments. This measure can be interpreted as the share of the pie that consists of all team slots in games in European competitions during a season occupied by teams of country c. For example, during the 1999/2000 season, Dutch teams played 38 games in European tournaments. Since in total 362 games were played that season, the international quality measure of Dutch soccer is 0.0525.

3.2 National Competitive Balance

The development of the variance of the estimated θ's over time for our seven different countries is graphically depicted in Figure 1. If quality differences between teams in a national competition would have increased over time, the lines in Figure 1 should be sloping upward. If anything, the long-term trends in Figure 1 are sloping downward, suggesting an *increase* of national competitive balances over time. In Figure 1 and later figures we aid the interpretation by drawing a line which is a non-parametric regression of the variable graphed on time.

The development of the coefficient of determination of model (15) over time is found in Figure 6 in the Appendix. From the standard F-test on significance of a regression for each country, we find that R^2 deviates significantly from 0 for all countries for all seasons. Hence, the parameters θ_i and h_i jointly differ significantly from 0. In Germany and Spain the competition has become less predictable over time as judged by the decrease of R^2 over time in these countries. Still, typical values of R^2 in recent seasons for these countries are in the $0.28 - 0.32$ range. The average value of R^2 for The Netherlands is 0.40. So 40% of the variation in goal difference in the Dutch soccer league can be explained by a model as simple as (15).

It appears from Figure 2 that the concentration ratio (16) has not changed much over time in the countries we examine. The variation of CR_4 from year to year is of much larger magnitude than any trend that can be discerned. But

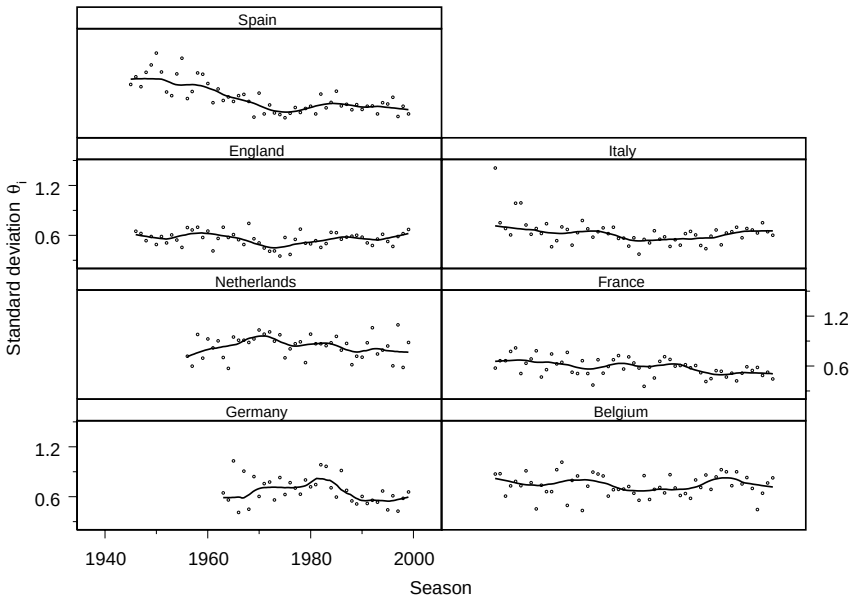

Figure 1: Variation of quality over time.

the concentration ratio pertains to the strength of the top four teams; it does not look at the identity of those teams. Do the same teams compete for the championship each year, or do the identities of the best teams change? This issue is addressed in Table 3, where we give (for each country) the number of teams that have made up the top four in the end-of-season ranking, and the four teams that have appeared in the top four of the ranking most often. So for The Netherlands we see that 22 different teams have had a ranking in the top four during any season between 1955/56 and 1999/2000. The teams with most appearances in the top four are: Ajax, Feyenoord, PSV and Twente. Ajax has ended the competition in the top four 88.6% of all seasons, Feyenoord in 81.8%, et cetera. In Table 3 we see noticeable differences between countries. In The Netherlands there are three teams that make up the top, in Spain two teams, and in Belgium and Germany there is one team that has been consistently at the top. In England and France, though, the teams that ended in the top four most often (Manchester United and Monaco, respectively), finished the season more frequently *outside* of the top four than in the top four. Moreover, it should be noted that in Belgium and England there are many more teams that have ended in the top ranking at some moment in time than in Germany, Italy, and The Netherlands. Apparently, the pool of potential national top teams is larger in Belgium and England than in the other countries. We conclude from Table 3 that the top is most concentrated in The Netherlands, followed by Italy and Spain. However, from Figure 2 it is clear that the quality difference of these teams with those that are ranked lower has not increased over time. The concentration at the end of the nineties is not different from the concentration during the early seventies.

In Figure 3 we graph the development of year-to-year change of ranking DN_t^* in the seven leagues we analyze in this paper. From the smooth curves in

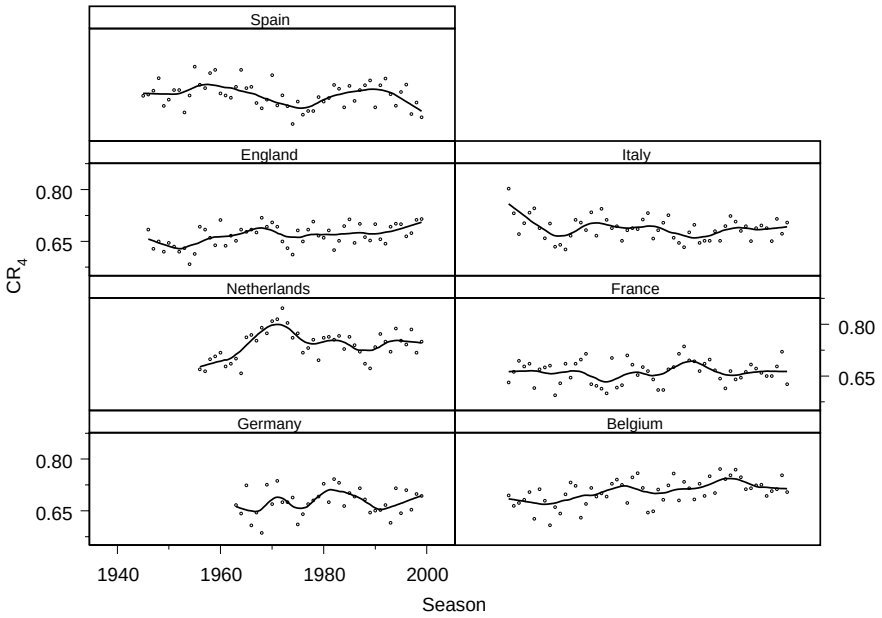

Figure 2: Concentration ratio CR_4 over time.

Country	Number of teams	Best four teams
Belgium	34	Anderlecht (90.9%), Standard Luik (56.4%) Club Brugge (50.9%), FC Antwerp (25.5%)
England	34	Manchester United (45.5%), Liverpool (45.5%) Arsenal (30.3%), Wolverhampton Wanderers (24.2%)
France	27	Monaco (41.8%), St. Etienne (38.2%) Bordeaux (38.2%), Olympique Marseille (36.4%)
Germany	21	Bayern München (75.7%) Borussia Mönchengladbach (37.8%) Werder Bremen (35.1%), Vfb Stuttgart (32.4%)
Italy	20	Juventus (78.2%), AC Milan (69.0%) Internazionale (67.3%), Fiorentina (34.5%)
Netherlands	22	Ajax (88.6%), Feyenoord (81.8%) PSV (77.3%), Twente (27.3%)
Spain	19	FC Barcelona (89.1%), Real Madrid (83.6%) Atletico Madrid (54.5%), Valencia (41.8%)

Table 3: Teams with most rankings in the top four (1945/46-1999/2000).

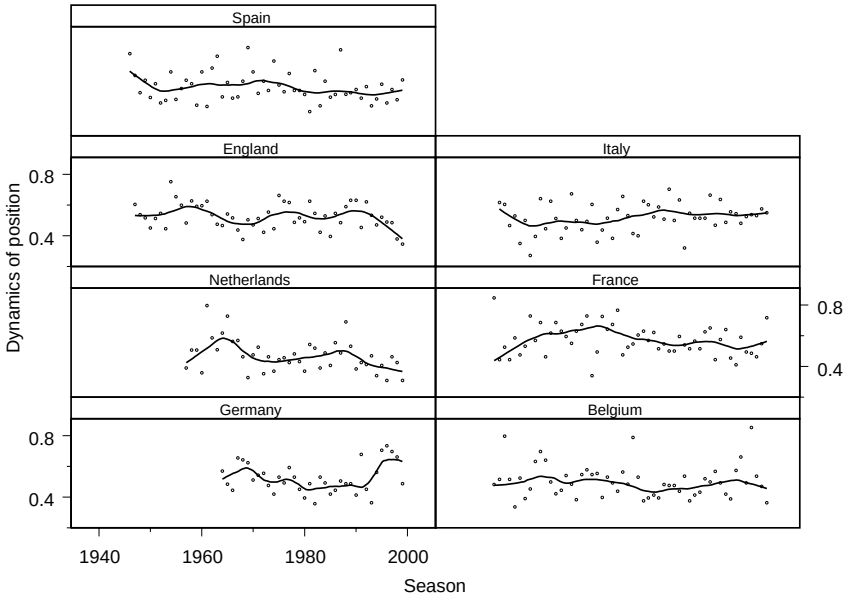

Figure 3: Dynamics of position.

the plots we see that there are no long-term trends: it is not the case that fewer teams change places at the end of the sample period than at the beginning of the sample period. However, there is clearly year-to-year variation. In some seasons teams change only a few places; in other seasons they change more places in the final ranking.

3.3 International Quality Differences

The development of international quality over time is drawn in Figure 4. English teams were banned from participating in European competitions from 1985/86 to 1989/90 because of fan riots in May 1985. Therefore, ψ_{Eng} is 0 for these seasons. Again, to aid in determining long-term patterns we have drawn a regression line in the panels of Figure 4. The pattern that emerges from Figure 4 is interesting: the international success of England, Italy, and Spain has increased clearly over time. The Netherlands, France, and Turkey have gained some success in European international soccer since the early eighties. Other countries either have not changed their position in the European pecking order, or they have declined as is the case most notably with Germany. International success by teams of the former Soviet Union (and its successors) has not changed by much over time, but the qualities of teams from other countries from Eastern Europe have deteriorated. Undoubtedly, that reflects the opening of the borders for citizens of these countries and the economic problems in Eastern Europe.

3.4 Statistical Tests

The graphical analysis suggests that competitive balance in national competitions has not been subject to many changes, while international quality dif-

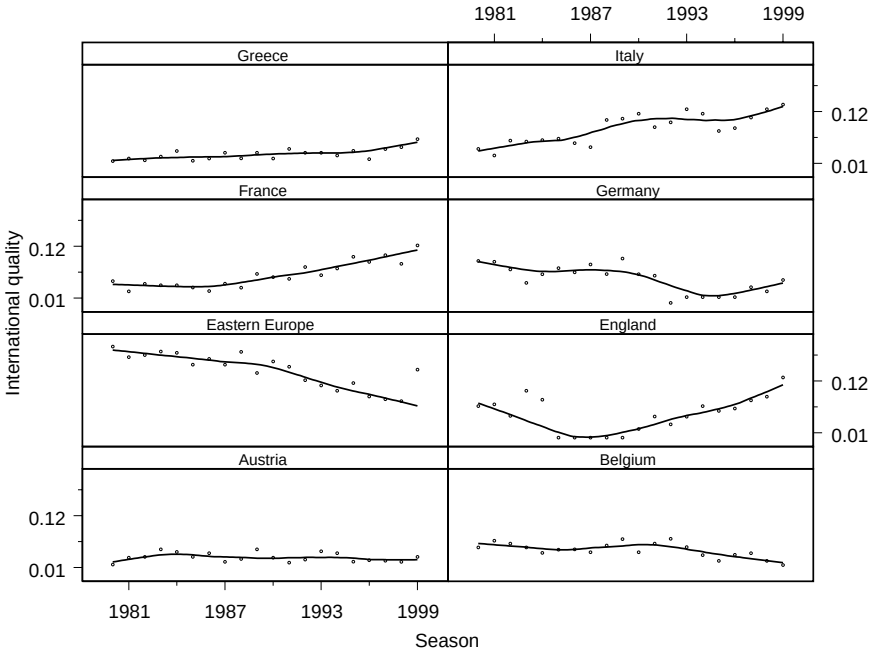

Figure 4: International quality over time (continued).

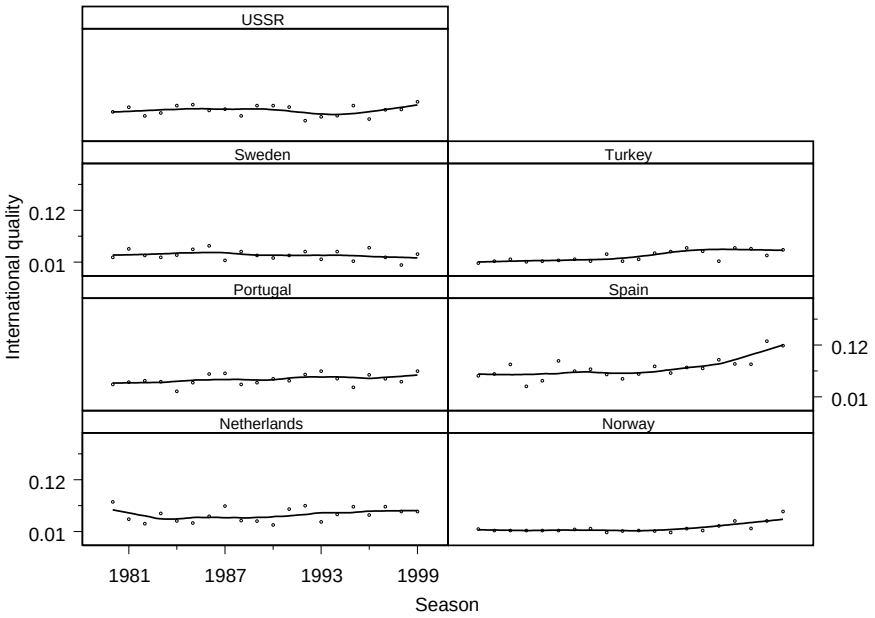

Figure 4: International quality over time.

ferences may have changed over time. In this subsection we will test these hypotheses formally, with reference to the introduction of the Champions' League and the Bosman ruling (cf. Table 1), so that we distinguish between differences in means of our variables of interest and sample variation.

First, we consider the effect of the introduction of the Champions' League and the Bosman-ruling on national competitive balance. We let y_{it} be the dependent variable in country i in year t. According to our theoretical discussion, we need to distinguish between weak-drawing and strong-drawing countries. Therefore, let D_i be an indicator of drawing power (1 for strong-drawing countries and 0 for weak-drawing countries). The time dummies CL_t and B_t indicate whether or not an observation is from after the introduction of the Champions' League or the Bosman-ruling, respectively. The model we estimate is

$$y_{it} = \alpha_i + \beta_1 D_i CL_t + \beta_2 (1 - D_i) CL_t + \gamma_1 D_i B_t + \gamma_2 (1 - D_i) B_t + \varepsilon_{it}. \qquad (19)$$

This model assigns a different mean level of national competitive balance to each country, and that mean level may have changed after the introduction of the Champions' League or the Bosman-ruling. The fixed effects α_i measure the structure of the soccer market in each country, its competitiveness, the size of the market in a country, and all other factors that vary between countries and determine national competitive balance. The effect of the introduction of the Champions' League (CL-effect) on competitive balance is β_1 for strong-drawing countries and β_2 for weak-drawing countries. The effect of the Bosman-ruling for strong-drawing countries is γ_1, and the effect on national competitive balance in weak-drawing countries is γ_2. Note that our model specification model (19), together with the order of intervention events, is associated with an identification problem. That is, the main effect of the introduction of the Bosman ruling (introduced in 1995, as reflected in γ_1 an γ_2) cannot be estimated without the interaction with the co-existing Champions' League (established in 1990, its main effect being associated with β_1 and β_2). Adding a $CL_t \cdot B_t$ interaction term would not help at all, as then the main effect cannot be distinguished properly from the interaction one. Given this unsolvable identification problem, we decided to concentrate on the main effects only.

We estimate model (19) for each of the seven countries, for the period 1980/81 to 1999/2000. England, France, Germany, Italy, and Spain are considered to be strong-drawing countries because of the size of the market in these countries, whereas Belgium and The Netherlands are coded as weak-drawing countries.[6] This division corresponds to the size of the population in these countries. According to the theoretical model discussed earlier (cf. Table 1), national competitive balance is expected to be unaffected by the introduction of the Champions' League and the Bosman-ruling, so we do not expect that the coefficients β_1, β_2, γ_1, and γ_2 differ significantly from 0.

In Table 4 we see that the effects of the introduction of the Champions' League and the Bosman ruling on the static measure of national competitive balance (σ_0) is marginally significant. The hypothesis of no effect is rejected at a level of significance of 5%, but not at a level of significance of 1%. The dynamic measure of national competitive balance (DN) has not been affected by the introduction of the Champions' League. Similar results are found if the concentration ratio is used as the dependend variable in regression (19).

According to our theoretical model, we expect that international quality differences (ψ) do not depend on the introduction of the Champions' League but are affected by the Bosman-ruling. This is confirmed in Table 4: the Bosman

[6] Similar results are found when France and/or Germany are considered to be weak-drawing countries, so the results presented in Table 4 are robust to the implied alternative groupings.

Variable	Hypothesis	p-value
σ_θ		
	no CL-effect, no Bosman-ruling effect	0.0244
	no CL-effect	0.0328
	no Bosman-ruling effect	0.360
DN		
	no CL-effect, no Bosman-ruling effect	0.663
	no CL-effect	0.377
	no Bosman-ruling effect	0.872
ψ		
	no CL-effect, no Bosman-ruling effect	0.000
	no CL-effect	0.651
	no Bosman-ruling effect	0.001

Table 4: Tests of significance of effect of Champions' League and Bosman-ruling.

Variable	Parameter	Estimate	St. error
ψ			
	β_1	0.0005	0.0030
	β_2	−0.0039	0.0042
	γ_1	0.0117*	0.0037
	γ_2	−0.0169*	0.0052

Table 5: Point estimates of Champions' League effect and Bosman-ruling effect on international success (* indicates significance at 1% level).

ruling has had a significant effect on international success of countries, but the introduction of the Champions' League has had no statistically significant effect. Point estimates are given in Table 5. The estimates of β_1 and β_2 do not differ significantly from 0, so we may conclude that international success has not been affected by the introduction of the Champions' League (this hypothesis is not rejected at the usual level of significance: see Table 4). The effect of the Bosman-ruling is significant: strong-drawing countries have become stronger, and weak-drawing countries have become weaker. This effect is strongly significant. Moreover, the size of the Bosman-ruling effect is larger than the (insignificant) size of the Champions' League effect.

By and large, the statistical tests confirm our visual inspection of the graphs in the previous subsections. National competitive balance, as measured either by the standard deviation of the quality of soccer teams or by the dynamics of position, has been affected very little by either the introduction of the Champions' League or the Bosman-ruling. International success, on the other hand, has been affected significantly by the Bosman-ruling: strong-drawing countries have become more successful and weak-drawing countries have become less successful. This is evidence in favor of our theoretical model in section 2.

4 Conclusion

In this paper we have examined the effects of recent changes in the (international) institutional setting of European soccer on both national competitive

balances and international quality differences. Our main conclusions are that national competitive balances have not changed over time, despite the introduction of the Champions' League and the Bosman-ruling, whereas international quality differences have increased, particularly as a result of the Bosman ruling. These results have been derived in a theoretical model and have, by and large, been confirmed by the empirical evidence. From this overall pattern of results, by way of appraisal, we may speculate about the likely consequences of future changes in European soccer's institutional setting, which helps to identify a number of interesting avenues for future research.

First, in the autum of 2001, after long negotiations, the European Union has announced to agree with UEFA plans to reform the player transfer system such that fees for young players are permitted. The argument is that this is a fair way to compensate for the clubs' investment in the education and training of youth players. Clearly, the proposed transfer system reform implies a partial de-liberalization of the labor market for soccer talent. From the perspective of this paper's model and evidence, after reversing the argument, we can predict that this is likely to *decrease* international quality differences (reversed Hypotheses 3 and 4), to the benefit of weak-drawing countries, without affecting national competitive balance (Hypothesis 5). Empirically, we may estimate the consequences of the transfer system reform later in this decade. Theoretically, future research may be directed at finetuning our model of international soccer competition by introducing a dual labor market, distinguishing segments for young versus not-so-young players.

Second, there are talks about the establishment of a new international league—the Euro League—among top clubs from weak-drawing countries such as Austria, Belgium, Greece, The Netherlands, Norway, Portugal, and Sweden as a response to the claimed increase in international quality differences in the nineties. As yet, the response from the UEFA to this idea has not been favorable. However, this paper's model and evidence (i.e., Hypotheses 1 and 2) suggest that the introduction of such an Euro League per se is unlikely to affect the participating clubs' average international quality. In interaction with the Bosman ruling, though, the establishment of such an Euro League may well reduce international quality differences (cf. the model in subsection 2.5), so closing (part of) the gap with the current strong-drawing countries, without having any effect on national competitive balance (Hypothesis 5). The reason for this is that by joining forces the top-performing clubs from the weak-drawing countries may prove to be able to create a strong-drawing league of their own. This, in turn, improves their position on the market for soccer talent. This is clearly in the interest of the UEFA. After all, international soccer leagues will loose much of their appeal as a result of the erosion of the competitive excitement that comes with increasing international quality differences. Future research may focus on answering the question as to what happens if, in line with their current intentions, the top clubs *do* leave their national leagues by developing a model that includes entry into and exit from competing leagues.

The results in our paper can be extended to other European sports markets, like the ones for basketball, rugby, and volleyball. The defining characteristic of a sports market is that it 'sells' competition. Fans identify themselves with a team, which is less so in other markets with rare talents (like art or music). Moreover, in European soccer, teams compete in two markets: a national market and an international market. Hence, the consequences of any measure to enhance competition need to be assessed in both markets. Our theoretical and empirical analyses indicate that national competitive balances have been remarkably robust over time, despite the institutional changes. On the other hand, we found that international balance has changed over time: the stronger

countries have become more successful in European tournaments at the expense of weaker countries. Two recent initiatives—the proposed transfer system reform and the Euro League establishment—may help to counteract the historical trend toward divergence in the European soccer arena.

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Appendix

In this appendix we provide additional figures on the estimation results of model (15). In Figure 5 we graph the variance of home advantage for different countries, and in Figure 6 we show the how the coefficient of determination varies over time.

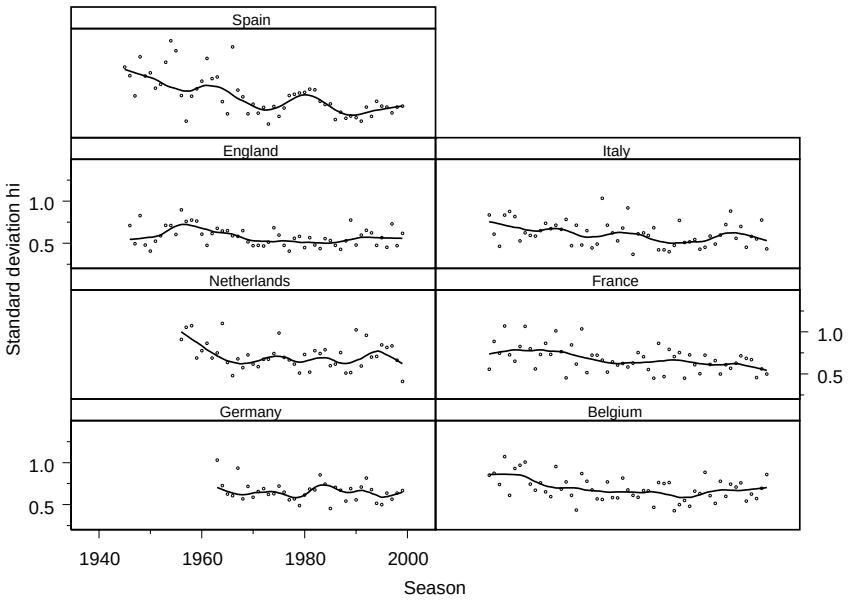

Figure 5: Variation of home advantage over time.

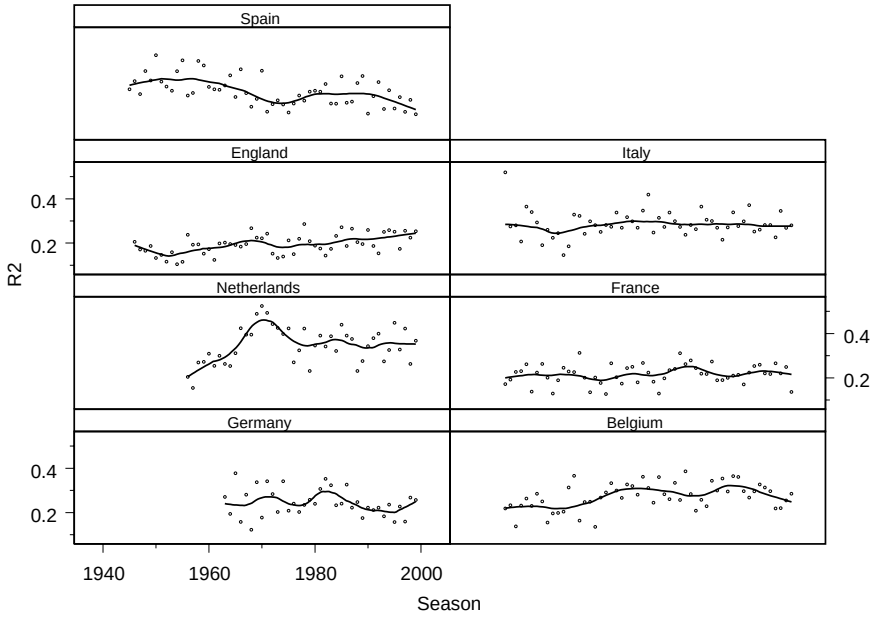

Figure 6: R^2 of model (15) over time.