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## Some comparative economics of the organization of sports: competition and regulation in north American vs. European professional team sports leagues

Wladimir Andreff<sup>1</sup>

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### Abstract:

This article contends that a new research avenue is open to comparative economics which is the economic comparison between American (closed) and European (open) professional team sports leagues. It starts with sketching the major institutional differences between the two leagues systems. Then it surveys the American modelling of competitive balance in these sports leagues that objects pro-competitive balance regulation as being non Walrasian when (American) teams are profit maximising. A next step is to cover how the Walrasian model has been adapted to European open leagues and their regulation of win maximising clubs under a hard budget constraint. Such approach has recently been outdated by models where win maximising clubs operate with a flexible supply of talent in a non cooperative game, given the globalization of the labour market for sporting talent (namely after the Bosman case). Finally, the article ploughs into a new research path advocating for a disequilibrium model where clubs would have a “soft” budget constraint rooted in their weak governance, and empirically tests a vicious circle between TV rights revenues and wages in French football that may explain the aforementioned disequilibrium.

JEL: L83, L21, J42, J31, G30.

Keywords: sports economics, comparative economics, economic organisation, governance, sports leagues, Walrasian model, Nash equilibrium, competitive balance, regulation, soft budget constraint, TV rights, wages, profit maximising, win maximising

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What is the future of comparative economics? This question has been with us since the collapse of the former communist regimes associated with “socialist centrally planned economies”. Various responses have been suggested in the literature during the post-communist period of economic transformation and I will briefly sketch a few of them below (**see section 1**). But no one could imagine that a possible dividing line between a quasi-socialist system and a deregulated market economy were to persist in some area until today, 2010. Had it been so, would not all those involved into comparative economics have taken this opportunity to prolong the use of their usual economic and institutional tools of comparative analysis in that area? Amazing as it may seem, such an area does exist and my contribution is devoted to briefly present it as an avenue for new comparative economic research.

There is a dividing line between the North American closed league system in professional team sports – a sort of island of regulated “quasi-socialist” economy in the middle of a liberal American market capitalism – and the European open league system which has rapidly been almost completely

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<sup>1</sup> Professor Emeritus at the University of Paris 1 Panthéon Sorbonne, Honorary President of the International Association of Sport Economists, former President of the EACES (1997-98) and of the French Economic Association (2007-08).

deregulated, starting from European football (soccer) in 1995 and spreading throughout other European sports and all open professional team sport leagues. There are four dimensions along which closed and open team sports leagues can be compared: organizational (section 2), in a Walrasian model (section 3), using a Nash-equilibrium conjecture (section 4), and through empirical testing (section 5). I will briefly screen all four. The empirical evidence will show that European open leagues differ from North American closed leagues in that teams' budget constraints in the former are soft while they are hard in the latter. We thus meet Kornai's insight in unexpected places. A disequilibrium model would fit open leagues better.

### 1) Which future for comparative economic studies?

Jan Tinbergen (1961) was the first economist and Nobel Prize winner who stated and predicted that the core object of comparative economics, capitalism versus socialism, would vanish, since the two opposite institutional and economic systems may be replaced by a single system. This hypothesis is known as one of convergence between economic systems (Andreff, 1992). The collapse of the Soviet-type systems between 1989 and 1991 followed by two decades of post-communist transformation did not exactly confirm Tinbergen's (and others') convergence prognosis. The two former systems did not merge because one of them – the Soviet system – was definitely submerged by the other with a restoration of a capitalist market economy in former Soviet economies. Did the total collapse of the communist system and the associated globalisation of capitalism put an end to comparative economics and turn the latter into a branch of economic history? Nuti (1999) has contented that “nothing could be further from the truth”. Let me offer an elaboration on Nuti's seven arguments:

- 1) Some Soviet-type economies are surviving in countries like Turkmenistan, Tajikistan, North Korea and even Cuba.
- 2) There are countries, namely Vietnam and China, which are neither traditional Soviet-type systems, nor post-transitional economies such as Central and Eastern European countries which have joined the EU; sooner or later, their systemic transformation will become a special case, as Kornai (2006), who adds the Muslim countries to the list, suggested. He concludes that ‘transitology’ (a variant of comparative economics when a system changes or collapses) is not over.
- 3) As long as we have different systems, the question of actual or possible transition from one to the other remains a topic for comparative economics, since different transition paths have been observed in the 1990s. Even within capitalism, institutions evolved in various countries at various speeds (Kornai, 2006).
- 4) Within the capitalist system itself, there exist several prototypes of a market economy which distinguish the Anglo-American model from a Japanese and

South Korean networked version, German *Mitbestimmung*, and even more so (the former French) state capitalism in various developing countries (see also Boyer, 1993). On the other hand, it is the way which is now used by mainstream economics to re-integrate a liberal analysis of institutions into the so-called new comparative economics – see for instance Djankov *et al.* (2003), Glaeser *et al.* (2001 & 2003), Glaeser & Shleifer (2001, 2002 & 2003), and for a criticism Andreff (2006).

- 5) Even economic systems with identical economic institutions may behave very differently if their economic policies are systematically (permanently and consistently) different – for instance Thatcherite-Reaganite policy as against Scandinavian solidarity welfare policies.
- 6) There is some sort of study of economic engineering, *i.e.* of new or modified economic institutions, including yet untried sets of economic institutions (“utopias”) as well as historical comparisons, e.g., with ancient economic systems and their “great transformation” (Polanyi, 1944).
- 7) History never end up: both single institutions and the systems they form evolve continually; in this sense, Karl Marx was the first notable practitioner of evolutionary economics through his theory of the development of “modes of production” (*i.e.*, economic systems).

To make Nuti’s listing absolutely comprehensive, I would add another issue which also pertains to comparative economics:

- 8) Emerging capitalism exhibits different features, institutions and – in line with the evolutionist view – different levels of and paths to economic development as compared to already developed fully-fledged capitalist market economies; this is exemplified nowadays by the attractiveness of BRICs or BRICS<sup>2</sup> to comparative economic studies.

Eleven years after Nuti’s article, many studies in comparative economics have drifted towards either economic institutionalism or development economics which has translated, since 1997, into a rapid decrease in the number of Econlit-listed publications belonging to comparative economic systems, as noticed by Dallago (2004). With Nuti’s arguments 2, 4 and 6, it may sound that the future of comparative economics lies with institutional economics, while arguments 3 (including path dependence) and 7 lead comparative economics to combine with institutional and development economics into an evolutionary approach. Comparative economics comes even closer to development economics if (our) argument 8 is accepted. Although Nuti was certainly right saying that post-communist “transformation has enriched the range of system morphology, and has greatly enhanced the importance and significance of the study of comparative economic systems, policies and institutions, and their processes of transition and evolution”, in the long run, comparative economists might well be left with only four countries to study (argument 1) or must become – and specialise as –

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<sup>2</sup> Brazil, Russia, India, China with a small ‘s’, adding South Africa with a big ‘S’.

institutionalists, evolutionists or development economists. Comparative economics will be all the more phased out for those who consider Russia (and other transition countries) as having made remarkable economic and social progress in order to become a “normal country” (Shleifer & Treisman, 2005). However, such conclusion is debatable and, for instance, Rosefielde (2005) contends that a country like Russia is an abnormal political economy unlikely to democratize, westernize or embrace free enterprise any time soon.

In such a mood, it is crucial to find new avenues for comparative economics. I have discovered one of them in studying the economics of sports (Andreff 1981 to, among others, Andreff, 1989, 1996, 2001 & 2008; Andreff & Staudohar, 2000; Andreff & Szymanski, 2006; Poupaux & Andreff, 2007), because professional team sports leagues are not designed, organized, regulated and functioning with the same basic characteristics everywhere. On the one hand, closed North American sports leagues are exempt from the bulk of legislation that applies to any other U.S. industry, while a “quasi-socialist” monopolistic regulation is used to make sports leagues profitable to their owners. On the other hand, open European sports leagues operate in a more competitive environment due to their coverage by the European competition policy. However, since the major objective of a European sport club is not profit maximisation and its budget constraint is usually soft, some pieces of the former economic analysis of planned (shortage) economies seem to be relevant there. This is the story I would tell you to convince that the economics of sports, in particular the economics of professional team sports leagues, is a new promising area for comparative economics.

## **2) An organizational comparison between closed and open team sports leagues**

Institutional rules that fix how a professional team sports league is organized, regulated and managed can be encapsulated in twelve ‘stylized facts’ (Andreff, 2007a; Szymanski, 2003).

- 1) A North American professional team sports league is an independent organization which is *closed* by an entry barrier created by franchise sales; a European league, like in soccer, is integrated in a hierarchical structure where the national soccer federation supervising the league is itself dependent on an international federation. Entry in a closed league is only possible by the purchase of an expansion franchise, if there is any for sale, when the new entering team’s market and its assigned location are assessed profitable by a league commissioner. Moreover, entry in the league cartel must be approved by a qualified majority of incumbent teams. Competition can only occur with the creation of a rival major league in the same professional sport as another closed league. In *open* leagues, entry relies on a promotion/relegation system, but the creation of a second major league in the same professional sport in a given country is ruled out by the international federation.

- 2) In a closed major league the number and the identity of the teams are fixed, whereas a team's upward/downward mobility is ensured by promotion/relegation in open leagues: best ranked teams of the second division are promoted in first division while last-ranked teams of the first division are demoted to second division. Thus from one season to the next the identity of some clubs, those demoted and promoted, changes in an open league. One team which starts playing in the lowest amateur division can climb step by step the whole ladder of the sporting hierarchy, simply due to its sporting performance, and end up in the first division, and even qualify for a European league. Such a bottom-up route does not exist in a closed league system, since the major league is closed downwards.
- 3) In a closed league a team enjoys an absolute exclusivity over a urban area where it is the only one (in any given professional sport) allowed to organize a major league's games. Thus each team has a monopoly in the local market for its sport shows. If the local market ceases to be profitable, a team can, with the league's agreement, move to another urban area. From their inception up to 2005, 48 team relocations have occurred in the four North American major leagues (7 in NFL, 9 in NHL, 12 in MLB, and 20 in NBA). In an open league there is no such geographical team mobility; mobility is vertical from lower to upper divisions and the other way round. There is neither territorial exclusivity nor local monopoly of a team in a given sport: in most European capitals, more than one team play in the first soccer division.
- 4) Competitive balance is looked for in both closed and open leagues. Labour market regulations are the major tool for attempting to reach it in closed leagues. Though they exist also in open leagues, labour market regulations are supplemented by other instruments. In particular, promotion/relegation automatically ensures a partial re-balancing of the sport contest at the end of each season by demoting the weakest and promoting the strongest. Moreover this system acts as an incentive mechanism: teams exert considerable efforts to avoid the sanction (demotion) and gain the reward (promotion); the proportion of games high in contention is bigger than in a closed league. On the other hand, promotion/relegation is a self-unbalancing process from an economic viewpoint and leads to deep economic and financial disparities across the league. Being qualified for the Champions League, a team will increase its revenues by 20% to 40%. Being relegated to a lower division, a team may see its revenues plunge by 75-80% in European soccer while being promoted should increase its revenues five times or so.
- 5) A closed league can restrict recruitment rules and players' mobility since it enjoys a monopsony power in the labour market for talent. This occurred first in baseball as early as 1879 when a reserve clause was introduced to prohibit any player's move from one team to another without the team owner's agreement. Since the 1970s, after several labour conflicts – strikes and lockouts – veterans have obtained a free agent status that takes hold after a defined number of years of playing in a major league. However, newcomers

- (young and foreign players) in the league are picked in rookie draft, ranked by experts according to their previous sporting performance. In European open leagues a reservation system, based first on a lifelong contract until 1968 and then on a system of transfer at the end of players' labour contract, had restricted players' mobility and their freedom to sign a team. The Bosman case (1995) has ruled out all restrictions to player free choice on the European labour market for talent. This ruling aligned professional sports with Article 48 of the Rome Treaty that guarantees free worker mobility to all European Union citizens. The Bosman ruling also phased out quotas of national players (6 out of 11 in 1995) that a professional soccer team had to field at any game.
- 6) Rookie draft also functions as a reverse-order-of-finish draft (Kahane, 2006). Thus, professional team sports is the only industry in North America where firms, that is, teams, have a restricted right to choose whom they will hire. Team owners in North American major leagues argue that such restriction is a must for balancing team sports contests. Hiring players is also quantitatively restricted by roster limits. There is no such thing as rookie draft – qualitative limitation – or quantitative roster limits in European open leagues. The Bosman deregulation of the labour market has triggered high player mobility, in particular with regards to superstars. European open leagues have to comply with EU competition policy, though team managers have argued without success for a sports industry exception, similar to North American leagues' exemption of antitrust law, to escape it.
  - 7) Player mobility in closed leagues is all the more limited in that trading for cash is restricted or forbidden (since 1960 in NFL and 1976 in MLB), especially for superstars. Inter-team player transfers are usually barter, so that team competition for hiring the same player is practically nonexistent (Szymanski, 2004a). In European open leagues most player transfers are transactions in cash or monetary settlement, barter and loans of players to another team being a rare exception.
  - 8) Player working conditions and salaries result from collective bargaining between club owners and player trade unions in closed leagues. Some leagues (NBA 1983, NFL 1994) have succeeded in bargaining a salary cap which has been advocated by club owners as a means to avoid superstar concentration in rich teams and maintain a competitive balance. But it is also a lever for keeping a league monopsony on the labour market since the reserve clause has been abandoned. A luxury tax completes this payroll regulation in some leagues. In open leagues with deregulated labour markets (post-Bosman Europe), the degree of player unionisation is much lower, collective bargaining is much less formalised, and salary caps are rare.
  - 9) Pooling TV rights sales at the league level with revenue distribution across teams is common practice in closed leagues. A monopoly power is thus ensured to the league in the market for its derived product, i.e. televised sport. Professional team sports are the only U.S. industry where such cartel
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behaviour is exempted from anti-trust law ever since the Sports Broadcasting Act (1961). Revenues obtained from gate receipts, sponsorship and merchandising are also pooled and re-distributed. Local TV revenues are the only exception to pooling and re-distribution. TV rights pooling also prevails in open leagues with a few exceptions – for instance, soccer TV rights are sold by the teams themselves in Greece, Portugal, Spain (and Italy until 2007). There is no pooling for sponsorship and merchandising, and gate receipts distribution between home and visiting teams has been given up in the 1980s.

- 10) Most American sports teams are not stockholding companies whose shares are floated on the stock exchange. In the NFL flotation is even absolutely forbidden. Club owners do not want to be exposed to the risk of being merged or acquired by an outsider – another entry barrier in the closed leagues. In European soccer open leagues flotation of team shares has developed since the 1990s, even though various teams have been de-listed after their shares have floated down (Aglietta et al., 2008).
- 11) Being a cartel of teams, a closed league maximizes its profits and shares them across teams. Thus it can be assumed that the objective function of North American professional sports teams is profit maximization. When a team is no longer in the race for playoffs, this financial objective finally gains over winning games. In an open league, a team struggling for promotion or threatened by demotion usually adopts a win maximization objective (Sloane, 1971) possibly subject to – it has often been assumed (Késenne, 1996) – a balanced budget constraint.
- 12) Due to profit maximization in closed leagues, investment in sporting talent is only undertaken if it increases revenues more than costs. Unlike big-market teams, small-market teams lack profit incentives to build up competitive teams that will maximize league revenues; this is another manner in which big market-teams subsidize small-market teams in the closed leagues (Fort & Quirk, 1995). Promotion-relegation and win-maximization drive teams into an arms race – or a rat race à la Akerlof (1976) – in which each team attempts to recruit the best players to improve its relative strength compared with opponent teams; the latter, in turn, are led to overbid. The problem is that such investments in talent are socially efficient only if they upgrade the absolute (and not only relative) quality of teams (Lazear & Rosen, 1981), which cannot be taken for granted. Since there is only one (or a few) winner(s) in the arms race who can recoup their investment costs, an open league is always under the threat of generalised cost inflation of salary and transfer fees, all the more so because the latter is not slowed down by a profit maximization objective. Most big teams are doomed to be in the red in a deregulated open league.

### 3) Can a Walrasian equilibrium model explain the stylized facts?

Since El Hodiri and Quirk (1971) a Walrasian equilibrium model has been used to represent a two-team closed league with profit-maximizing and wage-taker teams in a competitive labour market for talents. Each team  $i$  in market of size  $m_i$  maximizes its profit through variations in the quantity of talent  $t_i$ :

$$\text{Max } \pi_i = \text{Max } (R_i - C_i), \quad (1)$$

$$R_i = R_i(m_i, t_i), \quad \frac{\partial R_i}{\partial m_i} > 0, \frac{\partial R_i}{\partial t_i} > 0 \text{ or } \frac{\partial R_i}{\partial t_i} < 0, \frac{\partial^2 R_i}{\partial t_i^2} < 0, \frac{\partial^2 R_i}{\partial t_i \partial m_i} > 0, \quad (2)$$

$$C_i = s \cdot t_i + c_i^0 \quad (3)$$

It is assumed that a number of units of homogenous talent are embodied in each player, more in superstars than in other players. Then Fort and Quirk (1995, p. 1271) “assume that talent is measured in units such that an additional unit of talent increases win percent by one unit. Under this convention:

$$\frac{\partial w_i}{\partial t_i} = 1 \text{”} \quad (4)$$

Such assumption allows to substitute win percent by the quantity of recruited talent in the revenue function  $R_i$  of team  $i$ . The supply of talent is assumed to be fixed ( $\sum_i t_i = 1$ ) since the labour market is closed by league regulation. With a fixed supply of talent, team owners internalize the following externality: recruiting an additional unit of talent will deprive the other team of this unit, which will deteriorate the league competitive balance. Team revenue  $R_i$  is a function of local market size  $m_i$ , ticket price<sup>3</sup> and the number of wins – or win percent  $w_i$  (therefore of  $t_i$ ). The revenue function is concave in win percent and thus wins have a decreasing marginal effect on revenues. The marginal revenue of a win, assuming the revenue function is quadratic,

$$R_i = \left[ a_i - \left( \frac{b_i}{2} \right) w_i \right] w_i + k_i \text{ is:}$$

<sup>3</sup> Ticket price is assumed to be formed in a competitive market and it is given as a parameter in the team economic calculation (like in the standard Walrasian model). The product market of a team (sport show sales) is not focused on in this standard model.



$$\frac{dR}{dw_i} = a_i - b_i \cdot w_i, \quad b_i > 0, \quad (5)$$

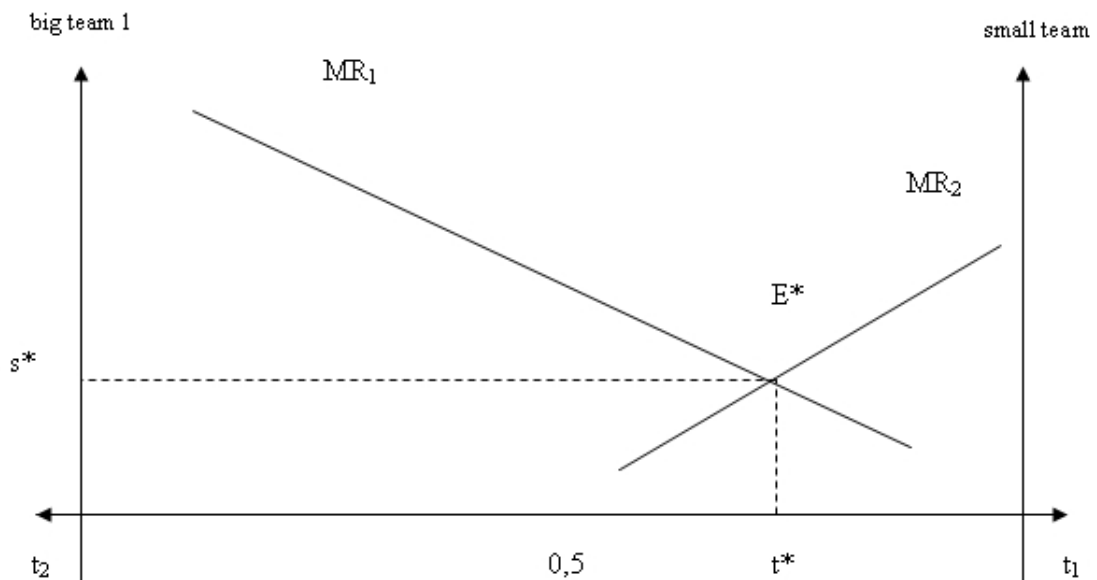
and

$$\sum_i t_i = 1. \quad (6)$$

Team revenue is increasing in wins until a maximum after which it decreases, namely when the team wins the championship. talent has an increasing then a decreasing return. In the team cost function,  $s$  is the salary per unit of talent and  $a_i^0$  represents a fixed cost (stadium, management). The equilibrium wage is provided by the invisible hand or a Walrasian auctioneer. Team  $i$  augments its talent recruitment until marginal revenue of talent is equal to its marginal cost, the exogenous equilibrium unit wage:

$$MR_i = \frac{\partial R_i(m_i, t_i)}{\partial t_i} = s \quad \text{for } \forall i. \quad (7)$$

Graph 1: Competitive balance with profit maximization



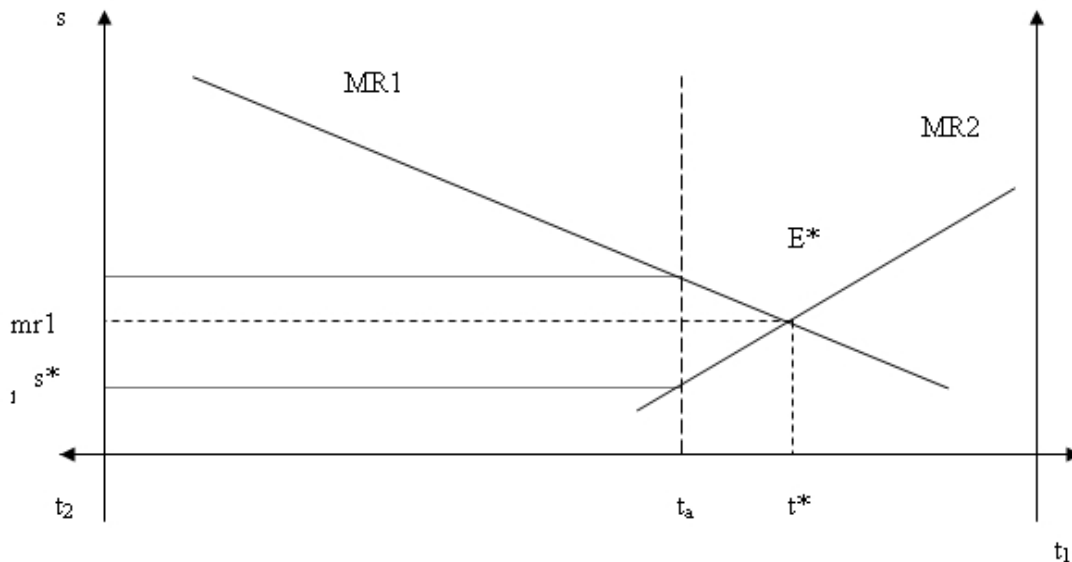
Graph 1 shows a big-market team 1 (big team) competing over talent with a small-market team 2 (small team) with  $m_1 > m_2$ . Since market 1 is bigger than market 2, this creates a revenue disparity between the two teams. For any given wage, team 1's demand for talent is bigger than team 2's demand. In equilibrium ( $E^*$ ), the sum of the two teams' demand for talent is equal to the supply of talent

of 1 unit, at equilibrium wage  $s^*$ . Then the big team recruits more units of talent than the small team,  $t_1 > t_2$ , and the league does not reach the best competitive balance ( $t = 0,5$ ). The league's economic equilibrium is associated with disparities in team payrolls. Win likelihoods are uneven,  $w_1 > w_2$ , and the league is unbalanced. *Economic equilibrium generates competitive imbalance* in a closed league.

The standard model has long been considered the benchmark to assess actual North American leagues and, often, to criticize their monopolistic regulation as not being able to improve competitive balance and guarantee an efficient resource allocation. In particular:

**A.** The model validates the invariance principle (Rottenberg, 1956), since restriction (reserve clause) of player mobility does not change the distribution of talent across teams. Assume that restrictions generate a talent distribution  $t_a \neq t^*$  (Graph 2). Then the marginal revenue of talent is higher in the big than the small team:  $mr_1 > mr_2$ . Despite the reserve clause, the two teams can increase their profit by trading players, the small team selling talents to the big team until the difference in marginal revenues will vanish, in  $E^*$ . We are back to the same equilibrium as with a free (unrestricted) labour market. From this derives a policy recommendation: phase out restrictions on player mobility since they have no effect on the competitive balance.

Graph 2: Competitive balance with profit maximization and player mobility restrictions



**B.** Revenue distribution across teams, through the redistribution of gate receipts and TV rights, does not affect the competitive balance and lower equilibrium wage. Assume that revenue sharing is such as each team keeps a  $\alpha$  share of its revenue and distributes a  $(1 - \alpha)$  share to the other team. Then team  $i$  revenue is:

$$\alpha R_i + (1-\alpha)R_i \tag{8}$$

Marginal revenue of team  $i$  wins is:

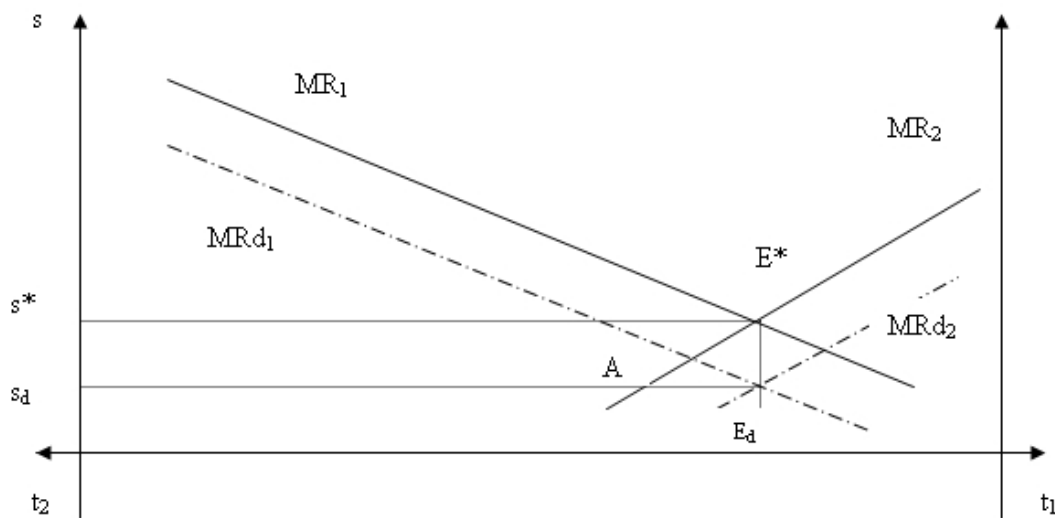
$$\alpha RM_i - (1-\alpha)RM_i \tag{9}$$

which, by (5) substituting  $t_i$  for  $w_i$  (by 4) becomes:

$$\alpha(a_i - b_i t_i) - (1-\alpha)(a_j - b_j t_j) \tag{10}$$

that corresponds to  $MRd_1$  and  $MRd_2$  in Graph 3.

*Graph 3: Competitive balance with profit maximization and revenue sharing*



Thus, in a two-team model, revenue sharing diminishes both marginal revenues in the same proportion and marginal cost must also decrease in the same proportion to maintain equal to marginal revenue. Equilibrium wage is down by the same proportion. In  $Ed$ , the distribution of talent is the same as in  $E^*$ , and the invariance principle is confirmed. Both teams lower their demand for talent because they would have to share the revenue from an additional recruitment with the other team; lower recruitment is detrimental to game quality in the league. A policy recommendation ensues: since revenue sharing does not

improve competitive balance and since it lowers quality, it should be avoided. Note however that if the small team which benefits from revenue redistribution would keep this redistributed share to increase its profit instead of investing in talent (point A, Graph 3), revenue sharing would alter the competitive balance. On the other hand, if the demand for talent decreases more in the big team, revenue sharing would improve the competitive balance (Késenne, 2000a).

**C.** A salary cap in such model produces a more even talent distribution across teams, lowers the wage and inflates owners' profit, but the wage loss is more significant than profit increase because the new market equilibrium diverges from the one that maximizes profit (Késenne, 2007). Thus, a salary cap lowers overall league revenues. Talent distribution is more even but their allocation is not efficient, some players operating below their marginal revenue (Késenne, 2000b). A salary cap is not recommended in a closed league though it sustains small team financial viability.

The Walrasian model has been adapted to open leagues by Késenne (1996 & 2000a) through altering three assumptions: a. teams are win maximizers; b. therefore they recruit as much talent as possible within their budget constraint; c. in a globalized labour market, free entry of players renders the assumption of a fixed supply of talent irrelevant. Teams remain wage takers in this market so that:

$$\text{Max } t_i \quad (11)$$

$$R_i(m_i, t_i) - s \cdot t_i - c_i^0 = 0 \quad (12)$$

Using the Lagrangian, first order conditions are:

$$1 + \lambda_i \left( \frac{\partial R_i}{\partial t_i} - s \right) = 0 \quad (13)$$

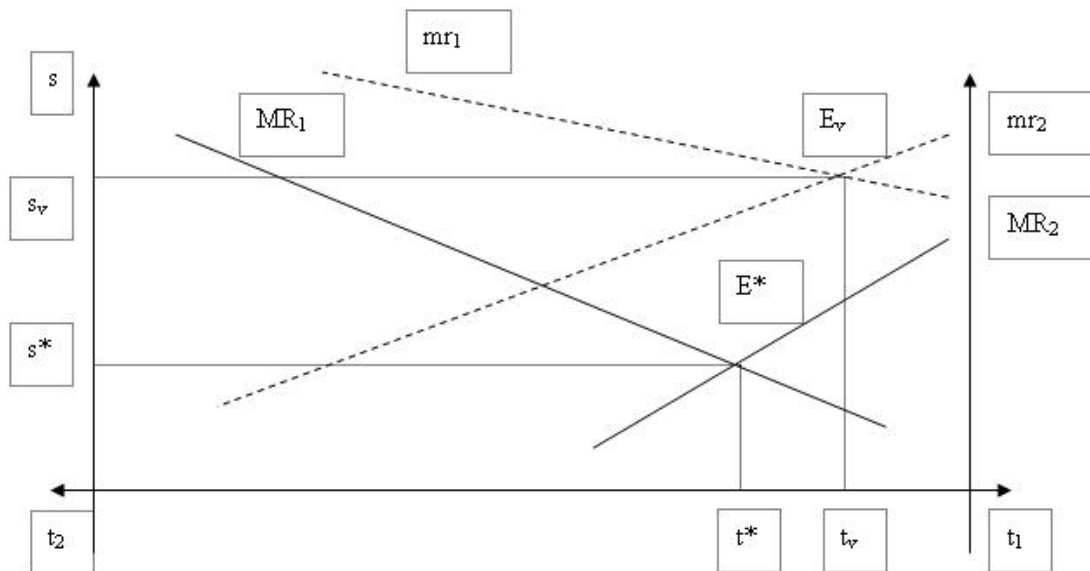
hence

$$RM_i = s - \frac{1}{\lambda_i} < s \quad (14)$$

$$R_i - s \cdot t_i = 0 \quad (15)$$

From (14), the marginal revenue of talent is shown to be lower than its marginal cost. For a given unit of talent cost, the team demand for talent that maximizes its wins is bigger than if the team were profit maximizing; thus the team spends more to recruit more talent (Graph 4). Equation (15) shows that a team's demand for talent is no longer given by its marginal revenue curve but by its average revenue curve (revenue per unit of talent):  $\bar{R} = R_i / t_i = s$ . Equilibrium is no longer located in  $E^*$  (as with profit maximization) but in  $E_v$ . The equilibrium wage is *higher* with win maximization ( $s_v > s^*$ ) and talent distribution is even more uneven, *i.e. the league is more unbalanced* than in a closed league with profit maximizing teams. Overall league revenue is lower than in the latter case since all talents between  $t^*$  and  $t_v$  play in the big team where their marginal revenue is lower than what it would have been in the small team.

Graph 4: Competitive balance with win maximization (compared to profit maximization)



In European open leagues, regulation basically relies on TV revenue sharing. Assume that in accordance with the sharing agreement team  $i$  keeps an  $\alpha$  share of TV revenues and leaves a  $(1 - \alpha)$  share to the other team, with  $0,5 \leq \alpha < 1$ . For win maximising teams, the demand for talent is given by the average revenue curve, that is:

$$\bar{R}_i^r = \left( \frac{1}{t_i} \right) \left[ \alpha R_i + (1 - \alpha) \bar{R} - c_i^0 \right] \quad (16)$$

where  $\bar{R}$  is team average revenue whose partial derivative with respect to  $\alpha$  is:

$$\frac{\partial \bar{R}_i^r}{\partial \alpha} = \frac{1}{t_i} (R_i - \bar{R}) \quad (17)$$

The right-hand side of (17) is positive for a big team, its demand curve for talent moves downwards when the degree of revenue sharing increases. It is negative for the small team whose demand curve for talent moves upwards. If the small team's budget is short of funds and it is less endowed with talent, then the *revenue sharing agreement is competitive balance improving*. The invariance principle does not hold. Revenue sharing enhances equilibrium wage compared with a no revenue sharing situation: players benefit from it in an open league.

Table 1 – Competitive balance (Noll-Scully ratio) in American major sports leagues and the five most significant European soccer leagues, 1966/67 – 2005/06

League	1966/67 to 1975/76	1976/77 to 1985/86	1986/87 to 1995/96	1996/97 to 2005/06	Average 1966/2006
<i>North American leagues</i>					
NFL	1,70	1,51	1,48	1,54	1,56
MLB	1,78	1,81	1,62	1,90	1,78
NBA	2,71	2,43	2,96	2,77	2,72
NHL	2,42	2,32	1,82	1,74	2,08
<i>European soccer leagues</i>					
Premier League (England)	1,44	1,46	1,44	1,61	1,49
Ligue 1 (France)	1,22	1,45	1,30	1,30	1,32
Bundesliga (Germany)	1,26	1,45	1,35	1,46	1,38
Lega Calcio (Italy)	1,46	1,39	1,54	1,67	1,51
Liga de Futbol (Spain)	1,21	1,33	1,47	1,38	1,35

Source : Kringstad & Gerrard (2007).

In summary, a Walrasian model often passed successfully the econometric testing of its assumptions in the case of closed leagues in the past decades. However, in more recent years, the results are blurred. Econometric studies of

the NFL have shown a weak profit incentive to win (Zimbalist, 2002). Lavoie (2005) has stressed financial deficits and team bankruptcies, instead of competitive balance, in North American leagues. Downward and Dawson (2000) conclude their analysis saying that the standard model has paid too much attention to competitive balance. The most striking empirical observation is that competitive balance is worse in closed than in open leagues (Buzzachi *et al.*, 2003 & Table 1), contrary to the expectations of the theoretical model. Empirical testing of the standard model for open leagues is at its beginning, but it appears that revenue concentration on a few big teams neither deteriorates league competitive balance nor game attendance (Szymanski, 2001). Those European soccer leagues which have abandoned TV revenue pooling with revenue distribution are the most unbalanced (Andreff & Bourg, 2006).

#### 4) A comparison within a Nash-equilibrium model

The Walrasian model has recently been called into question as the relevant basis for analysing and comparing closed and open leagues, since the assumption of a fixed supply of talent does not hold any longer with labour market globalisation after Bosman in open leagues but also in closed leagues (Osborne, 2006). Szymanski's assumption (2003), that an increase of one talent unit augments the win percent by one unit (relation 4 above), for any win percent, is not unaffected by this change. Given this assumption, the marginal revenue of a win is equal for all teams. When in reality teams of nearly all national leagues recruit in a global market, an additional talent hired by one team is no longer lost for another team of the same league, if the player is transferred from a foreign or lower league. Fixed supply is no longer internalized by teams in their strategies. The Walrasian model must be substituted by a non cooperative Nash game, where each team's strategy is to fix its quantity of talent without knowing the effect of the recruitment choice made by its opponent team (in a two-team game). On the other hand, Szymanski (2004b) stresses that in a league of 20 to 30 teams it is not sensible to assume that teams are wage takers since some teams (ex: Manchester United, Chelsea) are much more influential in the market for talent: a pure competition model is not relevant.

In a game whose payoff is winning a prize, the relationship between effort and success percent defines a contest success function. A simple representation of the latter is a function in which win probability – probable win percent – is a ratio between effort (investment in talent) of a team participating to the game and overall effort by all teams. In a two-player model, such ratio is:

$$w_1 = \frac{t_1}{t_1 + t_2} \quad (18)$$

Differentiating (18):

$$\frac{\partial w_1}{\partial t_1} = \frac{t_1 + t_2 - t_1 \left(1 + \frac{dt_2}{dt_1}\right)}{(t_1 + t_2)^2} \quad (19)$$

Assumption (4) of Walrasian model  $\frac{\partial w_1}{\partial t_1} = 1$  implies  $\frac{\partial t_2}{\partial t_1} = -1$  since, with a fixed supply of talent, such model is a zero-sum game, one unit of talent recruited by team 1 is subtracted to team 2. If so, then (19) becomes:

$$\frac{\partial w_1}{\partial t_1} = \frac{1}{t_1 + t_2} \quad (20)$$

Team 2 has only one response (loosing one unit of talent) to team 1's recruitment strategy in the Walrasian model. The ratio between wins and investment in talent (20) is equal to 1 when  $t_1 + t_2 = 1$ , *i.e.* with a fixed supply of talent. Now, if supply is flexible, one unit of talent recruited by one team is not subtracted from the other team, so that  $\frac{\partial t_2}{\partial t_1} = 0$  (and  $\frac{\partial t_1}{\partial t_2} = 0$ ). In a non cooperative game, team 2 has various responses to any possible change in team 1 recruitment strategy.

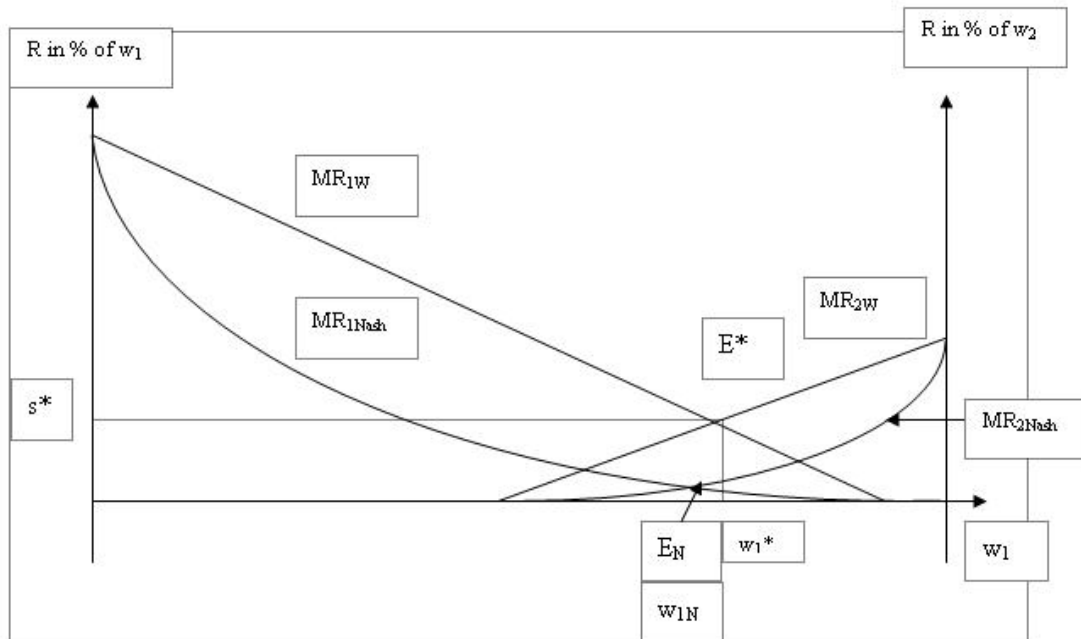
For a comparison between the implications of both Walrasian and Nash models (Szymanski, 2004b), let us consider the derivative of a quadratic revenue function (6) on the quantity of recruited talent. This derivative is equal to:

$$(a_i - b_i w_i) \frac{\partial w_i}{\partial t_i} \quad (21)$$

Assuming that  $\frac{\partial t_2}{\partial t_1} = -1$  and normalizing total talent to one, (21) becomes equal to (5), *i.e.*, marginal revenue is a linear function of wins. If, on the contrary, we assume a non-cooperative game, (21) becomes  $(a_i - b_i w_i) w_j$  and marginal revenue is no longer a linear function of talent. With two teams, and given that  $\frac{\partial t_2}{\partial t_1} = 0$ , when overall supply of talent is normalized to one, (19) simplifies to be equal to  $w_2$  and marginal revenue of talent is:  $(a_1 - b_1 w_1) w_2$ . Graph 5 exhibits the difference between the marginal revenue function of a team 1 win, with the Nash conjecture, that is  $MR_{iNash} = (a_1 - b_1 w_1) w_2$ , and the marginal revenue function of talent (which is also the marginal revenue function of a win) in the Walrasian model, that is  $MR_{iW} = a_1 - b_1 w_1$ . A similar difference shows up for team 2.



Graph 5 – Nash conjecture and Walrasian equilibrium with profit maximization and a fixed supply of talent



Nash equilibrium is in  $E_N$ , to the left of Walrasian equilibrium  $E^*$ . If a big team recruits more than a small team ( $t_1 > t_2$ ), the big team will obtain a lower win percent in the non-cooperative game than under the Walrasian model ( $w_{1N} < w_1^*$ ), and the small team will obtain a higher win percent. The small team imposes a stronger externality than the big team because the latter generates more significant additional revenue than the small team for any increase in win percent. In  $E_N$ , the marginal revenue of one talent unit is equal in the two teams, but *marginal revenue of a win* is not equal between teams; it is higher in the big team than in the small one. Késenne (2007) infers that the Nash equilibrium is not efficient because the league's overall revenue could be increased by moving talents from the small to the big team but. Yet this will *worsen* league competitive imbalance.

From this Nash equilibrium model a number of results have been derived in the recent contributions:

- A. The invariance principle does not hold in the non-cooperative game (Szymanski, 2003) and gate revenue sharing deteriorates the competitive balance with profit maximizing teams (Szymanski & Késenne, 2004). However, if the teams are win maximizers, revenue sharing improves competitive balance (Késenne, 2005).
- B. The demand for talent is higher with win maximizing than for profit maximizing teams, the sport contest is more unbalanced and the equilibrium wage is higher (Késenne, 2006).
- C. With win maximizing teams, talent distribution is the same under a non-cooperative game and Walrasian equilibrium (Késenne, 2007). A team which

intends to win as many games as possible within its budget constraint will spend all its revenues on talent recruitment without considering other teams' recruitment strategies.

A hot debate has followed up the emergence of a Nash model of sports leagues. Some economists have contended that the Walrasian model can no longer co-exist since only a single general theory of professional sports leagues can prevail (Szymanski, 2004b; Késenne, 2006). Others advocate that the assumption of a fixed talent supply and Walrasian model are still valid (Eckard, 2006) and still others claim that the Walrasian model remains relevant for closed leagues with profit maximization while the non-cooperative game applies to open leagues in which team owners have non cooperative strategies (Fort, 2006). The question is still open whether any equilibrium model fits with European open leagues.

## 5) European open leagues with a soft budget constraint

Since open leagues are now essentially deregulated<sup>4</sup> and teams basically do not aim at profit maximization, an increasing number of professional (soccer) teams are running heavy deficits, season after season, and are sinking into very deep indebtedness<sup>5</sup>. However, repeated deficits and increasing debt have not driven any of them to bankruptcy since they have been bailed out by banks (Spain), occasionally by the State (Italy, 2006), often by TV channels, and they are not liquidated even after heavy arrears of payments, of social contribution and of taxes (as in France and other European countries). In such a case, economic theory says that firms (teams) enjoy a soft budget constraint but also that the whole economy functions all the time in disequilibrium. This situation, typical of shortage economies (Kornai, 1980), i.e., former centrally planned economies, can also emerge in a number of industries in market economies to which the model has been extended (Kornai *et al.*, 2003).

### 4.1. Soft budget constraint: a disequilibrium model of a sports league

If team  $i$  can survive after years of deficit, a soft budget constraint (22) is to replace (12):

$$R_i(m_i, t_i, e_i) - s \cdot t_i - c_i^0 \leq 0 \quad (22)$$

Then the model switches from equilibrium to a disequilibrium regime (Andreff, 2009), that is common in a model of excess demand in the labour market. Teams attempt to maximize their wins and purchase as much talent as

<sup>4</sup> At least much less regulated than North American leagues.

<sup>5</sup> See *Journal of Sports Economics* 7 (1) 2006 special issue on the financial crisis of European soccer and a part of the 8 (6) 2007 issue, including my own (Andreff, 2007b).

they can since they are not effectively constrained by their budget (in all cases when the relationship 22 is strictly negative). Of course, this explains the arms race to recruit players as well as a tendency to fuel all the more wage inflation and transfer fees when superstars have a monopoly on their specific (non substitutable) talents. Then, teams develop an excess aggregated demand for talents in the labour market, such that demand grows beyond the point where marginal revenue of talent is equal to its equilibrium wage  $s$ , so that in disequilibrium (23) prevails:

$$R_i(m_i, t_i) \leq s \quad (23)$$

With an excess recruitment of talent, most teams – except the winners – will not be able to reach the win percent that they would have obtained in an equilibrium model. Thus teams will not be able to recoup their recruitment expenditures at the end of the season because they will earn less (attendance and TV) revenues than expected and less than if they had been the contest winners. This will, again and again, fuel excess expenditures  $s.t_i$  compared to revenues  $R_i$ . Then, the easiest way for many clubs in the red is to find someone to bail them out. A league bargaining TV rights with TV channels and re-distributing TV rights revenues across teams is the most usual means to pour more money into the deficit team budgets. The most crucial issue for European open leagues is to sustain or recover financial balance – much more than competitive balance – in teams driven to excess demand for talent in a deregulated global market. A further consequence of a soft budget constraint in a market economy is bad governance of the firm (team) as long as teams find a way to be bailed out (Andreff, 2007c).

#### **4.2. TV rights revenues / salaries vicious circle that softens team budget constraint**

Studies of sport and TV have not yet established a relationship between the arms race for superstars and TV rights that ease team revenues in a league with win maximizing teams operating under a soft budget constraint. Yet nearly all European soccer leagues rely basically on TV rights revenues for their finance while an increasing number of teams are in the red (Ascari & Gagnepain, 2006). All studies witness a correlation between the rise in TV rights revenues and payroll inflation. In an optimistic interpretation of such correlation the following virtuous circle is assumed: TV revenues enable teams to pay high salaries in order to field highly performing squads whose frequent wins support increased TV revenues, and so on and so forth (Baroncelli & Lago, 2006). Italian *Calcio*, to which Baroncelli and Lago refer, is in the deepest financial crisis and hardly confirms the idea of such a virtuous circle. It is more realistic to assume a vicious circle in which the league, as a monopoly in its sport market, bargains for the highest possible TV rights in view of gathering ex post sufficient resources to cover uncurbed payroll inflation (and superstar recruitment). If bargaining is

successful – as is usual – this will sustain the league's finances and bail out teams in the red. However, in many soccer leagues, like the French *Ligue 1*, the recruitment strategy financed by TV revenues does not translate into sufficient team productivity increases in terms of winning European contests<sup>6</sup> to earn big enough revenues. Then teams are not able to recoup their recruitment expenditures and the league has to come back to TV channels for bargaining even higher TV rights.

TV rights bargaining → Increased team budgets → Payroll inflation → Insufficient productivity increase (in terms of wins) → Insignificant revenue increase → Back to TV rights bargaining

Now, the causality of the relationship between TV rights revenues and payroll has to be tested in order to validate the vicious circle assumption. The test is confined to the two French professional soccer leagues<sup>7</sup>, due to the paucity of data about TV rights revenues which hinders an extension of econometric verification to other European leagues. Our sample encompasses 213 observations from 2002-03 up to 2007-08 seasons. If the vicious circle is to be confirmed, TV rights revenues are the endogenous variable, and we use a double OLS methodology with instrumental variables. The dependent variable  $TV_{it}$  is defined as the amount of TV rights revenues of club  $i$  in year  $t$ . We test whether it is explained with three exogenous instrumental variables:

- *POP 2005*, 2005 population of the city where the team is located;
- *NOT* is a variable representing the media notoriety of a team, i.e., the team ranking by LFP (the French football league) according to its broadcasting performance (LFP utilises this ranking to re-distribute 20% of TV rights revenues across teams);
- *DIST* is a proxy for the distance that TV channels have to cover in order to reach the stadium of different teams in view of broadcasting all league games. *DIST* is measured as team transportation costs (taken from team budgets) which is an acceptable proxy since it measures the costs incurred for a team to travel to all other stadiums in the league (and nearly the same costs fall on a TV channel which moves to all stadiums for broadcast purpose). The following model is tested using our 213 observation sample:

$$TV_{it} = k + a.POP_i + b.DIST_i + c.NOT_{it} + u_{it}$$

<sup>6</sup> At least qualifying for the quarter finals in the Champions League and UEFA Cup.

<sup>7</sup> All French professional soccer teams are compelled by law to publish their financial accounts every year since the 2002-03 season.

In three other specifications we control for the possible influence of each season, the division level (taking *Ligue 1* as the reference category) and the seasons in three other specifications. Results are available in Table 2.

Table 2: OLS regression of TV rights revenues on instrumental variables

TV rights revenues	(I)		(II)		(III)		(IV)	
	Coefficient	P >  t	Coefficient	P >  t	Coefficient	P >  t	Coefficient	P >  t
POP 2005	0.003	0.03**	0.002	0.06*	0.003	0.03**	0.002	0.05**
DIST	9.73	0.00***	7.11	0.00***	9.34	0.00***	6.30	0.00***
NOT	-26.53	0.71	-138.45	0.03**	-73.29	0.31	-217.86	0.00***
LEAGUE	1)	2)	-7137.80	0.00***	3)	4)	-7816.28	0.00***
Year 2003-04	5)	6)	7)	8)	-1067.83	0.44	-703.34	0.54
Year 2004-05	9)	10)	11)	12)	-422.42	0.75	-118.31	0.92
Year 2005-06	13)	14)	15)	16)	2009.61	0.14	2832.70	0.01***
Year 2006-07	17)	18)	19)	20)	2527.31	0.07*	3751.95	0.00***
Year 2007-08	21)	22)	23)	24)	1684.71	0.23	3139.85	0.01***
Constant	-1323.90	0.23	7243.41	0.00***	-1235.42	0.35	7855.52	0.00***
R2	0.76		0.82		0.77		0.84	
F-stat	220.26		236.64		87.41		122.29	

\*\*\* Significant at a 1% threshold; \*\* at a 5% threshold; \* at a 10% threshold.

We then test the relationship between payroll (salaries and compulsory social contributions) and the endogenous regressor  $TV$  as it is explained in the four above mentioned models. Staiger and Stock (1997) have demonstrated that, when instrumental happen to be weak, conventional asymptotic results do not hold with big samples. If the F-statistic is smaller than 10 with a single endogenous regressor, there is a potential issue of weak instrumental variable. To be relevant, our test must exhibit  $F > 10$ , which is the case.

Table 3: OLS regression of payroll on predicted TV rights revenues

Payroll	(I)		(II)		(III)		(IV)	
	Coefficient	P >  t	Coefficient	P >  t	Coefficient	P >  t	Coefficient	P >  t
Predicted TV	1.047	0.00***	1.101	0.00***	1.086	0.00***	1.175	0.00***
LEAGUE	1)	25)	1419.37	0.22	2)	26)	2415.21	0.04**
Year 2003-04	3)	27)	4)	28)	709.14	0.62	773.27	0.53
Year 2004-05	5)	29)	6)	30)	695.07	0.61	793.43	0.51
Year 2005-06	7)	31)	8)	32)	-1455.02	0.30	-1728.96	0.16
Year 2006-07	9)	33)	10)	34)	-4539.37	0.00***	-4934.97	0.00***
Year 2007-08	11)	35)	12)	36)	-2827.49	0.05**	-3220.82	0.01***
Constant	848.51	0.15	-566.08	0.66	1729.91	0.11	-470.50	0.75
R2	0.77		0.82		0.78		0.83	
F-stat	692.88		484.64		118.90		144.09	

\*\*\* Significant at a 1% threshold; \*\* at a 5% threshold; \* at a 10% threshold.

The relationship between the *TV* variable and the instrumental variables is significant in all four models (Table 3). Playing in higher league is also significant. The observation year is not significant, except in 2007 and 2008 when a very harsh bargain fought by LFP with competing TV channels, led to a new agreement in February 2008 which increased TV rights. The relationship between payroll and TV rights revenues is significant in all models, and the assumption of a vicious circle in which TV rights revenues determine salaries is validated.

## 6) Conclusion

Closed and open sports leagues can be compared as regards their organisation, their uncertainty of outcome (competitive balance) which results from league (de-)regulation in the framework of a standard Walrasian model and a non-cooperative game. However, open leagues cannot compare to closed leagues with regards to financial variables, and the team recruitment strategies that they trigger, because teams' budget constraint is in effect soft in the former and hard in the latter. Furthermore, increased TV rights revenues are bargained by the league, which enable teams to inflate their payrolls. All this shows that sports economics promises to be a promising area for comparative economics. Our conclusions could probably be extended, by further research, beyond professional team sports leagues to amateur sports organisation, the commercial

sports sector, sports and economic development and, of course, to comparisons of the sports economy and its institutional dimensions in post-communist countries with its features in developed market economies.

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