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ABSTRACT

Does Compliance with Financial Fair Play Rules Improve the Football Clubs' Sport Performance and Their Chances to Reach UEFA Competitions?*

This paper evaluates the European football clubs' compliance with UEFA Financial Fair Play (FFP) regulations and the effect of financial stability on sport achievements. The empirical analysis uses data of teams competing in the 1st division of four top domestic leagues (Premier League, La Liga, Serie A, and Ligue 1) over the seasons 2009/10 to 2015/16. We control for team quality through the annual wages (in quadratic form) and use the Wage-to-Revenue (WRR) ratio as a proxy variable to measure how close the clubs meet the break-even requirements. Our results reveal that greater financial responsibility implies better sport performance and higher chances to qualify for the Champions and Europa Leagues.

JEL Classification: D22, J24, J33

Keywords: professional football, financial fair play, competitive balance, wage-to-revenue ratios

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1. Motivation and literature

The introduction of the Financial Fair Play (FFP) regulations by the governing body of the Union of European Football Associations (UEFA) aims to encourage the sustained financial stability of football clubs. An essential element of the FFP is the break-even requirement, calculated as the difference between what UEFA defines as "relevant revenue" and "relevant expenses". Under the break-even rule, the clubs' spending is constrained by the financial means available to them (e.g. their annual earnings); that is, the teams with higher income are thus allowed to spend larger amounts on salaries[1]. In practice, "break-even requirements" allow for an acceptable cumulative average loss of €30 million, computed over a three-year period (UEFA, 2015). Appendix 1 provides a detailed description.

This paper empirically examines if the fulfillment of such regulations (e.g. financial responsibility) might have a systematic positive influence on sport achievements, beyond the improved financial stability of clubs. First, we investigate whether a closer fulfillment of the break-even requirement, as captured by a lower Wage-to-Revenue Ratio (WRR), indicates better managerial practices that lead to enhanced sport performance. For this purpose, we run a battery of OLS regressions in line with the productivity equation proposed by Carmichael et al. (2011). And second, we inquire into the chances for qualifying to UEFA competitions, as we believe this additional analysis enables us to throw further light into the disparities across domestic leagues. For this endeavor we rely on logit model estimation, which is extensively adopted in the context of general management (see Hoetker (2007), for instance) and also in sports (Green et al. (2015); Ahtiainen and Jarva (2020), among others).

Let us now briefly consider how our contribution fits in with the sports literature regarding FFP legislation. Previous contributions addressed the implications of the FFP regulations on a number of aspects, such as: the consolidation of dynasties associated to historical clubs (Vöpel, 2011); the forgone income due to excluding "external" agents to provide resources (Madden, 2011); the cost

[1] Ahtiainen & Jarva (2020) offer a description of the FFP regulations "*unanimously approved by UEFA's Executive Committee in September 2009. In June 2010, the first set of FFP regulations were introduced, and they have been updated three times since (UEFA, 2012, 2015, 2018). However, the key requirements of FFP have remained largely unchanged: (i) it highlights transparency and credibility by setting minimum disclosure requirements for clubs' financial statements; (ii) it requires clubs to prove that they do not have overdue payables to other clubs, their players, and social/tax authorities throughout the season; (iii) it requires clubs to comply with the break-even requirement. Specifically, FFP's break-even rule states that relevant incomes and expenses essentially match over the reporting periods, and any difference must be above a predetermined threshold. Failure to comply with the FFP requirements can invoke various penalties ranging from warnings and fines to disqualification/exclusion from UEFA's competitions (i.e. the Champions League or Europa League)*".

efficiency of football clubs that face a trade-off between sport and economic outcomes (Ghio et al., 2019); the joint sporting and financial efficiency of football clubs (Gallagher and Quinn, 2019); the probability of clubs reporting losses (Ahtiainen and Jarva, 2020); the impact on the business model of football clubs (Dimitropoulos and Scafarto, 2021); etc.

A relevant aspect that has increasingly attracted the research efforts in the field concerns the impact of the FFP on the competitive balance of teams playing in European leagues. In recent years there have been many papers addressing this issue: Franck (2014); Peeters and Szymanski (2014); Freestone and Manoli (2017); Birkhäuser et al. (2019); Plumley et al. (2019); and Garcia-del-Barrio and Rossi (2020), among others. The latter paper argues that, while commitment to FFP rules enforces greater financial stability (an effect that is only modest, according to Ahtiainen and Jarva, 2020), it can also diminish the quality of the competitions by undermining the competitive balance of teams. Moreover, Garcia-del-Barrio and Rossi (2020) find evidence that WRRs have converged towards smaller figures in the main European football leagues. They argue that break-even requirements limit the teams' chances to deviate from WRR values attached to low-financial-risk. Accordingly, weaker teams—that is, those facing the risk of relegation—are supposed to counterbalance their poor sport performance with greater financial instability[2].

Arguably, regulatory limits on the income received from external agents can affect weaker teams more decisively than top-performing teams, as the former group is thus impeded to reduce their wage gap relative to their better-to-do rivals. Peeters and Szymanski (2014), however, suggest the existence of spillover effects related to the drop in the cost of reaching a given level of sport talent and achievements. They argue that FFP regulations, in addition to restricting the clubs' wage spending, will also improve the competitive balance of teams as they reduce the competitive advantage of teams at the top. We believe that both arguments may actually be valid.

Franck (2014) expresses concerns about the effects of FFP regulations, as the competitive balance is typically implemented through limits on wage spending (Peeters and Szymanski, 2014) —like salary caps in US professional leagues.[3] The economic literature has also addressed the link between overinvestment and revenue dissipation in sports (Dietl et al., 2008). Other papers (Dietl et al., 2009)

[2] Di Simone and Zanardi (2020) make use of "Staff-to-Sales" (SS) ratio, which is the equivalent to our WRR variable.

[3] Ghio et al. (2019) offer an empirical analysis for Italian clubs to assess the trade-off between sporting and economic outcomes. Their findings imply that FFPs do not improve the average efficiency of Italian first division teams. Gallagher and Quinn (2019), in turn, look into the effect of break-even financial constraints on the joint sporting and financial efficiency of 60 English football clubs for the period 2003/2004 to 2016/2017. They find that break-even rules bring about reductions in the clubs' efficiency (on average), and that UEFA financial regulations may force clubs to give attention to financial achievements while weakening the future competitive intensity in the Premier League.

argue that the introduction of salary caps (as a fixed proportion of the clubs' income) is ultimately equivalent to the break-even FFP rules imposed by UEFA. Rohde and Breuer (2016) find evidence on financial achievements being explained by the clubs' brand value as well as by their sport performance. Thus, football clubs are bound to suffer from mismanagement as long as they overinvest in talent—something that is likely to happen when they prioritize sport success over economic returns.

Our contribution departs from the previous references in that we examine how the introduction of the FFP rules—in the form of break-even requirements—affects football clubs objectives beyond their economic outcomes, as we pay special attention to how WRRs relate to sport achievements. In our empirical analysis we will consider the implications of estimating the models with variables in levels as well as in deviations from the mean. The latter seems to be a more suitable strategy on two accounts: first, it is the relative strengths among teams what matters in the end (Sanderson, 2002); and second, models in deviations tend to enjoy better statistical properties to explain the clubs' behavioral equations. This approach is equivalent to using the share (of revenues, wages, etc.) that a team has within a league and season; previous research adopting this approach includes Carmichael et al. (2011) and Caporale and Collier (2015), for instance.

The structure of the paper is as follows. Section 2 includes the data description and a brief analysis on how the UEFA financial rules affect the WRRs, while distinguishing among the domestic leagues under examination. Section 3 describes the basic model and the econometric strategies to test our hypothesis. Section 4 reports the estimations obtained from the different specification models and offers a discussion on the main results. Finally, in the concluding section, we summarize the results and venture a few intuitions.

2. Data Description

The empirical analysis we develop here is based on data of teams playing in the first division category of four main European football leagues: England, Spain, Italy and France. (Data for Germany are not available). Thus, the dataset comprises 560 observations: 20 observations per league and season, over a period of seven years (from 2009/10 to 2015/16). Actually, due to missing values, the regression analyses were made on 557 (rather than 560) observations.

For the majority of the clubs, data on financial variables—e.g. annual revenues (R_{it}) and annual wages (W_{it})—were obtained from Deloitte (Football Money League, FML; and Annual Report of Football Finance, ARFF) or from databases such as SABI, Aida, Amadeus, and Hoovers. In some cases, we collected the information directly from the clubs' official accounts.

Table 1 reports some descriptive statistics of the main variables. The information on the WRR variable, given its relevance for our analysis, is further decomposed by seasons.

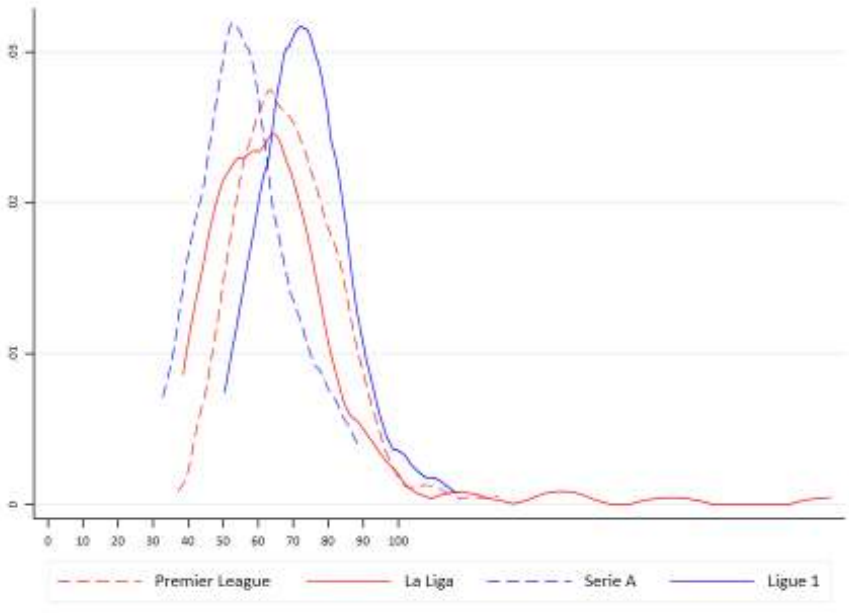
Table 1. Descriptive statistics of the Main Variables

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Annual Wages (in Mill.)	558	67.4891	65.0220	7.6480	371.7350
Annual Revenues (in Mill.)	557	108.5088	115.8975	13.4260	690.1000
Wage / Revenue (WRR) %	557	66.2422	17.8667	32.7682	223.4163
Points in Domestic League	560	51.9375	16.1606	17	102
Wage/Revenue Ratio (by season)					
WRR (in %)	**Obs.**	**Mean**	**Std. Dev.**	**Min.**	**Max.**
Season 2009/10	79	68.7240	18.3566	34.9539	144.3468
Season 2010/11	79	70.2821	21.7254	34.5662	177.8663
Season 2011/12	80	68.9575	23.6512	35.8764	223.4163
Season 2012/13	80	64.8803	15.3858	34.8692	128.6862
Season 2013/14	80	63.1727	15.2610	37.6144	148.8179
Season 2014/15	79	63.1765	13.1953	32.7682	94.5126
Season 2015/16	80	64.5454	13.9047	39.5207	106.8145

Sources: Deloitte ARFF, Deloitte FML and authors' own collection from club's accounts.

Before addressing the main topic of this paper, Figure 1 displays the estimated Kernel probability density functions of the WRR, one for each of the four football leagues considered.

Figure 1. Kernel density functions – Wage-to-Revenue Ratios (by domestic leagues)



This preliminary analysis reveals significant discrepancies in the patterns of WRRs across domestic leagues. It seems that wage inflation affects the French Ligue 1 more intensively, with Italian Serie A falling on the other end of the scale.

The empirical analysis will focus on three main variables: (i) number of points in domestic leagues, (ii) annual wages, and (iii) the Wage-to-Revenue Ratio (WRR). To test whether or not financial negligence leads to poorer sport performance in football clubs, we will run a set of conventional "sport performance" equations. In particular, we will regress the number of points upon the wages (in a quadratic), our WRR variable, and a set of controls.

On the one hand, if the estimated coefficients on WRR turn out to be negative and statistically significant—even when accounting for the squad quality as captured by the annual wage bill—then a growing share in WRR would mean fewer points in the league and, thus, poorer sport performance. On the other hand, if the WRR coefficients happen to be positive and statistically significant, we should conclude that overspending in talent provokes an additional positive impact on sport performance. Finally, if these coefficients are not significant, we should simply acknowledge no systematic link between the clubs' financial management and sport performance.

Note that the WRR requirements are part of the FFP rules imposed by the UEFA to promote the clubs' financial discipline and stability, which prevents them from overspending with respect to their actual revenues. To ensure that the clubs' accounts are balanced, UEFA adopted, in 2013, the break-even requirements, which limit the annual wage spending depending on their annual revenues. The conditions regarding the compliance with break-even requirements were only effective since the 2014/15 season[4]. In particular, it was not until May 2014, during the 2014/15 season, that UEFA imposed the first sanctions to clubs failing to fulfill the break-even requirements, which allowed clubs to spend up to €5 million beyond the income earned during a three-year assessment period.

According to UEFA, by setting the acceptable deficits in absolute figures, instead of relative percentage terms, they are less restrictive to smaller and medium-sized clubs. At any rate, in the empirical analyses carried out in this paper we rely on WRRs since they are more illustrative and do not differ essentially to the way in which the break-even assessments are structured. The following section lays out our model and describes how it fits in with the literature.

3. Description of the baseline model

We base our model on the productivity equation, as in Carmichael et al. (2011). Equation (1) describes how the clubs' annual wage bill, the WRR, and other control variables, affect the football teams' performances. We measure sport performance by the number of points scored at the end of

[4] Even though UEFA implemented the FFP rules in 2011, their actual application started later. To prevent exclusion from UEFA competitions, the clubs' accounts in 2011/12 and 2012/13 had to follow the FFP rules. Since then, UEFA imposed economic penalizations, warnings, transfer bans, points' deductions, limits on registering players, etc.

the domestic football league. Given that all the leagues have the same number of teams (and games) and they comply with the same competition rules, there should be no significant difference between using the number of points in levels or in deviations from the mean.

$$SP_{it} = f(W_{it}, WRR_{it}, Z) \quad (1)$$

where: SP_{it} = domestic sport performance (points) - club i and season t
W_{it} = total annual wages - club i and season t (millions of €)
WRR_{it} = wage over revenue ratio - club i and season t (millions of €)
Z = a vector of other controls.

In any case, Equation (1) and its explicit version in (2) below, are based on the idea that sport achievements are basically determined by sport talent, as captured by the teams' annual wage bills. For the sake of simplicity the dependent variable will only account for domestic sport performance.

Initially, we estimate the models with the three main variables (points in domestic leagues, annual wages, and WRRs) in levels. Then we replicate the estimation expressing the variables in deviations with respect to their means. As stated earlier, it is the relative strength between rivals what ultimately matters for performance (Sanderson, 2002). We report the estimations resulting from both specifications as a robustness check.

Our baseline estimable equation will take the following form:

$$SP_{it} = \alpha_0 + \alpha_1 \cdot W_{it} + \alpha_2 \cdot W_{it}^2 + \alpha_3 \cdot WRR_{it} + \sum_{t=1}^{6} \vartheta_t \cdot Season_t + \sum_{j=1}^{3} \eta_j \cdot League_j + \gamma_i + \upsilon_{it} \quad (2)$$

Thus, the number of points scored in the domestic league at the end of the season is regressed on annual wages, its quadratic form[5], WRR, and a set of controls (e.g. year and league dummies).

Of course, our empirical analysis adheres to the usual positive correlation found between the teams' amount of talent (as measured by the annual wage bill) and sport achievements (Szymanski and Smith, 1997; Forrest and Simmons, 2002; and Barajas and Rodriguez, 2010).

The clubs' annual wage bill is meant to capture the amount of talent in the teams' rosters, which is then supposed to translate into sport achievements and, eventually, have a positive impact on the clubs' economic perspectives. We expect a positive and statistically significant coefficient for α_1 but a negative and significant coefficient for α_2—the latter not only accounts for diminishing returns in wages, but also relates to the usual patterns attached to overinvestment in sport talent.

[5] The introduction of wages in a quadratic form is in line with the studies on productivity functions and is consistent with the law of diminishing marginal returns and, moreover, delivers the best results.

Our attention will however be focused on coefficient α_3, whose sign permits assessing the extent to which the clubs' financial responsibility affects sport performance[6]. Hence, higher WRRs beyond certain threshold, would arguably make the financial situation of football clubs more unmanageable, resulting in poor sport performances. A negative and significant coefficient would thus imply that economic mismanagement leads to poorer sport achievements —a feature that will also be illustrated below by breaking down the contribution of the WRR variable into different threshold levels, as to see the progression or make out a pattern among those levels.

A few remarks on the estimation methodology need to be made. In a panel estimation framework as ours, heterogeneity bias usually implies the inclusion of either fixed effects (FE) or random effects (RE), which can capture the differences among cross-sections better than a pooled OLS estimation. For this reason, and as another robustness check, in the next section we offer both the pooled and FE estimations. If the teams that commit to a higher level of both wages and WRRs are the same all over the sample, then fixed effects can conveniently pick up these elements of individual heterogeneity and add explanatory power to the model.[7]

4. Empirical Analysis

This section presents a variety of empirical approaches and results based on the simple model described in equations (1) and (2). Section 4.1 reports the estimations for models where sport performance is measured by the number of points scored in the domestic league at the end of the season. Section 4.2 performs a more refined analysis by distinguishing the distinctive patterns observed in each of the four domestic leagues under analysis. Finally, Section 4.3 examines the probability to reach the UEFA Europa league or the Champions league.

[6] Another related topic concerns the debate on football clubs' objectives. Some studies conclude that clubs tend to behave generally as win-maximizing rather than profit-maximizing organizations —Sloane (1971); Késenne (1996); Zimbalist (2003); Késenne (2006); Vrooman (2007); Garcia-del-Barrio & Szymanski (2009); Fort (2015). Other scholars consider that the target for most clubs is to maximize profits —El-Hodiri & Quirk (1971); Fort and Quirk (1995); Szymanski & Késenne (2004); Grossmann & Dietl (2009). The literature also stresses the existence of a trade-off between wins and profits (Dietl et al., 2008), leading to some papers (Dietl et al., 2011) to assume that professional sport leagues are contests where clubs behave as "utility" maximizers, as they maximize the weighted sum of wins and profits.

[7] It is a conventional procedure to discriminate between the FE and RE estimations relying on the Hausman test (Hausman, 1978). In our models, the test indicates that the differences in the coefficients are not systematic. However, even though the RE estimators are hence consistent and efficient, we chose reporting the FE estimators due to a theoretical reason: we do not expect that the idiosyncratic elements of heterogeneity may change in such a short period of time.

For the sake of robustness, we estimate the models both for the main variables (wages, points, and WRR) in levels as well as in deviations from the mean, where the means are computed for each league and season in the database. Besides, we use a collection of control dummies to account for the peculiarities of each domestic league (where the Italian Serie A remains as the reference league) and a set of temporal dummies to control for the different seasons. The latter are crucial for the case in which the main variables are in levels, and become almost irrelevant when expressed in deviations from the mean.

4.1. Estimations of the baseline model

Table 2 exhibits the estimated coefficients of the productivity equation on the pooled sample in specification (2.1) and with fixed effects in (2.3). Notice that the alternative versions in (2.2) and (2.4) break down the WRR variable into dummies representing different intervals: below 50%; 50 to 60%; 60 to 70%; 70 to 80%; 80 to 90%; and, finally, above 90%. By offering several related estimations not only do we achieve greater robustness, but we are also able to reach more nuanced conclusions about the topic at hand.

The results are straightforward and indicate that greater financial responsibility, which is associated to lower WRR, comes along with better sport performances. This conclusion holds for different specifications models, as the statistical significance of the WRR estimated coefficient in models (2.1) and (2.3), and the d_WRR estimator in models (3.1) and (3.3) indicate. The two mentioned models of Table 3 correspond to the specifications where the main variables (points, wages, and WRR) are expressed in deviations from their means, calculated for every season and domestic league[8].

Moreover, the estimations of models including fixed effects —like (2.2) and (3.2)— reinforce the conclusiveness of our results, since the significance levels attached to WRR and d_WRR still hold even when we account for potential elements of individual heterogeneity of the teams. The results of model (2.2) and (3.2) convey additional enlightening information: the negative impact on sport performance starts being significant when teams' WRR range between the interval 60 to 70%; and it becomes increasingly large as the WRR percentage grows bigger. Nevertheless, it is worth noticing that the conclusions seem to apply to models (2.4) and (3.4), although the corresponding coefficients, even when increasingly negative, are not statistically significant.

[8] This approach, used in the models gathered in Table 3, is the preferred strategy in a number of papers that model performance equations—where clubs' annual salaries are related to sport performances—by using the teams' relative positions in their respective leagues (Torgler and Schmidt (2007); Caporale and Collier (2015); and Garcia-del-Barrio, and Tena-Horrillo (2019), among others).

Table 2. Productivity Equations – Domestic Points Models (in levels)

Dep.Var.	**Points**	**Points (seg)**	**Points**	**Points (seg)**
Models	(2.1) OLS	(2.2) OLS	(2.3) FE	(2.4) FE
Salaries	0.4516***	0.4515***	0.4373***	0.4186***
	(0.025)	(0.025)	(0.052)	(0.052)
Salaries^2	-0.0009***	-0.0009***	-0.0008***	-0.0008***
	(0.000)	(0.000)	(0.000)	(0.000)
WRR	-0.1253***		-0.1008***	
	(0.028)		(0.032)	
WRR<50		-0.3313		-2.2916
		(2.387)		(9.273)
WRR_60		-0.5383		-0.7122
		(2.307)		(9.399)
WRR_70		-4.3997*		-4.5644
		(2.569)		(9.439)
WRR_80		-3.6494		-4.4901
		(2.635)		(9.478)
WRR_90		-5.3260*		-5.5280
		(2.892)		(9.525)
WRR>90		-10.0155***		-9.1612
		(2.895)		(9.671)
Premier L	-11.3611***	-10.8533***		
	(1.333)	(1.349)		
La Liga	6.5356***	6.7185***		
	(1.164)	(1.182)		
Ligue 1	6.7591***	7.1169***		
	(1.274)	(1.302)		
2010_11	-0.4624	-0.2435	-1.4625	-1.2846
	(1.410)	(1.421)	(1.407)	(1.407)
2011_12	-2.1325	-2.0548	-3.1097**	-3.0181**
	(1.556)	(1.550)	(1.424)	(1.426)
2012_13	-2.0399	-1.9954	-2.9717**	-2.9570**
	(1.524)	(1.553)	(1.440)	(1.440)
2013_14	-2.8491*	-2.9369*	-4.4945***	-4.7164***
	(1.567)	(1.599)	(1.466)	(1.474)
2014_15	-4.2039***	-4.3996***	-5.7400***	-5.8548***
	(1.514)	(1.584)	(1.536)	(1.538)
2015_16	-5.9589***	-6.1100***	-8.4782***	-8.4054***
	(1.614)	(1.650)	(1.622)	(1.616)
Constant	39.7356***	34.3925***	40.2852***	38.3284***
	(2.181)	(2.684)	(2.939)	(9.563)
Fixed Effects	–	–	Yes	Yes
N. Obs.	557	557	557	557
R^2	0.6659	0.6700	0.5086	0.5135
Adj. R^2	0.6585	0.6595		
within R^2			0.1702	0.1836
AIC	4088.33	4089.53	3828.64	3829.55

Notes: Robust standard errors in parentheses | In Fixed Effect (FE) models, R^2 denotes the overall R-squared.
*** p<0.01, ** p<0.05, * p<0.1

Table 3 reports the estimations of models with the variables expressed in mean deviations.

Table 3. Productivity Equations – Domestic Points Models (in mean deviations)

Dep.Var.	**PointsDev.**	**PointsDev.(seg)**	**PointsDev.**	**PointsDev.(seg)**
Models	(3.1) OLS	(3.2) OLS	(3.3) FE	(3.4) FE
d_salaries	0.3020***	0.3019***	0.3470***	0.3359***
	(0.014)	(0.014)	(0.041)	(0.041)
d_ Salaries^2	-0.0007***	-0.0007***	-0.0008***	-0.0008***
	(0.000)	(0.000)	(0.000)	(0.000)
d_WRR	-0.1169***		-0.1110***	
	(0.028)		(0.033)	
WRR<50		-2.8882		-0.2254
		(2.618)		(9.240)
WRR_60		-3.1264		1.0125
		(2.494)		(9.361)
WRR_70		-6.2688**		-2.9518
		(2.768)		(9.408)
WRR_80		-5.3061*		-2.7083
		(2.744)		(9.443)
WRR_90		-7.2933**		-4.0783
		(2.903)		(9.489)
WRR>90		-12.3226***		-7.9200
		(2.971)		(9.637)
Premier L	1.3267	3.0446**		
	(1.244)	(1.321)		
La Liga	1.8853	3.1478***		
	(1.150)	(1.211)		
Ligue 1	-0.5799	1.5152		
	(1.165)	(1.297)		
2010_11	-0.1288	0.2669	-1.0966	-0.7262
	(1.393)	(1.414)	(1.401)	(1.400)
2011_12	-0.3571	-0.3068	-1.5289	-1.4500
	(1.530)	(1.519)	(1.410)	(1.410)
2012_13	-0.1114	-0.5632	-1.3736	-1.8273
	(1.526)	(1.552)	(1.422)	(1.426)
2013_14	0.2399	-0.4815	-1.8012	-2.7017*
	(1.590)	(1.634)	(1.431)	(1.450)
2014_15	1.3997	0.5071	-0.4586	-1.3680
	(1.519)	(1.587)	(1.480)	(1.486)
2015_16	1.7318	1.0696	-1.2029	-1.9164
	(1.754)	(1.776)	(1.526)	(1.520)
Constant	1.5589	5.9242**	4.0394***	6.3513
	(1.338)	(2.955)	(1.087)	(9.453)
Fixed Effects	–	–	Yes	Yes
N. Obs.	557	557	557	557
R^2	0.6470	0.6513	0.6402	0.6409
Adj. R^2	0.6392	0.6403		
within R^2			0.1755	0.1903
AIC	4118.06	4119.20	3823.63	3823.54

Notes: Robust standard errors in parentheses | In Fixed Effect (FE) models, R^2 denotes the overall R-squared.
*** p<0.01, ** p<0.05, * p<0.1

As expected, the results of Table 2 and 3 are similar, but we report both for the sake of robustness.

4.2. A more refined analysis by leagues

Table 4 shows the results of carrying out a more detailed analysis, where pooled OLS models estimations are estimated splitting out the WRR coefficient into four estimators, one for each league.

Table 4. OLS Productivity Equations – Domestic Points Models (different WRR slope by leagues)

	Points (A.2.1) = (2.1)	**Points'** (A.2.2)	**PointsDev.** (A.2.3) = (3.1)	**PointsDev.'** (A.2.4)
Salaries	0.4516***	0.4686***		
	(0.025)	(0.026)		
Salaries^2	-0.0009***	-0.0009***		
	(0.000)	(0.000)		
WRR	-0.1253***			
	(0.028)			
d_salaries			0.3020***	0.3048***
			(0.014)	(0.014)
d_ Salaries^2			-0.0007***	-0.0007***
			(0.000)	(0.000)
d_WRR			-0.1169***	
			(0.028)	
idleague#c.WRR				
WRR_Premier L		-0.2658***		
		(0.057)		
WRR_La Liga		-0.0439*		
		(0.024)		
WRR_Serie A		-0.2821***		
		(0.069)		
WRR_Ligue 1		-0.0983		
		(0.067)		
idleague#c.d_WRR				
d_WRR_Premier L				-0.2611***
				(0.057)
d_WRR_La Liga				-0.0416
				(0.026)
d_WRR_Serie A				-0.2140***
				(0.070)
d_WRR_Ligue 1				-0.1074*
				(0.064)
Premier L	-11.3611***	-10.9000*	1.3267	1.3281
	(1.333)	(5.570)	(1.244)	(1.238)
La Liga	6.5356***	-7.5244*	1.8853	1.8869*
	(1.164)	(4.262)	(1.150)	(1.139)
Ligue 1	6.7591***	-3.9268	-0.5799	-0.5793
	(1.274)	(6.359)	(1.165)	(1.162)
Constant	39.7356***	47.8850***	1.5589	1.5587
	(2.181)	(3.882)	(1.338)	(1.331)
Season Dummies	Yes	Yes	Yes	Yes
N. Obs.	557	557	557	557
R^2	0.6695	0.6771	0.6470	0.6550
Adj. R^2	0.6585	0.6682	0.6392	0.6454
AIC	4088.33	4075.24	4118.07	4111.35

Notes: Standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Notice that in Table 4, the models (A.2.1) and (A.2.3) are taken from Table 2 and 3, and (A.2.2) and (A.2.4) shed new evidence on the impact of WRR on sport performance: we see negative and statistically significant coefficients for Premier League, Serie A, and (in a lesser extent) for Ligue 1; all but the Spanish league.

4.3. Estimation of Logit models: probability to reach UEFA leagues

The implementation of break-even requirements was introduced by UEFA to foster football clubs' financial responsibility and to lower their risk to face a financial failure. European teams have to comply with these rules should they want to be granted the license authorizing them to participate in European competitions (UEFA, 2015).

Interestingly, the empirical analyses of sections 4.1 and 4.2 reveal that compliance with the break-even restrictions also implies better sport performances of European football teams. This result holds systematically and is robust to different model specifications. We now turn our attention to the teams' probabilities to reach UEFA competitions. The analysis will examine separately the chances for a team to qualify for the Europa League and the Champions League.

Notice that the current UEFA Champions League draws heavily on the previous pre-1992 competition, the "European Cup", where domestic football league winners competed in a knockout tournament. The current structure of the Champions League involves a qualifying stage, a divisional round-robin phase, and a final knockout stage. The attempt to create a closed *'Superleague'* in European football has been a matter of serious consideration since the 1990s. The issue is controversial, as it involves legal demands against historic Top European football clubs. In this context, Green et al. (2015) give some insights:

"*UEFA has rejected (implicitly or explicitly) two alternative competition formats. One is an end of season playoff competition akin to playoffs in North American leagues. This would not be feasible due to the sheer number of domestic leagues in Europe. The second, more feasible, design is a breakaway European* 'superleague' *where elite teams detach themselves from their domestic leagues to form a separate competition, either closed or open with promotion or relegation.* (…) *The established Champions' League competition design has games scheduled in midweek to avoid conflicts with the weekend fixtures in domestic league competitions facilitating coexistence with domestic leagues*".

The purpose of this section is to measure the extent to which a change in the teams' WRR—as a measure of the degree of the clubs' fulfillment of FFP rules—affects the team's probability to reach UEFA competitions. Given the probabilistic nature of this exercise, we rely on Logit estimation,

whose nonlinearity makes for a more difficult interpretation of the estimated coefficients[9]. For this reason, and as suggested by the literature, we will report the marginal effects so we can assess how our explanatory variables can change the probability of reaching the targeted outcome (Hoetker, 2007).

The estimated coefficients of a Logit model measure the effects of the explanatory variables on the log-odds of the outcome, instead of the effects on the probability, which is what we are typically interested in knowing.

On the one hand, odds ratios are often misinterpreted by considering them as relative probabilities. On the other hand, marginal effects convey the information as differences in probabilities, thereby being more appropriate than odds ratios and relative probabilities. Marginal effects are therefore better suited to see the effects of an explanatory variable on a binary (0 or 1) dependent variable (Norton and Dowd, 2018). Also notice that marginal (e.g. incremental) effects are derivatives, and in the case of a continuous variable—and when the model is non-linear—it applies to a small change in the explanatory variable. The interpretation is more intuitive for dummy variables, as the change goes from 0 to 1. In the tables below we will present the marginal effects at the mean, that is to say, assuming that the other covariates take their average value[10].

In line with the previous comments, Table 5 shows the results of estimating the four specifications that result from combining two pair of alternatives: (i) estimations with variables in levels (models 5.1 and 5.2) or in deviations from the mean, for each season and national league (models 5.3 and 5.4); and (ii) models including a continuous WRR as regressor (models 5.1 and 5.3) or a collection of dummies by intervals (models 5.2 and 5.4). Along with the estimated coefficients we provide the corresponding marginal effects (dy/dx) at the bottom of the table.

To evaluate the models' predictive power we rely on the pseudo R-squared statistic, which—even if it does not measure the proportion of the variance explained by the regressors, as with the R-squared in OLS models—is still a valid statistic to compare among models that use the same dataset and dependent variable (Yatchew and Griliches,1985).

[9] Although the Logit and Probit estimations are similar in binary studies, the former model is preferred for samples with short time periods due to problems of incidental parameters observed in FE Probit estimations (Greene, 2004). We only report the marginal effects for pooled models, as Logit models do not provide them for FE estimations.

[10] We neglect the discussion on whether the average marginal effect or the marginal effect at the mean are better (Williams, 2012)—in calculating marginal effects it does not matter at which value we hold the other covariates constant, because we are taking differences in the effects.

Table 5. Logit Models – Probability to qualify for the UEFA Europa League

Dep.Var.	**EuropeL**	**EuropeL(seg)**	**EuropeDev.L**	**EuropeDev.L(seg)**
Models	(5.1) Logit	(5.2) Logit	(5.3) Logit	(5.4) Logit
Salaries	0.0948***	0.0975***		
	(0.010)	(0.011)		
Salaries^2	-0.0002***	-0.0002***		
	(0.000)	(0.000)		
WRR	-0.0381***			
	(0.010)			
d_salaries			0.0627***	0.0642***
			(0.007)	(0.007)
d_ Salaries^2			-0.0002***	-0.0002***
			(0.000)	(0.000)
d_WRR			-0.0359***	
			(0.010)	
WRR<50		-6.4252***		-8.6166***
		(1.431)		(1.399)
WRR_60		-6.7507***		-8.8335***
		(1.388)		(1.340)
WRR_70		-6.5108***		-8.5209***
		(1.408)		(1.373)
WRR_80		-7.5229***		-9.4553***
		(1.422)		(1.373)
WRR_90		-8.4206***		-10.3591***
		(1.417)		(1.398)
WRR>90		-8.9602***		-11.0392***
		(1.482)		(1.493)
Premier L	-2.0462***	-2.2582***	0.6522	0.9324*
	(0.589)	(0.606)	(0.503)	(0.543)
La Liga	1.9773***	1.8535***	1.0250***	1.2067***
	(0.401)	(0.415)	(0.353)	(0.380)
Ligue 1	1.5474***	1.5339***	-0.2216	0.2403
	(0.498)	(0.510)	(0.378)	(0.446)
Constant	-2.7668***	1.8377	-0.6623	8.3923***
	(0.701)	(1.628)	(0.429)	(1.394)
Season Dummies	Yes	Yes	Yes	Yes
N. Obs.	557	557	557	557
Pseudo R^2	0.4516	0.4643	0.4456	0.4600
AIC	411.20	412.27	415.41	415.27
Marginal Effects	(5.1)	(5.2)	(5.3)	(5.4)
Salaries	0.0197***	0.0202***		
Salaries^2	0.0000***	0.0000***		
WRR	-0.0079***			
d_Salaries			0.0131***	0.0133***
d_Salaries^2			0.0000***	0.0000***
d_WRR			-0.0075***	
WRR<50		-1.3304***		-1.7859***
WRR_60		-1.3978***		-1.8308***
WRR_70		-1.3482***		-1.7660***
WRR_80		-1.5577***		-1.9597***
WRR_90		-1.7436***		-2.1470***
WRR>90		-1.8553***		-2.2880***
Premier L	-0.4257***	-0.4676***	0.1360	0.1933*
La Liga	0.4113***	0.3838***	0.2137***	0.2501***
Ligue 1	0.3219***	0.3176***	-0.0462	0.0498

Notes: Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Specification (6.1) confirms yet again that the teams' annual wages capture the quality of the squads, and can thus be considered as a major driver of the teams' chances to reach European competitions. The fact that the two coefficients defining the quadratic functional form of the baseline model (salaries and squared salaries) are statistically significant reveals the existence of diminishing returns to scale. This is certainly a robust result, given that the estimators are statistically significant in all four specification models.

In this section we focus specifically on the probability of the teams to qualify for UEFA competitions, which must be considered as a reward in terms of sporting opportunities, reputation, and economic returns. We are especially interested in the WRR variable, since the preceding sections provided the evidence for improved sport performances in football teams as a result of financial responsibility. We venture that this finding points towards a more general conclusion, namely, that financial mismanagement (in organizations) goes along with poor general managerial practices. According to our results, a lack of financial orthodoxy in football appears to be correlated with poorer sport performances.

In reporting the marginal effects we want to highlight both the qualitative as well as quantitative conclusions. These marginal effects indicate the real changes in the predicted probability; that is, by what degree the probability of qualifying for a UEFA league will change when allowing for a unit change in the WRR. Remember that the WRR is expressed as the percentage of the annual salary spending with respect to annual revenues.

Notice that the magnitude of the marginal effects varies across observations, along with the values of the other regressors. Therefore, average marginal effects can differ for subgroups, which could lead to deliver, in a different context, policy recommendations that are quite different and that depend on the respective sub-group (Norton and Dowd, 2018).

According to the marginal effects in models (5.1) and (5.3), the probability to reach the UEFA Europa League decreases by 0.79% or 0.74%, when there is a 1% increase in the WRR variable in levels and in deviations from the mean, respectively. Note that this is equivalent to a 7.9% and 7.4% increase, respectively, if we were to consider a 10% increase in WRR. Table 6 shows the results for the UEFA Champions League, and the interpretation of models (6.1) and (6.2), as well as models (6.3) and (6.4), is then equivalent, in all aspects, to their counterparts in Table 5.

The marginal effects reported in models (6.1) and (6.3) show a drop in the probability to play the UEFA Champions League of about 0.37% or 0.27%, with each 1% increase in WRR. Even more informative are the results in specifications (5.2) and (5.4)—in Table 5—; as well as (6.2) and (6.4)—in Table 6—, which display the intervals for the WRR variable.

Table 6. Logit Models – Probability to qualify for the UEFA Champions League

Dep.Var.	**ChampL**	**ChampL(seg)**	**ChampLDev**	**ChampLDev(seg)**
Models	(6.1) Logit	(6.2) Logit	(6.3) Logit	(6.4) Logit
Salaries	0.0855***	0.0902***		
	(0.011)	(0.013)		
Salaries^2	-0.0001***	-0.0002***		
	(0.000)	(0.000)		
WRR	-0.0663***			
	(0.016)			
d_salaries			0.0669***	0.0709***
			(0.007)	(0.008)
d_ Salaries^2			-0.0002***	-0.0002***
			(0.000)	(0.000)
d_WRR			-0.0626***	
			(0.016)	
WRR<50		-5.6014***		-7.3553***
		(1.897)		(1.763)
WRR_60		-6.6687***		-8.3048***
		(1.751)		(1.593)
WRR_70		-6.7007***		-8.3224***
		(1.815)		(1.671)
WRR_80		-8.7402***		-10.3200***
		(1.810)		(1.627)
WRR_90		-9.2167***		-10.9600***
		(1.679)		(1.524)
WRR>90		-8.9618***		-10.7398***
		(1.927)		(1.831)
Premier L	-2.2066***	-2.5641***	-0.9954*	-0.5618
	(0.568)	(0.630)	(0.574)	(0.621)
La Liga	2.5118***	2.3179***	1.2973**	1.7345**
	(0.679)	(0.748)	(0.646)	(0.691)
Ligue 1	2.2873***	2.3119***	0.1197	1.1205
	(0.747)	(0.858)	(0.591)	(0.719)
Constant	-2.7782**	0.0886	-2.3732***	6.3194***
	(1.112)	(2.241)	(0.597)	(1.867)
Season Dummies	Yes	Yes	Yes	Yes
N. Obs.	557	557	557	557
Pseudo R^2	0.5981	0.6164	0.5990	0.6220
AIC	237.93	238.27	237.45	235.34
Marginal Effects	(6.1)	(6.2)	(6.3)	(6.4)
Salaries	0.0048***			
Salaries^2	0.0000***			
WRR	-0.0037***			
d_Salaries		0.0046***	0.0030***	0.0028***
d_Salaries^2		0.0000***	0.0000***	0.0000***
d_WRR			-0.0028***	
WRR<50		-0.2870***		-0.2869***
WRR_60		-0.3417***		-0.3239***
WRR_70		-0.3433***		-0.3246***
WRR_80		-0.4479***		-0.4025***
WRR_90		-0.4723***		-0.4275***
WRR>90		-0.4592***		-0.4189***
Premier L	-0.1234***	-0.1314***	-0.0443*	-0.0219
¤ La Liga	0.1404***	0.1188***	0.0577**	0.0677**
Ligue 1	0.1279***	0.1185***	0.0053	0.0437

Notes: Standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 7 summarizes the main findings obtained from the previous two tables. It exhibits, along with the marginal effects, the difference, in percentage, of each group (e.g. interval) with respect to the marginal effect of the reference group (WRR smaller than 50%). The calculations are useful to recognize discrepancies across the intervals.

Table 7. Logit Models – Probability to qualify for the UEFA Champions League

	Europa League - Marginal Effects				**Champions League - Marginal Effects**			
Model	(5.2) (dy/dx)	Change wrt WRR<50	(5.4) (dy/dx)	Change wrt WRR<50	(6.2) (dy/dx)	Change wrt WRR<50	(6.4) (dy/dx)	Change wrt WRR<50
WRR<50	-1.3304		-1.7858		-0.2870		-0.2868	
WRR_60	-1.3978	-5.07%	-1.8308	-2.52%	-0.3417	-19.06%	-0.3239	-12.94%
WRR_70	-1.3481	-1.33%	-1.7660	1.11%	-0.3433	-19.62%	-0.3246	-13.18%
WRR_80	-1.5577	-17.09%	-1.9597	-9.74%	-0.4478	-56.03%	-0.4025	-40.34%
WRR_90	-1.7436	-31.06%	-2.1470	-20.23%	-0.4722	-64.53%	-0.4275	-49.06%
WRR>90	-1.8553	-39.45%	-2.2879	-28.12%	-0.4592	-60.00%	-0.4189	-46.06%

Source: Authors' own calculations

We find that teams that overspend in salaries tend to show an increasing drop in the probability to reach UEFA competitions. Whenever the teams' WRR goes beyond the 70% threshold—implying that they presumably deviate too much from FFP rules—they experience a sharp reduction in their chances to reach both the UEFA Europa and Champions leagues. Moreover, our results suggest a larger reduction in the teams' chances as they further deviate to 80% and 90% and beyond. These results are even bigger in magnitude for the case of the UEFA Champions League than for the UEFA Europa League.

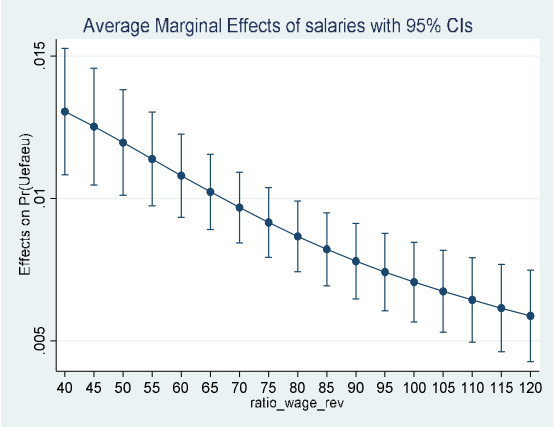
Similar results (just for UEFA Champions League) are found by Di Simone and Zanardi (2020), who distinguish between compliance with FFP rules and the salary to sales ratio (SS), which results from the ratio between staff costs and sales. They use other ratios too, such as the "Player purchase on revenue" (PPR), aiming at capturing the cost structure of clubs; and the ratio between the difference of sold and purchased players over the revenue (SPR), which is intended to measure the skill to handle the football market. More importantly to our study is the fact that they adopt a different approach to evaluate the degree of fulfillment of the FFP rules. These authors define a dummy variable (denoted as FFP) that takes the value 1 when the following three conditions are

fulfilled (and 0 otherwise): (i) financial leverage less than 0.7; (ii) staff costs over sales less than 0.7; and (iii) equity value greater than zero[11].

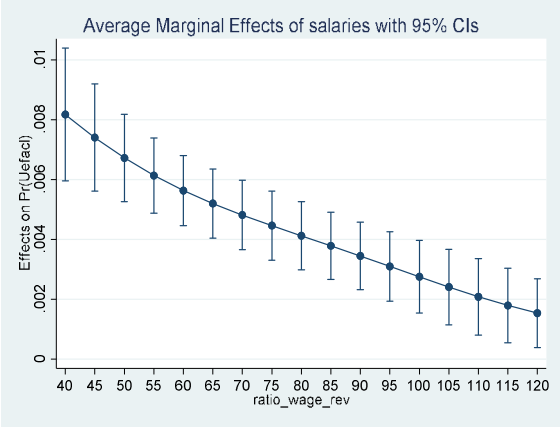
To illustrate the previous analysis and facilitate the interpretation of the role played by the WRR variable, Figure 2 displays our simulations on the probability to qualify for UEFA competitions. The graphical analysis appears to be in line with our previous results.

Figure 2. Effects on the Probability to qualify for the UEFA Europa and Champions Leagues

UEFA Europa League



UEFA Champions League



Source: Authors' own elaboration (Stata)

The interpretation of the figures is clear. The Logit models predict a positive probability of qualifying for the UEFA Europa and Champions leagues as the clubs' wage bill grows bigger. This result applies all along the range of values of the WRR variable. However, the positive correlation between the teams' salaries and the probability of reaching a league position that qualifies clubs for one of UEFA's competitions becomes smaller as the WRR covariate increases. This result is consistent with the main conclusion of the paper, namely, that financial mismanagement seems to be associated with poor management in other areas.

4. Conclusions

Our empirical analysis on major European football leagues reveals that greater financial responsibility leads to better sport performance and higher chances to qualify for the Champions and Europa Leagues. We believe our results are in line with the premise that UEFA's FFP rules have a

[11] Concerning the "Salary to Sales" (SS) ratio, which is equivalent to our WRR, they find that a 1% drop in SS implies and improvement in the Champions League rank of about 0.68, implying that a team would be able to reach beyond the initial phase, thus qualifying for the quarter-finals, with a reduction of 4 percentage points of SS.

beneficial financial effect on clubs, and even reach beyond the intended scope of the FFP spirit, as they appear to benefit also the teams' sport performance and achievements.

We have examined the behavior of four major domestic football leagues through the lens of a productivity equation (sport performance) and found, across several specifications, that the smaller the Wage-to-Revenue Ratio (WRR) the better the clubs' performance. This effect seems to be further aggravated when WRR goes beyond the 70% benchmark. In addition to this, we have applied logit regression analysis to study the impact of WRR on the clubs' probability to reach greater sport achievements, such as qualifying for the UEFA competitions. Our results suggest an increase in the probability of reaching UEFA's Europa and Champions leagues of roughly 7% and 3%, respectively, with a 10% drop in the WRR.

In summary, this paper has applied different econometric strategies that yield consistent results in support of financial stability—as embedded in UEFA's FFP rules—as a driver of better sport performance. In principle, the introduction of break-even requirements to foster greater financial responsibility is expected to lower the risk of financial failure of football clubs. Interestingly, these same break-even limits also help teams to perform better in the playing field, a result that holds consistently while controlling for the quality of the teams' rosters.

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APPENDIX 1. The UEFA FFP guidelines and break-even requirements.

Information retrieved from: *https://www.uefa.com/insideuefa/protecting-the-game/financial-fair-play*)

This Appendix summarizes the content of the FFP regulations and justify the reason why our empirical analysis is based on models where we use the WRR variable, instead of the difference between "relevant income" and "relevant expenses"—which, according to the definition of UEFA Club Licensing and FFP Regulations, is the club's break-even result for a reporting period.

A club fulfils the financial requirement insofar as its aggregate break-even result is not negative; otherwise, the club has an aggregate deficit, which the rules find tolerable expenses those in excess to revenues by an amount smaller than €5m. Moreover, the regulations allow clubs to accumulate more than €5m deficit if the entire deviation is paid by contributions from equity participants or related parties.

More specifically, the FFP regulations allow clubs to spend €5 million beyond the amount of income they generate in a 3-years assessment period. However, if the owners cover the losses, this restriction may become €30 million (it was originally €45 million).

With minor changes over the years, the fundamental principles and objectives described by UEFA (2019) have remained essentially the same:

- to improve the economic and financial the capacity of the clubs, increasing their transparency and credibility;
- to place the necessary importance on the protection of creditors and to ensure that clubs settle their liabilities with employees, social/tax authorities and other clubs punctually;
- to introduce more discipline and rationality in club football finances;
- to encourage clubs to operate on the basis of their own revenues;
- to encourage responsible spending for the long-term benefit of football;
- to protect the long-term viability and sustainability of European club football.

This regulations are detailed in full in the UEFA Club Licensing and Financial Fair Play Regulations (and the Addendum). They are developed around two main areas: the commitment for clubs, over a period, to balance their books (first assessed in the 2013/14 season); and the obligation for clubs to meet all their transfer and employee payment obligations at all times (first assessed in 2011).

Concerning our empirical strategies, even if the difference between revenues and wages (that we denote as "profits") seems to more faithfully reflect the FFP regulations, we chose the WRR approach because it avoids potential distortions produced by the inflation (as it would affect equally revenues and wages) and, furthermore, conveys more intuitive interpretations, while capturing the essence of the break-even requirements.

Precisely, in Table A.1.1 we replicate a selection of models where the "Profits" variable substitutes WRR as a regressor. As expected, the positive and statistically significant levels of the estimated coefficients for "Profits" proves our previous results that the closer fulfilment of the break-even requirements is positively correlated to better sport performance.

Table A.1.1. Sport performance and break-even requirements (measured through "Profits")

	Points(profit) (2.1') OLS	d_Points(prof) (3.1') OLS	Points(profit) (2.3') FE	d_Points(prof) (3.1') FE
salaries	0.3988***		0.3788***	
	(0.027)		(0.051)	
salaries_2	-0.0009***		-0.0008***	
	(0.000)		(0.000)	
profits	0.0705***		0.0555***	
	(0.016)		(0.020)	
d_salaries		0.2532***		0.2837***
		(0.016)		(0.041)
d_salaries_2		-0.0008***		-0.0007***
		(0.000)		(0.000)
d_profits		0.0701***		0.0581***
		(0.018)		(0.020)
premier_l	-11.5487***	1.3573		
	(1.292)	(1.250)		
la_liga	5.1141***	1.9407*		
	(1.118)	(1.127)		
ligue_1	5.3280***	-0.6117		
	(1.170)	(1.159)		
s2010_11	-0.5510	-0.1266	-1.5371	-1.0878
	(1.382)	(1.371)	(1.411)	(1.406)
s2011_12	-2.2281	-0.3549	-3.1528**	-1.4987
	(1.540)	(1.503)	(1.428)	(1.415)
s2012_13	-1.7802	-0.1000	-2.8147*	-1.4651
	(1.519)	(1.505)	(1.441)	(1.427)
s2013_14	-2.8266*	0.2645	-4.5767***	-2.0249
	(1.566)	(1.585)	(1.478)	(1.436)
s2014_15	-3.8027**	1.4852	-5.5437***	-0.7822
	(1.499)	(1.510)	(1.535)	(1.483)
s2015_16	-5.5655***	1.8120	-8.3025***	-1.6592
	(1.575)	(1.740)	(1.622)	(1.527)
Constant	32.7405***	1.6126	34.7982***	3.8647***
	(1.582)	(1.319)	(2.475)	(1.089)
Fixed Effects	-	-	Yes	Yes
N. Obs.	557	557	557	557
R^2	0.6666	0.6496	0.5235	0. 6417
Adj. R^2	0. 6592	0. 6419		
within R^2			0.1659	0.1694
AIC	4087.12	4113.94	3831.46	3827.74

Notes: Robust standard errors in parentheses | In Fixed Effect (FE) models, R^2 denotes the overall R-squared.

*** p<0.01, ** p<0.05, * p<0.1

Then, a similar analysis is shown in Table A.1.2, for regressions estimated separately by domestic football leagues. The results yield identical conclusions as those we achieved and discussed in Section 4.2.

Table A.1.2. Sport performance and break-even rules ("Profits") by domestic leagues

Leagues	**Premier L**	**La Liga**	**Serie A**	**Ligue 1**
	Points(profit)	Points(profit)	Points(profit)	Points(profit)
Models	(4.1') OLS	(4.1') OLS	(4.1') OLS	(4.1') OLS
salaries	0.4590***	0.4893***	0.4117***	0.4269***
	(0.051)	(0.051)	(0.076)	(0.059)
salaries_2	-0.0010***	-0.0009***	-0.0012***	-0.0014***
	(0.000)	(0.000)	(0.000)	(0.000)
profits	0.0786***	-0.0140	0.1555***	0.1509*
	(0.022)	(0.026)	(0.035)	(0.077)
s2010_11	-1.7166	0.1482	0.1995	-1.5110
	(2.173)	(2.014)	(3.211)	(3.232)
s2011_12	-4.0181	-0.6836	-2.8891	-2.6940
	(2.884)	(2.339)	(3.324)	(3.607)
s2012_13	-5.1887*	1.0639	-2.6436	-1.2260
	(2.674)	(2.628)	(3.639)	(3.141)
s2013_14	-8.3443***	0.3831	-2.5249	-2.4243
	(2.939)	(2.685)	(3.567)	(3.292)
s2014_15	-12.7950***	-0.4863	-3.6196	-0.2993
	(2.711)	(2.633)	(3.163)	(3.153)
s2015_16	-15.8977***	-3.5879	-3.7862	-0.9538
	(3.569)	(2.470)	(3.123)	(3.357)
Constant	20.7803***	34.5707***	29.9678***	35.9081***
	(3.210)	(2.048)	(2.681)	(3.334)
N. Obs.	139	139	139	140
R^2	0.6881	0.8076	0.6361	0.5925
Adj. R^2	0.6663	0.7942	0.6107	0.5642
AIC	1029.79	984.79	1042.01	1030.77

Notes: Robust standard errors in parentheses | In Fixed Effect (FE) models, R^2 denotes the overall R-squared.
*** p<0.01, ** p<0.05, * p<0.1

These results are not surprising, since the condition that the relevant income minus relevant expenses, as defined in the UEFA, must be not negative (for the clubs to fulfill the break-even requirements) is basically similar to imposing that WRR must be smaller than 1. That is to say:

$$R - W > 0 \qquad \text{is equivalent to the condition that:} \qquad WRR = W / R < 1$$

To prove the fact that these two inequalities are equivalent is straightforward: we know that $W = R \cdot WRR$; then, the break-even condition requires that: $R - W = R - R \cdot WRR = R \cdot (1 - WRR) > 0$. For the last expression to hold, we only need that $WRR < 1$. Hence, each of the two conditions implies the other.

Notice, as was mentioned above, that the actual rules allow the clubs to deviate from zero ($R - W > -T$) and, more importantly, that the fulfillment of the break-even requirements (to prevent clubs to accumulate financial deficits) applies to 3-years periods.