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Economic Model of Financial Fair Play in Professional Football

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Abstract

The organisers of most professional sports leagues now employ one or more forms of policy intervention such as revenue sharing and salary capping schemes. The focus of the sports economic literature was initially directed towards the theoretical effects of these policies on competitive balance, wage rates and owner profits in the context of Major US sports leagues. That work has since been broadened in the literature to include other types of policy intervention and other model assumptions such as 'win maximising' owners and 'open' labour markets that characterise other professional leagues such as for association football.

More recent policy intervention has included the regulation of financial performance of professional (association) football clubs. Hitherto, the literature has not addressed the implications of 'Financial Fair Play' (FFP) regulation in a dynamic context. This paper provides a basic theoretical model to address that requirement. It shows, for example, the conditions that would result in a stable or an unstable league and the effect of introducing FFP on the total expenditure of teams in the league.

Economic Model of Financial Fair Play in Professional Football

1. Introduction

In 1885, when the Football Association (The FA) allowed professional playing contracts, it also intervened in the operation of the league to prevent players from playing for more than one team during a season and to limit the wages that could be paid to players. Whilst neither of these restrictions now applies to the professional football clubs under the auspices of The FA, professional football competition organisers have more recently introduced regulation relating to 'Financial Fair Play' (FFP).

The Union of European Football Associations (UEFA, 2010) FFP regulations address two issues of concern for professional football competition. One issue is the concern that clubs overspend and are not able to finance the deficit. Kuper and Syzmanski (2009, p.106) note that "[i]n most industries a bad business goes bankrupt, but football clubs almost never do." Conn (1997) points out, however, that the failure of a football club not only imposes a cost on the owners, it also imposes financial loss on the creditors and economic and social costs on the local community. Hamil and Walters (2010) make the further point that, whilst football clubs have often been rescued by new owners in the past, this is less likely to be an option now because the potential size of the gap (created by a super-benefactor) is greater than in the past and that there are likely to be fewer potential super-benefactors willing or able (in the current economic environment) to step in. This exposes the club to a greater risk of financial failure. A major concern now for the football industry is that, if that support were withdrawn, a professional football club could experience a financial crisis on a scale that is too large for the remaining stakeholders to save the club.

Lago et al., (2006) highlight the risk that this financial failure also has an indirect risk of contagion of economic impact on other sporting entities in the competition resulting from a failure to fulfil fixtures, given the 'joint product' (identified by Neale, 1964) inherent in competition and more widely due to non-payment of transfer fees to other sporting entities.

The other issue addressed by the UEFA (2010) FFP regulations is the concern that clubs overspend and, whilst they are able to finance the deficit, the amount is sufficiently large to be considered as resulting in an 'undue' advantage in the sporting competition. In this case the integrity of the sporting competition is undermined by the 'off field' economic competition for financial resource.

The UK Government, All Party Parliamentary Football Group, first inquiry report (February 2004, p.3) stated :

"We welcome the private benefactors who have invested huge personal fortunes in the game and as a result some clubs have been transformed. "

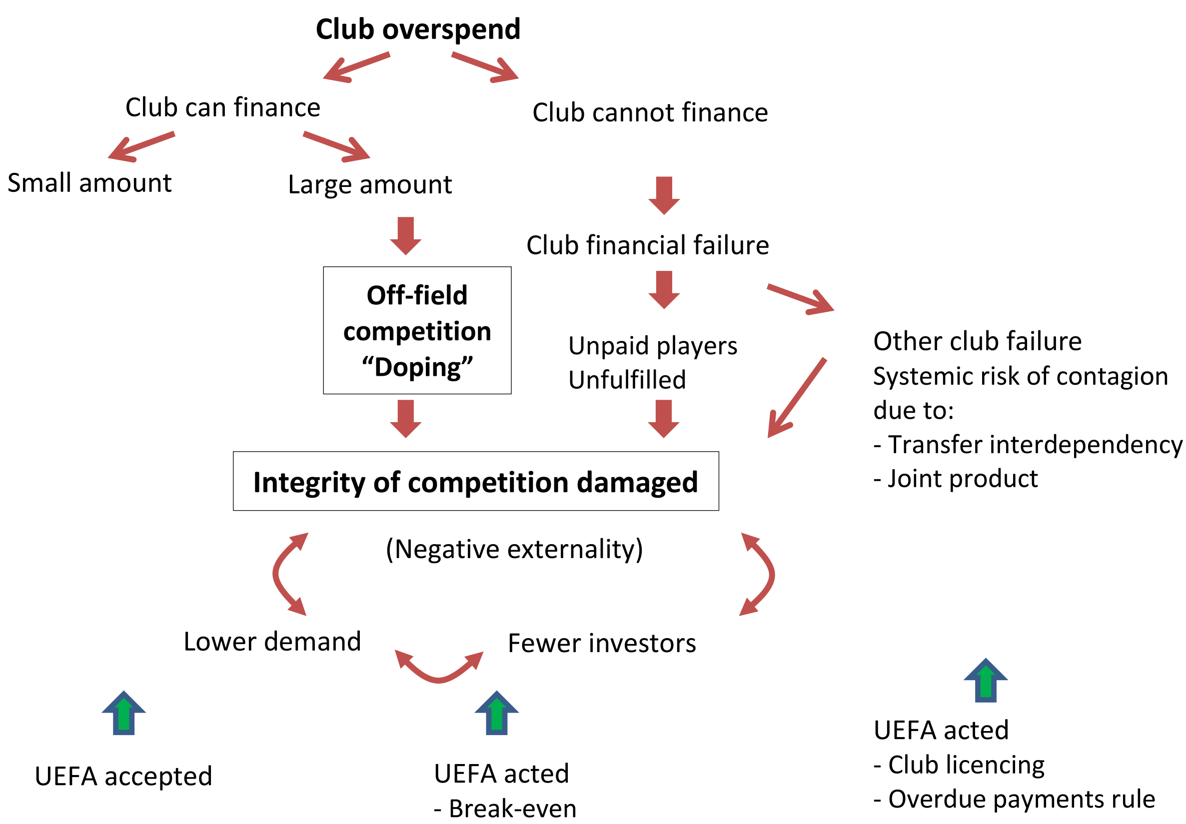
However, by the time of its second report (April 2009) the opinion of the Group had changed to:

"…there are few who would argue that football trophies should be awarded to a club on the basis of its wealth or the size of its debts." (p. 1).

The term 'financial doping' was used by UEFA Chief Executive Lars-Christer Olsen to describe this situation [(1)].

With both issues UEFA is concerned by the risk that the integrity of sporting competition is damaged. This negative externality may reduce interest, and hence demand, for the competition and this can adversely affect spectator attendance, broadcast media value, other commercial income and investor interest in the competition. Figure 1 illustrates the concerns considered by UEFA (2010) in the FFP regulations.

Figure 1. Club Overspend Competition Consequences Diagram



El-Hodiri and Quirk (1971) provides an early mathematical model of a professional sports league to examine the justification of the exemption of some policy interventions in Major US sports leagues from some aspects of antitrust statutes. Smith and Szymanski (1997) provide a static model of the English football industry.

The literature relating specifically to FFP is currently expanding rapidly. For the financial regulation introduced by UEFA, Müller et al (2012) provides the empirical and theoretical foundation. Sass (2012) presents a multi period mathematical model which shows the increasing competitive dominance of large market teams being dampened by the FFP regulations. Peeters and Szymanski (2013) take the approach of simulating the impact of FFP on the finances and sports results of European clubs and estimating its effect empirically. Franck (2013) argues that FFP restores efficient managerial incentives and protects financial stability for leagues. Whilst Madden (2014) argues that the imposition of a break-even requirement will, in extremis, create a Pareto disimprovement.

Hitherto, the literature has not addressed the implications of FFP in a dynamic context. This paper provides a basic theoretical model to address that requirement.

2. Model

Static specification

Assume the league has two teams, denoted by superscripts A and B. The relationships for team A (and by symmetry for team B) are as follows:

(i) Budget constraint

$$X^A{}_t = R^A{}_t + K^A{}_t \tag{1}$$

Where:
$X =$ Expenditure on talent
$R =$ Revenue from sporting operations
$K =$ External finance

Revenue for a period is fully allocated to the sum of the cost of players for the period and payment to the club's owners. This formulation allows for the possibility of a soft budget constraint (see, for example, Storm and Nielsen, 2012).

(ii) Revenue function

$$R^A{}_t = \alpha^A W^A{}_t \qquad (\alpha > 0) \tag{2}$$

Where:
$\alpha =$ Club ability to convert sporting success into revenue
$W =$ Wins

Revenue is determined by the sporting success of the team and the ability of the club to convert sporting success into revenue.

(iii) Contest success function

$$W^A{}_t = \frac{\emptyset^A{}_t}{\emptyset^A{}_t + \emptyset^B{}_t} \tag{3}$$

Where:
$\emptyset =$ Effective talent

Skaperdas (1996) shows that this logit form and the alternative probit form are the only two specifications that satisfy the plausible criteria for a contest success function. The logit form is adopted here because it provides zero result from zero effort.

(iv) Production function

$$\emptyset^A{}_t = \beta^A L^A{}_t \qquad (\beta > 0) \tag{4}$$

Where:
$\beta =$ Club effectiveness in converting talent into sporting results
$L =$ Quantity of talent

This allows for the possibility of differences in the sporting effectiveness between teams for a given amount of spend on talent.

(v) Expenditure function

$$L^A{}_t = \frac{1}{\delta} X^A{}_t \qquad (\delta > 0) \tag{5}$$

Where:
$\delta =$ Cost of talent units

Talent is assumed to be homogeneous and the cost per unit is constant (and exogenous to the model).

Dynamic extension
Let the subscripts t and $t-1$ represent the decision period and previous period, respectively

(vi) Competitive reaction function

$$L^B{}_t = \gamma^B L^A{}_{t-1} \tag{6}$$

Where:
$\gamma =$ Competitor reaction to previous talent spend

This specification implicitly makes the expenditure choice of team B endogenous. The choice for team B in the current period is relative to the observed choice of team A in the previous period. It incorporates both the expectation of team B for the choice that team A will make in the current period and the desire of team B to change their relative competitive position compared to the previous period.

Dynamic model solution
Assume that the strict break-even condition of FFP applies to the budget constraint (i.e. $K^A{}_t = 0$). Then the model yields the first order difference equation for team A (see Appendix for the detailed derivation) of:

$$X^A{}_t + \gamma^B \frac{\beta^B}{\beta^A} X^A{}_{t-1} = \alpha^A \tag{7}$$

Solving for the time path of $X^A(t)$ gives the inter-temporal equilibrium value of X^A. Assuming,

$$\gamma^B \frac{\beta^B}{\beta^A} \neq -1 \tag{8}$$

(as must be the case if, for example, $\gamma^B > 0$) the (stationary) inter-temporal equilibrium value of X^A is:

$$\boldsymbol{X^A(t) = \frac{\alpha^A \beta^A}{\beta^A + \gamma^B \beta^B}} \tag{9}$$

The path to equilibrium is determined by the value of the term, θ, where:

$$\boldsymbol{\theta \equiv -\gamma^B \frac{\beta^B}{\beta^A}} \tag{10}$$

If $|\theta| < 1$, it is convergent. If $|\theta| > 1$, it is divergent.
If $\theta < 0$, it oscillates. If $\theta > 0$, it is non-oscillatory.

Note that as the parameter values β^A, β^B and γ^B are all positive the path must be oscillatory. Furthermore, if the solution is divergent, expenditure (and revenue) will become negative for one of the teams and effectively terminate the competition.

An additional insight is provided by considering the total expenditure of the teams when the model is in equilibrium.[2] In that case the total expenditure is derived as follows:

From (9):

$$X^{A^*} = \frac{\alpha^A \beta^A}{\beta^A + \gamma^B \beta^B} \tag{11}$$

From (5), (6) and (9), and noting that in equilibrium, ${L^{B^*}}_t = {L^{B^*}}_{t-1}$:

$$X^{B^*} = \frac{\gamma^B \alpha^A \beta^A}{\beta^A + \gamma^B \beta^B} \tag{12}$$

Hence, in equilibrium, total expenditure is:

$$X^{A^*} + X^{B^*} = (1 + \gamma^B) \frac{\alpha^A \beta^A}{\beta^A + \gamma^B \beta^B} \tag{13}$$

From (10) and (13) and re-arranging produces the result:

$$\boldsymbol{X^{A^*} + X^{B^*} = \frac{\alpha^A (1 + \gamma^B)}{(1 - \theta)}} \tag{14}$$

This shows that even with FFP (i.e. ${K^A}_t = {K^B}_t = 0$) and a stable solution (i.e. $|\theta| < 1$) total expenditure is a function of the competitor reaction to talent spend (i.e. γ^B). A greater propensity to spend to win is sufficient to have the effect of increasing total expenditure in the league despite the imposition of a hard budget constraint.

3. Conclusion

If the intension of regulators implementing FFP is to create a non-oscillatory, stable (i.e. convergent) expenditure decisions by league clubs it is necessary that: $0 < \theta < 1$. Hence the outcome depends on the parameter values β^A, β^B and γ^B; that is, on the relative effectiveness of clubs to convert talent into wins and the expected desire of clubs to increase their talent to improve their relative competitiveness. However, as these parameter values are all positive it must be the case that $0 > \theta$ and the path will be oscillatory (even if it is convergent). The solution does not depend on the cost of talent units.

Furthermore, the model shows that the imposition of FFP is not even sufficient to prevent an increase in total spend if teams continue to pursue a policy of spending for competitive success.

Notes

(1) UEFA.com (25 March 2004). Club licensing vital, says Olsen. UEFA.com. Retrieved, 17 March 2013, from: http://www.uefa.org/news/newsid=157594.html

(2) I am grateful to Professor Ron Smith at Birkbeck, University of London, for his insight on this point and for his comments on the paper more generally.

Appendix

Derivation of dynamic model solution

Model

(i) Budget constraint

$$X^A{}_t = R^A{}_t + K^A{}_t \tag{1}$$

(ii) Revenue function

$$R^A{}_t = \alpha^A W^A{}_t \qquad (\alpha > 0) \tag{2}$$

(iii) Contest success function

$$W^A{}_t = \frac{\emptyset^A{}_t}{\emptyset^A{}_t + \emptyset^B{}_t} \tag{3}$$

(iv) Production function

$$\emptyset^A{}_t = \beta^A L^A{}_t \qquad (\beta > 0) \tag{4}$$

(v) Expenditure function

$$L^A{}_t = \left(\frac{1}{\delta}\right) X^A{}_t \qquad (\delta > 0) \tag{5}$$

(vi) Competitive reaction function

$$L^B{}_t = \gamma^B L^A{}_{t-1} \tag{6}$$

Solution

Part 1. Form the first order difference equation

Substituting for $R^A{}_t$ from (2) into (1) gives:

$$X^A{}_t = \alpha^A W^A{}_t + K^A{}_t \tag{7}$$

Substituting for $W^A{}_t$ from (3) into (7) gives:

$$X^A{}_t = \frac{\alpha^A \emptyset^A{}_t}{\emptyset^A{}_t + \emptyset^B{}_t} + K^A{}_t \tag{8}$$

Substituting for $\emptyset^A{}_t$ (and by symmetry for $\emptyset^B{}_t$) from (4) into (8) gives:

$$X^A{}_t = \frac{\alpha^A \beta^A L^A{}_t}{\beta^A L^A{}_t + \beta^B L^B{}_t} + K^A{}_t \tag{9}$$

Substituting for $L^A{}_t$ from (5) into (9) gives:

$$X^A{}_t = \frac{\alpha^A \beta^A \left(\frac{1}{\delta}\right) X^A{}_t}{\beta^A \left(\frac{1}{\delta}\right) X^A{}_t + \beta^B L^B{}_t} + K^A{}_t \tag{10}$$

Substituting for $L^B{}_t$ from (6) into (10) gives:

$$X^A{}_t = \frac{\alpha^A \beta^A \left(\frac{1}{\delta}\right) X^A{}_t}{\beta^A \left(\frac{1}{\delta}\right) X^A{}_t + \beta^B \gamma^B L^A{}_{t-1}} + K^A{}_t \tag{11}$$

Substituting for $L^A{}_{t-1}$ from (6) with one period lag into (11) gives:

$$X^A{}_t = \frac{\alpha^A \beta^A \left(\frac{1}{\delta}\right) X^A{}_t}{\beta^A \left(\frac{1}{\delta}\right) X^A{}_t + \beta^B \gamma^B \left(\frac{1}{\delta}\right) X^A{}_{t-1}} + K^A{}_t \tag{12}$$

Then

(a) Setting $K^A{}_t = 0$ (i.e. applying the FFP constraint)

(b) Cancelling $\left(\frac{1}{\delta}\right)$ terms

$$X^A{}_t = \frac{\alpha^A \beta^A X^A{}_t}{\beta^A X^A{}_t + \beta^B \gamma^B X^A{}_{t-1}} \tag{13}$$

Dividing (13) through by $X^A{}_t$ gives:

$$1 = \frac{\alpha^A \beta^A}{\beta^A X^A{}_t + \beta^B \gamma^B X^A{}_{t-1}} \tag{14}$$

Re-arranging gives the first order difference equation:

$$\boldsymbol{X^A{}_t + \gamma^B \left(\frac{\beta^B}{\beta^A}\right) X^A{}_{t-1} = \alpha^A} \tag{15}$$

<u>Part 2. Solve the first order difference equation</u>

2.1 The inter-temporal equilibrium value of X^A

The first order difference equation is of the form: $y_{t+1} + ay_t = c$

If $a \neq -1$, then the inter-temporal equilibrium value (i.e. the particular solution, y_p) is given by:

$$y_p = \left(\frac{c}{1+a}\right)$$

Applied to (15),

The assumption $a \neq -1$ corresponds to:

$$\boldsymbol{\gamma^B \frac{\beta^B}{\beta^A} \neq -1}$$

The inter-temporal equilibrium value is given by:

$$X^A(t) = \frac{\alpha^A}{1 + \gamma^B \frac{\beta^B}{\beta^A}}$$

Re-arranging gives the inter-temporal solution equilibrium value:

$$\boldsymbol{X^A(t) = \frac{\alpha^A \beta^A}{\beta^A + \gamma^B \beta^B}}$$

2.2 The path to equilibrium for X^A

Let the difference equation be homogeneous of the form: $my_{t+1} - ny_t = 0$

Then the path to equilibrium value (i.e. the complementary function, y_c) is given by:

$$y_c = k\left(\frac{n}{m}\right)^t$$

The ratio $\left[-\left(\frac{n}{m}\right)\right]$ determines the path. Applied to (15) for we have: $m = 1$ and $n = -\gamma^B \left(\frac{\beta^B}{\beta^A}\right)$

Defining $\theta \equiv \left(\frac{n}{m}\right)$ gives:

$$\boldsymbol{\theta \equiv -\gamma^B \frac{\beta^B}{\beta^A}}$$

The conditions stated in the paper for convergence and oscillation are the mathematical conditions applying to θ.

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