The Effects of Managerial Turnover: Evidence from Coach Dismissals in Italian Soccer Teams

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Abstract. In this paper sport data are used to study the effects of manager replacement on firm performance. Using match results of the major Italian soccer league ("Serie A") we analyze the effects of coach (manager) changes in terms of team performance. From our preliminary estimates, including year and team fixed effects, it emerges that changing the coach produces a positive effect on a number of measures of team performance. However, this effect turns out to be statistically insignificant once we take into account the fact that the firing of a coach is not an exogenous event, but it is triggered by a "dip" in team performance. Using as an instrument for coach change the number of remaining matches in the season (which is a proxy for the residual length of the coach contract) Two-Stages Least Squares estimations do not show any significant effect of coach change on team performance.

***JEL Classification**: J63; M50; M54; L83.*
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1. Introduction

Data on sports have been used in a large and increasing number of fruitful researches. Thanks to the availability of detailed and reliable measures of performance and data on individual careers, they are mostly employed to analyze issues related to incentives and labour market outcomes. An interesting topic, already considered using sport data, is the tendency of firms and organizations to replace their managers in order to try to improve their performance. In this paper we analyze the effects of changing the coach on team performance using match level data from the major Italian soccer league "Serie A" for the five seasons between 2003-2004 to 2007-2008.

The use of soccer data to infer the effects of the impact of manager dismissal in firms presents some relevant advantages since outcomes are measured directly on a weekly basis and do not suffer from serious measurement problems. On the other hand, data on firm performance are usually collected on a yearly basis and to measure the effects of manager turnover researchers compare results in years prior to the dismissal with results obtained after the dismissal. However, during this time period other things tend to change as well. To avoid this problem in some works firm stock prices are considered as indicators of firm performance. Stock prices are available on a daily basis, but unfortunately they are strongly influenced by expectations and are related more on what markets believe about the effect of manager turnover than on the actual effect it produces on firm performance.

As a top manager in a firm, the coach represents a crucial subject for the management of soccer clubs, since he undertakes a number of strategic and operative decisions which affect the

team performance. The coach trains and motivates players, selects players for each match, decides the tactics and game strategies of the team, etc.

Due to the crucial role of the coach for team performance, it is quite a common occurrence in soccer his replacement in case of negative results. From a theoretical point of view, coach dismissal might have different effects on team performance. On the one hand, the new coach may be able to motivate the players better, for example he may not take into account past positions in defining team composition and, as a consequence, the players have to provide a higher effort in order to be selected for the next game. On the other hand, coach dismissals may be the result of fan and media pressure, which does not generally consider that replacement destroys information accumulated by the ousted coach (Hoffler and Sliwka, 2003).

Testing empirically in a rigorous way these countervailing forces and understanding whether firing the coach helps to improve team outcomes is difficult because it is unknown what would have happened if the old coach had led the team.

Two thorny econometric problems need to be addressed when trying to disentangle the effects of coach turnover on team performance: 1) during a season a team plays against different opponents and therefore old and new coaches face different conditions: in order to obtain reliable estimates it is necessary to control for opponents quality; 2) coaches are not randomly fired: in fact, a dismissal is typically decided after a number of consecutive negative results. Since in a stochastic environment, unusually low or unusually high outcomes are statistically followed by outcomes that tend to be closer to the mean ("regression to the mean"), naïve analysis, which do not control for this aspect, may erroneously conclude that coach forced turnover leads to an improvement in team performance even if its real effect is negligible.

Similar problems, probably even worst, are met when analyzing firm performance and manager turnover. In fact, also in this case managers are not randomly fired and after and before firing a number of unobservable factors, which affect firm performance for reasons unrelated to the managerial turnover, tend to change.

Probably because of these econometric problems, the literature on the effects of manager turnover on organizational performance does not find univocal results. The business literature shows mixed results, but on balance these studies suggest small positive effects of managerial turnover on firm performance. Bonnier and Bruner (1989) and Weisbach (1988) observe significantly positive stock price reactions to turnover news. On the other hand, Khanna and Poulsen (1995) find the opposite result. Reinganum (1985) and Warner, Watts and Wruck, (1988) report small, statistically insignificant, price changes associated with turnover events. Other works examine the relation between turnover and changes in operating performance measured using accounting information. Denis and Denis (1995) show that forced resignation of top managers are followed by large improvements in firm performance. Similar results are found by Khurana and Nohria (2000). More recently, Huson, Malatesta and Parino (2004) show

that turnover announcements are associated with significantly positive stock returns and are positively related to accounting measures of performance.

Similarly, studies based on sport data do not find univocal results of the effects of coach turnover on team performance. Some studies found evidence that turnover improves team performance (Fabianic, 1994; McTeer *et al*., 1995), while others did not find any significant effect (Bruinshoofd and Ter Weel, 2003, Koning, 2002; Maximiano, 2006). Other works found instead a negative impact (Brown 1982; Salomo and Teichmann, 2000; Audas et al., 2002; Audas et al. 2006).

It is worthwhile to notice that earlier analyses on coach turnover are based on simple models, which do not consider the serious econometric problems discussed above.

In comparison to the previous literature our paper introduces some innovations. Firstly, we use an instrumental variable approach, to tackle the problem of endogeneity in coach turnover; secondly, we control for opponents' quality considering teams' ranking position in the past season or points accumulated until the considered round; finally, our study is the first focusing on Italian "Serie A", one of the most important championships in the world in terms of revenues produced, stadium attendance, supporters' interest, media coverage, etc.

We start estimating a model of team performance, measured using different indicators, controlling for opponents' quality and including team and season fixed effects. From the estimates of the coefficient on a dummy variable indicating a coach change within the season, it emerges that changing the coach produces a positive effect on team performance.

Subsequently, we test whether these results are robust once problems that may derive from the fact that firing the coach is not a random event are handled. We use as an instrument for coach change the number of remaining matches in the season. This variable affects the cost of coach change, since typically dismissed coach has to be paid by the club for the remaining part of the season: therefore, the number of remaining matches negatively affects the probability of coach change. On the other hand, the number of remaining matches should not affect directly team performance (for reasons unrelated to coach change).

Interestingly, from Two-Stage Least Squares estimates it emerges that coach replacement does not produce any significant effect on team performance. These results lead us to conclude that the positive effects of coach change that emerge in LSDV estimations are a result of the "Ashenfelter dip phenomenon".[1]

The paper is organized in the following way. Section 2 presents the most salient features of the data and a number of descriptive statistics. Section 3 presents fixed effects estimates, and

[1] The "Ashenfelter dip phenomenon" was originally noted by Ashenfelter (1978) in relation to the fact that the earnings of participants to training programs tend to decline just before they enter in these programs. Therefore, the comparison of earnings before and after training will tend to overestimate the effects of the program.

in Section 4 we carry out instrumental variables estimates of the effects of coach turnover on team performance. Section 5 concludes.

2. Data and descriptive statistics

We use a dataset with information at match level of 5 seasons of the major Italian soccer league "Serie A" (starting from 2003–2004 to 2007–2008). Data were collected from the websites of Wikipedia and *RAI* Sport (http://www.raisport.rai.it/).

The Italian "Serie A" was composed by 20 teams in each season, except in 2003–2004 in which there were 18 teams. In each season, teams played each other twice (both as the home and visiting team) for a total of 38 matches (34 in 2003-04).[2] Therefore, there have been 1826 matches, yielding a total number of 3652 observations of team performance. For each match we have available data on teams, their respective coaches, goals scored, the place and the date when each game was played. Furthermore, we know the date when a coach has been replaced during the season, the total points obtained by teams before each round, the positions of teams in the final ranking of each season.

As regards coach changes, we consider only changes of coaches taking place within the season, because replacements between seasons do not allow us to distinguish between effects due to the coach change from other factors related to a different composition and quality of the team or of its opponents. In fact, teams are subject to a considerable renewal between seasons through an intense exchange of players and, in addition, the composition of the league changes because the three lowest placed teams are relegated into a lower division, "Serie B", and the three best placed teams of "Serie B" are promoted into "Serie A".

Coach dismissals are a quite frequent phenomenon in soccer. In our dataset, on average 41% of teams have changed the coach during a given season. There were 5 replacements in 2003-04; 9 in 2004-05; 8 in 2005-06; 9 in 2006-07 and 9 in 2007-08. A total of 23% of matches were played by teams managed by a new coach. Coach change is more frequent among low-performing teams (67% of lowest placed ten teams fired the coach) and rare among high-performing ones (only 16% of first-ranked ten teams replaced the coach).

From media coverage, we know that almost all the coach replacements are initiated by the management of the club and, even in the few cases of coach resignations, these have been provoked by the discontent of the board. Therefore, we do not distinguish between replacements and resignations.

Team performance is measured using different indicators of the outcome obtained on the pitch: the number of points gained in each match by the team (*Points*), the number of *Goals*

[2] In the first half of the season each team will play one time against all its opponents, while in the second half each team plays in the exact same order against the same teams, but a home game played in the first half will be an away game in the second half, and vice versa.

Scored, the number of *Goals Conceded* and the *Score Difference* (equal to the *Goals Scored* minus the *Goals Conceded*). According to the rule of soccer, teams are awarded 3 points if they win a game, 1 point in case of draw and 0 points if they lose. The sum of points obtained in each game determines the final ranking.

As it is possible to see in Table 1 – considering only teams that changed the coach within a season – on average the new coach earns more points with respect to the old coach. Furthermore, on average the number of goals scored per game increases and the number of goals conceded decreases, so that team score difference improves.

Table 1. A comparison of team performance under the old and the new coach

	Points	*Score Difference*	*Goals Scored*	*Goals Conceded*
Old Coach	0.974	-0.489	0.968	1.457
New Coach	1.099	-0.328	1.091	1.419

Notes: only teams who changed the coach within a season are considered

Based on the data shown in Table 1, one would conclude that firing the coach of an underperforming team yields better results. However, results obtained on the field are influenced by a series of factors, which have to be taken into account, in order to have a reliable picture. One extremely important aspect is related to the fact that the old coach and the new coach do not play against the same opponents. For example, it is possible that the old coach started the season by playing against the toughest opponents, while the new coach faces weaker teams. In order to take into account these aspects, in the next Section we undertake an econometric analysis controlling for the quality differences among the opponents and for other determinants of team performance.

3. Coach Change and Team Performance: Fixed-Effects Estimates

In this Section, we evaluate the effects of changing the coach on team performance. The dependent variable is team performance measured, in the main specification, as the number of points earned by a team per game. Moreover, in alternative specifications, we measure team performance with the Score difference. Each game is considered twice: from the perspective of the home team and from the perspective of the visiting team.

The variables we consider to explain team performance are the following: a dummy variable indicating if the game is played at home (*Home*); two alternative measures that capture the differences in the quality of opposing teams: the difference in the final ranking positions (in

the current season) between the considered team and its opponent (*Ranking Difference*); the difference in the points earned by the two teams until the present round (*Points Difference*)[3].

The dummy variable indicating whether the game is played at home should control for the well-known "home advantage", which as shown by many studies is strong in sports and in soccer in particular, due to psychological reasons, social pressure by the crowd, possible favouritism of referees and so on (see Carmichael and Thomas, 2005, and Scoppa, 2008).

The variables measuring differences in team quality should correct for any bias introduced by the fixed schedule of the play implying that the new and the old coach face different opposing teams and play home or away alternatively.

Our variable of interest is a dummy variable indicating if a new coach is leading the team, replacing the old one in the current season (*Coach Change*).

Performances of teams are obviously not directly comparable among them and, in addition, the performance of the same team is not comparable across seasons, because of changes in the team composition. Therefore, we estimate our model with fixed effects at team and seasonal level, that is we control for heterogeneity of teams inserting dummy variables for each team in each season. In this way, the estimate of the *Coach Change* effect is obtained by the comparison between the average performance of the team observed in matches played with the old coach and in matches played with the new coach (in the same season).

Results of estimates are reported in Table 2. In column (1)-(3) we consider as a measure of team performance (the dependent variable) the number of points gained in each game.

The effect of *Coach Change* is positive and strongly statistically significant in each specification. However, the magnitude is small: according to our estimates, playing with a new coach yields a team 2-3 points more every 10 matches.

Control variables have the expected sign: estimates show that playing at home has a positive effect on team performance; the quality of opponent teams, measured as their respective ranking positions (column 1 and 3) or by points earned (column 2) has the expected impact on team performance: the higher the ranking difference (implying that the considered team is many positions below its opponent in the final ranking) the lower the points obtained, while the higher the difference in points (accumulated until the latest round) the higher the points obtained.

[3] Similar lagged variables are used in a number of previous studies to control for mean-reversion (see for example Pfeffer and Davis-Blake, 1986; Jacobs and Singell, 1993; Fizel and D'Itri, 1997; Audas et al. 2006).

Table 2. The effects of Coach Change on Team Performance. Fixed Effects Estimates

	(1) Points	(2) Points	(3) Points	(4) Score Difference	(5) Score Difference	(6) Score Difference
Coach Change	0.225***	0.339***	0.131***	0.261***	0.427***	0.196***
	(0.067)	(0.071)	(0.050)	(0.082)	(0.087)	(0.061)
Home	0.602***	0.611***	0.603***	0.790***	0.803***	0.790***
	(0.037)	(0.038)	(0.037)	(0.045)	(0.047)	(0.045)
Ranking Difference	-0.062***		-0.058***	-0.084***		-0.077***
	(0.003)		(0.003)	(0.004)		(0.003)
Points Difference		0.015***			0.022***	
		(0.002)			(0.002)	
Season 2004-05			-0.045			-0.038
			(0.066)			(0.081)
Season 2005-06			0.018			0.024
			(0.068)			(0.083)
Season 2006-07			0.012			0.032
			(0.069)			(0.084)
Season 2007-08			-0.016			0.002
			(0.070)			(0.086)
Constant	0.997***	0.967***	1.025***	-0.455***	-0.499***	-0.444***
	(0.030)	(0.032)	(0.055)	(0.037)	(0.039)	(0.068)
Observations	3652	3652	3652	3652	3652	3652
Number of Teams	98	98	30	98	98	30
R-squared	0.151	0.086	0.159	0.176	0.101	0.180
Number of Teams	30	30	30	30	30	30

Notes: In columns (1), (2) and (3) the dependent variable is *Points*; in columns (4), (5) and (6) the dependent variable is *Score Difference*. Columns (1), (2), (4) and (5) include dummy variables for each team in each season, while columns (3) and (6) include dummy variables for each team and aggregate dummy variables for seasons. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

In columns (3) we replicate the estimates of column (1) using team fixed effects not season-specific (but controlling for aggregate seasonal effects). Results are similar to previous specifications.

In columns (4)-(6) we use as dependent variable the *Score Difference* instead of *Points*. Results are very similar to, respectively, column (1)-(3).

In an alternative specification, we find slightly higher effects when we analyse the short time impact of coach turnover by focusing on results obtained by a team just in the four matches after replacement. For example, in a specification analogous to column (1), it emerges that playing with a new coach yields the team to gain 0.278 points per match in the four matches after replacement (results are not reported in the table, but available upon request).

We have also experimented using as dependent variables two alternative measures of team performance (results are not reported to avoid cluttering the Table): the number of goals scored and the number of goals conceded (per game). These two measures are aimed at describing respectively the offensive and defensive capability of the team (see also Koning 2003). We find that Coach Change has a significant and positive effect on Goals Scored and a

negative effect on Goals Conceded, implying that the new coach is able to improve both the offensive skills and the defensive skills of the team.

As robustness exercise, we also run an ordered probit analysis considering as depended variable the final result of the game (Win, Draw and Loss) as an ordinal variable. Results are very similar to those shown in Table 2.

5. Instrumental Variables Estimates for the Effects of Coach Change

In the previous Section we have taken into account in our estimates problems deriving both from the fact that teams changing the coach tend to be of different quality and related to the quality of opponents, since, given the schedule of the season, the old and the new coach face different opponents.

We have also tried to control for the phenomenon of mean reversion in team performance using lagged match results (a similar strategy has been adopted for example by Audas et al. 2006, Koning, 2002).

Nevertheless, this does not allow to deal in a satisfactory way with endogeneity problems due to the fact that coaches are not fired randomly throughout the season, but dismissal decisions are usually the consequence of a spell of bad outcomes. Our model tries to explain whether firing the coach helps at obtaining a better performance compared to that obtained previously, but the occurrence of coach change depends itself on previous performance and then on the perceived improvement that may emerge. In addition, the team's board has information about the coach characteristics (not included in our data), which are used in firing decisions. Therefore, our variable of interest, *Coach Change*, is correlated with the error term of the regression.

Figure 1 represents the average performance of teams in matches before and after the change. It clearly shows that coach dismissals happen after a series of disappointing results. This is analogous to the "Ashenfelter dip phenomenon", that is, selection for treatment is influenced by negative shocks to the performance.

However, if teams are hit by a series of negative shocks they may recover after some period of time, simply as result of "regression to the mean", independently if they have dismissed the coach or not.

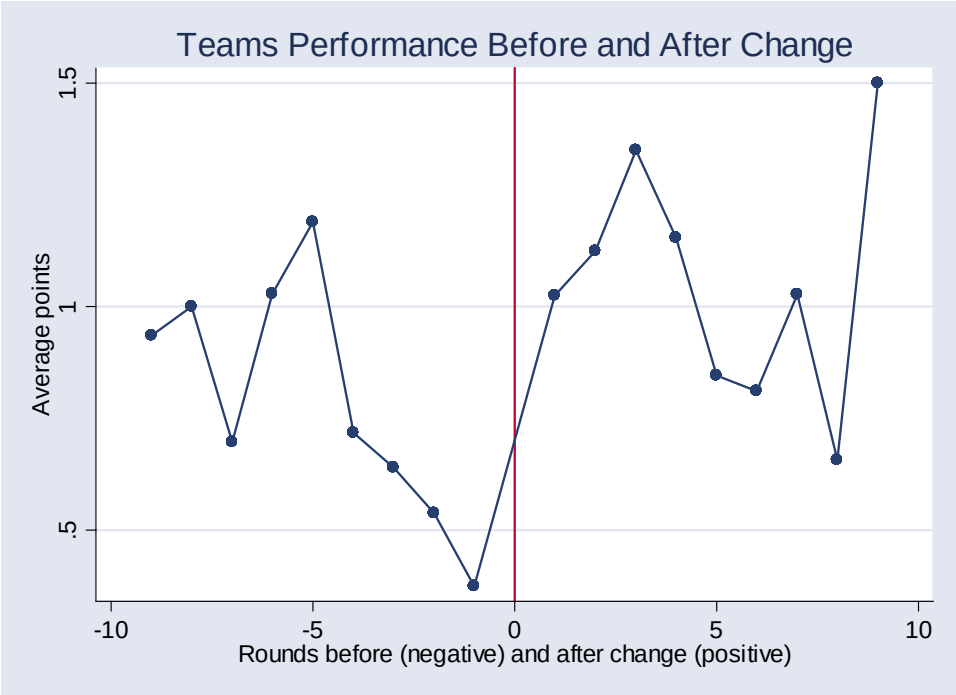

Figure 1. Team Performance Before and After Coach Change

In order to handle this problem, we use an instrumental variable for *Coach Change* and estimate our model through Two-Stages-Least-Squares.

We need to find an instrumental variable *Z* which must comply with the two usual conditions: 1) the instrument must be correlated with the endogenous variable, that is $Cov(Coach\_Change, Z) \neq 0$; 2) the instrument must not affect team performance directly, for reasons beyond its influence on the variable of interest. It is required that the instrument is exogenous, that is $Cov(Z, \varepsilon) = 0$.

We believe that the number of matches to be played by a team before the end of the season (*Remaining Matches*) has both these characteristics. Firstly, the number of remaining matches in the season is a proxy for the residual length of the contract signed between the coach and the club. Since such contracts typically establish that in case of firing the dismissed coach has to be paid for the remaining part of the season, breaking a contract turns out to be more costly the higher the number of remaining matches (because the team has to pay both the new and the old coach during this period). From our First Stage regression, *Remaining Matches* is strongly negatively related to the probability of *Coach Change*. Secondly, the number of remaining matches should not affect directly team performance (for reasons unrelated to coach change), that is, our instrument is exogenous.

Two-Stage Least Squares estimates are reported in Table 3, where we measure team performance both as *Points* (column 1) and as *Score Difference* (column 2).

Panel B of Table 3 shows the results from First Stage regressions. In the first stage the

instrumental variable strongly determines the probability of *Coach Change*. We are reassured that our instrument is not weak, since the *F*-statistic for the test of whether the instrument coefficient is equal to zero is well above the threshold value of 10 suggested by Stock and Watson (2003).

Table 3. The effects of Coach Change on Team Performance using Remaining Matches as Instrumental Variable.

Panel A: Two-Stage Least Squares

	(1) Points	(2) Score Difference	(3) Points	(4) Score Difference
Coach Change	0.030	-0.000	0.030	-0.000
	(0.139)	(0.170)	(0.139)	(0.171)
Home	0.603***	0.791***	0.603***	0.791***
	(0.037)	(0.045)	(0.037)	(0.045)
Ranking Difference	-0.062***	-0.084***	-0.056***	-0.074***
	(0.003)	(0.004)	(0.003)	(0.004)
Constant	1.041***	-0.395***	1.047***	-0.401***
	(0.041)	(0.050)	(0.062)	(0.076)
Observations	3652	3652	3652	3652
Number of Teams	98	98	98	98

Panel B: First Stage Regressions

	Coach Change	Coach Change	Coach Change	Coach Change
Remaining matches	-0.012***	-0.012***	-0.012***	-0.012***
	(0.000)	(0.000)	(0.000)	(0.000)
Home	0.002	0.002	0.002	0.002
	(0.008)	(0.008)	(0.008)	(0.008)
Ranking Difference	-0.000	-0.000	-0.013	-0.013
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	0.451***	0.451***	0.451***	0.451***
	(0.009)	(0.009)	(0.009)	(0.009)
Season 2004-0005			0.080***	0.080***
			(0.020)	(0.020)
Season 2005-0006			0.005	0.005
			(0.021)	(0.021)
Season 2006-0007			-0.009	-0.009
			(0.021)	(0.021)
Season 2007-0008			0.069***	0.069***
			(0.021)	(0.021)
Observations	3652	3652	3652	3652
Number of Teams	98	98	98	98
R-squared	0.232	0.232	0.232	0.232

Notes: Panel A reports the Two-Stage Least Squares estimates, instrumenting Coach Change using Remaining matches. Panel B reports the corresponding first stage. Standard errors, corrected for heteroskedasticity, are reported in brackets. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at 1, 5, and 10 percent levels.

Panel A of Table 3 presents Two Stage Least Squares estimates. Our results show that, when instrumented, *Coach Change* is not statistically significant (neither when team performance is measured with *Points*, nor when performance is measured with *Score Difference*).

According to our estimates, once endogeneity problems are handled, replacing badly

performing coaches within the season does not suffice to improve the performance of a team[4].

In columns (3) and (4) we replicate the estimates of column (1) and (2) using team fixed effects not season-specific. Again, we do not find any significant effect of coach replacement on team performance.

Similar results are obtained also when we investigate the effect of coach turnover respectively on the offensive and defensive skills of the team.

We find instead a negative effect when we analyse the short time impact of coach turnover. From IV estimates it emerges a negative and statistically significant (at 10% level) effect when we consider as dependent variable *Points* and a negative but not statistically significant effect when we measure performance as *Score Difference* (estimates are available upon request). This result may be interpreted in relation to the loss of specific human capital that takes place once the old coach is dismissed: in fact it may take time for a new manager to acquire all the relevant information and to "take charge" (see Rowe *et al.*, 2005).

6. Concluding Remarks

Managers dismissals are quite frequent both in firms and in sport teams. However, the evidence on the effects of these managerial replacement decisions is not clear. Nor the business literature neither analysis based on sport data come out with univocal results. While a number of studies show a positive results other works do not find any statistically significant effect or find indeed negative effects.

Earlier analysis were based on simple econometric models, which were not able to take into account some relevant econometric problems related to the fact that we do not observe the same team playing at the same point in time with the old and the new coach. More recently empirical studies have undertaken a number of estimation strategies to handle these problems.

This paper adds to this literature and tries to provide some additional evidence on the effect of coach replacement, focusing on the major Italian soccer league ("Serie A"), using an instrumental variable approach.

From our analysis it emerges that endogeneity problems can lead to biased conclusions on the effect of coach replacement. In fact, when we estimate the impact of coach change with fixed effects at team and seasonal level, it emerges a positive statistically significant effect (even if small), which vanishes when we control for endogeneity problems in coach replacement. According to our Two-Stages Least-Square estimates, in which we use as an

[4] We have also dealt with mean reversion using an alternative approach which consists in excluding from the analysis match results for a number of weeks prior to coach changes. We have experimented excluding results of the 4 weeks prior to manager forced resignations. Our results suggest that coach turnover does not produce any statistically significant positive effect on team performance (the coefficient on our variable of interest is positive, but statistically insignificant).

instrument for coach forced resignation the number of matches to be played by the team before the end of the season, playing with a new coach does not produce any statistically significant effect on team performance.

This finding confirms results obtained by some recent studies (Bruinshoofd and Ter Weel, 2003, Balduck and Buelens, 2007) and suggests that the firing of a coach has to be explained in relation to other reasons rather than for the expected improvement in team performance. For example, team boards may over-estimate their own ability to undertake optimal replacement decisions, or as suggested by the scapegoating theory, firing the coach may represent a convenient mean for owners of placating frustrated stakeholders and displacing blame for the poor performance away from themselves.

A relevant question is whether these results can be generalized to other organizational structures, such as firms. While, on the one hand, it is important to consider that they pertain to team sports, which are characterised by some particular features and then it is not possible to derive general conclusions, on the other hand, they suggest that the natural tendency for mean reversion has to been taken seriously into account in order to avoid misleading conclusions on the effect of managerial turnover on organizational performance.

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