A Market's Reward Scheme, Media Attention, and the Transitory Success of Managerial Change

By Bernd Süssmuth, Leipzig, and Stefan Wagner, Berlin*

JEL D82; J41; L14; M52

Incentives; structural change; moral hazard; professional sports.

Summary

Against the background of growing media interest in professional soccer, this paper proposes a moral hazard model with costly state verification to explain how rule changes affecting the reward scheme of team performance impact on the success of managerial change. As has been shown recently based on four decades of data from the German soccer premiership by Wagner (2010), the incentive change in professional soccer leagues enacted by the FIFA in 1995/96 rendered the drastic measure of firing a coach a more efficient instrument in the clubs' striving for success. In contrast to existing approaches, our model by accommodating the role of media interest is able to jointly explain (i) the impact of introducing an asymmetric reward scheme, (ii) of managerial turnover and (iii) of the perceived degree of ambition of a club on the athletic output of the team. It is shown that the rule change induces a higher agency cost, which is temporarily economized by clubs that change their management. This cost reducing effect temporarily enhances the efficiency of generating athletic output for top league clubs.

1 Introduction

For some industries, the market's reward scheme is occasionally subject to exogenous change. As an example, consider European competition policy with regard to the automotive industry and its authorized dealers. Up to 2002, the year of enactment of the European Commission's 'Block Exemption' deregulation, the market rewarded the dealer but for sales of new or used cars from a specific producer. Authorized dealers were not allowed nor rewarded for sales of cars accepted in part-exchange if they were of a brand different from the one of their contractual partners. Today the market rewards deals on the sales floor independent of brands of sold cars. Sometimes the change of a market's reward scheme happens to be enacted retroactively. A most prominent example is the 1998 Sonny Bono Copyright Term Extension Act. It extended US copyright terms from life of the copyright owner plus 50 years to life plus 70 years. As it directly concerned existing intellectual property rights protection, in particular, of Walt Disney and AOL Time Warner, it is straightforward to interpret this rule change both as exogenous and retroactive. Of course, we can think of many other examples of more or less direct rule change impacting on economically relevant decisions: the introduction of the European Credit Transfer System (ECTS) aimed at standardizing student achievement in

* We thank Ruud Koning and two anonymous referees for very helpful comments and suggestions.

higher education across Europe, the recently enacted performance-linked salary scheme for full professors in Germany (*W-Besoldung*) and so forth.

Soccer is the world's most pre-eminent sport. The FIFA (*Fédération Internationale de Football Association*) World Cup 2002 finals were watched by an all time high audience, i. e., 4.6-times per world inhabitant. In total, the World Cup 2002 and the World Cup 2006 drew a cumulative audience of 68.8 billion people or the world's population 11 times over. There is no doubt that the soccer industry is the most significant and visible sports industry in the world. As for the German top league, the *Erste Bundesliga*, TV rights were sold to 130 countries broadcasting the league. For the *Bundesliga*, revenues from media braodcasting are the primary source of revenues. For detail on the league's three-digit million Euros income from TV broadcasting rights see, for example, Kern and Süssmuth (2005). In 1995/96, the national markets (professional leagues) of this industry were subject to an exogenous change of reward scheme. The points awarded to the winner of a league match were increased from two to three.[1] Hiring and firing of players and managers[2] is a central part of the strategy space of top clubs to succeed in the premiership and thereby increase revenues. After the recruitment of squad and management, the rule change, therefore, can be regarded as an exogenous and retroactive change of reward scheme.

Recently, several authors analyzed the impact of managerial turnover on athletic team performance in professional soccer (e. g., Audas et al. 2002; Bruinshoofd/ter Weel 2003; Koning 2003; Wagner 2010). The evidence produced by these studies is mixed but can be summarized in the following way: If there is a positive effect at all, then it is either small or transitory or both. This paper contributes to the literature by extending the work of Wagner (2010) and proposing a model that by accommodating the role of media interest is able to integratedly explain (i) the impact of introducing an asymmetric reward scheme, (ii) of managerial turnover and (iii) of the perceived degree of ambition of a club on a team's athletic output. It is shown that the rule change induces a higher agency cost, which is temporarily economized by clubs that change their management. This cost reducing effect temporarily enhances the efficiency of generating athletic output for top league clubs.

2 Moral hazard and media attraction

According to anecdotal evidence, the administrative management of *FC Bayern München*, the most prominent among contemporary German soccer clubs, was less well informed about the training methods of its new coach in 2004[3] than were millions of TV viewers and tabloid readers through the immense detail on the new "brushing broom" reported on in the media.

This extreme form of monitoring the first days or weeks of a newly hired coach became ever more popular in the last decade. In fact, we expect it to even gain in weight as trai-

[1] In contrast to the rest of professional leagues in the world, for the English Premier League the rule change was established already in 1981 by the English Football Association (F. A.).

[2] In order not to multiply terms, we henceforth treat 'manager' and 'coach' as synonyms, adhering to standard practice in the Anglo-Saxon leagues.

[3] In particular, Felix Magath (the succesor of Ottmar Hitzfeld, i. e. the new coach, in 2004) introduced training methods including medicine balls and cross country runs that were in great detail outlined and discussed in German mass media and Munich's daily tabloids.

ning kibitzers just started to make extensively use of news spreading web-based platforms or blogs like Twitter. To rationalize the implied effects of such phenomena, consider the immediate consequences of managerial turnover in top league soccer.

Assumption 1 *Changing the coach temporarily alleviates the information asymmetry between coach (agent) and club (principal). This is due to the fact that screening a newly hired coach in the premiership is a "free lunch." In the short run, the monitoring cost is shifted on the media, experts, etc. This frees resources that can be spent to foster the competition among players of the squad (e.g. by hiring back-up players) or to strengthen individual incentives of players (e.g. through additional bonus payments).*

It is straightforward to consider a club to be in one of three possible states:

$$\begin{tikzcd}[column sep=small]
 & L \arrow[dl, "\overline{e}"'] \arrow[dr, "\underline{e}"] & & & M \arrow[dl, "\overline{e}"'] \arrow[dr, "\underline{e}"] & & & H \arrow[dl, "\overline{e}"'] \arrow[dr, "\underline{e}"] & \\
\pi_L|_{\overline{e}} & & \pi_L|_{\underline{e}} & \pi_M|_{\overline{e}} & & \pi_M|_{\underline{e}} & \pi_H|_{\overline{e}} & & \pi_H|_{\underline{e}}
\end{tikzcd}$$

Figure 1 Three-states moral hazard model: conditional probabilities

States and corresponding payoffs L, M, and H denote situations in which a team's results are predominately losses, draws, or wins, respectively; let payoffs be ordered and denoted accordingly: $L < M < H$. Performance depends on the effort of the manager (agent) to recruit and coach the team. It can be high $\overline{e}$ or low $\underline{e}$. The coaching effort determines the respective conditional probability of a certain state, where obviously

$$\pi_H|_{\overline{e}} = 1 - \pi_L|_{\overline{e}} - \pi_M|_{\overline{e}} \text{ and } \pi_{\mathrm{H}}|_{\underline{\mathrm{e}}} = 1 - \pi_{\mathrm{L}}|_{\underline{\mathrm{e}}} - \pi_{\mathrm{M}}|_{\underline{\mathrm{e}}}$$

need to hold. The state-dependent payoffs for the clubs (principals) determinetheir net income, that is their revenues net of allowances and shares in profit for the coaches

$$x_j = \mathrm{pay} - \mathrm{off} - \mathrm{y_j}$$

for all payoffs $\in \{L, M, H\}$, where y_L, y_M, and y_H denote the respective performance-contingent premia of the coach.

Proposition 1 *Given Assumption 1, a change of management is the more efficient, the higher the implied agency cost of the information asymmetry (i.e. the higher the cost of setting contractual incentives for the coach not to shirk and to maximize wins) that could be avoided in the short run.*

In order to develop our corollary that the rules change implies a higher agency cost, we need to calculate and compare agency cost before and after the change of rules by the FIFA in 1995/96. To do so requires us to compute the principals' profit under full information as well as for a Pareto efficient contract under asymmetric information both for the situation before and after the incentive change.

2.1 The model before the incentive change

2.1.1 Full information reference case before change of reward scheme

Let us assume $e^* \in \{\underline{e}, \overline{e}\}$ for which we need to find the optimal contract $\{y_L^*, y_M^*, y_H^*, e^*\}$ from the first mover's perspective, i.e., the perspective of the contract offering clubs. The clubs maximize their uncertain payoffs under a standard participation constraint (PC). In terms of a manager's utility v, the PC ensures that the engagement at a minimum corresponds to (or exceeds) a certain reservation position $\overline{v}_0$, for example, realizable through an alternative offer. Let us assume $L = 0$ and a standard concave utility function of a representative coach, this can be written as

$$\max_{y_L, y_M, y_H, \underline{e}, \overline{e}} u = -\pi_L y_L + \pi_M(M - y_M) + \pi_H(H - y_H) \tag{1}$$

$$\text{s.t. } v = \pi_L\sqrt{y_L} + \pi_M\sqrt{y_M} + \pi_H\sqrt{y_H} - e \geq \overline{v}_0, \tag{PC}$$

where $\overline{v}_0$ denotes the reservation utility of the coach. For a Stackelberg-leadership of the clubs the PC is binding.
The corresponding Lagrangian function is

$$\mathcal{L} = u + \lambda(v - v_0).$$

From the first three first order conditions it follows that

$$y_L^{-\frac{1}{2}} = y_M^{-\frac{1}{2}} = y_H^{-\frac{1}{2}} = \frac{2}{\lambda} \Leftrightarrow y_L^* = y_M^* = y_H^*.$$

Substituting the latter expression in $\overline{v}$, we obtain

$$y^* = (v_0 + e)^2, \tag{2}$$

that is, state-independent optimal premia for the coaches.

Table 1 State-probabilities conditioned on managerial effort: before change of rules

		State		
		L	M	H
	$\underline{e}$	$\pi_L\vert_{\underline{e}}$	$\pi_M\vert_{\underline{e}}$	$\pi_H\vert_{\underline{e}}$
Effort		$=$	$>$	$<$
	$\overline{e}$	$\pi_L\vert_{\overline{e}}$	$\pi_M\vert_{\overline{e}}$	$\pi_H\vert_{\overline{e}}$

This is the standard result for a full information set-up. It follows that for $e = \underline{e}$ and $e = \overline{e}$, $y^* = \underline{y}^*$ and $\overline{y}^*$, where $\underline{y}^* < \overline{y}^*$, respectively. That is, the clubs have to set incentives in terms of adequate premia, in order to ensure a particular effort of coaches by means of distinctive contracts. Which of the two possible contract offers, $\{\underline{e}^*; \underline{y}^*\}$ and $\{\overline{e}^*; \overline{y}^*\}$, is made to the coach depends on the implied utility u^* for the club. Let us assume a uniform distribution of state's probabilities of a coach who is relatively more inclined to shirk (i.e., $e = \underline{e}$): $\{\pi_L|_{\underline{e}} = \pi_M|_{\underline{e}} = .\pi_H|_{\underline{e}}\}$; while for diligent agents (i.e., $e = \overline{e}$), we suppose $\{\pi_H|_{\overline{e}} > \pi_L|_{\overline{e}} > \pi_M|_{\overline{e}}\}$. From equations (1) and (2) it follows that $u^*|_{\underline{e}} < u^*|_{\overline{e}}$. Therefore, under full information and *before* the change of the league's reward scheme, the optimal contract is $\{\overline{e}^*; \overline{y}^*\}$, implying a state-independent premium for the coach and generating an amount of utility $u^*|_{\overline{e}}$ for the club. Table 1 summarizes the conditional probabilities and their changing with a coaching effort for our reference case.

Think of a coach switching from $\underline{e}$ to $\overline{e}$ in the reference case in the following way. Due to more efficient coaching, the team is capable of winning a higher share of matches played.

As indicated by the strict inequality sign (Table 1), this is due to winning more on-the-bubble matches that would have otherwise resulted in a draw. There is a variety of possible reasons for this improvement, for example, a better physical constitution of the squad. In terms of relative frequencies it implies that $\pi_H|_{\underline{e}} + \Delta = \pi_H|_{\overline{e}}$ and $\pi_M|_{\underline{e}} - \Delta = \pi_M|_{\overline{e}}$ where $0 < \Delta < 1$ represents the relative frequency of draws turned into wins due to applying coaching effort $\overline{e}$ instead of $\underline{e}$. It is noteworthy, already at this stage of the analysis, that Δ is solely due to a change in coaching effort and thus will remain the same after reforming the reward scheme.

2.1.2 Asymmetric information case before change of reward scheme

To guarantee a decent coaching effort $\overline{e}$ in the asymmetric information case, implying the promise (i.e., a higher probability) for a successful league performance of the team, an incentive compatibility constraint (IC) of the form $\pi_L|_{\overline{e}}\sqrt{y_L} + \pi_M|_{\overline{e}}\sqrt{y_M} + \pi_H|_{\overline{e}}\sqrt{y_H} - \overline{e} \geq \pi_L|_{\underline{e}}\sqrt{y_L} + \pi_M|_{\underline{e}}\sqrt{y_M} + \pi_H|_{\underline{e}}\sqrt{y_H} - \underline{e}$is required in maximization problem (1).
The corresponding Lagrangian function is

$$\begin{aligned} L = \overline{u} &+ \lambda(\pi_L|_{\overline{e}}\sqrt{y_L} + \pi_M|_{\overline{e}}\sqrt{y_M} + \pi_H|_{\overline{e}}\sqrt{y_H} - \overline{e} - \overline{v}_0) \\ &+ \xi\left[(\pi_L|_{\overline{e}} - \pi_L|_{\underline{e}})\sqrt{y_L} + (\pi_M|_{\overline{e}} - \pi_M|_{\underline{e}})\sqrt{y_M} + (\pi_H|_{\overline{e}} - \pi_H|_{\underline{e}})\sqrt{y_H} - \overline{e} + \underline{e}\right], \end{aligned}$$

where the first line represents a manifestation of the PC and the second line a manifestation of the IC, respectively.
From the first order condition corresponding to the derivative of the Lagrangian function with respect to ξ we get

$$\sqrt{\widehat{y}_H} = \frac{\overline{e} - \underline{e}}{\pi_H|_{\overline{e}} - \pi_H|_{\underline{e}}} + \frac{\pi_L|_{\overline{e}} - \pi_L|_{\underline{e}}}{\pi_H|_{\overline{e}} - \pi_H|_{\underline{e}}}\sqrt{\widehat{y}_L} + \frac{\pi_M|_{\overline{e}} - \pi_M|_{\underline{e}}}{\pi_H|_{\overline{e}} - \pi_H|_{\underline{e}}}\sqrt{\widehat{y}_M}, \tag{3}$$

where the hat denotes incentive compatible premia.

Assumption 2 *For State L, that is a situation in which a team's results are predominately losses, and the pay-off of the club goes to zero we plausibly assume a zero-premium for the coach.*
Under Assumption 2, equation (3) simplifies to

$$\begin{aligned} \sqrt{\widehat{y}_H} &= \frac{\overline{e} - \underline{e}}{\pi_H|_{\overline{e}} - \pi_H|_{\underline{e}}} + \frac{\pi_M|_{\overline{e}} - \pi_M|_{\underline{e}}}{\pi_H|_{\overline{e}} - \pi_H|_{\underline{e}}}\sqrt{\widehat{y}_M} \Leftrightarrow \qquad (4) \\ \widehat{y}_M &= \frac{\widehat{y}_H}{b^2} - a^2 = \widehat{y}_H - a^2, \end{aligned}$$

where $b^2 = \left(\frac{\pi_M|_{\overline{e}} - \pi_M|_{\underline{e}}}{\pi_H|_{\overline{e}} - \pi_H|_{\underline{e}}}\right)^2 = 1$ since $\pi_H|_{\underline{e}} + \Delta = \pi_H|_{\overline{e}} \wedge \pi_M|_{\underline{e}} - \Delta = \pi_M|_{\overline{e}}$ and $a^2 = \left(\frac{\overline{e} - \underline{e}}{\pi_H|_{\overline{e}} - \pi_H|_{\underline{e}}}\right)^2 > 0.$

Hence, for constant values of v_0, it follows for the optimal state-contingent premia offered to coaches that $\widehat{y}_H > \widehat{y}_M$. By equation (4) and the PC, there are two equations with two unknowns that can readily be solved for $\widehat{y}_H$ and $\widehat{y}_M$. Obviously, $\widehat{y}_H > \widehat{y}_M$ is required

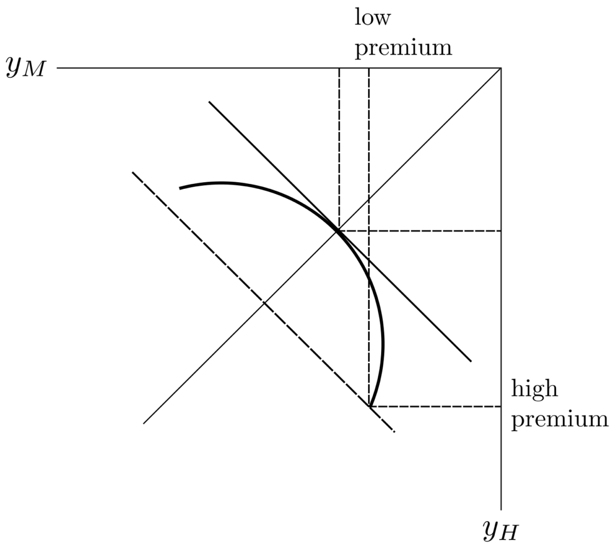


Figure 2 Certain and uncertain situation: before rule change

to generate enough uncertainty for the coach to work efficiently. The corresponding u_0 is calculated from inserting $\widehat{y}_H$ and $\widehat{y}_M$.into the utility function of clubs. The implied agency costs (AC) amount to $AC_0 = u_0^* - u_0$, where the former is obtained from the full information reference case. Figure 2 makes the point, where u_0^*.is represented by the line that is closer to the origin, while $u_0 < u_0^*$.is given by its parallel, which lies further off the origin.

2.2 The model after the incentive change

2.2.1 Full information reference case after change of reward scheme

Assumption 3 *In accordance with empirical evidence (Garicano/Palacios-Huerta 2005), we introduce the 1995/96 FIFA incentive change, which (everything else equal) consists in a higher weight in terms of league points for wins, as resulting in a decrease of the relative frequency of draws.*

Table 2 State-probabilities conditioned on managerial effort: after

		State		
		L	M	H
	$\underline{e}$	$\widetilde{\pi}_L\vert_{\underline{e}}$	$\widetilde{\pi}_M\vert_{\underline{e}}$	$\widetilde{\pi}_H\vert_{\underline{e}}$
Effort		$=$	$>$	$<$
	$\overline{e}$	$\widetilde{\pi}_L\vert_{\overline{e}}$	$\widetilde{\pi}_M\vert_{\overline{e}}$	$\widetilde{\pi}_H\vert_{\overline{e}}$

It follows that the probability for draws (State M) a priori and irrespective of managerial changes decreases, while the probability for the other outcomes (L and H) increases.

As there is no definite empirical answer how exactly the probabilities reallocate, we suppose that the probability of H and L each increases by half the decline in the probability of M.[4] In Table 2 the first row of probabilities is related to the first row of probabilities in Table 1 as follows: $\widetilde{\pi}_M|_{\underline{e}} = \pi_M|_{\underline{e}} - \Omega$, $\widetilde{\pi}_L|_{\underline{e}} = \pi_L|_{\underline{e}} + \Omega/2$, $\widetilde{\pi}_H|_{\underline{e}} = \pi_H|_{\underline{e}} + \Omega/2$, where $0 < \Omega < 1$. As noted above, the effect from the different levels of coaching effort remains untouched, that is, $\widetilde{\pi}_H|_{\underline{e}} + \Delta = \widetilde{\pi}_H|_{\overline{e}}$ and $\widetilde{\pi}_M|_{\underline{e}} - \Delta = \widetilde{\pi}_M|_{\overline{e}}$ where $0 < \Delta < 1$.

From equations (1) and (2) it is easily found that under symmetric information the principal's utility in the state-independent premium case remains unchanged, that is, $u_0^* = u_1^* = u^*$.

2.2.2 Asymmetric information case after change of reward scheme

It is fairly obvious that the distance between $\widehat{y}_H$ and $\widehat{y}_M$. will not change compared to the situation before the rule change (Table 1) due to neither a^2 nor b^2 having changed. However, we need to clarify if and how state-contingent premia change. To do so, consider the first order condition corresponding to the derivative of the Lagrangian function with respect to λ above

$$c^2 \equiv \overline{e} + v = \left(\widetilde{\pi}_M|_{\overline{e}}\right)^2 \widehat{y}_M + \left(\widetilde{\pi}_H|_{\overline{e}}\right)^2 \widehat{y}_H$$

and recall that $\widehat{y}_H = \widehat{y}_M + a^2$. Solving for $\widehat{y}_H$, we get

$$\widehat{y}_H = \frac{c^2 - \left(\widetilde{\pi}_H|_{\overline{e}}\right)^2 a^2}{\left(\widetilde{\pi}_M|_{\overline{e}}\right)^2 + \left(\widetilde{\pi}_H|_{\overline{e}}\right)^2}. \tag{5}$$

As $\widetilde{\pi}_M|_{\overline{e}}$ decreases and $\widetilde{\pi}_H|_{\overline{e}}$ increases, it remains indeterminate whether state-contingent premia $\widehat{y}_M$ and $\widehat{y}_H$ actually need to be raised or cut. However, since $u = \pi_M(M - y_M) + \pi_H(H - y_H)$ and π_M changes (i.e. falls) by two-times the percentage points π_H changes (i.e. increases), utility level u decreases, i.e. $u_1 < u_0$; see footnote 4.

The latter implies that Proposition 1 holds. Accordingly, the change of the reward scheme generates a higher agency cost that can be temporarily economized by a club replacing its coach: $AC_1 = u^* - u_1 > AC_0 = u^* - u_0$. In Figure 3 this corresponds to the distance between the solid and the dotted line compared to the distance between the solid and the dashed line. The avoided cost can be used to hire new players or for any other productivity enhancing measure. Therefore, they also temporarily lead to a better performance of clubs that change their management after the league's reward scheme reform in comparison to clubs that did so before. Figure 3 visualizes agency costs that can be economized after a rule change (compared to the situation before the change), in particular, by a club that attracts a relatively high media attention through a relatively high level of aspiration. As by regulation, teams are after the start of a season only during the winter

[4] This assumption is quite well in accordance with German data. The distribution of outcomes of home-matches over the 1990/91-1994/95 season is: 46.5 % wins, 30.6 % draws, 22.8 % losses. For the 1996/97-2000/01 seasons corresponding figures are 49 % (i.e. +2.5 %) wins, 25.9 % (i.e. -4.7 %) draws, and 25.1 % (i.e. +2.3 %). We owe this information to one of the anonymous referees. Notice, however, that the observed decline in draws may also partly be due to the financial attractiveness of the UEFA Champions League that increased around the same time. Assuming that teams pursue participation in this competition, they may play more riskily and hence incur fewer draws.

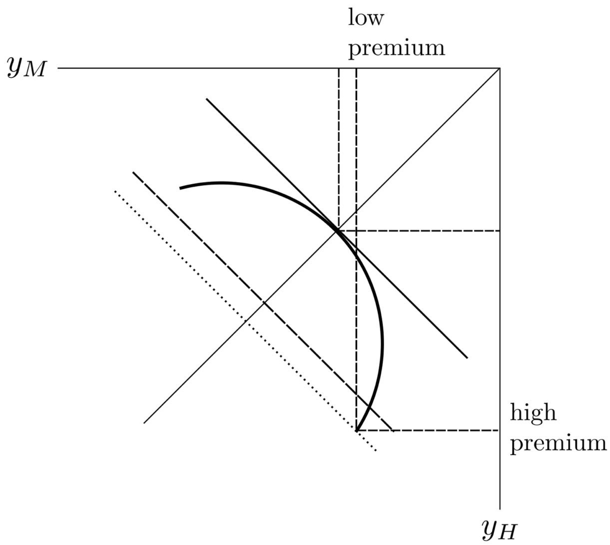


Figure 3 Certain and uncertain situation: before and after rule change

break allowed to sign new players to foster competition in the squad financed through the above sketched mechanism, dismissals before the winter break should be more effective than after it.

Summing up, our model bears four central testable implications:

Hypothesis 1. The introduction of the three points rule makes mid-season coach replacements, at least, temporarily more effective.

Hypothesis 2. The performance effect is the higher, the higher is the media interest as reflected by the perceived degree of ambition or aspiration level of a club.

Hypothesis 3. Due to higher media interest teams ranked at either the top flight or bottom end of the league table stand to gain more from mid-season dismissals than middle of table ranked teams.

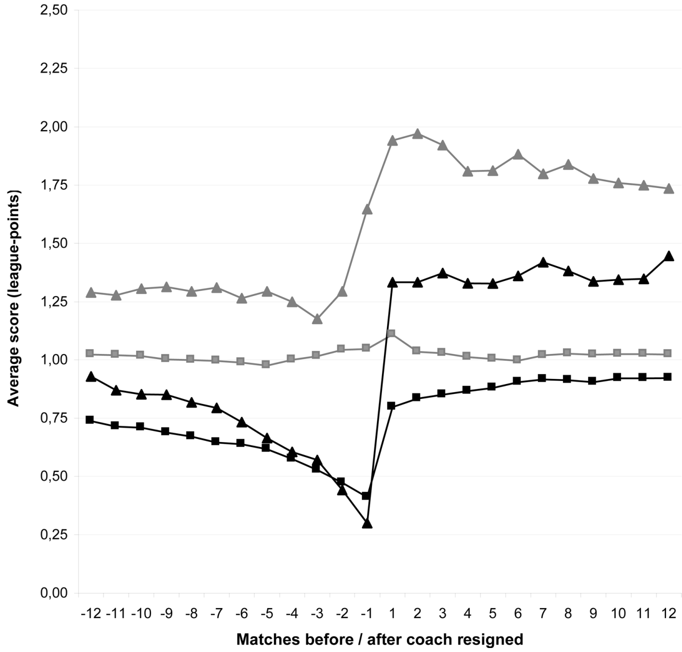
Hypothesis 4. Coach replacements before the winter break are more effective as new coaches have a credible threat point through the generated possibility of hiring new players during the break.

3 Evidence

The empirical analysis follows two major tracks. First, we study the within-group effects among the clubs that changed their management over the period of observation before and after the rule change by the FIFA in 1995/96. We also discriminate between within-season and in-between two seasons managerial turnover. In a second subsection, we focus on within-season managerial change and compare mean differences for groups with treatment (managerial change) and for control groups without treatment (no managerial change) before and after the structural break. Finally, we test whether the differences-in-differences are statistically significant, and descriptively compare the share of clubs facing relegation for the different regimes. Results from difference-in-differences estimations are given in the final subsection. The analysis and interpretation widely follows Wagner (2010).

3.1 Management changing group: within-group differences

As can be seen from Figure 4, there is a clear-cut and statistically significant decrease of average scores in terms of league points from the point in time 12 match days before the resignation (-12) to one match before the change (-1): $\mu_{-12}^{<95/96} - \mu_{-1}^{<95/96} = 0.74 - 0.41 = 0.33$ and $\mu_{-12}^{\geq 95/96} - \mu_{-1}^{\geq 95/96} = 0.93 - 0.3 = 0.63$. The superscript denotes whether the managerial change took place before ($<95/96$) or after ($\geq 95/96$) the rule change. Note, these sample mean differences refer to the clubs with a within-season turnover of the management. They are statistically significant at all conventional levels of significance. Obviously, the teams also show the worst performance immediately before the managerial change takes place (-1). The first match after the change on average clearly shows the strongest increase in performance: $\mu_{+1}^{<95/96} - \mu_{-1}^{<95/96} = 0.80 - 0.41 = 0.39^{**}$ and $\mu_{+1}^{\geq 95/96} - \mu_{-1}^{\geq 95/96} = 1.33 - 0.3 = 1.03^{**}$. Again, both mean differences are highly significant (at the one per cent level of significance), denoted by '**'. This picture is confirmed if we compare the average athletic performances from a season's start to the point in time of the managerial change (subscript 'before') with the performances after the change to the end of the season (subscript 'after'): $\mu_{\text{after}}^{<95/96} - \mu_{\text{before}}^{<95/96} = 0.89 - 0.75 = 0.14^{**}$ and $\mu_{\text{after}}^{\geq 95/96} - \mu_{\text{before}}^{\geq 95/96} = 1.27 - 0.99 = 0.28^{**}$. As can be seen from Figure 4, particularly the clubs changing their management after season



Note: black (grey) line – within-season (interseasonal) turnover squares (triangles) – before (after) rule change, i. e., 1995/96

Figure 4 Within-group mean differences in performance I

Table 3 Within-group mean differences in performance I
Performance measure: scores (league points)

Window	Within-season		Interseasonal	
	$<$ 1995/96	$\geq$ 1995/96	$<$ 1995/96	$\geq$1995/96
[+4 ÷ -4]	0.29**	0.72**	0.01	0.56**
[+8 ÷ -8]	0.24**	0.56**	0.03	0.54**
[+12 ÷ -12]	0.18**	0.52**	0.00	0.45**
[+17 ÷ -17]	–		0.04	0.35*
[+34 ÷ -34]	–		0.04*	0.26*
[after ÷ before]	0.14**	0.28**	0.00	0.18*

Note: *, ** denotes significance at 5, 1 per cent level of significance.

1995/96 are set on a higher performance trajectory immediately after resigning their unsuccessful coaches (black-colored triangles graph).

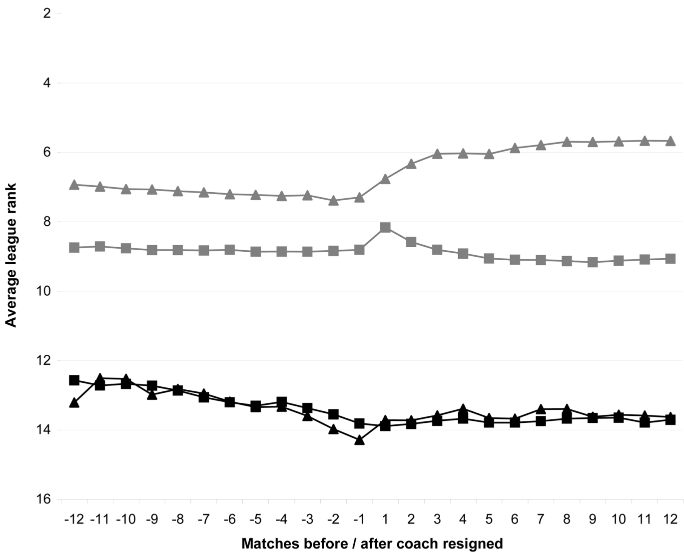
The results are somehow different for the interseasonal changes. Before the rule change starting with season 1995/96, we do not observe any obvious differences in performance over the whole time frame. The corresponding grey-colored squares graph in Figure 4 merely shows any volatility over the different match days. Statistically there is no significant difference in these means. However, for the period after the FIFA's rule change, there is a clear and statistically significant improvement in performance reaching a higher trajectory, beginning with the second match after the managerial change (grey-colored triangles graph).

Table 3 gives a detailed summary of our findings for different time frames (windows), where, for example [+4 ÷ -4] denotes the difference of league points scored on average between one and four matches after hiring a new coach and league points scored on average between one and four matches before firing the coach.

A striking feature of Figure 2 is that for both changing regimes (interseasonal and intraseasonal) the clubs significantly outperformed particularly after the 1995/96 rule change (squares vs. triangles). It should be noted that qualitatively the statistical significance in mean differences is preserved both for re-scaling the pre-1995/96 scores with a scaling factor of 1.33, taking into account the different reward schemes, and for counterfactually calculating the league points after season 1995/96 according to the pre-1995/96 scheme.[5]

Figure 5 and Table 4 replicate the previous analysis applying the average league rank instead of points as a performance measure. At first sight, the results are merely in line with our previous findings. However, as the league rank - in contrast to average league points - is crucially dependent on a club's history of results before the managerial change, we need to take this path dependency into account. An adequate time frame for the league rank effect of managerial turnover is to compare the rank the match day before the change of coaches (-1) with the average rank after the premiership ends or up to the next managerial change that happens within the same season. The corresponding mean differences are displayed in the last row of Table 4. They are statistically significant at any conventional level of significance. Remarkably, the average rank improvement nearly doubles after the rule change in 1995/96.

[5] Respective test results are available on request from the authors.



Note: black (grey) line – within-season (interseasonal) turnover squares (triangles) – before (after) rule change, i. e., 1995/96

Figure 5 Within-group mean differences in performance II

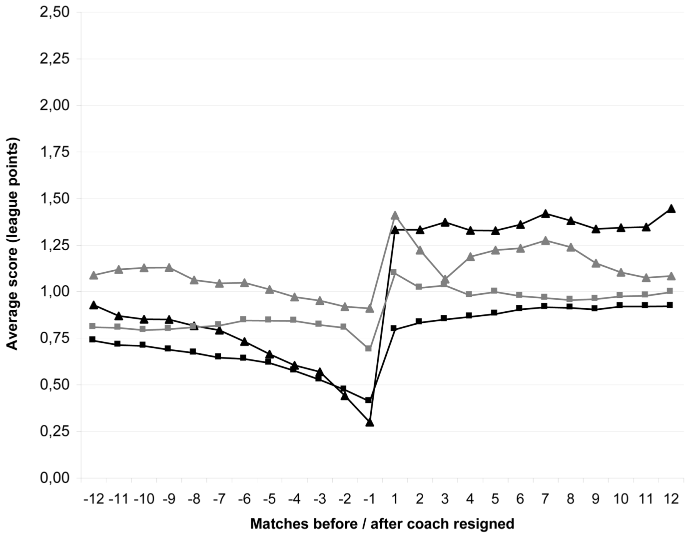
Table 4 Within-group mean differences in performance II
Performance measure: league table ranks

Window	Within-season		Interseasonal	
	$< 1995/96$	$\geq 1995/96$	$< 1995/96$	$\geq 1995/96$
[+4 ÷ -4]	-0.29**	-0.06	-0.06	1.22
[+8 ÷ -8]	-0.81**	-0.57	-0.32	1.43
[+12 ÷ -12]	-1.13**	-0.41	-0.32	1.26
[+17 ÷ -17]	–		-0.10	1.25
[+34 ÷ -34]	–		0.11	1.63
[after ÷ before]	0.76**	1.41**	-0.39	1.90

Note: *, ** denotes significance at 5, 1 per cent level of significance.

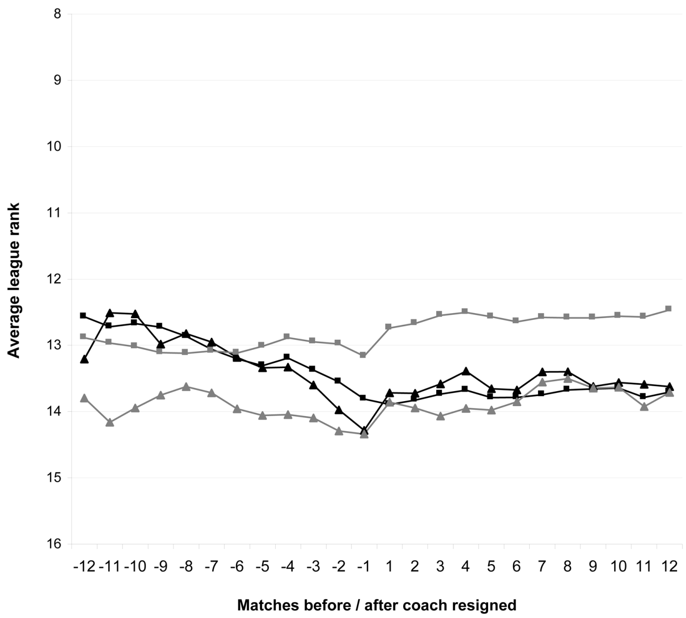
3.2 Management changing group vs. control group

In the following, we focus on within-season managerial turnover. The black-colored graphs in Figure 6 and 7 correspond to their black-colored counterparts in Figures 4 and 5, respectively. However, they are now plotted against the corresponding control groups' grey-colored graphs. Tables 5 and 6 represent the analogue of Tables 3 and 4 for our control groups. It is noteworthy that except for the [after ÷ before]-time frame no mean difference, i. e., neither for league points nor league ranks, is statistically significant. Since the rule change in 1995/96, the positive effect for the period from the match before the managerial change of the competitor's coach (-1) to the end of the premiership or of the competitor's coach's incumbent period in terms of league ranks is



Note: black (grey) line – management changing (control) group squares (triangles) – before (after) rule change, i. e., 1995/96

Figure 6 Across-group mean differences (within-season) I



Note: black (grey) line – management changing (control) group squares (triangles) – before (after) rule change, i. e., 1995/96

Figure 7 Across-group mean differences (within-season) II

Table 5 Control-group mean differences in performance I
Performance measure: scores (league points)

Window	Within-season < 1995/96	Within-season ≥ 1995/96	Interseasonal < 1995/96	Interseasonal ≥ 1995/96
[+4 ÷ -4]	0.14**	0.22*	-0.08	-0.05
[+8 ÷ -8]	0.15**	0.18	-0.02	-0.05
[+12 ÷ -12]	0.19**	0.00	0.01	-0.11
[+17 ÷ -17]	–		0.01	0.08
[+34 ÷ -34]	–		0.02	0.00
[after ÷ before]	0.18**	0.23**	-0.05*	-0.05

Note: *, ** denotes significance at 5, 1 per cent level of significance.

Table 6 Control-group mean differences in performance II
Performance measure: league table ranks

Window	Within-season < 1995/96	Within-season ≥ 1995/96	Interseasonal < 1995/96	Interseasonal ≥ 1995/96
[+4 ÷ -4]	0.38**	0.09	0.05	-2.67*
[+8 ÷ -8]	0.54**	0.12	0.06	-2.38*
[+12 ÷ -12]	0.42	0.08	0.21	-1.71
[+17 ÷ -17]	–		0.33	-1.39
[+34 ÷ -34]	–		1.01*	-0.58
[after ÷ before]	0.88**	0.77**	-0.25	-1.86

Note: *, ** denotes significance at 5, 1 per cent level of significance.

Table 7 Differences in mean differences in performance I
Performance measure: scores (league points)

Window	Within-season < 1995/96	Within-season ≥ 1995/96	Interseasonal < 1995/96	Interseasonal ≥ 1995/96
[+4 ÷ -4]	0.15**	0.48**	0.09	0.61*
[+8 ÷ -8]	0.10*	0.39**	0.05	0.59**
[+12 ÷ -12]	0.00	0.52**	-0.01	0.55**
[+17 ÷ -17]	–		0.02	0.27
[after ÷ before]	-0.18	0.04	0.05*	-0.23*

Note: *, ** denotes significance at 5, 1 per cent level of significance.

Table 8 Differences in mean differences in performance II
Performance measure: league table ranks

Window	Within-season < 1995/96	Within-season ≥ 1995/96	Interseasonal < 1995/96	Interseasonal ≥ 1995/96
[+4 ÷ -4]	-0.87**	-0.16	0.02	3.89*
[+8 ÷ -8]	-1.35**	-0.70	-0.24	3.79*
[+12 ÷ -12]	-1.55**	-0.50	-0.46	2.97
[+17 ÷ -17]	–		-0.37	2.64
[after ÷ -1]	-0.12	0.64	-0.14	3.76*

Note: *, ** denotes significance at 5, 1 per cent level of significance.

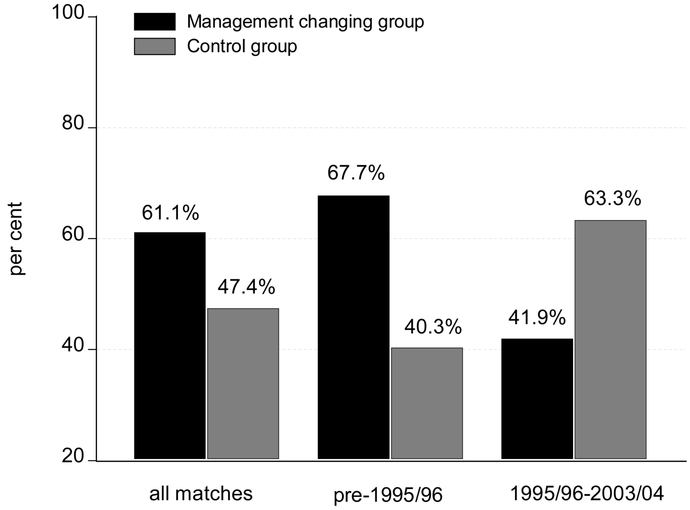


Figure 8 Share of realized relegations; turnover date vs. end of season

about half the size of the respective treatment group (0.77 vs. 1.41; see the last row entry in the third column of Table 6 and 4, respectively). The test results for a test of differences in the mean differences of the two groups is summarized in Table 7 and 8 for the two different measures of performance. The difference in mean differences under the null is zero for this test. Interestingly, on average the clubs with managerial turnover signifi-

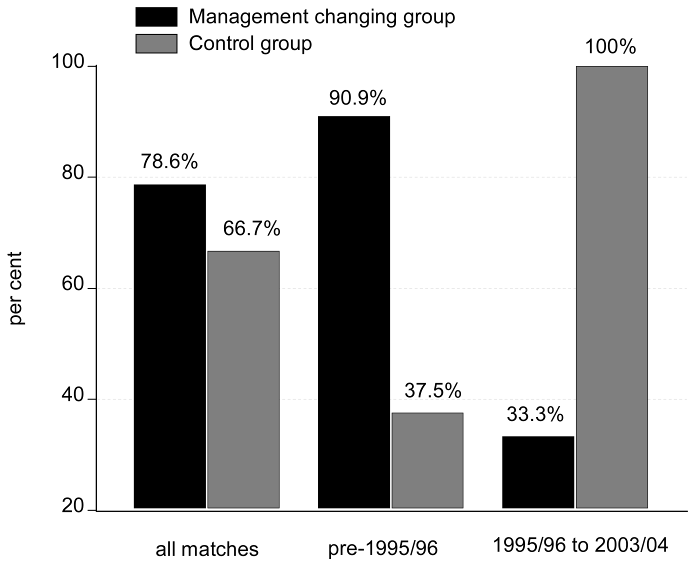


Figure 9 Share of realized relegations, turnover at six days to end of season vs. end of season

cantly outperform the control group in terms of league points after the rule change. This, however, does not apply to the whole season. While there is a systematic difference in the performance of the management changing group compared to the control group in the short run, there is no systematic difference over the whole period. This caveat is in line with the evidence of existing studies that do not account for the structural break induced by the rule change.

A final performance measure that is economically of paramount importance is the 0/1-event of relegation. In order to assess the impact the FIFA's rule change had on this measure, we calculate the share of clubs that at the end of the season ranked at the relegation implying bottom of the league to clubs that did so at the date of the managerial change. The lower this share, the more successful we would assess the turnover. The evidence is striking, in particular, when looking at a subsample of teams that ranked on a relegation implying rank six match days before the end of season. Figure 8 and 9 make the point.

3.3 Difference-in-differences estimates

Table 9 reports difference-in-differences estimates with the average number of points awarded to a team in the four games after a coach replacement and the four games before the replacement as dependent. Positive values indicate a performance increase under the new coach. Independents are (i) coach replacement, that is a dummy variable being 1 for teams that replaced its coach and being 0 for the control teams. If the findings from the event study hold, the effect of this variable should be positive; (ii) coach replacement under the 3-points-rule. An additional interaction term is included to the analysis being equal to one for coach replacements that took place under the 3-points rule. As controls, we include relative rankings, i. e., a team's rank in the league table at a given time t is supposed to be a good indicator of its strength since it is based on the cumulative number of points obtained during a season until time t. Using this information, we construct a measure indicating whether a team played relatively strong or relatively weak opponents by simply computing the average difference in the rank of the opponent and the team which changed its manager. This is done for the four games after and for the four games before the replacement took place. If the average is high, this indicates that a team played weak opponents. The regression of the performance effect of a coach's resignation contains the difference of these averages (relative rankings). Positive values indicate that a team's opponents in the games under the new coach were ranked worse in the league tables than the opponents under the old coach. Additionally, we controlled for a coach resignation after the season break (dummy) as well as for match home advantages of teams. Finally, the variable "aspiration level" captures the difference between the ranking of a team at the end of the previous season and the ranking when its coach was replaced. Generally, it can be assumed that greater aspiration levels are associated with a higher level of media interest for the club in general. The results confirm that our moral hazard model proposed above is well in accordance with the data: The introduction of the three points rule made the succession of a coach, at least, transitorily more effective (hypothesis 1), and this performance effect is the higher, the higher is the media interest as reflected by the perceived degree of ambition or "aspiration level" of a club (Table 9): hypothesis 2. At first sight, there also seems some support for our hypothesis 4 as coach replacements after the winter break are found to be less effective as indicated by the negative sign of corresponding coefficient estimates in Table 9.

However, the latter confirmation of hypothesis 4 is not robust as can be seen from estimates shown in Table 11, 12, and 13. Actually, the significant interacted coefficient

Table 9 Difference-in-differences estimates for different reward schemes

Performance Change (After-before)	(1) 3-points-rule 1963-1995	1995-2003	Total	(2) 2-points-rule 1963-1995	1995-2003	Total
Aspiration level	0.015 **	0.019	0.016 **	0.015 **	0.017 +	0.016 **
	[0.005]	[0.015]	[0.005]	[0.005]	[0.010]	[0.005]
Relative rankings	0.031 **	0.085 **	0.041 **	0.031 **	0.057 **	0.036 **
	[0.006]	[0.020]	[0.007]	[0.006]	[0.014]	[0.006]
Home advantage	0.716 **	0.896	0.734**	0.716 **	0.725 +	0.714**
	[0.141]	[0.597]	[0.156]	[0.141]	[0.410]	[0.135]
After Winter-break (1/0)	-0.108 *	-0.083	-0.094+	-0.108 *	-0.055	-0.094+
	[0.053]	[0.169]	[0.055]	[0.053]	[0.116]	[0.048]
Mgmt. change (1/0)	0.205 **	0.489 **	0.191 **	0.205 **	0.330 **	0.205 **
	[0.053]	[0.159]	[0.058]	[0.053]	[0.109]	[0.050]
Mgmt. change 3pts(1/0)			0.403 **			0.156 *
			[0.089]			[0.077]
Constant	0.128*	0.243	0.143 **	0.128 *	0.128	0.124**
	[0.052]	[0.167]	[0.055]	[0.052]	[0.115]	[0.048]
N obs	375	110	485	375	110	485
R-squ.	0.18	0.24	0.21	0.18	0.25	0.20

Notes: Regression coefficients from regression of differences before-after an event (+/- 4 matches) where + denotes signi.cance at 10 %, *5 %, and ** at 1 % level, respectively; reward schemes (1), (2) were applied both factually and counterfactually (depending on period).
Consistent standard errors given in rectangular parentheses.

Data: Coverage is all 39 seasons played in the *Erste Bundesliga* from 1963/64 until 2002/2003: A season starts in the second half of a calendar year .most often in August.and ends in May, each season contains a winter break; total number of (a) clubs = 48, (b) managers = 281, and (c) matches = 12,4888; *data source*: IMPIRE AG (www.bundesliga-datenbank.de)

Table 10 Difference-in-differences estimates: Three points reward scheme

	Period 1963-1994				Period 1995-2003			
$Rank_{t-1}$	0.013+	0.022*	0.014+	0.013+	0.027	0.024	0.031	0.027
	[0.007]	[0.009]	[0.007]	[0.007]	[0.024]	[0.032]	[0.024]	[0.024]
$Rank_{t-1} \times MC$		-0.019				0.006		
		[0.012]				[0.044]		
LSR	-0.008	-0.008	-0.003	-0.008	-0.035+	-0.035+	-0.021	-0.035+
	[0.006]	[0.006]	[0.008]	[0.006]	[0.020]	[0.020]	[0.025]	[0.020]
LSR × MC			-0.011				-0.035	
			[0.011]				[0.038]	
Rel. Rank	0.024**	0.025**	0.024**	0.024**	0.035	0.035	0.038+	0.036
	[0.007]	[0.007]	[0.007]	[0.007]	[0.022]	[0.022]	[0.022]	[0.023]
Home Advantage	0.669**	0.663**	0.660**	0.668**	1.209+	1.210+	1.186	1.206
	[0.154]	[0.154]	[0.154]	[0.154]	[0.721]	[0.725]	[0.722]	[0.726]
Winter break (WB)	0.011	0.011	0.014	0.054	-0.247	-0.246	-0.264	-0.238
	[0.055]	[0.055]	[0.055]	[0.077]	[0.174]	[0.175]	[0.175]	[0.239]
WB × MC				-0.086				-0.02
				[0.106]				[0.355]
MC	0.200**	0.445**	0.321*	0.240**	0.576**	0.491	0.941*	0.588*
	[0.054]	[0.170]	[0.132]	[0.074]	[0.183]	[0.627]	[0.433]	[0.282]
Const.	0.029	-0.1	-0.037	0.008	0.287	0.329	0.076	0.282
	[0.102]	[0.133]	[0.121]	[0.106]	[0.351]	[0.462]	[0.418]	[0.361]
N obs.	371	371	371	371	99	99	99	99
R-squ.	0.12	0.12	0.12	0.12	0.22	0.22	0.22	0.22

Notes: Regression coefficients from regression of performance differences (in league points) before-after an event (+/–4 matches), where +, *, ** denotes signi.cance at 10, 5, 1 % level, respectively; the three-points reward scheme is applied counterfactually to Period I (factual two-points reward scheme regime).
Consistent standard errors given in rectangular parentheses.

Abbreviations:
$Rankt_{t-1}$ – rank before managerial change (MC)
LSR – last season.s .nal rank
Rel. rank – relative rank as de.ned in the text
WB – after winter break

Table 11 Difference-in-differences estimates: Two points reward scheme

	Period I 1963-1994				**Period II 1995-2003**			
$\text{Rank}_{t\text{-}1}$	0.013+	0.022*	0.014+	0.013+	0.025	0.022	0.027+	0.025
	[0.007]	[0.009]	[0.007]	[0.007]	[0.016]	[0.021]	[0.016]	[0.016]
$\text{Rank}_{t\text{-}1} \times \text{MC}$		-0.019				0.006		
		[0.012]				[0.030]		
LSR	-0.008	-0.008	-0.003	-0.008	-0.024+	-0.024+	-0.014	-0.024+
	[0.006]	[0.006]	[0.008]	[0.006]	[0.013]	[0.014]	[0.017]	[0.014]
LSR × MC			-0.011				-0.025	
			[0.011]				[0.025]	
Rel. Rank	0.024**	0.025**	0.024**	0.024**	0.026+	0.026+	0.028+	0.026+
	[0.007]	[0.007]	[0.007]	[0.007]	[0.015]	[0.015]	[0.015]	[0.015]
Home Advantage	0.669**	0.663**	0.660**	0.668**	0.866+	0.868+	0.851+	0.865+
	[0.154]	[0.154]	[0.154]	[0.154]	[0.486]	[0.489]	[0.487]	[0.490]
Winter break (WB)	0.011	0.011	0.014	0.054	-0.196+	-0.195	-0.208+	-0.192
	[0.055]	[0.055]	[0.055]	[0.077]	[0.117]	[0.118]	[0.118]	[0.161]
WB × MC				-0.086				-0.01
				[0.106]				[0.239]
MC	0.200**	0.445**	0.321*	0.240**	0.396**	0.319	0.655*	0.402*
	[0.054]	[0.170]	[0.132]	[0.074]	[0.124]	[0.423]	[0.292]	[0.190]
Const.	0.029	-0.1	-0.037	0.008	0.111	0.149	-0.039	0.109
	[0.102]	[0.133]	[0.121]	[0.106]	[0.237]	[0.312]	[0.282]	[0.243]
N obs.	371	371	371	371	99	99	99	99
R-squ.	0.12	0.12	0.12	0.12	0.24	0.24	0.24	0.24

Notes: Regression coefficients from regression of performance differences (in league points) before-after an event (+/–4 matches), where +, *, ** denotes signi.cance at 10, 5, 1 % level, respectively; the three-points reward scheme is applied counterfactually to Period II (factual three-points reward scheme regime)
Consistent standard errors given in rectangular parentheses.

Abbreviations: see Table 10 above.

Table 12 Difference-in-differences estimates, three points reward scheme: 1963-2003

Three points rule: Total period					
$Rank_{t-1}$	0.027 [0.024]	0.022* [0.010]	0.017* [0.007]	0.015* [0.007]	0.015* [0.007]
$Rank_{t-1}$ × MC		-0.019 [0.013]			
$Rank_{t-1}$ × MC × NR		0.029** [0.007]			
LSR	-0.035+ [0.020]	-0.013* [0.006]	-0.008 [0.008]	-0.015* [0.006]	-0.014* [0.006]
LSR × MC			-0.020+ [0.011]		
LSR × MC × NR			0.028** [0.010]		
RelativeRank	0.035 [0.022]	0.028** [0.007]	0.028** [0.007]	0.027** [0.007]	0.027** [0.007]
HomeAdvantage	1.209+ [0.721]	0.721** [0.168]	0.700** [0.169]	0.732** [0.170]	0.736** [0.168]
WB	-0.247 [0.174]	-0.055 [0.056]	-0.043 [0.057]	-0.025 [0.079]	-0.052 [0.056]
WB × MC				-0.09 [0.116]	
WB × MC × NR				0.319* [0.129]	
MC	0.576** [0.183]	0.463* [0.180]	0.453** [0.137]	0.288** [0.080]	0.203** [0.060]
MC × NR					0.407** [0.098]
Const.	0.287 [0.351]	-0.004 [0.139]	0 [0.127]	0.092 [0.111]	0.093 [0.106]
Nobs	99	470	470	470	470
R-squ.	0.22	0.16	0.15	0.14	0.16

Notes: see Tables 9-11. NR .new rule. Consistent standard errors in parentheses.

(WB × MC × NR) estimate even shows a positive sign in the specification of Table 12. Yet, the estimate is sensitive to the reward scheme applied to the data as can be seen from the insignificant estimates of the corresponding coefficient in Table 13. A similar sensitive relationship is found for the asymmetric reaction of the final rank in the last season of a club (Table 12 and 13).

4 Discussion and Conclusion

This paper proposed a model that by accommodating the role of media interest sought to integratedly explain the impact of introducing an asymmetric reward scheme, of managerial turnover, and of the perceived degree of ambition of a professional soccer club's athletic output. The rule change induces a higher agency cost, which is temporarily economized by clubs that change their management. This cost reducing effect temporarily enhances the athletic performance for top league clubs. As the existing literature predominantly focuses on assessing the statistical significance of coach replacement effects, the

Table 13 Difference-in-differences estimates, two points reward scheme: 1963-2003

	Two points rule: Total period				
$Rank_{t-1}$	+0.025 [0.016]	0.021* [0.009]	0.015* [0.006]	0.014* [0.006]	0.014* [0.006]
$Rank_{t-1} \times MC$		-0.016 [0.011]			
$Rank_{t-1} \times MC \times NR$		0.013* [0.006]			
LSR	-0.024+ [0.013]	-0.011* [0.005]	-0.007 [0.007]	-0.013* [0.005]	-0.012* [0.005]
LSR × MC			-0.014 [0.010]		
LSR × MC × NR			0.01 [0.008]		
RelativeRank	0.026+ [0.015]	0.026** [0.006]	0.025** [0.006]	0.025** [0.006]	0.025** [0.006]
HomeAdvantage	0.866+ [0.486]	0.694** [0.147]	0.683** [0.148]	0.696** [0.149]	0.702** [0.148]
WinterBreak (WB)	0.196+ [0.117]	0.04 [0.050]	-0.033 [0.050]	-0.009 [0.069]	-0.037 [0.050]
WB × MC				-0.063 [0.101]	
WB × MC × NR				0.098 [0.112]	
MC	0.396** [0.124]	0.424** [0.158]	0.382** [0.120]	0.263** [0.069]	0.212** [0.052]
MC × NR					0.164+ [0.086]
Const.	0.111 [0.237]	-0.033 [0.122]	-0.014 [0.111]	0.052 [0.097]	0.061 [0.094]
Nobs	99	470	470	470	470
R-squ.	0.24	0.14	0.14	0.14	0.14

Notes: see Tables 9-11. NR .new rule. Consistent standard errors in parentheses.

main contribution here lies in the fact to provide a possible structural explanation for this result. The theoretical as well as the empirical model of this paper make some simplifying assumptions that we are aware of and want to briefly discuss in this final section. First, we interpret clubs as principals and coaches as agents. Of course, the reality is a multi-agents rather than a stylized two-agents world, including, in particular, also sponsors and players as central drivers of managerial change. Especially, the latter, that is players and their psychological relationship with coaches are aspects that we abstracted from in our analysis. The classical example is players giving an indirect vote of confidence or no confidence by playing or not playing to their limits in critical situations. Additionally, there might be more or less residual rights of sponsors in the decision of hiring and firing coaches that seem to make more sophisticated models such as models of limited transferable control and partial contracting (Aghion et al. 2002, 2004) more adequate than our basic model. Secondly, we suppose clubs to maximize financial payoffs. Even if this objective corresponds to maximizing win ratios as states of the world in our model map into profits, there might be other objectives like win-maximization subject to a zero-loss budget constraint (Késenne 2007) prevalent among clubs in the European soccer leagues. A final concern is our measuring of media attraction. A linear relationship between league table rank and media interest is quite a strict assumption. Thus, it does not come as a surprise that the difference between the final rank of a club in the preceding season and the rank at the date of firing a coach is found to have the most clear-cut empirical support. We ascribe this to the fact that the popular media, in general, and the tabloid market, in particular, maximize audience and readership by stumbling or even "falling heroes."

Overall, we find our model to be well in line with evidence for the German *Erste Bundesliga*, for which the introduction of the three points rule made the succession of a coach transitorily more effective. The performance effect is the higher, the higher is the media interest as measured by the perceived degree of ambition of a club, which we approximate by the difference between the final rank of a club in the preceding season and the rank at the replacement of the coach. The rank in the preceding season and the rank at the date of the firing taken alone do not have a coherent impact on after-managerial-change performance of clubs. Similarly, coach replacements before the winter break are not found to be clearly more effective than after-break changes. This might be due to the fact that although new coaches have a credible threat point through the generated possibility of hiring new players during the break, they have a similar threat point for the summer break. In the second half of the season they might be able to even more effectively threat players with an intention to leave with the depreciation of their market value by giving them no chance to play.

References

Aghion, P., M. Dewatripont, P. Rey (2002), On partial contracting. European Economic Review 46: 745-753.

Aghion, P., M. Dewatripont, P. Rey (2004), Transferable Control. Journal of the European Economic Association 2: 115-138.

Ashton, J.K., B. Gerrard, R. Hudson (2003), Economic Impact of National Sporting Success: Evidence from the London Stock Exchange. Applied Economics Letters 10: 783-785.

Audas, R., S. Dobson, J. Goddard (2002), The Impact of Managerial Change on Team Performance in Professional Sports. Journal of Economics and Business 54: 633-65.

Bruinshoofd, A., B. ter Weel (2003), Manager to Go? Performance Dips Reconsidered with Evidence from Dutch Football. European Journal of Operational Research 148: 233-246.

Garicano, L., I. Palacios-Huerta (2005), Sabotage in Tournaments: Making the Beautiful Game a Bit Less Beautiful. CEPR Discussion Paper 5231.

Kern, M., B. Süssmuth (2005), Managerial Efficiency in German Top League Soccer: An Econometric Analysis of Club Performances on and off the Pitch. German Economic Review 6: 485-506.

Késenne, S. (2007), The Economic Theory of Professional Sports. London.

Koning, R.H. (2003), An Econometric Evaluation of the Effect of Firing a Coach on Team Performance. Applied Economics 35: 555-564.

Wagner, S. (2010), Managerial Succession and Organizational Performance. Evidence from the German Soccer League. Managerial and Decision Economics 31: 415-430.

Prof. Dr. Bernd Süssmuth, University of Leipzig, Institute for Empirical Research in Economics & Econometrics, Grimmaische Str. 12, 04109 Leipzig, Germany.
suessmuth@wifa.uni-leipzig.de

Prof. Dr. Stefan Wagner, ESMT European School of Management and Technology Berlin, Schlossplatz 1, 10178 Berlin, Germany.
stefan.wagner@esmt.org