The Effects of Institutional Change in European Soccer

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November 30, 2011

Abstract

The last decades have seen two profound changes in European soccer. First, international trade in soccer talent has increased markedly. Second, international competitions such as the Champions League have gained much in importance. Using a theoretical model, we study how these changes affect competitive balance within national competitions, and how they affect quality differences between national competitions. In our model, international competitions increase competitive balance in all countries. International trade is likely to increase competitive balance in large countries, but to decrease it in small countries. International quality differences are likely to increase, as talent flows from small countries to large ones.

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1 INTRODUCTION

For over a decade, soccer fans throughout Europe have been concerned about the future of their favorite game. These concerns are largely due to two major institutional changes: the introduction of the Champions League in 1992, and the Bosman ruling in 1995. The Champions League is a prestigious and highly lucrative international competition among the best clubs from each country. The Bosman ruling refers to a ruling by the European Court of Justice in December 1995, when it judged that the commonly used transfer system was not in accordance with article 39 of the Treaty of Rome, as it hampered the mobility of professionals (see Court of Justice of the European Communities, Case C-415/93, or Feess and Muehlheusser, 2003). Effectively, the ruling implied a free flow of soccer talent within the EU. As Szymanski (2007, pg. 369) notes:

> Post-*Bosman* we have seen a dramatic increase in player mobility combined with even greater concern about competition. This concern has taken two forms:
>
> - The fear that teams from larger nations dominate Europe at the expense of teams from smaller countries.
> - The fear that strong clubs in larger countries increasingly dominate national competition.
>
> The common factor linking these two fears is the Champions League.

In other words, fans fear that these developments have an adverse effect on the competitive balance *within* a national competition, but also on the competitive balance *between* national competitions.

In this paper, we address these concerns. We develop a theoretical model in which soccer clubs compete for talent on the job market, and compete against each other in both national and international competitions. For simplicity, we interpret the Bosman ruling as a move from a situation without international trade in soccer talent, to a situation with such trade. This seems in line with the empirical evidence. Kleven et al. (2010) look at the effect of the tax regime on the mobility of soccer players. They find that top earnings tax rates have a strong effect on the migration of soccer players in Europe – but only after the Bosman ruling. We interpret the introduction of a Champions League as a move from a situation without an international competition, to a situation with such a competition.[1,2]

Our model also allows us to shed light on the effects of the "6+5 rule". This rule, which was adopted by the soccer's international body FIFA in May 2008, requires that "each club must field at least 6 who are players eligible to play for the national team of the country of the club." (FIFA, 2008). Effectively, the implementation of this rule would hinder international trade in soccer talent and bring us back to the situation that prevailed before the Bosman ruling.

Using our model, we consider four stylized worlds. The first world is one in which each country has a national soccer competition that operates in full autarky: without international trade in talent, and without an international competition such as a Champions League. For our second world, we assume full international mobility of playing talent, but no international competition. Our third world has a Champions League, but no international trade. The fourth world has both trade and a Champions League. For each world, we study competitive balance within a national competition. That is, we study to what extent large clubs will dominate their national competition. Also, we study the international distribution of soccer talent that will result, that is, the competitive balance between national competitions. Comparing these worlds allows us to analyze the effects of both the Bosman ruling and the Champions League.

[1]Of course, before the 1990s there was already an international competition in place, and there was also some possibility for players to move abroad. Yet, the introduction of the Champions League greatly increased the importance of these international competitions, while the Bosman ruling revolutionized the possibility of international transfers. For ease of exposition, we therefore make the extreme assumptions mentioned in the main text.

[2]In Haan, Koning, and van Witteloostuijn (2007) we test empirically whether national competitive balance has changed after the Bosman ruling and the introduction of the Champions League. The evidence we find is inconclusive.

In each world, we assume that profit-maximizing clubs hire talent up to the point where the marginal revenue to hiring additional talent equals the marginal costs of doing so. The probability that a club wins the national competition is equal to its share of the total amount of talent in that competition. Clubs differ in the size of their fan base. Revenues of a club are increasing in talent, but at a decreasing rate. Marginal costs equal the wage rate of talent. The supply of talent is fixed. The market-clearing wage rate for talent can then be determined. In autarky, it is determined by the amount of talent that resides in the country of interest. With free trade, talent can flow freely, so wage levels have to be equal across countries.

Our model fits the tradition of the sports economics literature,see for example Rottenberg (1956), and also El Hodiri and Quirk (1971) or Fort and Quirk (1995). Yet, we do assume that firm revenues are a concave function of the amount of talent that they hire, rather than of win percentage. Szymanski and Kesenne (2004) note that the approach traditionally used in this literature is not consistent with Nash equilibrium (see also Szymanski, 2004). With our specification, we circumvent this problem, while still keeping the analysis tractable. Moreover, we feel that our assumption makes perfect sense. Whenever a team hires a top player, this often leads to an increase in the sale of season tickets. Arguably, more fans are now willing to buy such a ticket simply to be able to see the top player perform, rather than because of the increased probability of winning the championship that the hire may imply. Crucially, we assume that the wage rate for talent is endogenously determined. Individual teams take this wage rate as given.

In this paper, we take a theoretical approach. A related empirical paper to our model, is for example Buraimo, Forrest, and Simmons (2007). They show that the final ranking of professional soccer teams in England is determined significantly by the population in a five-mile radius from the home stadium, thereby providing empirical evidence for the concept of local drawing power used in our theoretical analysis. Frick (2007) studies international migration of soccer players and concludes that migration of players has increased over time, and that this development has been fostered by the Boasman ruling. In Frick (2009) he reviews evidence of increased transfer fees over time, a decrease of player movements that actually result in payment of a transfer fee (because players are free agents after their contract expires since the Bosman ruling), and increased contract duration since the Bosman ruling. Koning (2009) shows that success of teams from a particular country has become more persistent since the Bosman ruling, thereby providing evidence that international quality differences have increased. As far as theoretical analyses of the effect of player mobility and competitive balance in soccer are concerned, we refer to Frick (2009), Feess and Muehlheusser (2003), Késenne (2007), and Szymanski and Kesenne (2004). Where relevant, we will refer to these papers to illustrate similarities or differences to our approach.

In a nutshell, our results are as follows. International competitions increase competitive balance in all countries. In theory, all teams are able to win the prize money involved in winning the Champions League. That implies that all teams are willing to put in some extra effort to win that League. Hence, competitive balance within each competition increases, while international quality differences will decrease as well. The Bosman ruling is likely to increase competitive balance in large countries, but to decrease it in small countries. International quality differences are likely to increase, as talent flows from small countries to large ones. This implies that wages increase in small countries (which hurts small teams more than large ones) while they decrease in large countries (which benefits small teams more than large ones). However, international talent flows due to the Bosman ruling are much larger than those due to the introduction of the Champions League. Hence, the net effect of the two changes is for talent to flow to large countries.

Table 1: Roadmap

	CL	No CL
international trade	Section 2	Section 3
no international trade	Section 4	Section 5

The roadmap for the remainder of this paper is given in Table 1. In Section 2, we show a benchmark model in which there is no international trade in talent, and no Champions League. We also derive a result that allows us to study the effects of institutional changes on domestic competitive balance. In Section 3, we introduce international trade, while Section 4 studies the introduction of a Champions League. In Section 5, we study the case with both international trade and a Champions League. Section 6 concludes.

2 Scenario 1: no trade, no Champions League

In this section, we consider a national soccer competition that operates in full autarky. For each club, we will derive its demand for talent as a function of the wage rate. Equilibrium on the labor market then requires that the wage rate is such that the total demand for talent equals its supply.

Suppose there are n teams in a national championship in country c. The probability that team i wins the national competition in country c is denoted p_{ci}. The amount of talent that is hired by club i is t_{ci}. We assume that the probability that team i wins the championship equals it share of talent in the national competition:

$$p_{ci} = \frac{t_{ci}}{\sum_j t_{cj}}. \tag{1}$$

Thus, a team that doubles the amount of talent that it hires, will also double the probability that it will win the championship. Revenues for team i include gate receipts, merchandising profit, local television contracts, et cetera. We assume that these revenues equal

$$R_{ci} = (D_{ci} - k\, t_{ci})\, t_{ci}. \tag{2}$$

Here, D_{ci} is a constant that differs among clubs and that represents 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 an exogenous constant that does not qualitatively affect the analysis. Throughout this paper we will assume that k is such that we are always on the increasing part of the revenue curve. We assume that there is no prize money involved in winning the league. This is just for simplicity: in the current set-up, it is very easy to include such prize money in the analysis, but once we introduce a Champions League this makes the analysis much more cumbersome.

This specification is closely related to one that is often used in the sports economics literature, and that was pioneered by El Hodiri and Quirk (1971). However, in that common specification, gate revenues are a function of win probability, whereas in our specification gate revenues depend on the amount of talent that a team hires. In other words, while they look at the relative quality of a team, we assume that revenues are determined by the absolute quality. This distinction is due to Feess and Stähler (2009) who analyze a model that nests both assumptions. Of course, as win probability is affected by the amount of talent, our specification also implies that gate revenues increase with the win probability – but only in an indirect manner. The specification that we use greatly simplifies the analysis. It also circumvents a problem that plagues many papers that use the traditional specification and employ an analysis that is not consistent with Nash equilibrium, as pointed out by Szymanski and Kesenne (2004). Note that our model considers a league with n teams, not 2 as in most of the literature.

Clubs are price takers. They maximize profits by setting marginal revenues equal to marginal costs, so

$$D_{ci} - 2k t_{ci} = w_c,$$

where w_c denotes the equilibrium wage rate of talent in country c. The demand for talent from club i then equals

$$t_{ci} = \frac{D_{ci} - w_c}{2k}. \tag{3}$$

Denote the total supply of talent in country c as E_c, with E for endowment. We assume the amount of talent within a country to be fixed, as is common in these types of static models in the sports economics literature (see e.g. Fort and Quirk, 1995).Fort and Quirk (1995) Equilibrium on the labor market requires that w_c is such that the total demand for talent equals its total supply:

$$\sum_j \frac{D_{cj} - w_c}{2k} = E_c.$$

Writing $\overline{D}_c$ for the average drawing power of all clubs in country (so $\overline{D}_c \equiv \sum_j D_{cj}/n$), and $\overline{E}_c$ for the average amount of talent ($\overline{E}_c = E_c/n$), we can write the equilibrium wage rate as

$$w_c^{nn} = \overline{D}_c - 2k\overline{E}_c. \tag{4}$$

The superscript nn denotes the fact that we have no trade, and no Champions League. Plugging this expression for w_c^{nn} into (3), we have that the equilibrium amount of talent at club i equals

$$t_{ci}^{nn} = \overline{E}_c + \frac{D_{ci} - \overline{D}_c}{2k},$$

and we can then write the probability of winning for team i as

$$p_{ci}^{nn} = \frac{t_{ci}}{E_c} = \frac{1}{n} + \frac{D_{ci} - \overline{D}_c}{2kE_c}. \tag{5}$$

In the remaining sections, we will also derive the winning probability of each individual team, and assess how competitive balance is affected due to some institutional change. Note that the competitive balance in a competition reflects the predictability of a competition: the higher the competitive balance, the harder it is to predict the outcome of the competition. The following result will prove useful in what follows:

Lemma 1 *Consider scenarios A and B. Sufficient for more competitive balance in scenario A rather than scenario B are the following conditions:*

1. $p_{ci}^{A} = p_{ci}^{B} = 1/n$ if $D_{ci} = \overline{D}_c$.
2. $0 < \partial p_{ci}^{A}/\partial D_{ci} < \partial p_{ci}^{B}/\partial D_{ci}$.

The Lemma compares competitive balance in some scenario A to that in some scenario B. Condition 1 requires that in both scenarios the team with the average drawing power (so $D_{ci} = \overline{D}_c$) also has an average probability of winning the national competition, in the sense that $p_{ci} = 1/n$. From (5) it is easy to see that this is satisfied in full autarky. Condition 2 requires first of all that a team will have a higher win probability if it has higher drawing power ($\partial p_{ci}/\partial D_{ci} > 0$) in both scenario A and scenario B. Again, from (5), it is easy to see that this is satisfied in the case of full autarky. Define a weak team as one that has $D_{ci} < \overline{D}_c$. Such a team has a probability of winning that is below $1/n$. A strong team, with $D_{ci} > \overline{D}_c$, has a probability of winning that is above $1/n$. It is now easy to see that competitive balance in scenario A is higher than competitive balance in scenario B if each weak team has a higher win probability in scenario A, while each strong team has a higher win probability in scenario B. If this is true, then the variance of winning probabilities in scenario A is lower, which indeed implies that there is more competitive balance.

Note that we can write

$$p_{ci}^{s}\left(D_{ci}\right) = \int_{0}^{D_{ci}} \frac{\partial p_{ci}^{s}}{\partial D} dD, \qquad s \in \{A, B\},$$

so, using $p_{ci}^{A}\left(\overline{D}_c\right) = p_{ci}^{B}\left(\overline{D}_c\right)$,

$$p_{ci}^{A}\left(D_{ci}\right) - p_{ci}^{B}\left(D_{ci}\right) = \int_{\overline{D}_c}^{D_{ci}} \left(\frac{\partial p_{ci}^{A}}{\partial D} - \frac{\partial p_{ci}^{B}}{\partial D}\right) dD.$$

Hence, with $\partial p_{ci}^{A}/\partial D_{ci} < \partial p_{ci}^{B}/\partial D_{ci}$, we have that $p_{ci}^{A} > p_{ci}^{B}$ if and only if

$D_{ci} < \overline{D}_c$, that is, if and only if team i is a weak team. That is exactly what we need.

3 SCENARIO 2: TRADE, NO CHAMPIONS LEAGUE

In this section, we consider a world in which soccer talent can move freely between national competitions. We therefore extend the analysis to a case with m countries that all have their own national competition. For simplicity, we assume that all countries have exactly n teams in the championship. Again, the probability that team i wins its national competition is given by (1), while revenues are given by (2). Demand for an individual club is still given by (3), but crucially, the equilibrium wage rate for talent is now determined on the world market, rather than on the domestic market. Denote the world supply of talent as E_w. Thus $E_w \equiv \sum_c E_c$. Equilibrium requires that w is such that the world demand for talent equals the world supply, so

$$\sum_c \sum_j \frac{D_{cj} - w}{2k} = E_w,$$

which implies

$$w^{tn} = \overline{\overline{D}} - 2k\overline{\overline{E}}, \tag{6}$$

with $\overline{\overline{D}}$ the average drawing power among all clubs in all countries: $\overline{\overline{D}} \equiv \sum_c \sum_j D_{cj}/mn$, and $\overline{\overline{E}}$ the average talent among all clubs in all countries: $\overline{\overline{E}} = E_w/mn$. The superscripts t and n indicate that this is the equilibrium if we do have trade, but do not have a Champions League. Note that (6) is very similar to (4). The only difference is that equilibrium wage levels are now based on average drawing power and average talent for all clubs in the world, rather than merely within country c. Using (3), the equilibrium amount of talent hired by club i in country c is then given by

$$t^*_{ci} = \overline{\overline{E}} + \frac{D_{ci} - \overline{\overline{D}}}{2k}$$

For the total amount of talent in country c, we have

$$T^{tn}_c = \overline{E} + \frac{D_c - \overline{D}}{2k}, \tag{7}$$

where we have denoted the average per-country level of drawing power as $\overline{D}$, so $\overline{D} \equiv \sum_c D_c/m$. Similarly, $\overline{E} \equiv \sum_c E_c/m$. In what follows, we will again denote as $\overline{D}_c$ the average drawing power per team for all teams in country c, so $\overline{D}_c \equiv D_c/n$, with $D_c \equiv \sum_i D_{ci}$. Since $\overline{\overline{E}} = \overline{E}/n$ and $\overline{\overline{D}} = \overline{D}/n$, we can write

$$p_{ci} = \frac{t_{ci}}{T^{tn}_c} = \frac{1}{n}\frac{2k\overline{E} + nD_{ci} - \overline{D}}{2k\overline{E} + D_c - \overline{D}}.$$

After some further manipulations, this implies

$$p^{tn}_{ci} = \frac{1}{n} + \frac{D_{ci} - \overline{D}_c}{2k\overline{E} + D_c - \overline{D}}. \tag{8}$$

Effectively, this is the exact same expression as in (5), once we take into account that the total amount of talent in country c is now T^{tn}_c, as given by (7), rather than the endowment E_c.

In the remainder of this paper, we will refer to a small country as one which has weaker drawing power than the average country (so $D_c < \overline{D}$), and to a large country as one that has stronger drawing power than the average country (so $D_c > \overline{D}$). We can then prove the following result:

Theorem 1 *Consider a move from autarky to one with international trade in soccer talent. Such a move will increase competitive balance in large countries, but will decrease competitive balance in small countries.*

Proof. All proofs are in the Appendix. ■

To study how the introduction of trade affects the international distribution of talent, we first have to make some additional assumptions on the initial talent distribution. On the one hand, one could argue that countries with a high drawing power simply have a larger population, and hence will also have a proportionally higher endowment of soccer talent. This would imply that $E_c = \gamma \overline{E}$ if $D_c = \gamma \overline{D}$. As another extreme assumption, one could envision a world in which all countries have equal population size, and where different drawing powers simply reflect different preferences: countries with a high drawing power then have a strong taste for soccer. In such a world, one may expect that all countries have an equal endowment of talent, so $E_c = \overline{E}\ \forall c$. It seems natural to assume that the true relation between a country's initial endowment of talent and its drawing power, is somewhere between these two extremes. In the remainder of this paper, we will derive a number of results that relate to the size of countries. We will prove all of these results both for the case in which the endowment of talent is proportional to drawing power, and for the case in which the endowment is equal across countries. It is easy to see that the results then also hold for any convex combination of the two.

We can show the following:

Theorem 2 *Consider a move from autarky to one with international trade in soccer talent. Such a move will lead to a net flow of talent from small to big countries. Hence quality differences between national competitions will increase. Wages will increase in small countries, but will decrease in large countries.*

Taken together, our results thus suggest that soccer fans in small countries have every reason to worry about the effects of the Bosman ruling: competitive balance in their national competition decreases, while the amount of available talent will decrease. But for fans in large countries, the opposite is true: not only does the amount of talent in those countries increase, but competitive balance also increases. The effects on the international distribution of talent are obvious: as borders open, production factors flow to the place where they have the highest productivity, which in our case are the countries with a high demand for soccer.

The opposite effects on competitive balance within countries are more intricate, but can be understood as follows. Consider a small country. Due to the Bosman ruling, wages in such a country will increase. From (3), the *absolute* effect of a increase in the wage rate on the amount of talent that will be hired, is equal for all clubs. But that implies that the *relative* loss of talent is smaller for strong teams than it is for weak teams. As competitive balance is determined by the ratios of talents, this implies that competitive balance will decrease. Using a similar argument, competitive balance will increase in large countries that face a decrease in their wage rate due to the Bosman ruling.

4 SCENARIO 3: NO TRADE, CHAMPIONS LEAGUE

In this section, we study the effect of the introduction of a Champions League. We start with a situation in which there is no free trade in talent. We use a stylized representation of the Champions League. We assume that the probability of winning that league for a given club is proportional to the club's talent as a fraction of total talent available in the world, a specification that is equivalent to the one that we use in (1) to model the probability of winning the national competition. The prize money in the Champions League is denoted F_E. For simplicity, only the winner of the league receives prize money, and prize money does not depend on the identity of the winner.[3]

Yet, the possibility to participate in the Champions League not only allows clubs to win a huge amount of prize money. Champions League matches generate a lot of interest, and are broadcasted throughout the world to a much larger extent than matches from national competitions are. Participating in the Champions

[3]In other words, a club from a large country that wins, will receive the same prize money as a club from a small country that wins. It is worth emphasizing that this is no longer the case in the Champions League: by now, it has moved to a system where total prize money to be divided among the clubs from a given country, is proportional to the drawing power of that country (for details, see Koning (2009))

League will thus increase the earnings potential from sources such as merchandising, gate receipts etc. We therefore assume that, due to the existence of a Champions League, revenues as defined in (2) are increased by a factor $\lambda > 0$ of the initial revenues. With a Champions League, the expected total revenues of club i in country c thus equal

$$R_{ci} = (1 + \lambda)\,(D_{ci} - k\,t_{ci})\,t_{ci} + \frac{t_{ci}}{\sum_k \sum_j t_{kj}} F_E. \tag{9}$$

Of course, not all teams in a national competition participate in a Champions League. Hence, not all teams will see their revenues increase by a constant factor. Therefore, we should interpret λ as an expected value: on average, due to the existence of a Champions League, teams will see their expected revenue increase by a factor λ. Admittedly, this is a shortcut. Teams with more talent will have a better chance of reaching the Champions League and obtaining the additional revenue. That suggests that λ should also depend on the amount of talent in a team. For ease of analysis, we abstract from that. Note moreover that (9) still implies that strong-drawing teams benefit more in absolute value from a Champions League then weak-drawing teams do, as strong-drawing teams do have higher revenues. Also, the probability of winning the Champions League and earning prize money F_E does depend on t_{ci}. Hence, at least implicitly, we do allow for the fact that strong-drawing teams with more talent expect to earn more in a Champions League.

Maximizing profits, a club will solve the following first-order condition:

$$(1 + \lambda)\,(D_{ci} - 2k\,t_{ci}) + \frac{\sum_k \sum_j t_{kj} - t_{ci}}{\left(\sum_k \sum_j t_{kj}\right)^2} F_E = w_c.$$

By definition, the total amount of amount talent in the world is $E_w \equiv \sum_c \sum_j t_{cj}$, which implies that we can rewrite this condition as

$$(1 + \lambda)\,(D_{ci} - 2k\,t_{ci}) + \frac{E_w - t_{ci}}{E_w^2} F_E = w_c.$$

This implies

$$t_{ci} = \frac{F_E/E_w - w + (1+\lambda)\, D_{ci}}{2k\,(1+\lambda) + F_E/E_w^2} \tag{10}$$

Total demand for talent in country c equals $\sum_j t_{cj}$. Equilibrium on the market for talent agent requires $T_c^{nc} = E_c \equiv \sum_j t_{cj}$, which implies that equilibrium wage rate has to solve

$$\frac{nF_E/E_w - nw + (1+\lambda)\, D_c}{2k\,(1+\lambda) + F_E/E_w^2} = E_c.$$

Rewriting yields

$$\begin{aligned} w_c^{nc} &= \frac{nE_w - E_c}{nE_w^2} F_E + (1+\lambda)\left(\overline{D}_c - 2k\overline{E}_c\right) \\ &= \left(1 - \overline{E}_c/E_w\right) \frac{F_E}{E_w} + (1+\lambda)\left(\overline{D}_c - 2k\overline{E}_c\right). \end{aligned} \tag{11}$$

Comparing this to (4), we first of all have that wages increase by a factor $1+\lambda$: as productivity increases by this amount, so does the price of the production factor in a competitive market. Moreover, clubs are willing to pay an additional amount which can be interpreted as follows. First, F_E/E_w is the total amount of prize money in the Champions League per unit of talent in the world. It can be interpreted as the additional wage that soccer talent would earn due to a Champions League, if it were able to fully appropriate all the prize money. This, however, is not the case. For the sake of argument, suppose that an average team in a country would have all the soccer talent in the world, so $\overline{E}_c = E_w$. Such a team would be certain to win the Champions League, hence it has full bargaining power vis-a-vis its players and does not have to pay them anything extra. In that case, the first term is zero. Now suppose that an average team in a country has an amount of talent that is negligible relative to the world total, so $\overline{E}_c/E_w = 0$. Such a team would have no bargaining power, and would have to pay its talent its full share of Champions League prize money, which equals F_E/E_w.

Inserting (11) into (12), we obtain after some further manipulations:

$$t_{ci}^{cl} = \overline{E}_c + \frac{(1+\lambda)\left(D_{ci} - \overline{D}_c\right) E_w^2}{2k\,(1+\lambda)\,E_w^2 + F_E}. \tag{12}$$

Substituting this into (1), we obtain

$$p_{ci}^{nc} = \frac{t_{ci}}{E_c} = \frac{1}{n} + \frac{D_{ci} - \overline{D}_c}{2kE_c} \frac{(1+\lambda)\,E_w^2}{(1+\lambda)\,E_w^2 + F_E/2k}. \tag{13}$$

Compared to (5) the last term is additional and reflects the effect of a Champions League. We can now show the following:

Theorem 3 *Consider the introduction of a Champions League in a world without international trade in soccer talent. That introduction will increase competitive balance in all countries. Wages will increase.*

This is a surprising result, that runs counter to the fears cited in the Introduction. The intuition is as follows. First, we can see from the proof of the theorem that a Champions League would not have an effect on domestic competitive balance if prize money was zero, so $F_E = 0$. In other words, the fact that the Champions League allows all clubs to increase their gate revenue does not affect competive balance. Marginal revenue of all clubs increases by the same factor, which implies that the allocation of talent is unaffected. The only effect is an increase in the wage rate of talent. Yet, this picture changes if there is prize money involved. Prize money is the same for all clubs, regardless of their drawing power. All clubs therefore have the same incentive to try to win that prize money. This implies that drawing power becomes less important in the domestic allocation of talent. In turn, this implies more competitive balance in the national competition.

In this section, we only studied the introduction of a Champions League in a world without international transfers. To fully assess the effects of a Champions League, we need to allow for such transfers as well. In the next section, we therefore study a world with both international trade and a Champions League.

5 SCENARIO 4: INTERNATIONAL TRADE, CHAMPIONS LEAGUE

We now consider a world in which both international trade is possible, and a Champions League exists. The set-up of the model is identical to that in the previous section, with team revenues given by (9) which implies a demand for talent given by (10). But equilibrium on the labor market requires that the world demand for soccer talent equals the world supply, so we need

$$\frac{mnF_E/E_w - mnw + (1+\lambda)\,D_w}{2k\,(1+\lambda) + F_E/E_w^2} = E_w.$$

Solving for the equilibrium wage rate then yields:

$$w^{tc} = \left(1 - \frac{1}{mn}\right)\frac{F_E}{E_w} + (1+\lambda)\left(\overline{\overline{D}} - 2k\overline{\overline{E}}\right). \tag{14}$$

This expression is similar to (11), but again with the international club averages replacing the national club averages. Note that in (11), we had the term $\overline{E}_c/E_w$, the fraction of the talent of the average club in country c relative to total talent in the world. Now we have the fraction of the talent of the average club in the world relative to total talent in the world. By construction, this simply equals $1/mn$.

Solving for t_{ci} yields

$$t_{ci}^{tc} = \overline{\overline{E}} + \frac{(1+\lambda)\,E_w^2\left(D_{ci} - \overline{\overline{D}}\right)}{2k\,(1+\lambda)\,E_w^2 + F_E}. \tag{15}$$

The amount of talent that is hired by teams in country c equals

$$T_c^{tc} = \overline{E} + \frac{\left(D_c - \overline{D}\right)}{2k}\frac{(1+\lambda)\,E_w^2}{(1+\lambda)\,E_w^2 + F_E/2k}. \tag{16}$$

The probability that team i will win its national competition now equals

$$p_{ci}^{tc} = \frac{t_{ci}^{tc}}{T_c^{tc}} = \frac{1}{n} + \frac{(1+\lambda)\,E_w^2\left(D_{ci} - \overline{D}_c\right)}{(1+\lambda)\,E_w^2\left(2k\overline{E} + D_c - \overline{D}\right) + F_E\overline{\overline{E}}}. \tag{17}$$

For the results that follow, we need to put a mild restriction of prize money F_E. For the remainder of this paper, we will assume the following:

$$F_E < E_w (1 + \lambda)(D_w - 2kE_w). \tag{18}$$

To interpret this inequality, first note that the total worldwide wage bill in the case that $F_E = 0$, equals

$$E_w \cdot w^{tc} = E_w (1 + \lambda) \left(\overline{\overline{D}} - 2k\overline{\overline{E}} \right) = E_w (1 + \lambda)(D_w - 2kE_w)/mn.$$

Condition (18) then implies that total prize money in the Champions League *per existing club* does not exceed the total *worldwide* wage bill from sources other than prize money in the Champions League. It is clear that this is a very mild assumption. We can now show:

Theorem 4 *In a world with a Champions League, consider a move from autarky to one with international trade in soccer talent. Such a move will lead to a net flow of talent from small to big countries. Hence quality differences between national competitions will increase. Wages increase in small countries, and decrease in large ones. Competitive balance will increase in large countries, but will decrease in small countries.*

Note that these results are equivalent to those in Theorems 2 and 1, and hence are invariant to the existence of a Champions League. Again, as borders open, production factors flow to where they have the highest productivity, i.e. to countries with a high demand for soccer. Again, competitive balance increases in strong countries, as the relative distribution of talent in these countries improves, while competitive balance decreases in weak countries, as the relative distribution of talent deteriorates in these countries.

So far, we have only considered the introduction of international trade in a world with a Champions League. Yet, our results also allow us to study the effect of the introduction of a Champions League in a world with international trade. We can then show the following:

Theorem 5 *In a world with international trade in soccer talent, consider the introduction of a Champions League. Such a move will increase competitive balance in all countries. Wages will increase. Talent will flow from large countries to small countries. Hence, international quality differences will become smaller.*

Again we have that the introduction of a Champions League will increase competitive balance in national competitions. The intuition for this result is the same to that of Theorem 3. The effect on international quality differences is particularly surprising. The intuition for that result is very similar to that of Theorem 3. In a world without a Champions League, the earnings potential for teams from small countries is almost negligible. Hence, they have little incentive to attract talent. But with the introduction of a Champions League, such earnings potential does exist. This gives those clubs an incentive to at least have a shot at trying to win some of the money involved. Of course, the same is true for clubs in large countries, but for them, prize money in the Champions League is relatively less important. As a result, some talent will flow from large countries to small countries.

Above, we looked at the partial effects of the Bosman ruling (modelled as the introduction of international trade) and the introduction of the Champions League. This still leaves the combined effect of these institutional changes undetermined. For example, we saw that starting from autarky, introducing international trade increases international quality differences, but introducing a Champions League decreases them again. Also, in small countries introducing international trade decreases competitive balance, but the Champions League increases it again. In both cases, the net effect is not entirely clear. We can however prove the following:

Theorem 6 *Consider a move from autarky without a Champions League, to a situation with international trade in soccer talent, and a Champions League. Such a move will lead to a flow of talent from small countries to large countries. Wages* *increase in small countries, and decrease in large ones. Competitive balance increases in large countries. It also increases in some small countries, but will decrease in the smallest ones.*

Thus, the talent flow caused by the introduction of international trade always dominates that caused by the introduction of a Champions League. For small countries, international trade decreases competitive balance, but a Champions League increases it. For the smallest countries the trade effect dominates, while for somewhat larger countries, the Champions League effect does.

6 Summary and Conclusion

Using a theoretical model, we studied how the introduction of international trade in soccer players, and the introduction of the Champions League, has affected competitive balance within national competitions, and quality differences between national competitions. Our main results are summarized in Tables 2 and 3.

Table 2: The effect on international quality differences

initial situation	**introducing trade**	**introducing CL**	**introducing both**
no trade, no CL	increase	no effect	increase
no trade, CL	increase		
trade, no CL		decrease	

First, introducing international trade in talent leads to a flow from small countries to large ones. As the returns to talent are higher in large countries, more talent will be employed there. In small countries, the wage increase hurts all teams, but it hurts small teams relatively more than large ones. Therefore, competitive balance will decrease. In large countries, small teams benefit more from the wage decrease

Table 3: The effect on competitive balance

initial situation	**introducing trade**	**introducing CL**	**introducing both**
no trade, no CL	increases in big countries, decreases in small countries	increases in all countries	increases in most countries but decreases in very smallest
no trade, CL	increases in big countries, decreases in small countries		
trade, no CL		increases in all countries	

than large ones do, and competitive balance increases. As a result, wages will increase in small countries, but decrease in large ones. These results are independent on whether or not a Champions League exists.

The introduction of a Champions League implies the possibility for teams to win a large amount of prize money. This possibility is relatively more important for small teams. Hence, competitive balance increases in all countries, and talent flows from large to small countries, provided of course that international trade in talent is possible. Wages increase.

When we study the joint implementation of both international trade in talent and a Champions League, we find that talent flows from small to large countries. Hence, as far as the international distribution of talent is concerned, the trade effect dominates the Champions League. Competitive balance increases in all but the very smallest countries, where it will decrease.

Of course, any model is only as good as its assumptions. First, we assume that revenues are only affected by absolute qualities, not by relative qualities. This greatly simplifies the analysis, while we do not believe that changing this assumption would affect the qualitative results. Second, we assume that the presence of a Champions League increases the revenues from merchandising and the like by a factor that is constant for all teams. Of course, one could argue that teams with a strong drawing power benefit more than proportionally from a Champions League. If that effect is strong enough, it may at some point overturn the positive effect on competitive balance that we predict. Third, we assume that the amount of talent is fixed. If a wage increase would increase the supply of talent, then this would partly offset our results on the international distribution of talent. But it would not affect our qualitative result as long as the supply of talent is not infinitely elastic.

Based on our analysis, not all fears that we cited in the introduction are justified. Our results suggest that an increased mobility of players will indeed lead large countries to increasingly dominate European competitions. But competitive balance within national competitions will increase, albeit only in large countries. Furthermore, our results suggest that the Champions League in itself with lead to more competitive balance, both nationally and internationally. However, the latter effect is dominated by that of increased player mobility.

Based on our model, the "6+5" rule mentioned in the introduction is easy to analyze as well. That rule will decrease player mobility. On the basis of our analysis, that would imply that wages will decrease, that competitive balance will increase in small countries, but that it will decrease in large ones. International quality differences will decrease. Whether this is desirable from a welfare point of view, is debatable. Arguably, if fans in large countries are willing to pay more to watch soccer talent, it would be efficient to allow them to do so.

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Appendix: Proofs

Proof of Theorem 1

Note that $p_{ci}^{nn} = p_{ci}^{tn} = 1/n$ if $D_{ci} = \overline{D}_c$, so we can apply Lemma 1. Competitive balance increases if $\partial p_{ci}^{tn}/\partial D_{ci} < \partial p_{ci}^{nn}/\partial D_{ci}$ or if

$$\frac{1}{2k\overline{E} + D_c - \overline{D}} < \frac{1}{2kE_c}.$$

Suppose, without loss of generality, that a country has $D_c = \gamma\overline{D}$. Then the above inequality requires

$$(\gamma - 1)\left(\overline{D} - 2k\overline{E}\right) > 0.$$

With $\overline{D} - 2k\overline{E} > 0$, this is satisfied if and only if $\gamma > 1$, i.e. if the country is large. For a small country, we have $\gamma < 1$, so $\partial p_{ci}^{tn}/\partial D_{ci} > \partial p_{ci}^{nn}/\partial D_{ci}$, and competitive balance decreases.

PROOF OF THEOREM 2

From (7), talent flows to a country whenever

$$\overline{E} + \frac{D_c - \overline{D}}{2k} > E_c.$$

Suppose, without loss of generality, that a country has $D_c = \gamma \overline{D}$. With a proportional endowment of talent, the inequality then reduces to

$$(\gamma - 1)\left(\overline{D} - 2k\overline{E}\right) > 0.$$

With $\overline{D} - 2k\overline{E} > 0$, this is satisfied if and only if $\gamma > 1$, i.e. if the country is large. With equal endowments of talent, the inequality reduces to

$$(\gamma - 1)\,\overline{D} > 0,$$

which again is satisfied if and only if $\gamma > 1$. For the effect on wage rates, note from (4) and (6) that we can write

$$\begin{aligned} w^{tn} - w^{nn} &= \frac{\overline{D} - 2k\overline{E}}{n} - \frac{(D_c - 2kE_c)}{n} \\ &= \frac{(1-\gamma)\left(\overline{D} - 2k\overline{E}\right)}{n} \end{aligned}$$

which is positive if and only if $\gamma < 1$, thus if the country is small.

PROOF OF THEOREM 3

Consider a strong-drawing team, so $D_{ci} > \overline{D}_c$. Again using Lemma 1, we have that competitive balance in the national competition increases if

$$\frac{E_w^2\,(1+\lambda)}{2kE_w^2\,(1+\lambda) + F_E} < \frac{1}{2k},$$

or

$$\frac{1}{2k + \frac{F_E}{E_w^2(1+\lambda)}} < \frac{1}{2k},$$

which is indeed satisfied. The effect on wages follows from a straightforward comparison of (4) and (11).

PROOF OF THEOREM 4

Consider the increase in talent that a country will obtain due to the abolishment of trade restrictions. From (16), this equals

$$T_c^{tc} - E_c = \left(\overline{E} - E_c\right) + \frac{\left(D_c - \overline{D}\right)}{2k} \frac{(1+\lambda)\, E_w^2}{(1+\lambda)\, E_w^2 + F_E/2k}.$$

Again we assume that the initial endowments are either proportional or equal. First consider the case of a proportional endowment, so $T_c = \gamma \overline{E}$ iff $D_c = \gamma \overline{D}$. Then

$$T_c^{tc} - E_c = (\gamma - 1)\left(\frac{\overline{D}}{2k} \frac{(1+\lambda)\, E_w^2}{(1+\lambda)\, E_w^2 + F_E/2k} - \overline{E}\right).$$

Talent thus flows away from small countries (with $\gamma < 1$) to large countries (with $\gamma > 1$) if and only if

$$\left(\overline{D} \frac{(1+\lambda)\, E_w^2}{(1+\lambda)\, E_w^2 + F_E/2k} - 2k\overline{E}\right) > 0$$

or

$$E_w^2\,(1+\lambda)\,\overline{D} - \left(F_E + 2k\,(1+\lambda)\, E_w^2\right)\overline{E} > 0. \tag{19}$$

This is true if

$$E_w^2 (1+\lambda)\left(\overline{D}-2k\overline{E}\right) > F_E\overline{E}.$$

With $\overline{E} = E_w/m$ and $\overline{D} = D_w/m$, this implies (18).

Second, suppose that the initial endowment is equal among countries. In such a world, $E_c = \overline{E}$, so

$$T_c^{tc} - E_c = \frac{\left(D_c - \overline{D}\right)}{2k}\frac{(1+\lambda)E_w^2}{(1+\lambda)E_w^2 + F_E/2k}.$$

This immediately implies that large countries attract talent, while small countries lose talent. The effect on wages then follows directly.

Note from (17) that also in this case, the team with the average drawing power in a country, has a probability of winning the national competition that equals exactly $1/n$.Hence, we can apply Lemma 1. For competitive balance to increase, we thus need $\partial p_{ci}^{tc}/\partial D_{ci} < \partial p_{ci}^{nc}/\partial D_{ci}$ or

$$(1+\lambda)E_w^2\left(2k\overline{E} + D_c - \overline{D}\right) + F_E\overline{E} > 2k(1+\lambda)E_cE_w^2 + F_EE_c.$$

It is convenient to write this as

$$E_w^2(1+\lambda)\left(D_c-\overline{D}\right) - \left(F_E + 2k(1+\lambda)E_w^2\right)\left(E_c - \overline{E}\right) > 0, \tag{20}$$

First consider a country with an average supply of talent: $E_c = \overline{E}$, and an average amount of drawing power: $D_c = \overline{D}$. In that case, both sides of this inequality are identical, $p_{ci}^{tc} = p_{ci}^{nc}$, and competitive balance is not affected. For the other cases, first assume that $E_c = \gamma\overline{E}$ and $D_c = \gamma\overline{D}$. The inequality then reduces to

$$(\gamma-1)\left[E_w^2(1+\lambda)\overline{D} - \left(F_E + 2k(1+\lambda)E_w^2\right)\overline{E}\right] > 0.$$

But this is exactly (19), which we know to be true if (18) is satisfied. For the case of an equal endowment of talents, condition (20) reduces to

$$E_w^2 (1+\lambda)\left(D_c - \overline{D}\right) > 0$$

which is satisfied if and only if $D_c > \overline{D}$, i.e. if the country is large.

PROOF OF THEOREM 5

Using (8) and (17), we have from Lemma 1 that competitive balance increases if

$$\frac{1}{\left(2k\overline{E} + D_c - \overline{D}\right) + \frac{F_E \overline{E}}{(1+\lambda) E_w^2}} < \frac{1}{2k\overline{E} + D_c - \overline{D}},$$

which is always satisfied. The effect on wages follows directly from a comparison of (11) and (14). From (7) and (16), the net effect of the introduction of a Champions League in country c is

$$T_c^{tc} - T_c^{tn} = \frac{\left(D_c - \overline{D}\right)}{2k}\left(\frac{(1+\lambda)\,E_w^2}{(1+\lambda)\,E_w^2 + F_E/2k} - 1\right).$$

The term in brackets is always negative. That implies that countries will attract talent if $D_c < \overline{D}$, i.e. if they are small.

PROOF OF THEOREM 6

The effect on international quality differences is straightforward. Introducing a Champions League in a world without international trade obviously has no effect on international quality differences. Introducing international trade in a world with a Champions League leads to a flow to large countries. Hence introducing both changes at the same time has to lead to a flow to large countries as well. This also immediately implies the effect on wages.

The derivation of the effect on competitive balance is as follows. Using (5) and (17), we have from Lemma 1 that competitive balance increases if

$$\frac{1}{2kE_c} > \frac{(1+\lambda)\,E_w^2}{(1+\lambda)\,E_w^2\left(2k\overline{E}+D_c-\overline{D}\right)+F_E\overline{E}},$$

or

$$F_E\overline{E} > E_w^2\,(1+\lambda)\left(\overline{D}-2k\overline{E}\right)-(1+\lambda)\,E_w^2\,(D_c-2kE_c) \tag{21}$$

Consider the case of proportional endowments. The inequality then reduces to

$$F_E > E_w\,(1-\gamma)\,(1+\lambda)\,(D_w-2kE_w)\,. \tag{22}$$

For $\gamma > 1$, it is clear that this inequality is satisfied. With $\gamma = 0$, it exactly violates (18). With the right hand side strictly decreasing in γ, this establishes the result.

With equal endowments, (21) reduces to

$$F_E > E_w\,(1+\lambda)\,(1-\gamma)\,D_w.$$

Again, this is clearly satisfied for $\gamma > 1$. With $\gamma = 0$, it reduces to $F_E > E_w\,(1+\lambda)\,D_w$, which violates (18). With the right hand side strictly decreasing in γ, this establishes the result.