Owner Objectives and Competitive Balance

RODNEY FORT
Washington State University

JAMES QUIRK
California Institute of Technology (Retired)

A growing literature on leagues composed of owners maximizing winning percentage shows that particular league rules have different impacts compared with leagues composed of profit-maximizing owners. But the underlying question of how to distinguish between the two types of leagues has received no treatment. In this article, we show that the two types of leagues can be distinguished in the talent market. A league of winning-percentage-maximizing owners will have higher talent costs and greater demand for talent. But, and perhaps more important, the level of competitive balance between the two types of leagues is indeterminate. In addition, a new policy instrument is suggested, namely, nudging owners toward one or the other objective, depending upon the particular locations of the demand for talent if owners pursue profits or winning percentage.

Keywords: *profit maximization; winning percentage maximization; talent market; competitive balance*

We compare a league composed of profit-maximizing team owners, the "PM" league, with a league composed of the same owners that pursue winning percentage instead, the "WPM" league. There is a growing literature on WPM leagues aimed primarily at exploring policy prescription differences with PM leagues. For example, quality held constant, gate sharing has no impact on the talent choices of PM owners (Fort & Quirk, 1995; Vrooman, 1995; for quality changes associated with gate sharing, see Marburger, 1997; Kesenne, 2000). However, in a given WPM league, larger revenue market owners will reduce talent in the presence of gate sharing more than smaller revenue market owners will, enhancing competitive balance in that particular WPM league (Kesenne, 1996, 1999).

But an unresolved issue is how to tell when the object of analysis is a PM league or a WPM league, an important consideration before any policy prescription is

JOURNAL OF SPORTS ECONOMICS, Vol. 5 No. 1, February 2004 20–32
DOI: 10.1177/1527002503261275

adopted. Two "suggestions" about how to tell them apart actually do not hold much water. First, Szymanski and Smith (1997) and Kesenne (1999) suggest that WPM leagues predominate the lower echelons in European football based on the observation that many of them lose money. But analysts of the U.S. sports business scene practically take for granted that accounting statements can be misleading (Okner, 1974; Quirk & Fort, 1992). In the European case, Moorhouse (1999) argues that there are problems with the data used by those making the WPM argument, and Fort (2000) questions whether there has been a close enough look at European league accounting statements in this regard. Second, the pricing choices of teams cannot distinguish PM and WPM leagues. Both PM and WPM leagues typically will price gate attendance in the inelastic portion of demand, especially with attendance-related local revenues and local TV revenues in the picture (Fort, in press–a; Fort & Quirk, 1995; Vrooman, 1995).

And there are still others who attempt to pin down the objectives of owners with circumstantial evidence. Szymanski and Kuypers (1999) argue that Division I of English Football (the Premiership) clearly most resembles the PM case, right down to the incentives to offer equity shares. Indeed, they note that the stock market now expects the teams in top European leagues to earn profits. And there also is some behavioral evidence of PM behavior in the top divisions of European Football (thanks again to Stefan Szymanski for this example). Football clubs cannot issue dividends in excess of 15% of paid share capital. In practice, this is a negligible figure, but companies like Manchester United PLC try to avoid this rule by making Manchester United Football Club a subsidiary of the PLC (which is not a football club) and funneling profits through other subsidiaries. Finally, Andreff and Staudohar (2000) argue that European leagues are evolving toward the American PM league structure.

In this article, we examine the talent choices that would be made by a given group of owners depending on whether they are in a WPM league or a PM league, all else constant. The price of talent will be no less in the WPM league than in the PM league; generally, we would expect the price of talent in a WPM league to be greater than in a PM league. And the demand for talent in a WPM league will be no less than in a PM league; generally, we would expect the demand for talent to be greater in the WPM league. However, the level of competitive balance under either owner objective is indeterminate. One cannot tell a PM from a WPM league based on the level of competitive balance they exhibit.

The setting for our findings is a careful one: comparing two leagues identical in all market respects except for the objectives of the team owners. This suggests that competitive balance comparisons between currently existing leagues will prove fruitless (e.g., between the Premiership and Division II in English Football). Just too many determinants of competitive balance are variable between the two. But examples for empirical analysis do occur to us, such as the spread of the U.S. versions of PM hockey and PM basketball into Europe. WPM versions already exist there in the same markets. Thus, there may be an ongoing natural experiment in

Europe concerning owner objectives. In addition, the evolution of European leagues toward the North American PM model, as suggested by Andreff and Staudohar (2000), might generate data to distinguish owner objectives.

Finally, our analysis suggests an interesting policy consideration, namely, competition policy that nudges owners toward one league structure or the other may generate more efficient gains in competitive balance than altering the incentives in a given league structure (e.g., using revenue sharing). Of course, as with all policy prescriptions (especially highly formative ones like ours!), extreme caution is suggested. Other determinants of competitive balance besides the objectives of team owners, as well as fan welfare, may also be affected when either PM or WPM behavior is encouraged. But adding one more to the policy alternatives mix can do no harm with the caveat that competitive balance is analyzed from the perspective of fan welfare.

The article proceeds as follows. In the second section, we present the theoretical findings. WPM leagues will hire more talent at higher prices, but the level of competitive balance cannot be predicted based on owner objectives. In the third section, we discuss the research implications. Care must be exercised in finding the right evaluative data to compare competitive balance outcomes based on owner objectives. The fourth section discusses an interesting policy possibility involving incentives to operate teams as PM or WPM concerns. Conclusions round out the article in the fifth section.

COMPETITIVE BALANCE IN PM AND WPM LEAGUES

Following the literature on WPM leagues to date, a gate-only revenue function is adopted. In addition, the WPM literature adopts a curious convention that such behavior occurs subject to a break-even constraint on profits. Both of these modeling restrictions are maintained for purposes of comparison with the WPM literature. The gate-only convention is discussed at the end of the section. As for the break-even constraint, a mainstay of WPM analysis, we find it a curious convention but keep it for comparative purposes.

To begin with, at least by the data appendix in Szymanski and Kuypers (1999), there are at least paper losses (if not real losses) in English Football, especially in the lower divisions. There do not appear to be any legal restrictions imposing the zero-profit constraint in that league. In other countries, there appear to be only very limited legal restrictions on profits and only in some cases (we are indebted to Stefan Szymanski for the following insights into the European legal setting and profits).

In France, a club can apply for special status as a "company with a sporting objective." This designation gives the club special tax status, but in turn, it cannot offer dividends. In England, where top division teams sell equity shares, football clubs cannot issue dividends in excess of 15% of paid share capital. But a decision to run heavy losses is not precluded by law. Teams like Barcelona and Bayern

Munich are "clubs" in the legal sense without traded shares and no realistic means to distribute profits to investors. In Italy, clubs were not permitted to float themselves on the stock market until the law was changed a couple of years ago.

Thus, except in limited cases such as when league license systems preclude running heavy losses, it appears WPM owners can run heavy deficits if they so choose. And if the justification for the WPM case is identification of the sportsman owner with his team's success, why would such an owner follow a self-imposed zero-profit restriction? The owner of a $1 billion European football team can spend, say, only $50 million per year because otherwise the team would show a loss? Surely, a WPM-oriented owner of such a team would never buy it in the first place. And just think of a second-tier owner, condemned to also-ran status. Why would such an owner be a WPM loser on the field because of an artificial zero-profit constraint when the team can just as well end up at the bottom of the league standings but with positive profits by adopting a PM orientation?

An extension of WPM modeling to relax this break-even constraint would allow the possibility of owner effects to enter subsequent empirical analysis. This would prove important if the supply of WPM owners is not perfectly elastic, and wealth differences might matter. In any event, although we are not quite sure why this type of constraint characterizes WPM analysis, we carry it along because our primary concern is comparison with the existing WPM literature.

Teams in the PM case are denoted by the superscript Π, and the superscript W denotes WPM teams. We compare how teams facing the same gate revenue and cost functions will choose talent under WPM and PM assumptions. L_i^W is the winning percentage of team i if its owner is of the WPM variety. That same owner, if a PM owner facing the same market, would choose winning percentage L_i^Π.

The concave gate-revenue function is the same in either case, but the level of revenues would be different for the different owner objectives, $R_i(L_i^W)$ and $R_i(L_i^\Pi)$ for the WPM and PM cases, respectively. We assume that $R_i(0) = R_i(1) = 0$, along with $R_i'' < 0$. On the cost side, F_i are fixed costs, independent of winning percentage. With p^W equal to the price of winning percentage in the WPM league, variable costs for the WPM team i are $p^W L_i^W$. Total costs become $C_i(L_i^W) = F_i + p^W L_i^W$. Similarly, if the same team owner were of the PM variety, total costs are $C_i(L_i^\Pi) = F_i + p^\Pi L_i^\Pi$. The WPM and PM cases are characterized by the following two expressions, respectively:

$$R_i(L_i^W) - p^W L_i^W - F_i = 0,\ i = 1, \ldots, n. \tag{1}$$

$$R_i'(L_i^\Pi) - p^\Pi = 0,\ i = 1, \ldots, n. \tag{2}$$

Equation 1 is the break-even constraint that is the mainstay of the analysis of WPM owners and Equation 2 is just marginal revenue equal to marginal cost for the PM case.

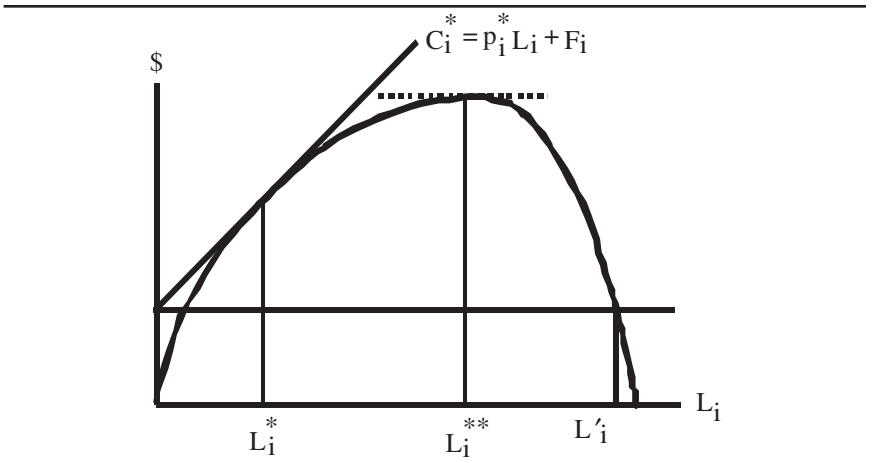

Figure 1: Winning Percentage Boundaries for the Winning-Percentage-Maximizing and the Profit-Maximizing Cases

For each team there is a critical vector, denoted (L_i^*, p_i^*), such that both Equation 1 and Equation 2 hold, that is, profits are maximized and equal to zero. In addition, (L_i^*, p_i^*) must satisfy the condition that $C_i^* = p_i^* L_i + F_i$ is tangent to $R_i(L_i)$ at L_i^* (so that marginal revenue equals marginal cost) and that

$$R_i'(L_i^*) = \frac{R_i(L_i^*) - F_i}{L_i^*} = p_i^*. \tag{3}$$

The tangency at one L_i^* satisfying Equation 3 is shown in Figure 1. Another way to think of p_i^* is to say that for team i to survive in a WPM league, the cost per unit of winning percentage must satisfy $p^W \le p_i^*$.

Let $p^* = \min p_i^*$. Then every team in either type of league survives if and only if $p^W \le p^*$ and $p^\Pi \le p^*$. Because we wish to compare talent outcomes in PM and WPM leagues composed of exactly the same teams, we impose this survivability condition. Of course, this does not imply $R'(L_i(p^W)) \ge 0$ for all i, although it is certainly true that $R'(L_i(p^\Pi)) \ge 0$ for all i. Really, all this means is that the C_i^* line can be no steeper than depicted in Figure 1.

Equilibrium (p^W, L_i^*) occurs in WPM case, assuming survivability $(p^W \le p^*)$, when

$$R_i(L_i^W) = p^W L_i^W + F_i,\ i = 1, \ldots, n, \tag{4}$$

where

$$L_i^W = \max\{L_i | R_i(L_i) = p^W L_i + F_i\},$$

and

$$\sum_{i=1}^{n} L_i^{W} = \frac{n}{2}.$$

The conditions in Equation 4 yield the level of winning percentage where profits are zero, and the optimal levels of winning percentage across all teams obey the fact of life that the sum of winning percentages is equal to half the number of teams in the league.

Turning to the PM case, assuming survivability ($p^{\Pi} \leq p^*$), equilibrium talent price and quantity (p^{Π}, L_i^{Π}) occurs when

$$R_i'(L_i^{\Pi}) = p^{\Pi}, \; i = 1, \ldots, n, \tag{5}$$

where

$$\sum_{i=1}^{n} L_i^{\Pi} = \frac{n}{2}.$$

The conditions in Equation 5 yield marginal revenue equal to marginal cost, and the sum of winning percentages across all teams equals half the number of teams in the league. With this much groundwork, we get to our first proposition (proofs of propositions are in the appendix):

Proposition 1: The equilibrium price of winning percentage in the WPM case is no less than in the PM case, that is, $p^{\Pi} \leq p^{W}$.

Proposition 1 establishes that the price of talent, the ultimate determinant of the cost of obtaining increments to winning percentage, is higher in a league of WPM teams than it is in a league where the same teams operate as PM teams. Intuitively, if teams retain no profit, then all net operating revenues would be directed right back into the talent market, raising the price of talent relative to a PM league. In fact, what can be shown is that the demand curve for talent for any team operating in a WPM league is to the right of the demand curve for talent of the same team operating in a PM league:

Proposition 2: At any p, the level of talent chosen in the WPM case can be no less than the level of talent chosen in the PM case, that is, $L_i^{W}(p) \geq L_i^{\Pi}(p)$ for all i.

Now we must be very careful with Proposition 2. It says that for any price p, the winning percentage chosen by team i as a WPM team is greater than the winning percentage team i would choose as a PM team. But by Proposition 1, $p^{W} \geq p^{\Pi}$, so $L_i^{W}(p^{W}) < L_i^{\Pi}(p^{\Pi})$ will occur for some i if there is some other j for which $L_j^{W}(p^{W}) > L_j^{\Pi}(p^{\Pi})$, because $\sum_i L_i^{W}(p^{W}) = \sum_i L_i^{\Pi}(p^{\Pi}) = \frac{n}{2}$. And this is a crucial distinction. Propo-

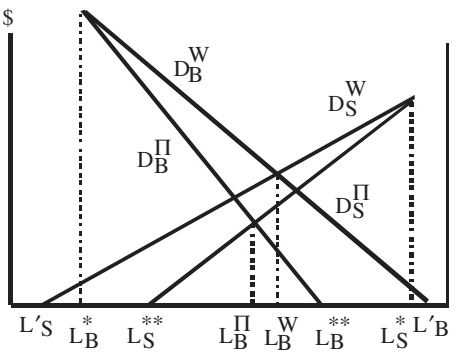

Figure 2: Competitive Balance in a Two-Team League: Winning-Percentage Maximizing and Profit Maximizing

sition 2 provides a simple way to demonstrate the contrast between equilibrium in a WPM league and in a PM league, shown in Figure 2. Because the input demand curves of both larger and smaller revenue market WPM teams lie to the right of their PM counterparts (see the proof of Proposition 2 in the appendix), the equilibrium price of talent has increased. But the effect on competitive balance depends on the magnitudes of the WPM versions of the large and small revenue market demand curves relative to their PM counterparts. And this, in turn, depends on factors beyond simple concavity (which is all we assume). This leads to the following proposition:

> *Proposition 3:* In a gate-only world without revenue sharing, and absent arbitrary restrictions on team revenue functions beyond concavity, the relationship between competitive balance in the WPM and PM cases is indeterminate.

In the region of winning percentages where marginal revenue is positive, either type of league can have greater balance prior to any gate-revenue sharing impositions. Proposition 3 makes it clear that the relative level of competitive balance in WPM and PM leagues is an empirical matter that depends on the shapes and locations of talent demand curves under each type of owner objective.

Thus far in our analysis, talent choices in the inelastic portion of gate demand can occur only for the WPM case (see the proof of Proposition 3 in the appendix). After all, in this simplest postulation of team revenue, no PM team would ever price in the inelastic portion of gate demand, that is, where marginal gate revenue is negative. But relaxing the gate-only revenue convention has clear implications here. Heilmann and Wendling (1976), Fort and Quirk (1995), Vrooman (1995), and extensions in Fort (in press–a) make it clear that the presence of other attendance- or win-related revenues can lead to pricing in the inelastic portion of gate attendance. And Fort (in press–b) adds the presence of attendance-related subsidies to the mix.

Thus, when the revenue function becomes more general, including other attendance- or win-related elements, L_i^{**} in Figure 1 no longer is the upper bound on talent in the PM case. If the gain from pursuing that kind of revenue is large enough relative to the simple gate revenues specified in $R_i(L_i)$, then a higher level of winning percentage than L_i^{**} could be chosen by the PM team. Quite simply, one cannot distinguish PM and WPM objectives on the basis of pricing in the inelastic portion of demand.

RESEARCH IMPLICATIONS

The theory just presented shows that the objective function matters to the analysis of input market prices and owner choices of talent level. But finding a valid empirical test of the model implications will be challenging. There must be direct comparisons, all else constant, of different leagues serving the same markets with the same cost functions. Comparing currently existing leagues cannot distinguish owner objectives if the existing leagues serve different markets with different revenue possibilities. Unfortunately, from the empirical perspective, whether PM or WPM cannot be determined from comparisons of competitive balance.

New leagues entering the same market would provide a valid test and two examples occur to us. First, there have been many instances of rival leagues in North America in all four major pro sports that place teams in the same market as the dominant league. If supporting data can be found, different talent choices might be discerned in these cases if either the rival or the dominant league had WPM leanings. Because both the dominant and the rival leagues draw from the same talent market, the best players should be in the WPM alternative because WPM teams are willing to bid a higher price than are teams in the PM league.

Second, in Europe, North American PM leagues are making inroads into hockey and basketball markets currently served by European leagues. Talent market competition between these leagues over time might provide the data needed to discern owner objectives. If North American PM versions displace WPM versions in the same market areas, then the price of talent should fall.

In addition to new leagues, the evolution of an existing league over time may also provide an enlightening experiment concerning owner objectives. If Andreff and Staudohar (2000) are correct, and European leagues are evolving toward American-style PM leagues, the price of talent hired will fall. Again, by Proposition 3, owner objectives cannot be determined in either case (new leagues or evolving leagues) based on comparisons of competitive balance.

POLICY IMPLICATIONS

From theoretical analysis to the policy arena is a heroic leap at least. And stretching our results to policy concerning competitive balance may send the reader run-

ning, but we make a very minimal observation in this regard. We make our point first and then return to a fuller consideration of the place of our observation in competitive-balance policy. Nudging owners toward PM or WPM behavior, depending on the location of talent demand in each case, can alter competitive balance. Quite simply, in the situation depicted in Figure 2, if owners chose the PM objective the league would be more balanced. Of course, the important point of Proposition 3 is that the opposite could be true depending on the relative location of the PM and WPM versions of talent demand.

The only point we wish to make is that a variety of approaches to altering competitive balance in sports leagues have been analyzed, but not this one. Gate sharing can alter competitive balance in WPM leagues (Kesenne, 1996) and other mechanisms work in PM leagues (Fort & Quirk, 1995; Vrooman, 1995). But if estimates can be made of talent-demand functions in given markets, for PM or WPM owner types, it is possible to choose the level of competitive balance as a matter of policy based on incentive structures driving owners toward either type of behavior.

We go no further with this observation for the obvious reasons. Sports policy choices always should proceed from a base of fan-welfare analysis. From this perspective, a number of things must be determined about competitive-balance policy in the first place. Does altering competitive balance actually improve fan welfare in the first place? Does the method that is chosen itself alter fan welfare? Fans may like the entire bundle of characteristics of WPM leagues better than the bundle associated with PM behavior (e.g., this is one argument behind keeping the NCAA amateur requirement). Finally, the relative costs of alternative methods matter as well if intervention is to be chosen in an efficient fashion. Put another way, if altering competitive balance enhances fan welfare, if changes in fan welfare based on this particular method are not onerous, and if it is relatively cost-effective compared to other methods, then incentives that alter owner objectives is an additional tool in the sports regulator's toolbox.

We do offer two additional observations concerning the alteration of owner objectives. First, there is evidence that changes in objectives have altered competitive-balance outcomes. Burkitt and Cameron (1992) document that attendance increased for the more PM-type upper league and fell for the more WPM-type lower league after reorganization of the English Rugby Football League in 1973. And Cairns (1987) shows that the distribution of attendance moved in favor of Premiere League clubs and that the inequality of attendance among these clubs also narrowed after reorganization of the Scottish Football League in 1975. Prior to reorganization, both leagues were viewed as precariously imbalanced from the perspective of on-field competition.

Our second observation concerns the actual implementation of regulatory alternatives. Revenue sharing is a decision internal to the league. The level of sharing required to have any meaningful impact on competitive balance may be quite large. In North America, league constitutions and bylaws require a supermajority for such

decisions, typically around 75%. As a result, for example, Major League Baseball is practically paralyzed in any attempt to institute what every observer knows must happen to generate meaningful change in competitive balance, namely, dramatic local revenue sharing (even beyond the steps in that direction in the recent collective-bargaining agreement). Interestingly, both English Rugby Football League and Scottish Football League chose reorganization and the introduction of more PM-oriented upper divisions over dramatic revenue sharing.

But unlike revenue sharing, encouraging PM or WPM behavior can be an external intervention. Essentially, laws governing league structure, plus tax policy, can nudge teams either toward WPM or PM behavior, whichever is dictated by talent-demand functions. This is certainly nothing new to the political process. For example, both legally defined not-for-profit firms coexist with other for-profit firms. Their business environments are carefully defined to foster a specific behavior. In the United States, pro sports team owners enjoy special tax status that encourages particular types of behavior as well. Government decision makers clearly can design policies to influence behavior.

CONCLUSIONS

In this article, we compare a given set of owners identical in all ways except for their objective functions. With no restriction in a gate-only world other than concave revenues, we show that the price of talent and the demand for talent are at least as great when these owners participate in a WPM league as for a PM league (Propositions 1 & 2, respectively). Furthermore, the relationship between competitive balance in the WPM and the PM cases is indeterminate (Proposition 3).

Very precise data settings will be required to determine whether owners are of the WPM or the PM variety in any given league. Comparisons between existing leagues serving different markets do not provide the data to discern owner objectives. But new leagues serving the same markets might provide the appropriate data to test owner objectives. And the evolution of existing leagues over time may also provide relevant experiments. But no prediction can be made concerning the level of competitive balance that will ultimately reign if either PM or WPM leagues prevail without modeling choices beyond concavity.

Although highly tentative, our analysis also suggests as a matter of policy relevance that altering objectives can change balance in a given league. The efficient choice among various policy alternatives (team objectives, gate sharing, local revenue sharing, salary caps, taxes on player salary expenditures, prize incentives, and competition policy), depends, of course, on fan welfare and the costs of implementation. An important advantage to altering team objectives is that it can be accomplished outside of the internal decision process of the leagues themselves. But a full assessment of any competitive-balance policy awaits the requisite fan-welfare analysis.

APPENDIX
Proofs of Propositions

Proof of Proposition 1

L_i^* is such that for $L_i > L_i^*$, $\frac{R_i(L_i) - F_i}{L_i} > R_i'(L_i)$. At equilibrium in WPM case, $p^W \leq p^*$, which implies that $p^W \leq p_i^*$ for all i. Furthermore, $L_i^W \geq L_i^*$ for all i because $p^W \leq p_i^*$ implies that winning percentage in the WPM case for team i is to the right of L_i^*, given concavity of $R_i(L_i)$. Hence, for all i, $\frac{R_i(L_i^W) - F_i}{L_i^W} > R_i'(L_i^W)$ implies $p^W > R_i'(L_i^W)$, $i = 1, \ldots, n$. Suppose that $p^\Pi > p^W$, contrary to our proposition. This implies for $R_i''(L_i) < 0$ that $L_i^\Pi < L_i^W$ for every i because $R_i'(L_i^\Pi) = p^\Pi > p^W > R_i'(L_i^W)$. But $\sum_{i=1}^{n} L_i^\Pi = \sum_{i=1}^{n} L_i^W = \frac{n}{2}$. This contradiction establishes that $p^\Pi \leq p^W$. QED.

Proof of Proposition 2

For our concave revenue function, $\frac{R_i(L_i^W(p^W))}{L_i^W(p^W)} > R_i'(L_i^W(p^W))$ for any $L_i^W(p^W) > L_i^*$. Furthermore, if the revenue function is concave, then so is $R_i - F_i$ for any constant F_i. Hence, $\frac{R_i(L_i^W(p^W)) - F_i}{L_i^W(p^W)} > R_i'(L_i^W(p^W))$ for any $L_i^W(p^W) > L_i^*$. Because, given any price of talent, p, $R_i'(L_i^\Pi(p)) = p$, and $\frac{R_i(L_i^W(p)) - F_i}{L_i^W(p)} = p$, then $\frac{R_i(L_i^W(p)) - F_i}{L_i^W(p)} = R_i'(L_i^\Pi(p)) \geq R_i'(L_i^W(p))$. By concavity, $L_i^W(p) \geq L_i^\Pi(p)$. QED.

Proof of Proposition 3

We offer a two-team league proof, using Figures 1 and 2. First, remember that the zero-profit winning percentage is the same for either type of league; $L_i^W(p^*) = L_i^\Pi(p^*) = L_i^*$ in Figure 1. And the greatest level of talent for team i in the PM league would be L_i^{**} (implying $p^\Pi = 0$) because marginal gate revenue turns negative after that. In the WPM league, the maximum level of talent chosen would be L_i', the level where $p^W = 0$ in Figure 1. In Figure 2, we show the demand functions for large and small revenue market teams in a two-team league. In each case, as per Propositions 1 and 2, the demand function for talent in the case where either team is in a WPM league (denoted D_i^W for team i) lies above the demand function for that team if it

were in a PM league (denoted D_i^{Π} for team i). Also, following the observations from Figure 1, under PM, $D_i^{\Pi} \rightarrow 0$ as $L_i^{\Pi} \rightarrow L_i^{**}$ while, under WPM, $D_i^{W} \rightarrow 0$ as $L_i^{W} \rightarrow L_i^{'}$.

In Figure 2, where the teams are $i = B, S$ for "big" revenue market and "small" revenue market, respectively, it is clear that the PM league is more balanced than the WPM league, that is, $L_B^{\Pi} < L_B^{W}$. Equilibrium in the PM market occurs at p^{Π} such that $D_B^{\Pi}(p^{\Pi}) = D_S^{\Pi}(p^{\Pi})$, which corresponds to the output level where marginal revenue for the big and small revenue PM teams are equal to each other. Equilibrium in the WPM market occurs at p^{W} such that $D_B^{W}(p^{W}) = D_S^{W}(p^{W})$, that is, where average revenue for the big and small revenue WPM teams are equal to each other. But it is easy to see that another set of demand functions can be drawn that would generate exactly the opposite outcome, that is, $L_B^{\Pi} > L_B^{W}$. Thus, without any further restrictions on revenue (and, hence, demand) functions, the competitive balance comparison between the two types of leagues is indeterminate. QED.

REFERENCES

Andreff, W., & Staudohar, P. D. (2000). The evolving European model of professional sports. *Journal of Sports Economics*, *1*, 257-276.

Burkitt, B., & Cameron, S. (1992). Impact of league restructuring on team sport attendances: The case of Rugby League. *Applied Economics*, *24*, 265-271.

Cairns, J. (1987). Evaluating changes in league structure: The reorganization of the Scottish Football League. *Applied Economics*, *19*, 259-275.

Fort, R. (2000). European and North American sports differences (?). *Scottish Journal of Political Economy*, *47*, 1-25.

Fort, R. (in press–a). Inelastic sports pricing. *Management and Decision Science.*

Fort, R. (in press–b). Subsidies as incentive mechanisms in sports. *Management and Decision Science*.

Fort, R., & Quirk, J. (1995). Cross-subsidization, incentives, and outcomes in professional team sports leagues. *Journal of Economic Literature*, *XXXIII*, 1265-1299.

Heilmann, R., & Wendling, W. (1976). A note on optimum pricing strategies for sports events. In R. E. Machol, S. P. Ladany, & D. G. Morrison (Eds.), *Management Science in Sports.* Amsterdam: North-Holland Publishing.

Kesenne, S. (1996). League management in professional team sports with win maximizing clubs. *European Journal for Sport Management*, *2*(2), 14-22.

Kesenne, S. (1999). Player market regulation and competitive balance in a win maximizing scenario. In S. Kesenne & C. Jeanrenaud (Eds.), *Competition policy in professional sports: Europe after the Bosman case.* Antwerp, Belgium: Standaard Editions.

Kesenne, S. (2000). Revenue sharing and competitive balance in professional team sports. *Journal of Sports Economics*, *1*, 56-65.

Marburger, D. (1997). Gate revenue sharing and luxury taxes in professional sports. *Contemporary Economic Policy*, *XV*, 114-123.

Moorhouse, H. F. (1999). Football post-Bosman: The real issues. In S. Kesenne & C. Jeanrenaud (Eds.), *Competition policy in professional sports: Europe after the Bosman case*. Antwerp, Belgium: Standaard Editions.

Okner, B. A. (1974). Taxation and sports enterprises. In R. G. Noll (Ed.), *Government and the sports business* (chap. 5). Washington, DC: Brookings Institution.

Quirk, J., & Fort, R. (1992). *Pay dirt: The business of professional team sports*. Princeton, NJ: Princeton University Press.

Szymanski, S., & Kuypers, T. (1999). *Winners and losers: The business strategy of football*. London: Penguin.

Szymanski, S., & Smith, R. (1997). The English football industry: Profit, performance, and industrial structure. *International Review of Applied Economics*, *11*(1), 135-153.

Vrooman, J. (1995). A general theory of professional sports leagues. *Southern Economic Journal*, *61*, 971-990.

Rodney Fort is a professor of economics at Washington State University, a member of the Editorial Board for this journal, and vice president of the International Association of Sports Economists.

James Quirk is retired as Professor of Economics, the California Institute of Technology.