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PROGRESSIVE TAXATION AS A MEANS FOR IMPROVING COMPETITIVE BALANCE

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Abstract

The existing instruments for improving the competitive balance within a sports league, such as revenue sharing, restrictions on free agency and salary caps, all have their shortcomings. In this paper, we show that a progressive sports tax, the revenues of which are not redistributed to smaller teams in the league, could be a better instrument. From the broader perspective of the theory of optimum taxation, this instrument may have advantages as well.

I Introduction

In the field of professional team sports, there is a common perception that market forces can cause wealthy clubs to employ so much talent that the competitive balance within the league is jeopardised. Surprisingly, however, academics have not yet given a clear answer to the question what exactly is the optimal level of competitive balance, and it remains unclear if and to what extent the absence of restrictions on free-market forces yields non-optimal results (see also Szymanski, 2003). This is an interesting field of further research. In case it turns out that free-market forces do not yield optimal results, there are various instruments for improving competitive balance. Indeed, many instruments are used in practice already. In this paper, we *assume* that changes in the competitive balance are desirable indeed, and we focus on the effectiveness of the instruments.

Various instruments have been discussed in the literature, but each of these has its shortcomings. *Restrictions on free agency* allow clubs to limit their players' mobility and to demand financial or other compensation for transfers. If clubs are profit maximisers, these restrictions do not affect the competitive balance (Fort and Quirk, 1995; the result is an application of the Coase theorem). However, if clubs are win maximisers subject to a financial constraint, transfer fees do have an impact on competitive balance since they affect the available budgets of different clubs differently. More specifically, Késenne

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(2002) shows that, if small clubs are net sellers of talent, transfer systems can improve the competitive balance. However, transfer systems may have a limited effect (in Europe at any rate): while there are indications that small clubs are net sellers of talent, the net financial effect of transfer fees may be minor in relation to turnover.[1]

The idea of (American) *salary caps* is that the payroll of each team should not exceed a fixed percentage of gross league revenues divided by the number of teams. Fort and Quirk (1995) have shown that a salary cap improves the competitive balance with profit-maximising teams. Késenne (2002) reaches the same conclusion for win-maximising teams. However, some practical problems emerge. First, teams have an incentive to cheat, and cheating is indeed significant in the US (Fort and Quirk, 1995). Secondly, in European football, where national and European club competitions coexist, it will be difficult to introduce a salary cap acceptable to most clubs, and to monitor compliance (Dobson and Goddard, 2001; Szymanski, 2003). For instance, salary caps could apply to all the clubs in the Champions League so that this competition becomes more balanced, or a national competition could have its salary cap so that it becomes more balanced, but one cannot have both. Obviously, implementing an equal salary cap for the hundreds of European clubs is not a realistic alternative.

Fort and Quirk (1995), Vrooman (1995) and Szymanski (2003) have demonstrated that *revenue-sharing* does not affect the competitive balance given certain assumptions. One of the main reasons is that revenue-sharing reduces the incentive for small clubs to attract top-quality players; if a small club buys top players it reduces the availability of such players for the bigger clubs and therefore their revenues – of which a small club gets part. However, the conclusion is based on various crucial assumptions. First, the clubs in the league compete for talents on a closed labour market. Second, a club's revenues can essentially be written as a function of (a) its win probability and (b) club-specific characteristics such as its drawing potential. Such a model is called a *relative quality model*, as the only thing that matters as far as match characteristics are concerned is the *difference* between the quality of the home team and that of its opponent (which determines the win probability). Third, a club has one source of revenue only (e.g. gate revenues), and a fixed share of these revenues is paid to other teams. Here, an alternative interpretation of (some of) the models is that (a) a club may have more than one source of revenue, but (b) the sum total of all revenues can be written as a function such as the one discussed above, and (c) for all types of revenue the share for other teams is equal. Fourth, clubs are profit maximisers.

When one of these assumptions is abandoned, revenue sharing can affect the competitive balance. First, Szymanski (2003) shows that the assumption of an open labour market (which he considers reasonable in the case of European football where players move easily between national leagues) leads to the conclusion that revenue sharing makes contests *less* balanced. Second,

[1] Szymanski and Kuypers (1999) show that small English clubs (in terms of attendance) tend to be net sellers of talent more often than the bigger English clubs. However, their data also indicate that the net financial effect of transfers is quite likely to be minor in relation to turnover.

Marburger (1997) and Késenne (2000) show that, in an *absolute quality model* (in which both the quality of the home team and that of the visiting team have a positive impact on demand), revenue-sharing can affect the competitive balance, and is even likely to improve it. However, according to Késenne this effect may be small, so that the instrument may still be relatively ineffective. Third, Fort and Quirk (1995) show that, when a club has gate revenues as well as local TV revenues, an increase in local TV revenue-sharing can improve competitive balance under certain conditions. We like to put this conclusion as follows: revenue-sharing is not necessarily ineffective when a club has different sources of revenue and the percentage of revenue shared is not the same for all sources.

Fourth, Késenne (also) applies his absolute-quality model to win-maximising teams. In this case, revenue sharing unambiguously causes talents to be more equally distributed. He also analyses the case in which clubs maximise a linear combination of wins and profits. If winning has a different appeal for different clubs, revenue sharing changes the distribution of talent in favour of clubs (of any size) where the appeal of winning is high. All in all, Késenne shows that revenue sharing has a significant favourable effect if certain objective functions are present, but has little or even an adverse impact in other cases. In reality, objectives seem to vary across clubs (and continents), but what exactly the objectives of the various clubs are remains unclear.[2] This implies that it is doubtful whether revenue sharing is a suitable instrument for improving competitive balance. The same conclusion also emerges from the discussion on the other three assumptions above.

Taxes on the payroll of players, or *luxury taxes*, are less common than the instruments discussed above; they have been introduced in one league only, the MLB. Here, the tax is imposed by the league, the proceeds being redistributed to the weaker teams. In the literature, luxury taxes have (also) been analysed in combination with redistribution to weaker teams only (to the best of our knowledge). More specifically, Marburger (1997) has analysed a luxury tax with a flat rate in the first instance. Clubs are profit maximisers. The proceeds of the tax are returned to the clubs as a subsidy. The subsidy rate is inversely related to a team's revenues. Marburger shows that this tax-subsidy scheme tends to *reduce* the competitive balance (as smaller teams hire less talent in order to get more subsidy). Next, Marburger combines this subsidy with a tax rate that is positively related to the payroll. He shows that this tax may counter-balance the impact of the subsidy. He also suggests that, if the tax is sufficiently progressive, the tax-subsidy scheme as a whole may even improve the competitive balance. He notes, however, that a luxury tax could entail enforcement problems similar to those of a salary cap. In this context, it is also relevant that, according to Szymanski (2003), luxury taxes will not be feasible for European football unless a closed Superleague emerges among other things, because it is unlikely that agreement between clubs is reached in a system with multiple leagues.

[2] For a discussion of the objectives of European football clubs see Szymanski and Kuypers (1999) and Morrow (1999). For a comparison with American sports see Fort (2000) and Szymanski (2003).

A criticism of Marburger's model is the following. In the model, a small team that hires more talent ignores a counter-effect, which is that other clubs will have less talent. As a result, the revenues of other clubs will decrease, causing tax revenues – and therefore subsidies – to drop. Now, as discussed earlier, an important reason why revenue sharing has no effect on competitive balance (with profit-maximising teams) is that a small team takes into account the fact that, if it hires more talent, other teams will have less talent and revenues so that its own returns from revenue-sharing will be reduced. If this kind of problem is relevant for redistribution of income to weaker teams by means of revenue sharing, it is plausible that it is also relevant for redistribution of income to weaker teams by means of taxes and subsidies. Thus, Marburger's tax-subsidy scheme may well turn out to have a less favourable impact on competitive balance if the counter-effect mentioned above is taken into account. In this context, the question arises whether the (simpler) device of a tax without subsidies is more effective in improving competitive balance.

In this paper, we analyse a progressive sports tax imposed by a government that appropriates the proceeds. In Section II we present a simple model of a sports league. Sections III and IV deal with a progressive revenue tax and a progressive payroll tax, respectively. In both cases, we show that this tax improves competitive balance. Section V discusses the tax from the perspective of the theory of optimal taxation; a concrete tax scheme is also proposed here. Our main findings are summarised in Section VI.

II The Model

The model concerns profit-maximising teams. This is an interesting case since, as we discussed above, revenue-sharing and restrictions on free agency are ineffective especially with profit-maximising teams. Suppose we have n teams that play each other, i versus j, two times a season. The expected percentages of matches won over the season are W_i and W_j, respectively. There is one source of success: the amount of talent hired by the team, L_i. It is assumed that $W_i(L_i = 0) = 0, \forall\ i$. The total stock of talent is fixed, and:[3]

$$\frac{\partial W_i}{\partial L_i} = 1\ \forall i; \quad \frac{\partial W_j}{\partial L_i} = -\frac{1}{n-1}\ \forall i,j. \tag{1}$$

The revenue from the match between home team i and visiting team j, Z_{ij}, amounts to:[4]

$$Z_{ij} = V_{ij}(W_i, W_j) \cdot M_i \tag{2}$$

with M_i being the market size of club i, and V_{ij} the *visitor recruiting function*. This function depends on the quality of both the home and the visiting team, as measured by means of the average seasonal winning probabilities, W_i and W_j. Clearly, the model is an absolute quality model. To guarantee that the visitors value uncertainty of outcome, the following derivatives of the visitor recruiting

[3] See Fort and Quirk (1995, p. 1271). The basic model is El Hodiri and Quirk (1971).

[4] This revenue function is more general than the revenue function of Késenne (2000, p. 60).

function are assumed:

$$\frac{\partial V_{ij}}{\partial W_i} > 0 \text{ or } = 0 \text{ or} < 0 \quad \text{for } W_i < W_i^* \quad \text{resp.} = W_i^* \text{ resp.} > W_i^*, \text{ and}$$
$$\frac{\partial V_{ij}}{\partial W_j} > 0 \text{ or } = 0 \text{ or} < 0 \quad \text{for } W_j < W_j^* \quad \text{resp.} = W_j^* \text{ resp.} > W_j^*, \tag{3}$$
$$\frac{\partial^2 V_{ij}}{\partial W_i^2} < 0, \frac{\partial^2 V_{ij}}{\partial W_j^2} < 0, \frac{\partial^2 V_{ij}}{\partial W_i \partial W_j} = \frac{\partial^2 V_{ij}}{\partial W_j \partial W_i} > 0, \quad \forall W_i, W_j.$$

To define the signs of the first derivative of the visitor recruiting function, it is assumed that the revenue function Z_i reaches a maximum at W_i^* for a given W_j and at $W_j = W_j^*$ for a given W_i, respectively. This formulation makes the visitor recruiting function very resilient with respect to the actual attitudes of visitors.

With all revenues of a match accruing to the home team, the season revenue of each club i is:

$$Z_i = \sum_{j \neq i}^{n} Z_{ij} = \sum_{j \neq i}^{n} V_{ij}(W_i, W_j) \cdot M_i. \tag{4}$$

The variable costs of team i are equal to cL_i, c being the unit price of talent. Fixed costs are F. The club maximises its profits by changing the amount of talent employed:

$$\max_{L_i} \sum_{j \neq i}^{n} V_{ij}(W_i, W_j) \cdot M_i - cL_i - F. \tag{5}$$

The first-order condition for a profit maximum is:[5]

$$\left(\sum_{j \neq i}^{n} \frac{\partial V_{ij}}{\partial W_i} - \frac{1}{n-1} \sum_{j \neq i}^{n} \frac{\partial V_{ij}}{\partial W_j} \right) M_i = c \quad \forall i. \tag{6}$$

Here, the left-hand side gives the marginal revenue of talent, from which the demand function can be derived. c is the market equilibrium price of talent, which results from confronting the aggregate of the demand functions of all teams with the fixed supply of talent. The strength of the teams is implicitly defined by equation (6); in general, it will differ because the market sizes, M_i, are not necessarily the same. However, differences in the size of the market might at least partially be compensated by a more effective visitor recruiting policy of football clubs with smaller market sizes.

[5] The second-order condition is:

$$\left(\sum_{j \neq i}^{n} \frac{\partial^2 V_{ij}}{\partial W_i^2} - \frac{2}{n-1} \sum_{j \neq i}^{n} \frac{\partial^2 V_{ij}}{\partial W_i \partial W_j} + \frac{1}{(n-1)^2} \sum_{j \neq i}^{n} \frac{\partial V_{ij}}{\partial W_j^2} \right) \cdot M_i < 0.$$

The assumptions above guarantee that this condition is fulfilled.

III A PROGRESSIVE TAX ON REVENUES

In this section, we analyse a progressive tax on revenues. Let $t(Z_i)$ denote the average tax rate relating to gross revenue level Z_i. The net revenue of club i can be written as [recall from equation (4) that $Z_i = \sum_{j\neq i}^{n} V_{ij}(W_i, W_j)M_i$]:

$$Z_i^n = [1 - t(Z_i)] \sum_{j\neq i}^{n} V_{ij}(W_i, W_j)M_i \quad \forall i. \tag{7}$$

Marginal net revenue (defined as the increase in net revenue resulting from a unit increase in gross revenue) is then given by:

$$\frac{\partial[(1-t)Z_i]}{\partial Z_i} = 1 - t - t'Z_i. \tag{8}$$

A progressive tax has two characteristics. First, the average tax rate is an increasing function of Z_i. Second, marginal net revenue (nevertheless) remains positive: $1 - t - t'Z_i > 0$. The first characteristic implies $t' > 0$. It also implies:

$$\frac{\partial(1 - t - t'Z_i)}{\partial Z_i} = -(2t' + t''Z_i) < 0. \tag{9}$$

The sports club maximises after-tax profits:

$$\max_{L_i}[1 - t(Z_i)] \sum_{j\neq i}^{n} V_{ij}(W_i, W_j) \cdot M_i - cL_i - F. \tag{10}$$

The first-order condition for an optimum is:[6,7]

$$(1 - t - t'Z_i)\left(\sum_{j\neq i}^{n} \frac{\partial V_{ij}}{\partial W_i} - \frac{1}{n-1}\sum_{j\neq i}^{n} \frac{\partial V_{ij}}{\partial W_j}\right)M_i = c \quad \forall i. \tag{11}$$

Here, the left-hand side gives the net marginal revenue of talent.

For the individual team, the price of talent, c, is given; it results from confronting the aggregate of the demand functions of all teams with the fixed supply of talent. The left-hand side in equation (6) and in equation (11) give the net marginal revenue of talent without and with tax, respectively. From these expressions, the individual demand functions can be derived. For every team and for all relevant constellations, the left-hand side in equation (11) is smaller than the left-hand side in equation (6). Hence, the net marginal revenue of talent of all clubs is reduced by the tax. Consequently, clearing the market for talent requires the price of talent to decline. In addition, the progressive tax ($t' > 0$)

[6] We impose a non-negativity constraint on profits, which requires: $Z_i(1 - t) \geq cL^*_i + F$ (with L^*_i as demand for talent according to the first-order condition).

[7] Second-order condition:

$$-(2t' + t''Z_i)\left[\left(\sum_{j\neq i}^{n} \frac{\partial V_{ij}}{\partial W_i} - \frac{1}{n-1}\sum_{j\neq i}^{n} \frac{\partial V_{ij}}{\partial W_j}\right)^2\right] + (1 - t - t'Z_i)\, SOC < 0,$$

SOC being the left-hand side of the second-order condition in footnote 5 for the maximisation problem without taxes. The condition here is fulfilled (recall $2t' + t''Z_i > 0$ and $1 - t - t'Z_i > 0$).

reduces the marginal revenues of the large clubs more than those of the small clubs, so that the downward shift of the demand curve is larger for the big teams. Therefore, competitive imbalance is reduced.

Consider a more specific tax scheme that satisfies the condition $(1 - t_i - t_i' Z_i) = \frac{a}{Z_i}$, with a being a constant equal to, for instance, the annual revenue of the smallest club in the situation without tax. This means that for the smallest club marginal gross revenue and marginal net revenue are equal in case its annual revenues are equal to its annual revenues in the situation without tax.[8] For all other clubs, the marginal net revenue after tax declines with increasing revenues, but remains positive.

For every team, the first-order condition then is:

$$\frac{a\left(\sum_{j\neq i}^{n} \partial V_{ij}/\partial W_i - \frac{1}{n-1}\sum_{j\neq i}^{n} \partial V_{ij}/\partial W_j\right)}{\sum_{j\neq i}^{n} V_{ij}(W_i, W_j)} = c. \tag{12}$$

The crucial point here is that the market sizes of teams, M_i, vanished. Hence, hiring talent does no longer depend on relative market sizes. Since the cost per unit of talent c is equal for all teams, the left-hand side of equation (12) must also be equal for all teams. This implies that a progressive tax can lead to full competitive balance if the visitor recruiting functions are the same for all teams. Because of club-specific visitor recruiting functions this statement cannot be extended to the conclusion that complete competitive balance (which may not be desirable) is always feasible. Nevertheless, the above shows that a progressive tax can be very effective in changing the competitive balance.

IV A Progressive Payroll Tax

An alternative is a progressive payroll tax. Let $t(cL_i)$ denote the average tax rate relating to the payroll cL_i, where cL_i excludes the tax. Marginal tax revenue then equals:

$$\frac{\partial(tcL_i)}{\partial cL_i} = t + t' cL_i. \tag{13}$$

A progressive tax rate implies:

$$\frac{\partial(t + t' cL_i)}{\partial cL_i} = 2t' + t'' cL_i > 0. \tag{14}$$

The club's objective is:

$$\max_{L_i} \sum_{j\neq i}^{n} V_{ij}(W_i, W_j) M_i - [1 + t(cL_i)]cL_i - F. \tag{15}$$

[8] The tax will cause the amount of talent in the smaller teams to increase, and consequently their revenues will increase. Therefore, as long as a does not exceed the income of the smallest team in the situation without tax, a/Z_i does not exceed one and negative tax rates are ruled out.

The first-order condition is:[9]

$$\left(\sum_{j\neq i}^{n}\frac{\partial V_{ij}}{\partial W_i}-\frac{1}{n-1}\sum_{j\neq i}^{n}\frac{\partial V_{ij}}{\partial W_j}\right)\cdot M_i=(1+t+t'cL_i)c. \quad (16)$$

Clearly, the tax increases the (gross) marginal cost of talent, and (in view of equation (14)) the more so for large clubs (which have a relatively high payroll). Therefore, the competitive balance will improve. Note that with the payroll tax the price of talent, c, will also decline. The results are essentially the same as in the case of a (progressive) tax on revenues.

V Discussion

According to the theory of optimal taxation, the tax system should be such that the allocation of resources is distorted least. A well-known implication is that economic sectors with high levels of economic rent should be heavily taxed.[10] In the previous sections, it has (implicitly) been assumed that the lower wage rate as a result of the tax does not cause the quantity of talent supplied to change, which implies that players are earning an economic rent. Besides, a non-negativity constraint on profits has been imposed.[11] In other words, if the tax has a negative effect on profits,[12] profits still will not become negative. Thus, the analysis is carried out as if there were a rent.

The crucial question is, of course, whether this model is realistic. First of all, the model concerns a league with a closed labour market, i.e. there is no labour market for talented players outside the league under consideration. The consequences of a tax will be different in an open labour market. Such a market more or less exists in European football, where players can move easily between national leagues. Suppose that the tax is introduced in one national league only (e.g. the German Bundesliga). In that case the wage rate (in Germany and other countries) will not be affected (or only so to a small extent),

[9] The second-order condition is given by (it is also fulfilled since, as assumed above, $2t'+t''cL_i>0$):

$$\left(\sum_{j\neq i}^{n}\frac{\partial^2 V_{ij}}{\partial W_i^2}-\frac{2}{n-1}\sum_{j\neq i}^{n}\frac{\partial^2 V_{ij}}{\partial W_i\partial W_j}+\frac{1}{(n-1)^2}\sum_{j\neq i}^{n}\frac{\partial V_{ij}}{\partial W_j^2}\right)\cdot M_i-c^2(2t'+t''cL_i)<0.$$

[10] According to the theory, the best policy is to tax pure rents at a 100% rate (see, for instance, Auerbach, 1985; Salanié, 2003). 'Pure rents' are incomes that are not necessary as an incentive to provide the service in question, so that the removal of pure rents does not affect the supply of this service. Therefore, the taxation of rents does not cause any excess burden (the crucial measure of the efficiency costs of taxation). Thus, the crucial question is whether there is a rent.

[11] See footnote 6. Since the wage rate equals the marginal revenue of talent, and since marginal revenue is a decreasing function of the quantity of talent, total revenues exceed wage costs. Thus, the constraint boils down to the assumption that fixed costs are so low that losses are avoided.

[12] There is a decrease in the wage rate, the size of which is determined *inter alia* by the progressive tax. In relation to this, the possibility of an increase in profits should not be ruled out *a priori*.

since the wage rate is determined on the European labour market (where total demand is affected by changes in the demand of German clubs to a small extent only). The decrease in the marginal revenue of talent, or the increase in the marginal labour costs, in Germany will therefore cause talented players to migrate from Germany to other leagues in Europe. Since German clubs lose talents and therefore revenues, while the wage rate remains (nearly) constant, they may start making losses. Put differently, the non-negativity constraint on profits is much less plausible in this case.

Hence, we conclude that the most serious threat to the taxes discussed here is an open labour market for talented players, which is more relevant for European football than for the major American team sports. The consequence for European football is, then, that the sports tax should not be introduced in one national league only, but in all leagues at once.

From the discussion above, a number of questions for future research emerge. A first question is whether, in the European football system with both national and European competitions, an EU-wide progressive tax will cause all these competitions to become more balanced. If this were the case, the tax may have an advantage over devices such as salary caps and luxury taxes (see also Section I).

Second, since it may be undesirable that (certain) small clubs cease to exist or produce a product of lower quality, the question arises whether there is a certain income level under which the marginal tax rate should be zero. Third, will a (timely announced) tax that reduces the revenues of the top clubs (net of costs other than those of fielding the team, such as the costs of stadiums, skyboxes, merchandise, and so on) to (say) 1970 levels make top clubs incapable of building large stadiums that also have sufficient facilities for television makers? Or does earlier experience suggest that a high tax need not reduce the quality of the product? Fourth, will a reduction in the salaries of players of top clubs to (say) 1970 levels cause these players to generate less pleasure for fans? Do Thierry Henry and Ronaldo, as a result of their higher salaries, give fans more pleasure than Johan Cruijff did?

In view of the effect on competitive balance, an essential element of the tax is that the revenues are not redistributed to weaker teams in the league. More specifically, it has been assumed that the government appropriates the revenues. An alternative, however, is that the professional clubs use the revenues to invest in social projects. Assuming that such expenditures do not make some professional clubs more popular *vis à vis* other clubs (so that relative drawing capacities do not change), the effects on competitive balance will be the same as the ones described in Sections III and IV. The use of the tax revenues for social projects may be especially attractive for the majority of European football clubs, which – according to their statutes – exist to realise social goals.[13]

[13] At present many English football clubs, for instance, are involved in social projects already (Watson, 2000). However, they can do so to a limited extent only, as they are still forced to pay players high salaries to remain successful on the field. The revenues of the tax could give them more room to realise their social potential.

VI Conclusion

We have proposed a new instrument to enhance competitive balance: a progressive tax on either the revenues of sports clubs or their payroll. The progression of the tax will create asymmetric changes in, respectively, the marginal revenues or the marginal costs of the clubs. As a result, both types of tax will improve the competitive balance. An underlying factor is that tax proceeds are not reimbursed to the clubs (as is the case with revenue-sharing and luxury taxes), so that the small clubs will not have any interest in the large clubs employing more talent and earning more money as a result. More in general, a progressive tax could be a superior instrument for improving competitive balance. In addition it has a specific advantage: the revenues can be used to reduce distorting taxes elsewhere (although the alternative of using the revenues for social projects may also be attractive). All in all, it seems to be a promising alternative.

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