

## WAGE LEVELS AND AGENCY PROBLEMS IN PROFESSIONAL TEAM SPORTS

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### Abstract:

*This paper seeks to provide theoretical foundations to address the effects of the asymmetric information inherent to contractual relationships between teams and players in professional team sports. Particularly, a Shapiro-Stiglitz efficiency model version along with Rosen's insight about superstars economics is used to show that in addition to the high demand (i.e. marginal productivity) is necessary to consider a moral hazard problem as a source or as an explanatory factor of the rigidity and inflation that characterize sport superstars wages. The importance attributed to this approach lies in the fact that taking the results of the analysis as a reference, some ways of reinforcing players observance of internal team norms, reducing the costs of supervision and some channels of capping the non-shirking remuneration can be proposed.*

**Keywords:** incentives, efficiency wages, agency theory, professional team sports

**JEL Classification:** E24, J41, L83

### 1. INTRODUCTION

The enormous amounts of money earned by certain professional players have provoked much discussion, not only among the general public, but also in academic circles. The most readily cited and conventional explanation for this phenomenon is the particular nature of the demand for the service offered by this type of worker, that is, their high marginal productivity. Many of the reasons that underlie the wage levels of atypical workers such as sports superstars are explained in the seminal article of Rosen (1981) which provides an insight into many of the mechanisms at work.

This author tries to find an explanation for the high levels of remuneration obtained by certain individual agents, among whom he includes musicians and actors as well as professional sportsmen. The main features of the kind of work carried out by these groups of workers that determine wage levels are (i) the intensive nature of the labor factor, (ii) the imperfect substitutability that exists between the quality and quantity of the input and (iii) the significant economies of scale generated by this kind of activity (1). While accepting the general validity of Rosen's approach in the case of individual agents, it should be pointed out that it does not contemplate the possible existence of principal-agent relationships specific to team activities. This type of relationship does indeed exist when it comes to superstars when these are considered as an input in a collective production function. What is more, this allows them to achieve high levels of remuneration because of the peculiar contractual agreement that binds them to their club. Thus, Rosen's classical explanation may be completed by establishing a wage determination model that defines the parameters of this kind of activity.

From a purely analytical point of view, the wage-efficiency hypothesis offers a coherent response to problems such as wage levels, rigidity and dispersion among workers of identical characteristics. It also provides an insight into wage discrimination among groups whose activity it is difficult to observe due to the asymmetrical information inherent in a typical agency problem.

In accordance with the hypothesis cited above, the additional wage (the wage over and above the value that would theoretically clear the market under conditions of perfect competition) that an employer would have to pay his workers in order to ensure their maximum performance, will be inversely proportional to unemployment levels. Further, efficiency wages will be more

likely to arise within sectors in which it is difficult to assess the effort exerted by the worker and in those in which low worker performance negatively affects the firm's results. The labor market for those professional players commonly known as superstars is characterized by the practical inexistence of unemployment, the difficulty of verifying the amount of effort they exert with any precision and by the direct and significant influence of a sub-standard individual performance of these superstars on the economic results of their club.

Taking these factors as a starting point, the present paper seeks to show that it is possible to use the wage efficiency model of Shapiro and Stiglitz (1984) as a theoretical tool for evaluating both the levels and the rigidity that characterize the wages of professional players. The model also facilitates an analysis of the rationale and the effectiveness of the incentive systems incorporated within the contracts that regulate the relationship between the player and his club. There are several types of models that use the general wage-efficiency hypothesis as a reference. In this work we adopt the version commonly known as the shirking model which is based on the probability of firing a player as a disciplinary measure. The choice of this particular version may be justified on two grounds; first, it facilitates an explanation of the efficiency wages theory in terms of moral hazard and, second, unlike other variants of the model, it makes the assumption that the only way to motivate workers (i.e. players) is through the threat of firing them. In fact, this threat has the effect of reducing the player's income level by labeling him as undisciplined (2).

In order to better establish a coherent line of argument, our analysis will be set out in the following way:

Section 2 identifies and characterizes the problem of asymmetric information inherent in contractual relationships between teams and players. Special emphasis is placed on the problem of moral hazard and its relevance to professional team players. Section 3 provides a particular application of the basic Shapiro-Stiglitz model. From this application we derive some factors that explain the magnitude of the remuneration that must be paid to team sports superstars in order to guarantee optimal effort. Section 4 looks at the mechanisms that clubs might use in order to ensure that players fulfill their contracts while exerting maximum effort. Finally, section 5 provides the main conclusions.

## **2. THE AGENCY PROBLEM IN PROFESSIONAL TEAM SPORTS**

From a normative point of view, agency theory proposes changes in the design of contracts in order to align the incentives of the agent with those of the principal. The main aim of these changes is to provide a solution to the problems that arise from the fact that the principal cannot be absolutely certain that the agent carries out his main activity to the best of his abilities. The traditional means of achieving this objective is by linking monetary remuneration to the effort exerted by the agent. This solution is only effective however, when and if the "effort" in question is directly observable (objectively verifiable), in such a way that the remuneration is adjusted to the individual marginal productivity of the agent.

In professional team sports the assumptions that underlie the above approach are not applicable. In fact, when they come to applying this type of mechanism, the principals, in this case the clubs, come up against a two-fold difficulty. First, the process that leads to the service offered in the market is the result of a typical case of collective production and collective production is characterized by the fact that isolating the individual marginal productivities is, in essence, extremely complex (Rose, 2002; Holmstrom, 1982). Second, the above mentioned production takes place in a context of strong asymmetric information, which hinders any kind of monitoring procedure.

Within the context of group production, as is the case of team sports, it is impossible to determine the marginal productivity of each player, not simply because of the limited information available (Alchian y Demsetz, 1972), but also because of the contractual synergies that are peculiar to these activities. In team sports it is not really licit to talk about individual productivity but rather

team productivity. This is because collective output is greater than the sum of the contribution of each individual [ $f(A) + f(B) < f(A \& B)$ ]. In fact, a team really operates as if it were a coalition in which the synergies created give rise to a surplus which is the result of the cooperative activity undertaken by all the members of the team. The main problem resides in the fact that this surplus may be usurped by any of the team members and it remains impossible to identify the individual responsible (Rose, 2002).

In spite of the fact that players must negotiate their contracts within the context of a team production scenario, those that belong to the elite of their sport, possess a monopolistic bargaining power that allows them to appropriate this "surplus" by arguing that, without their contribution there would be no surplus in the first place, or that it would be vastly reduced. Further, the impossibility of asserting individual marginal productivities with precision often leads to a problem of *free riding*, given that although the personal benefit derived from low efficiency in the realization of the player's tasks may be privately consumed, the cost of shirking must be borne by all the members of the group collectively.

Information problems may be assessed by using the theoretical analysis of contracts, which assumes that the contractual relationship between the player and the club is characterized by asymmetric information which is liable to generate ex post opportunism or moral hazard. The origin of this problem lies in the fact that the principal, i.e. the club, has practically no way of evaluating the level of effort exerted by the agent, in this case the player, with any degree of precision. Hence a substantial proportion of the agent's activity is beyond the principal's control and is commonly termed, "hidden action". The moral hazard derived from the asymmetric information implicit in the contractual relationship between the club and the player is due to the fact that the player may decide to act dishonestly and to expend effort at a rate below his potential (shirking).

The nature of the work carried out by professional players requires a certain amount of creativity and this depends on the extent to which the player is motivated. Given these conditioning factors, a player might decide to limit his effort in order to take advantage of the asymmetric information and thus benefit from the surplus utility available. This, of course, is detrimental to the team as a unit. When a player's behavior is inefficient this tends to generate high costs for the team which are reflected in sub-optimal results. Since these patterns of behavior are difficult to detect, teams are obliged to look for different methods of protecting themselves from the "divergent" strategies of their own players with whom they do not always have the same interests. The simplest and most immediate response to this kind of problem is the use of direct supervision by monitoring the effort exerted by the player and/or by establishing a system of incentives that "discipline" the player so this effort is maximized.

When it comes to analyzing the performance of a "worker" in the sports' sector, there are certain tools of control and supervision available that do not exist in other kinds of firms. Direct or indirect supervision by the club its officials, managers, team mates, fans and the media, mean that player performance is under constant scrutiny, but this scrutiny does not eliminate the possibility of "dishonest" behavior. In this sense, and given that the performance of the player on the field is much easier to monitor, the probability that the player shirks off the field increases. Obviously, these behavioral patterns affect the performance of the team on the field of play.

In summary, the level of individual effort in a team sport is much more difficult to verify objectively than one might first expect. This is especially true if one takes into account the unpredictable nature of sport which normally makes it impossible to discern whether or not the players' patterns of behavior are strategic or are simply a consequence of the inherent uncertainty of the stochastic nature of player performance.

With respect to incentive systems, it should be underlined that shirking is more likely when the contract does not satisfy the incentive compatibility constraint. This restriction is fulfilled if the contract establishes a system of incentives that generate efficient agent behavior. In practice, the most commonly used incentive systems in the world operate via two distinct mechanisms: paying the player according to the team's results and/or according to whether or not the player takes part in

official games. The first of these mechanisms estimates the effort exerted by the player ex post and the latter ex ante (3). Both of these solutions are fraught with difficulties and, in general, it is extremely difficult to find a measure that allows the analyst to evaluate the effort exerted without biasing the player's response to the incentives (Heubeck y Scheuer, 2003).

Initially, it might seem that a system that establishes incentives according to team results would be an objective measure and would align both the interests of the club and the player. In this case, however, the player finds himself exposed to greater risk given that his remuneration depends on the degree of cooperation needed for the team to achieve the best possible results. In fact, problems of moral hazard may arise given that, when joint production (results) is the only indicator of player performance, it is not possible to identify the agents whose behavior is dishonest (Holmstrom, 1982). Further, the existence of multiple variables that are beyond the control of the player, expose him to additional risk (uncertainty in the generation of positive results, hidden contingencies, etc.). Thus, any solution based on this type of measure should take into consideration the existence of a trade off between the benefits of the incentives and the variation in the level of risk that the player must take on board when accepting these incentive agreements.

With regard to the use of objective indicators based on individual performance or ex post control measures, it should be emphasized that these may provoke a considerable distortion in the way the team performs as a unit (joint functioning) given that the production function is collective, and the players (inputs), are highly interdependent.

The approach adopted throughout this section leads to the conclusion that the problem of moral hazard inherent in a contractual relationship in which there is asymmetric information is especially relevant when it comes to professional players. In the case of this type of agent, the difficulty of establishing all-embracing contracts with efficient incentive systems is exacerbated by the high levels of demand that exist with respect to both potential employers and fans.

### 3. THE MODEL

For the sake of parsimony, in this particular adaptation of the Shapiro and Stiglitz wage-efficiency model, four basic assumptions are made:

(i) The players that are considered to be superstars in a given sport all have identical qualities. In the model, this collective is made up of that group of players whose performance is substantially higher than that of the average player. Strictly speaking, a superstar is not simply a player who plays in a professional league (4), but rather, he is a player who is considered to be a key component of the team and whose participation is deemed to be indispensable, and through whom, the club may build and project its "brand image". In economic terms, what sets these players apart from their team mates is that they have a direct impact on the club's income. Of course, in reality, not all of these agents have the same talent, but as a means of maximizing the model's explanatory power, differences in their levels of talent may be assumed to be negligible. Hence, from an analytical viewpoint, the adoption of this supposition does not impinge on the validity of the conclusions.

(ii) The number of teams competing to hire these superstars is given as  $N$  and it is assumed that these entities behave as conventional firms (5).

(iii) The behavior of professional players, as is the case with any other group of rational individuals, follows a strict logical pattern. The player attempts to maximize the present value of his expected individual utility. Hence, it is assumed that the general utility for each agent at a given moment in time is:

$$U = w - c \quad [1]$$

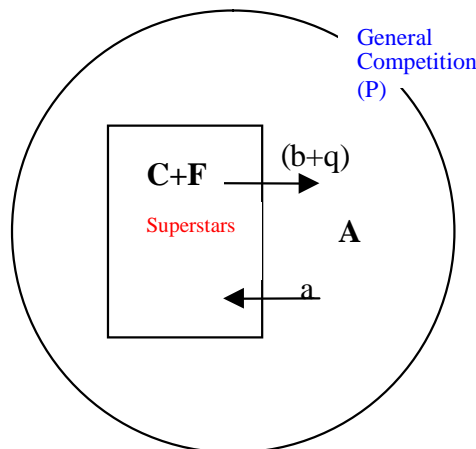
where "w" is the wage received and "c" the cost of the effort exerted by the agent. Thus, the agent's utility is the result of the income he receives for belonging to the club and the cost of fulfilling the task assigned and the normative internal restrictions or discipline imposed upon him by the club. The introduction of a supposition assuming that the agent is averse to risk may be incorporated by

using the following utility function:  $U = \sqrt{w} - c$ . The use of this kind of function, as will be seen below, does not affect the conclusions of the model.

(iv) With respect to the agent’s observance of the club’s norms, it is assumed there are only two possible outcomes: the agent fulfills his obligations entirely, in which case the cost is  $c$  or, he fails to do so entirely, in which case the cost is 0 and he would be deemed to be a free rider within the group (6).

In accordance with these criteria, the players within the population (P) may be divided into three categories. Firstly, there are those who fulfill their obligations (C), that is, those individuals who exert maximum effort in the realization of their activity. Secondly, there are those agents who fail to comply (F), i.e. players that are members of professional teams that belong to the elite and whose effort is below that which corresponds to maximum potential. Thirdly, there are those agents that do not belong to the group of superstars and these make up the set of players (A). Of the population of players  $P = C + F + A$ , those superstars that are active, i.e. those that have a contract that is in force with a club will be known as (G), where  $G = C + F$ .

Once the groups have been defined, it becomes important to establish the way in which players leave one group and enter another. The probability that a shirker be discovered and expelled in a given period of time is  $q$ , while the probability that a diligent agent be expelled due to reasons other than those connected to effort is  $b$  (7). Players who are not considered to be stars, and who, as such, do not receive remuneration concordant with this status, have a probability  $a$  of being incorporated into the group G (see figure 1)



**Figure 1. Inter-group movement**

Given the above, the effort corresponding to aggregate fulfillment may be written thus:

$$Cc + 0F = Cc \tag{2}$$

that is, the productive results of the team are a growing function of the level of effort with which the members of the team perform their tasks:  $F'(Cc) \geq 0$ . The profit function of the team as a whole would be:

$$\mathfrak{S} = F(Cc) - wG \tag{3}$$

Hence, if it is assumed that clubs are entities that aim to maximize the profits of partners and owners (*stakeholders*), and these will attempt to sign new players right up until the point when the cost of incorporating one new superstar is equal to the marginal cost of this incorporation.

$$\begin{aligned} \text{Max } \mathfrak{S} &= F(cG) - wG \\ \left( \frac{dF(cG)}{d(cG)} * \frac{\partial (cG)}{\partial G} \right) - w &= 0 \end{aligned}$$

It has further been assumed, that the players in their turn, optimize their expected individual utility function, and this is reflected in the maximization of the current net value of one of their

main assets, that is, belonging to an elite club. On considering an infinite temporal horizon, the present value of this asset would be the sum of a sequence of the following kind:

$$V = \frac{d+g}{1+r} + \frac{d+g}{(1+r)^2} + \frac{d+g}{(1+r)^3} + \dots + \frac{d+g}{(1+r)^n} \quad [4]$$

limited by  $V = \frac{d+g}{r}$ .

That is, professional players try to maximize the value of belonging to a particular club. This asset has two components. First, there are capital gains  $g$ , which are considered to be constant, and exist as a result of belonging to the squad of a particular club. Indeed, being a player in an elite club conditions popularity, exposure to a wide-scale audience and other potential sources of income. Second, there is a dividend  $d$ , which corresponds to the remuneration that the player receives for playing for the team. There is also a discount rate  $r$ , and it is assumed that this is the same for all players irrespective of their status. This rate reflects the "impatience" that the players feel with respect to the immediacy of their remuneration.

It should be noted that this approach makes the implicit assumption that those involved are maximizing their mathematical expectation of a function of the following kind:

$$E \int_0^{\infty} U(w_t, c_t) \exp(-rt) dt$$

According to our assumptions, the value of the different assets, i.e. those assets that correspond to non shirker players ( $V_c$ ), free riders ( $V_f$ ) and those that are excluded or outsiders ( $V_a$ ) may be calculated.

A player who is employed and does not shirk possesses an asset with the following value

$$V_c = \frac{(w-c) + b(V_a - V_c)}{r} \quad [5]$$

where  $b$  represents the probability of being excluded in spite of respecting all contractual norms without holding back any utility.

The value of belonging to a club for a *free rider* would be:

$$V_f = \frac{w + (b+q)(V_a - V_f)}{r} \quad [6]$$

Finally, the value of the asset that corresponds to an individual that does not belong to this group, that is, an outsider who has only a chance in the future of joining it, may be expressed as,

$$V_a = \frac{a(V_c - V_a)}{r} \quad [7]$$

Logically, if a club (principal) tries to fully develop the player's (agent's) potential and to persuade its players not to shirk, then it should guarantee the trustworthy team members a wage level which is at least as high as that obtained by those team members who act as free riders. Therefore, the lowest wage limit may be expressed as  $rV_c = rV_f$ , leading to:

$$(w-c) - b(V_c - V_a) = w - (b+q)(V_c - V_a) \quad \text{and} \\ V_c - V_a = \frac{c}{q} \quad [8]$$

Since  $c$  and  $q$  are positive, the *no-shirking condition* is necessarily greater than the remuneration for the *free rider*. For this reason, clubs should fix wage levels or guarantee that the benefits derived from belonging to the club are attractive enough to ensure that the player prefers to fully comply with his obligations rather than face the costs of a possible exclusion. From expression [5], the following more illustrative relationship is derived,

$$rV_c = (w-c) - b(V_c - V_a);$$

and hence,

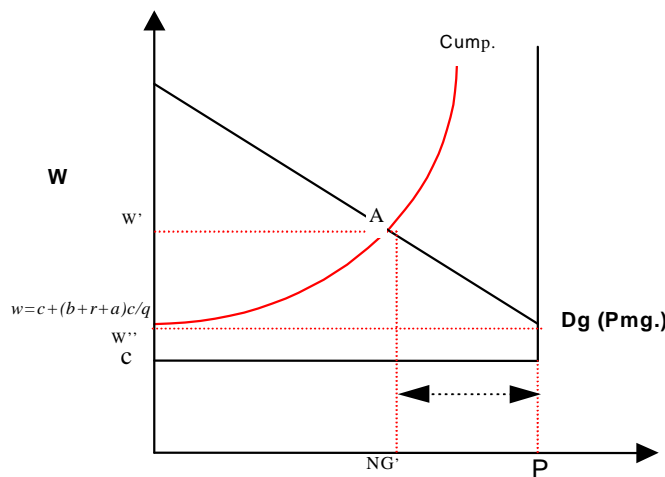
$$\begin{aligned}
 w &= c + b(V_c - V_a) - rV_c + rV_a - rV_a = \\
 c - b(V_c - V_a) + r(V_c - V_a) &= c - (b + r)(V_c - V_a) + rV_a = \\
 c + (b + r + a)(V_c - V_a) &= c + (b + r + a) \frac{c}{q}
 \end{aligned}
 \tag{9}$$

The above equation is a no-shirking condition curve that provides the wage levels needed to make sure that a player has absolutely no incentives to shirk. If the aversion to risk hypothesis ( $U = \sqrt{w - c}$ ) had been adopted, the no-shirking wages would be higher, but the conclusions would be identical. Hence,

$$w = c^2 \left( 1 + \frac{1}{q}(b + r + a) + (b + r + a)^2 \frac{1}{q^2} \right)$$

From [9] it may be concluded that the remuneration or benefit received by the players needed in order to guarantee that they uphold the internal norms of the club depends positively on the effort that players need to expend in order to perform their tasks optimally ( $c$ ), it also depends positively of the likelihood of exclusion due to factors beyond the player's control ( $b$ ), the probability of being hired by other clubs ( $a$ ) and the discount rate applicable to future remuneration ( $r$ ). Conversely, this remuneration depends negatively on the probability of detection and the punishment of those who shirk ( $q$ ).

A diagram of the model is given in figure 2. In this figure,  $Dg$  is the conventional demand curve determined by marginal productivity (8) and  $Comp$  represents the wage level curve that fulfills the no-shirking condition. This function is asymptotic when there is full employment. In other words, the wage level would approach infinity when the market was characterized by full employment ( $P$ ). Equilibrium would be reached at point A, for a wage level ( $w'$ ) which is greater than the wage level that would be obtained when there was full employment but without taking into account the no-shirking conditions ( $w''$ ). It can be seen that the difference between both wage levels increases considerably when and as the employment rate rises.



**NG**  
**Figure 2**

*Own Source: derived from Shapiro-Stiglitz*

#### 4. FACTORS THAT DETERMINE WAGE INFLATION IN PROFESSIONAL TEAM SPORTS

##### 4.1. THE RANDOM NATURE OF EXCLUSION AND THE PROBABILITY OF DETECTING SHIRKERS

From equation [9] it can be seen that the level of remuneration needed to guarantee that players respect the internal norms and exert maximum effort will be higher when (i) the random nature of exclusion ( $b$ ) is high and, (ii) when the probability that shirkers are detected and punished,  $q$ , is low.

Thus,

$$\frac{\partial w}{\partial q} = \frac{-c(r+b+a)}{q^2} < 0$$

$$\frac{\partial w}{\partial b} = \frac{c}{q} > 0$$

With respect to the randomness of exclusion (9) and the probability that the shirking will be detected, it should be reiterated that the level of individual effort in a team sport is more difficult to objectively verify than one might first expect. In practice, performance in sport is by nature "stochastic", i.e. it is characterized by what might be termed, "technical uncertainty". The source of this uncertainty lies in the fluctuations of quality and reliability inherent in the services that the contracted inputs (players) provide. Hence, individual performance will inevitably vary depending on the game and/or the season (Holmstrom, 1979, Krautmann, 1990). Therefore, professional players constitute a clear example of an input whose productivity is subject to a certain amount of randomness and which does not depend solely on the effort exerted by the player.

A player always has the option of blaming low levels of personal performance on factors or circumstances that are beyond his control (i.e. a bad run of results, the after effects of injuries, the quality and performance of his team mates, the incompetence of the manager or coach, etc.) (10). Further, there is always the possibility that some players normally exert a fairly high level of effort, but only perform to the very best of their abilities at economically strategic periods, for example, when their contracts are about to end. In short, there is a two-fold problem, in that, a player's behavior may be strategic and this very behavior takes place against a backdrop of unpredictability which, in a sense, constitutes the essence of competitive sport. Consequently, it is highly difficult to discern whether or not patterns of player performance depend on strategic behavior or are simply the product of uncertainty (11).

A further factor that should be taken into account is the extent to which the stability of belonging to a club might affect the parameters  $b$  and  $q$ . This factor generates wage inflation, since it reduces the efficiency of the methods of detection and sanction ( $q$ ), but also acts as a brake on this inflation since it reduces the probability of random expulsion ( $b$ ). This dynamic is intensified by the fact that belonging to a certain club constitutes a kind of capital that is highly specific and this creates barriers to the exit and entry of members and non-members respectively. Figure 3 shows the effects of changing the model's parameters. An increase in the value of  $q$  leads to a downward shift of the no-shirking curve. This reflects a decrease in the minimum remuneration received which makes the costs associated with forming part of a particular club acceptable. By contrast, a rise in the value of  $b$ , that is, in the level of randomness, shifts the curve upwards.





#### 4.2. THE PROBABILITY OF BEING CONTRACTED BY OTHER CLUBS

From expression [9] it follows that the remuneration received for fulfilling the terms of the contract will be positively linked to the probability of the player being hired by another team after being expelled,  $a$ . This means that, the no-shirking remuneration will be high when the demand for players is great and/or when the restrictions that condition the player's signing for another club are weak. Thus,

$$\frac{\partial w}{\partial a} = \frac{c}{q} > 0$$

From this perspective, the size of the labor market, i.e. the number of players that are active within it, may be a key factor in determining wage levels and the propensity to comply with agency contracts. Therefore, the threat of excluding a player or group of players from this market is not the only factor that affects remuneration and shirking.

To better analyze this hypothesis, it is assumed that the working rationale of the clubs is analogous to that of traditional firms. Further, it is also assumed that the sector itself is in a steady state, when there is no capacity for growth. This means that the number of players outside the group of superstars and the number of players expelled (*unemployment pool*) will be constant so that, over a given period of time, the number of players expelled will be equal to the number of players entering the group. In these conditions, and given that the level of remuneration would be over and above that required to ensure players exert maximum effort, players would find themselves subject only to random expulsion.

$$\text{Hence, } a = \frac{bNG}{P - NG}$$

from which it may be deduced that:

$$w = c + \left(r + b + \frac{bNG}{P - NG}\right) \frac{c}{q} = c + \left(r + \frac{bP}{P - NG}\right) \frac{c}{q} \quad [10]$$

It follows from expression [10] that the level of the no-shirking wage depends on the volume of individuals in the unemployment pool (A) from the subset of players that has been defined as superstars (G) (13). This means that, a rise in the percentage of players outside this sub set, those players that might potentially join the elite group of sports superstars, would provoke a decrease in the no-shirking wages. Under conditions of full employment, wages would be so high as to place the economic viability of clubs in jeopardy. Within this context, the survival of clubs would only be possible under conditions of perfect supervision and high levels of marginal productivity, conditions which, in practice, are unattainable.

If the enforcement of contracts is incompatible with full employment, clubs will have a vested interest in making sure full employment does not exist. For a club, signing a new player involves more than simply paying his transfer fee and the wages to ensure maximum compliance. Clubs must also take into account the additional cost that this player's incorporation involves in terms of the reduction of the number of unemployment pool. This reduction generates negative externalities among the teams, spillovers that would only be controllable if the league became a cartel, or if there was a real monopoly in demand, as is the case of the big leagues in the USA. It is also interesting to note that, a reduction in the size of the league would make it possible to improve the general level of well-being, because excluding more players would lower the costs of supervision. Thus, from this point of view, a set of limitations imposed on the size of the league might, in fact, be profitable for the professional league as a whole.

The mechanisms that influence the probability of hiring a player and those that contribute to increases in the pool of unemployed players are diverse: free agency, salary caps, other types of contractual clauses, agreements between clubs, trade union activity, the role of the media, the efficiency of recruitment in minor leagues, etc. Additionally clubs might also have other means at their disposal with which to reinforce the extent to which players comply with their contracts. For

example, all clubs employ certain mechanisms in order to devalue rival teams, or alternatively in order to foment loyalty to one's own team, thus reducing the chance of being signed by another.

A corollary of the above approach is that all leagues require a certain exclusion device in order to strengthen the adherence to internal norms, so the more exclusive a professional league is, the lower the direct remuneration received by players necessary to guarantee that they exert maximum effort. From this point of view, it becomes evident why there is a need to split or divide the leagues into divisions, as in Europe, or to establish a regulated system of access for clubs, as in the USA. In this sense, one factor that should be taken into consideration when it comes to defining the league's optimal size is that, *ceteris paribus*, all of the clubs obtain a benefit, in terms of wages, in limiting the number of teams that make up the "big" leagues. However, it should be noted that, although there is a decrease in these direct types of remuneration  $d$ , there is also an increase in indirect remuneration  $g$ , which corresponds to belonging to the most exclusive clubs.

#### 4.3. THE DISCOUNT RATE AND LENGTH OF CONTRACTS

There is at least one other highly important factor that influences the wages of professional players; the player's perception of the stability of future remuneration and, in particular, the discount rates applied to it.

Our initial approach was based on the idea of an asset with no temporal limit, but logically, curtailing the maturity of this asset would result in a reduction in its value. Thus, a decrease in a player's working life would imply a decrease in the value of the asset of belonging to a particular club and a consequent contraction in the period of capitalization. Hence, the longer the player's career, the lower the dividend paid out as a bonus for fulfillment<sup>1</sup>.

This relationship is also characterized by potential post-contractual opportunism. In fact, the owners of clubs worry that long term contracts negatively influence players' motivation and induce shirking. Therefore, it becomes extremely important to educe whether or not remuneration and contract duration are complementary or substitutive factors. A priori, signing a long term contract provides the player with a new opportunity for shirking and, according to our model, higher risk on the part of the club. This is a factor that is not directly addressed by agency theory. However, the duration of contracts and their levels of remuneration may be highly complementary if long term contracts are used in order to improve the conditions of the most complete and trustworthy players, and as a means of rewarding the most productive (14). This does not contradict agency theory; rather, it facilitates the possibility of using long term contractual relationships as a device for "labeling" more trustworthy players, a factor that affects both the parameters  $b$  and  $q$ .

Expression [9] also establishes a direct relationship between the levels of remuneration needed in order to guarantee that players behave optimally and the discount rate that they demand ( $r$ ). In this sense, if the player identifies with his club and feels a sense of loyalty, this reduces the "impatience" or the discount rate applicable to levels of remuneration.

Finally, it must be remembered that there is a possible relationship between the duration of the asset and the discount rate. Effectively, if one takes into account the characteristics of, what has been termed, the permanency asset, then it becomes possible to identify an inverse relationship between the duration of the contract and the discount rate. This is because an increase in the duration of the contract would raise the interest risk, which would imply an additional risk premium whose magnitude would be related to the maturity of the contract.

#### 4.4. TEAM SPORTS AS A COLLECTIVE ACTIVITY

When team sports are conceived of as a kind of collective activity in which there are a number of agents interacting in order to obtain a "team surplus", the problems of *free riding* and negative *spillovers* become especially relevant (Holmstrom, 1982) (15). However, the collective nature of team sports also means that individuals might begin to "identify" with the team and perhaps even develop a sort of collective rationality or a "we rationality" (Sugden, 2000).

In this type of activity in which results depend, to a large extent, upon the efficiency of the cooperation between individual agents, it would seem normal that there were agreements, either tacit or explicit, in which each member of the team takes into account the contribution of his team mates. This facet of the complex nature of team dynamics may be incorporated into the model in the form of sympathy relationships which exist between the agents (16). These relationships really reflect the interdependence of both the utility functions and the value of belonging to the club. The introduction of this factor alters the function that determines the dividend derived from belonging to the squad of a particular club. Under these new circumstances each player considers, not only his own personal benefit, but also the effects (measured as a percentage,  $\alpha$ ) that this behavior has on his team mates with whom he maintains a close interdependency relationship.

Logically, evaluations of this kind, carried out by no-shirking agents, provoke an important alteration in the incentives determining their behavior. This change can be seen in the evaluation of  $V_c$ . From [5] the following expression is derived:

$$rV_c = (w - c) - b(V_c - V_a) + \alpha((w - c) - b(V_c - V_a))$$

and hence,

$$V_c - V_a = \frac{\alpha w - (1 + \alpha)c}{-q + b\alpha} \quad [11]$$

This means that the difference in the evaluation of the asset of belonging to a particular club and expulsion becomes wider, if and when, the following inequality is fulfilled  $qw > (b + q)c$ , that is, it is a necessary condition that the expectation of a loss in the remuneration derived from belonging to the club is greater than the expectation of expulsion as the result of some random factor inherent in the nature of the sport. Thus, if the randomness is not excessive, a certain level of sympathy would imply the reevaluation of the player asset.

From the above result it becomes necessary to recalculate the non-shirking remuneration. In this case, if the condition relative to the level of arbitrariness is verified, the required remuneration will be lower.

$$\begin{aligned} rV_c &= (w - c) - b(V_c - V_a) + \alpha((w - c) - b(V_c - V_a)) \\ (1 + \alpha)w &= (1 + \alpha)(c + b(V_c - V_a) + r(V_c - V_a) + rV_a) \\ (1 + \alpha)w &= (1 + \alpha)(c + b(V_c - V_a) + r(V_c - V_a) + a(V_c - V_a)) \end{aligned}$$

thus, the minimum level of remuneration derived from belonging to the club will be:

$$w = c + (b + \frac{(r + a)(V_c - V_a)}{1 + \alpha}) \quad [12]$$

It follows that,

$$w = c + (b + \frac{(r + a)(\frac{\alpha w - (1 + \alpha)c}{-q + b\alpha})}{1 + \alpha}) \quad [13]$$

which is lower than that obtained in the reference case (see figure 3)

In short, if it is assumed that there is interdependency, the level of non-shirking remuneration decreases. Similarly, it may also be true that, in the presence of high levels of sympathy, the agents might be willing to continue belonging to the club even if their individual levels of remuneration were lower than the costs of performing their tasks.

## 5. CONCLUSIONS

The approach adopted in this paper allows us to show that the problem of moral hazard inherent in a contractual relationship in which there is asymmetric information is of special relevance when it comes to professional team players. One of the main reasons for the high levels of remuneration for some of these players (i.e. the superstars) is the difficulty of monitoring the

agency relationships. Consequently, one means of ensuring that players fulfill their contracts and exert maximum effort, in face of the high levels of demand for this type of agent, would be by increasing wages (efficiency wages). Although, the efficiency wage and the wage determined by the demand would converge in the full employment case, the scope of the informative asymmetry problem does not lose relevance to explain intermediate situations.

The remuneration or benefit received by the team members in order to guarantee that they respect the internal norms of the club and exert maximum effort, depends positively on the work needed to reach and work at their full potential, the randomness of exclusion from the team, the probability of being signed by another team and the discount rate applicable to future levels of remuneration. Conversely, this remuneration depends negatively upon the probability of detecting a player shirking and on the sanctions imposed.

The more exclusive a professional league is, the lower the levels of direct remuneration received by the players must be in order to guarantee that they fully comply with their responsibilities. This is a way of reinforcing the observance of internal team norms and reduces the costs of supervising the group as a whole. Consequently, from this point of view, a professional league might benefit significantly by reducing the number of member teams and, in particular, by "cartelizing" the group of teams that make up the league, and even by creating a monopsony or a monopoly of demand.

In addition to the above, there are additional channels via which remuneration may be reduced. These include the use of long-term contracts, the introduction of other kinds of penalization for shirking such as signaling a player's loss of reputation, disciplinary measures, expulsion from the market etc., or the promotion of the so called "we rationality". All of these factors are potential variables that ought to be considered in the complex process of establishing complete contracts, a task which is, in practice, economically unfeasible.

Finally, it should be emphasized that most of the above conclusions are, by extension, applicable to any collective activity which is labor intensive, characterized by imperfect substitutability between the quantity and quality of the inputs and in which there are agency relationships i.e. the performing arts, the music industry, etc.

## NOTES

- (1) The literature on how the professional sports labor market works and its idiosyncrasies is very extensive and the explanations of the determination of wage levels within this market are varied. Some of the outstanding works that have been used as references for subsequent research include the pioneering contribution of Rottenberg (1956), the contributions of Scully (1974) and Zimbalist (1992) or the more recent works of Gerrard, B. and S. Dobson (2000) and Lucifora and Simmons (2003). An application of the logic that underlies the work of Rosen specific to professional sports may be seen in Rosen and Sanderson (2001).
- (2) Other models that are based on the same general hypothesis are the model of labour *turnover* that looks at why firms want to retain their workers. The adverse selection model, on the other hand, considers that wages are a particularly good means of capturing well qualified workers. Sociological models diverge from the neoclassical perspective to better illustrate that wage rigidity may be a product of social conventions and ideas of socially acceptable behavior which are not the product of individualism but of certain norms of group behavior.
- (3) Among the *ex ante* alternatives there is a scenario entitled "*tournament*" in which the agents are faced with internal competition which they must overcome in order to obtain a first team place. This measure is ineffective however, in the case of superstars whose participation may be considered to be indispensable (Lazear y Rosen, 1981).
- (4) Examples of what we generically call the Big Professional Leagues are the MLB, NFL, NBA and NHL in the USA, or some of the professional football leagues in Europe such as those in England, Spain, Italy and Germany.
- (5) This assumption is, of course, open to debate given that, under certain circumstances, sporting success may not be conducive to the maximization of economic profit.
- (6) As mentioned above, incompliance with the club's norms may occur either on or off the field, and if incompliance occurs off the field this will have adverse repercussions in terms of performance. For example this kind of behavior would include alcohol or drug abuse, prolonged convalescence after injuries due to not following medical directives, selfish behavior in the changing room environment and any other bad habits that might have negative effects on player performance.

- (7) Taking into consideration the very particular conditions under which elite professional players work, it is most unlikely that low levels of effort are detected and, even when this occurs that the player in question be expelled from his club, hence the values of  $b$  and  $q$  tend to 0.
- (8) With respect to the demand curve, the traditional diminishing curve was chosen. However, the curve need not necessarily, take this shape. In fact, the synergies associated with collective or group production functions may give rise to a curve with a constant slope or even a rising slope, which would magnify the effects of wage inflation.
- (9) The arbitrary expression for exclusion refers to the situation in which, in spite of exerting a maximum effort, results are negative.
- (10) For example, a player will demand higher wages for signing for a club which is less likely to succeed, which has an unbalanced squad and/or is badly managed.
- (11) Among the body of literature that addresses the principal-agent problem in professional sport, Maxcy, Fort and Krautmann (2002) offer evidence that allows the verification of the efficiency of the mechanisms available for avoiding strategic behavior in the case of baseball.
- (12) In real terms, the manager or coach may influence player and team performance via two main channels. If the composition of the squad is considered as given constant in the short term, the manager will attempt to maximize performance using these inputs. This constitutes the direct contribution of the manager which depends; on the one hand, on his strategic input i.e. team selection and tactics and, on the other, on his capacity to motivate his players. In the long term, the manager may improve players' skills and/or reinforce the squad with new signings.
- (13) In this sense, the statements made by players expressing a willingness to leave their presents clubs in order to sign for clubs in which their status would be as a member of an "elite", but on lower wages, are paradigmatic.
- (14) Empirical evidence on the relationship between the duration of contracts and remuneration may be found in Krautmann and Oppenheimer (2002).
- (15) Under certain conditions, the spillover effects may explain that the productivity of a player depends on the team of which he is a member, and hence the wage level demanded may also vary. Further, the magnitude of the spillovers does not solely depend upon the individual characteristics of the player, but also on the performance of the other team members (Kendall, 2000)
- (16) Etymologically, the term sympathy alludes to the fact that the individual's well-being may be affected by the well-being of others in such a way that his decisions are not based exclusively upon the maximization of his own individual utility. In simple terms, it may be assumed that there are interdependent utility functions.

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