

ISSN 2282-8168

CEFIM Working Papers
No 46

Should football coaches wear a suit?
The impact of skill and management structure
on Serie A Clubs' performance

by Costanza Torricelli, Maria Cesira Urzì Brancati,
and Luca Mirtoleni

July 2014

Should football coaches wear a suit?
The impact of skill and management structure on Serie A
Clubs' performance

Costanza Torricelli^{a,b,c*}, Maria Cesira Urzì Brancati^{a,c}, Luca Mirtoleni^b

a. Department Economics, University of Modena and Reggio Emilia

b. CEFIN (Centro Studi di Banca e Finanza, Modena)

c. CeRP (Collegio Carlo Alberto, Torino)

July 2014

Abstract

This paper implements the methodology proposed by Bell et al. (2013) for the English Premier League to test the performance of football club coaches in the Italian Serie A, so as to explore the robustness of this approach to a different setup. Our results show that, over the seasons 2011-12, 2012-13 and 2013-14, only two coaches out of 49 outperform, three underperform, while the great majority performed as expected. It follows that conclusions about the appropriate sacking time are not easy and the final decision is determined by other circumstances. Although comparison with Premier League has to be taken with caution, our results show that, in the presence of the management structure and the tactical approach typical of Serie A, the model can pick up a few very extreme skill levels but it cannot differentiate among the great majority of coaches.

JEL: M12, G11, C15

Keywords: manager performance; football clubs; Italian premier league (Serie A); fixed effects, bootstrap

* Corresponding author: costanza.torricelli@unimore.it. The authors thank Chris Brooks for providing helpful suggestions for the implementation of the methodology and Michele Tedeschini for extremely useful comments for the interpretation of the results. Usual disclaimers apply.

1. Introduction

The relationship between managers' performance and their compensation has been deeply investigated in the case of mutual funds, with the underlying idea that managers should be rewarded for their ability of setting up a portfolio and not just for picking assets randomly. From Jensen's (1968) seminal paper to the later Fama and French (1993) the objective is thus to measure, in a Capital Asset Pricing Model framework, the extra return (alpha) generated by the manager with respect to the market. This research question is quite clearly represented by the title of the paper by Cuthbertson et al. (2008): "UK mutual fund performance: skill or luck?" with results suggesting a prevalence of luck, in line with most previous literature (e.g. Ibbotson and Kaplan, 2000, Kosowski et al., 2006).

Analogously, one can think of the coach of a team sport as the manager of a set of assets (available players) and of his/her performance as the ability to manage the portfolio (the team) so as to generate a return (a score) higher than the market one (the one generated by any coach with the same players). The importance of measuring the performance of football coaches is apparent if one thinks of the size and structure of the football industry in Europe, the current debate over salary caps (Bodansky, 2013), the financial fair play rule introduced by UEFA in September 2009 and its implications on finances and on-field results of European clubs (Peeters and Szymanski, 2014). Indeed, the aggregate revenues of the 53-top European Divisions¹ increased from € 10.6 billion in 2007 to € 13.2 billion in 2011, while the aggregate costs, which include coaches' compensations, soared from € 11.2 billion to € 14.8 billion (FGCI, 2013). These data have fostered explanations based on the application of the soft budget constraint theory (Kornai *et al.*, 2003) to the football industry (Rasmus and Klaus, 2012).

Nevertheless, only a few studies address the issue, as Bell *et al.* (2013) recently stressed in their article on the performance of English Premier League football club managers. In the same vein as Cuthbertson *et al.* (2008), the authors use a bootstrap methodology to identify whether the number of

¹ The 53-Top European Divisions are: Albanian Superliga, Andorran First Division, Armenian Premier League, Austrian Bundesliga, Azerbaijan Premier League, Belarusian Premier League, Belgian Pro League, Premier League of Bosnia and Herzegovina, Bulgarian A Professional Group, Croatian First League, Cypriot First Division, Czech First League, Danish Superliga, Premier League, Estonian Primer Division, Faroe Island Premier League Football, Finnish Premier League, Ligue 1, Georgian Premier League, Bundesliga, Gibraltar Premier Division, Superleague Greece, Hungarian National Championship, Icelandic Premier Division, Israeli Premier League, Serie A, Kazakhstan Super League, Latvian Higher League, Lichtenstein Football Association, A League, Luxembourg National Division, Maltese Premier League, Moldovan National Division, Montenegrin First League, Eredivise, NIFL Premiership, Norwegian Premier League, Ekstraklasa, Portuguese Liga, League of Ireland Premier Division, Macedonian First League, Liga I, Russian Premier League, Sammarinese Football Championship, Scottish Premiership, Serbian Superliga, Slovak Superliga, Slovenian First Football League, La Liga, Allsvenskan, Swiss Super League, Süper Lig, Ukrainian Premier League, Welsh Premier League.

points per game scored by the manager is due to the team characteristics or to the manager's skill, and eventually to assess the appropriate point to fire him in case of an enduring negative performance.

The aim of this paper is to contribute to this literature by implementing the methodology proposed by Bell *et al.* (2013) for the English Premier League to test the performance of football club coaches in the Italian premier league (Serie A) so as to explore the robustness of this approach to a different setup. In fact, Italian football differs from the English one in various ways: the role attributed to the coach², the traditionally different technical and/or tactical approach to the game, and the industry differences (e.g. clubs' revenue structure, property stadium).

To this end, we set up a dataset collecting data for the seasons 2011-12, 2012-13 and 2013-14 from Transfer Market, Serie A League, Federazione Italiana Gioco Calcio, UEFA, as well as various issues of the most read Italian sport newspaper Gazzetta dello Sport.

Our results show that only two coaches out of 49 outperform expectations (Conte and Guidolin), three are found at the bottom of the rank and were sacked after about a dozen games (Delneri, Beretta, and Bucchi), while the great majority performed as expected. It follows that conclusions about the appropriate sacking time are not trivial and the final decision is determined by other instances. Although comparison with Premier League has to be taken with caution, our results show that, in the presence of the management structure and the tactical approach typical of Serie A, the model can pick up a few very extreme skill levels but it cannot differentiate among the great majority of coaches.

The rest of the paper is organized as follows. Next Section reviews the literature on the issue and motivates the paper. Section 3 illustrates Bell-Brooks-Markham (Bell *et al.* (2013) methodology, while Section 4 describes the dataset and provides descriptive statistics. Results are provided in Section 5 and the comparison with Premier is offered in Section 6 where differential features of the Italian football are recalled. Last Section concludes.

2. Related literature and motivation

Most studies on football managers are concerned on the effect and/or the timing of sacking a football manager in different leagues.

² To be noted that in the English Premier League coaches are addressed as managers because they have more decision power over some choices (e.g. youth academy, player transfers) with respect to their Italian colleagues. These differences are relevant for comparison of results and will be discussed when comparing results. In the rest of the paper, although we will try to stick to the term coach for Italian clubs, the two terms may be used interchangeably.

A first set of studies is based on the comparison between a control group and a sacking group, whereby the clubs in the two groups are similar in terms of performance except for the decision of sacking the coach. Baldock and Buelens (2007) find that in the Belgian football league, over the seasons from 1998/99 to 2002/03, if a club's performance declined over a 2-month period, the coach would be sacked; however, the on-field performance would actually worsen with the new manager with respect to the control group. Based on an analogous comparative approach, Bruinshoofd and terWeel (2003) examine the Eredivisie (Dutch Premier League) between 1988 and 2000 and conclude against the opportunity of sacking a manager in terms of effectiveness and efficiency of the team's performance. More clear-cut conclusions are reached in Audas *et al.* (2002) based on the match results of the UK Football League and Premier between the 1972/73 and 1999/00 seasons: clubs that changed managers within season tend to show a worse performance with respect to clubs that did not.

De Paola and Scoppa (2008) underscore the endogeneity intrinsic in the analysis of club performance and coach replacement. To control for this the authors, who examine the Italian Serie A between the seasons of 2003/04 and 2007/08, implement a two-stage least-squares estimation and conclude that changing a manager does not have *per se* any effect on a team's performance, thus suggesting that coaches are nearly equivalent to each other in terms of skill.

Bridgewater (2009) and Hughes *et al.* (2010) share the view that there is a positive short-term effect of a manager change on team results due a "honeymoon effect". However, once this effect disappears, results drop and this explains why on average in the longer run managerial changes do not improve performance.

As for the optimal time to fire a manager, as far as we know, Hope (2003) is the only one to tackle the issue by means of a stylized model, which also hinges on the existence of a honeymoon period. The model, calibrated over data from English Premier League seasons 1996/97 to 2001/02, suggest a strategy characterized in terms of the length of the honeymoon period, the trapdoor level and the weight that should be given to most recent games. According to this model some coaches should have been sacked (e.g. John Gregory at Aston Villa and Walter Smith at Everton), but others should have not (e.g. Ruud Gullit or Gianluca Vialli at Chelsea, Joe Royle at Everton). However, Hope (2003) stresses limits of his model and underscores the importance of further work to include neglected issues (e.g. the distinction between home and away games, the quality of the opposition) and the importance of applying it to other leagues than the Premiership (e.g. Spain and Italy).

The issue addressed by Bell *et al.* (2013) differs from the previous ones in the literature, since their aim is to separate managers' performance from that of the team. Specifically, they follow the literature on mutual fund manager performance and use a bootstrap methodology to identify whether the number of points per game scored by the manager is due to the team characteristics or to the manager's skill, and eventually to assess the appropriate point to fire him in case of an enduring negative performance. The model, which provides very interesting results for English Premier League, has not yet been applied to other leagues to test its robustness to circumstances very different to those in the Premiership.

Since we intend to apply Bell *et al.* (2013) methodology to the Italian Serie A, we will illustrate it more in detail in the next section.

3. Bell *et al.* (2013) methodology and English Premier League results

Bell *et al.* (2013) propose a methodology that rests on the analogy between a football club manager and an investment fund manager, and thus exploits results well known in the finance literature to evaluate managers' performance. More specifically, the approach aims to separate the impact of the manager on the performance of the team from the effects of other characteristics. To this end, following Kosowski *et al.* (2006) and Cuthbertson *et al.* (2008), a bootstrap approach is used to single out two performance components: managerial skill and luck. First, a regression model is estimated to explain the club manager performance, then residuals are bootstrapped to reconstruct the time series of points for the club under the null hypothesis of no manager outperformance (i.e. regression intercept equal zero). Repeating the bootstrap many times it is possible to generate a performance distribution that is based only on luck and team features but not managerial skill.

The authors take an unobserved effects point of view, where manager i obtains a given result with the team he is managing/coaching at the time, and regards manager characteristics as an unobserved fixed effect. This implies estimating a fixed effects model as follows:

$$y_{it} = \beta_0 + \alpha_i + \sum_{j=1}^k \beta_j x_{jit} + u_{it} \quad [1]$$

where y_{it} is the performance measure equal to the number of points scored by a team (0 for a loss, 1 for a draw or 3 for a win) playing with manager i at time t ; β_0 is the intercept; α_i is the manager fixed

effect - regardless of the team they are managing - which may change over the sample; x are the observable characteristics, u_{it} are zero mean i.i.d. random errors.

The observable characteristics suggested by Bell *et al.* (2013) and the expected signs of the regression coefficients (in parenthesis) are:

1. the total player wage bill over the season as a measure of the quality of the players who have been purchased in the past, assuming that a manager purchases the most appropriate players the club's budget allows (positive sign);

2. the total net transfer spend, as a measure of the extent to which the club is currently able to purchase high quality new players (positive sign);

3. the total number of listed players who are injured/suspended/ unavailable for other reasons for match t (negative sign);

4. the total number of non-Premier league games that the team plays during that season, e.g. cup games (negative sign).

In addition, the values of each of these characteristics for the opposing team for match t are also used as explanatory variables, with reversed expected signs.

Bell *et al.* (2013) estimate both OLS and an ordered probit for English Premier League (seasons from 2004/05 to 2008/09) and find the expected signs although some of the observable characteristics turn out to be not significant, and specifically: net transfer (of both team and opponent), extra games (team only), and opponents unavailable players. This estimation step is only preliminary to the bootstrap analysis that allows to highlight managerial skill and requires re-estimating equation [1] with no fixed effect, i.e. $\alpha_i=0$. This allows generating the dependent variable under the null hypothesis of no manager fixed effects as:

$$y_{it}^* = \beta_0 + \sum_{j=1}^k \beta_j x_{jit} + u_{it} \tag{2}$$

Bell *et al.* (2013) proceed to sample with replacement from $y_{i,t}^*$ as constructed in [2], and for each of $j = 1, \dots, 10,000$ bootstrap replications, they generate T_N draws and compute the average number of points scored by manager i , $y_{i,t}^*$, at each replication j . The distribution thus obtained represents the

possible performances in matches managed by i that may have occurred purely due to team characteristics and luck. Finally, they suggest to examine where the actual performance of manager i fits within the ordered bootstrapped distribution and to define a manager as ‘skilled’ if they are in the top 5% of the distribution and as ‘unskilled’ if they are in the bottom 5% and ‘typical’ if they are anywhere in between.

Bell *et al.*'s (2013) analysis of English Premier League suggests that, unlike the fund management industry, the number of highly skilled football managers appears to be high, even if there were also managers with performances below expectations. Overall, their bootstrap analysis confirms some decisions to sack underperforming managers at a very early stage of their tenure, but also identifies skilled football managers who are sacked for reasons that cannot be attributed to their on-the-field performance.

Finally, results from a recursive implementation of the bootstrap methodology offers an approach that could be employed to evaluate football club managers in real time. Assuming that managerial performance can plausibly be gauged after 10 games, Bell *et al.* (2013) conclude “The lesson, therefore, is that managers who perform below expectation usually remain that way and therefore it may be optimal to remove them from office sooner rather than later; on the other hand, those managers who are merely somewhat disappointing should be given time to further develop their teams.”

4. Data and Descriptive Statistics

In this study we use data relative to three seasons (2011-12, 2012-13 and 2013-14) of the Serie A, the top football league system in Italy. The information in our dataset is unique and has been purposely collected from several sources: Transfer Market (www.transfermarket.it), Serie A League (www.legaseriea.it), Federazione Italiana Gioco Calcio (FIGC, www.figc.it), UEFA (www.uefa.com) as well as various issues of the most read Italian sport newspaper Gazzetta dello Sport (www.gazzetta.it). Our sample consists of 2,278 observations³ for 55 coaches, 30 of whom were sacked at least once. The list of the sacked coaches for each of the three seasons is given in the Appendix.⁴

Since the objective of this paper is to disentangle coaches’ ability from luck, we have to identify observable teams’ characteristics which are likely to have an impact on performance, but are independent of coaches’ ability. This is clearly not an easy task, since many of the team’s

³ Excluding missing data.

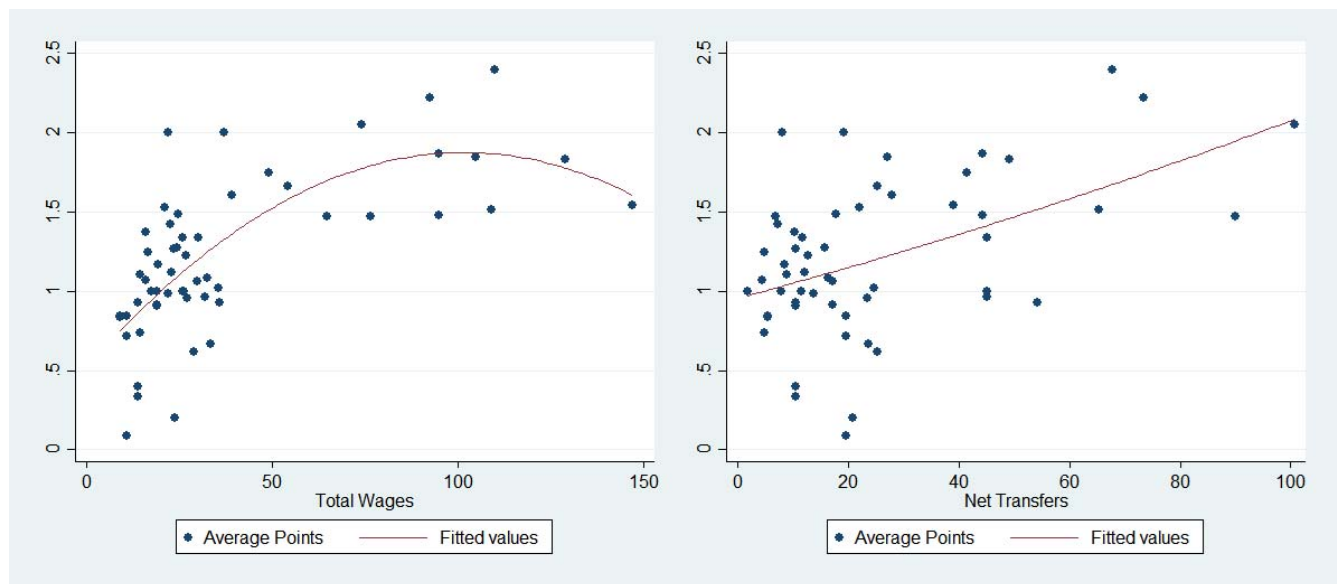
⁴ Data taken from the Serie A official website: <http://www.legaseriea.it/>.

characteristics are, in fact, a direct consequence of the coach's choices. In choosing observable characteristics, also on comparability grounds, we follow as closely as possible the suggestions provided by Bell *et al.* (2013), motivating any departure from their choices.

The first piece of information needed is the total wage bill corresponded to players over each season in millions of euros. The idea is that total wages capture players' ability and are largely determined from past purchases. Like Bell *et al.* (2013), we also assume that a manager would have purchased the most appropriate players subject to the club's budget constraint. We expect the relationship between average points per coach and total wages to be positive, and indeed this is clearly illustrated in Figure 1a. Albeit positive, we can see that the relationship is non-linear, therefore in our following estimates, in contrast to Bell *et al.* (2013), we will model the impact of total wages as a second order polynomial.

The second variable we will include in our estimates is the total net transfer spend in millions of euros. This measures the extent to which the club is able to purchase high quality new players, and we expect it to have a positive impact. The correlation between average points per coach and total net spend is illustrated in figure 1b. Again, the relationship is positive, and in this case the best fit appears to be linear as in Bell *et al.* (2013).

Figure 1 a - b: Average points per coach and total wages (a) /net transfers (b)



Source: own elaboration from Trasfermarket data; seasons 2011/2012, 2012/2013, 2013/2014

In line with Bell *et al.* (2013), we also add total wages and total net transfer spend of the opposing team for match t as explanatory variables, and we expect them to have the opposite sign.

Finally, we include whether or not the team has played an extra game – a Cup game – during the same week. The impact of the non-premier league games on the expected points score for league matches is ambiguous: on one hand, playing extra games may be exhausting for the players, raising thus the probability of worse following performances; on the other hand, winning a cup game may bring more enthusiasm and affect positively the following matches. It should be stressed that we also consider extra games (e.g. cup games) but, unlike Bell *et al.* (2013), where the variable is defined as the total number of non-league games during the season, we define it as a binary variable equal to 1 if the team played an extra game in the previous week and 0 otherwise. In such a way we capture an objective factor that may influence the result of the fixture.

Beside the functional form of the relationship between average points and total wages, and the extra games there are two further points of departures from the original paper worth highlighting. We do not control for total number of players suspended for match t , since the suspension may also be due to the coach's choice of lining up a cautioned player, hence we believe it has to be attributed to the manager's skill. Similarly, we do not control for total number of injured players. In our opinion, this observable characteristic is not necessarily an objective feature of the team as, except for accidental injuries, the very same training sessions and/or the decision to deploy a non perfectly fit player may have led to injuries (or absence thereof) and hence the latter may be acknowledged as an attainment by the coach.⁵

5. Empirical Strategy

5.1. *The determinants of clubs' performance*

This first step of the analysis is preliminary to the subsequent bootstrap analysis that aims to separate the manager skill from his luck. However some comments on these first set of results are in order.

We first estimate a simple linear regression by OLS and show the impact of the team's characteristics on the score gained. Based on Bell *et al.*'s (2013) equation [1] and control variables

⁵ Unfortunately it is not possible to distinguish in the data between injuries that are purely accidental and those that are determined by the coach's (wrong) decisions. Moreover if they are accidental, they should be in principle normally distributed for both teams.

selection and specification discussed in the previous section, we model coaches' ability as an unobserved fixed effect by including a dummy for each of the 55 coaches:

$$y_{it} = \beta_0 + \alpha_{it} + \beta_1 TW_{it} + \beta_2 TW_{it}^2 + \beta_3 NT_{it} + \beta_4 EG_{it} + \beta_5 TW_{it,opp} + \beta_6 TW_{it,opp}^2 + \beta_7 NT_{it,opp} + u_{it} \quad [3]$$

Where for each coach i and each fixture t :

TW = total player wage bill over the season in millions of euros

NT = total net transfers spend in millions of euros in each season

EG = Binary variable equal to 1 if the team has played an extra game (i.e. non Serie A) in the previous week and 0 otherwise

TW_{opp} = total player wage bill of the opponent over the season in millions of euros

NT_{opp} = total net transfers of the opponent spend in millions of euros in each season

Since y_{it} is not linear, we also model equation [3] as an ordered probit. We report only coefficients, rather than the marginal effects, because we are not directly interested in the probability of winning/drawing/losing, but only in showing the robustness to functional form of our OLS estimates.

Table 1 shows the results from the first regressions.⁶ As expected, the team's total wages have a positive effect in a concave fashion, consistently with Figure 1. Predictably, the impact of opponents' total wages has a negative sign and reaches a minimum at 93.5 million. Net transfers, both for own team and opponents, have a positive sign, but are not statistically significant. Similarly, having played an extra game has a positive sign, but no statistical significance. However, when including coach fixed effects, only the opponents' total wages remain highly statistically significant, while total wages of the team under consideration remain only marginally relevant. Furthermore, OLS and ordered probit estimates are practically identical.

A comparison with the results by Bell *et al.* (2003) for the English Premier League has to account for a few dissimilarities: the slightly different specification, the different choice over the control variables and the number of seasons considered. However a few interesting remarks are in order. In

⁶ We tried also a linear specification for Total Wages, but both R squared F-test support a better fit of the quadratic specification. Results available upon request.

line with Premier League, total wages of the opponents have a strong effect, while net transfers of both clubs are not significant; the latter result can be explained by the fact that transfers matter in a cumulative way rather than as the amount spent in each season (as it is in both papers). In contrast to Premier League, the coach fixed effect in Serie A seem to absorb the informative content of the team total wages - whose only marginally significant term is the linear one.

Table 1: Estimation results including team characteristics, with and without manager fixed effects

	OLS		Ordered probit	
	b/se	b/se	b/se	b/se
Total wages	0.0192*** (0.00)	0.0139* (0.01)	0.0180*** (0.00)	0.011 (0.01)
Total wages squared	-0.0001*** (0.00)	0.000 (0.00)	-0.0001*** (0.00)	0.000 (0.00)
Net transfers	0.001 (0.00)	-0.001 (0.00)	0.001 (0.00)	-0.001 (0.00)
Extra game	0.017 (0.08)	-0.051 (0.09)	0.028 (0.08)	-0.034 (0.08)
Total wages _{opp}	-0.0187*** (0.00)	-0.0223*** (0.00)	-0.0181*** (0.00)	-0.0218*** (0.00)
Total wages _{opp} Squared	0.0001*** (0.00)	0.0001*** (0.00)	0.0001*** (0.00)	0.0001*** (0.00)
Net transfers _{opp}	-0.002 (0.00)	0.000 (0.00)	-0.001 (0.00)	0.000 (0.00)
Coach Fixed Effects	NO	YES	NO	YES
Obs	2,278	2,278	2,278	2,278
R ² /Pseudo R ²	0.112	0.157	0.056	0.081

*Robust standard errors in parentheses; * p<0.01, ** p<0.005, *** p<0.001*

5.2. Manager skill or luck: results from bootstrap analysis

Following Bell *et al.* (2013), in order to disentangle coach's ability from team's characteristics, we will have to re-estimate equation [3], but imposing no fixed effect (i.e. $\alpha_i=0$), thus obtaining:

$$y^*_{it} = \hat{\beta}_0 + \hat{\beta}_1 TW_{it} + \hat{\beta}_2 TW_{it}^2 + \hat{\beta}_3 NT_{it} + \hat{\beta}_4 EG_{it} + \hat{\beta}_5 TW_{it,opp} + \hat{\beta}_6 TW_{it,opp}^2 + \hat{\beta}_7 NT_{it,opp} + \hat{u}_{it} \quad [4]$$

In line with Bell *et al.* (2013) and Hope (2003), we keep only coaches who managed for at least 10 games since lower sample sizes would not be sufficient to gauge the coach's ability. We therefore lose six coaches, namely Guerini, Pellegrino, Mondonico, Liverani, Giampaolo and Bisoli. Columns 1-2 in Table 2 provide the names of the coaches considered and the number of games managed, while columns 3-6 reports the corresponding total wages, net transfers and the actual average points obtained.

We then proceed to sample with replacement from equation [4] and for each of $j = 1, \dots, 10,000$ bootstrap replications we compute the average number of points \bar{P}_i scored by coach i , at each replication j . We thus obtain a distribution of the possible performances of each coach due only to team characteristics and luck. By ordering this distribution we can see where the actual coach performance fits. In line with previous paper, coaches in the top 5% of the distribution can be considered as skilled, with the ones in the bottom 5% seen as unskilled, and the others just typical or average.

The results are summarised in column 7, 8 and 9 of Table 2, where coaches are listed according to column (5), i.e. the actual average points.

Only two managers outperform expectations: Antonio Conte and Francesco Guidolin. However, while learning about Conte's superior skill may not come as a surprise, since he led the Serie A three times in a row, he is handsomely paid, and he is in charge of one of the undeniably most important Italian teams, Guidolin achieved great results despite more limited resources.

Unsurprisingly, the poorest performers, i.e. Delneri, Beretta, and Bucchi lie at the bottom of the rank and have been sacked after about a dozen games. Others, like Zeman, Luis Enrique and Stramaccioni are very close to the bottom ranks, but managed to stay above the threshold. Nonetheless, all but Luis Enrique were eventually dismissed (for a list of all sacked managers, see Appendix).

As for the coaches resulting in an average performance, two remarks are in order. First, since we consider three seasons for those that were in charge through the entire sample period, the outcome results from averaging over some good seasons and some worse ones. This is for instance the case of Allegri who performed well over the first season considered in this study, but less in last two and was in fact sacked in January 2014. The game by game performance, which highlights the dynamics of the performance and is important for dismissal decisions, will be investigated in the next Section where the case of Allegri will be considered again. Second the ranking obtained hinges on the definition of

“above” for those coaches who end up in the top 5%. Should we take a less crisp threshold, we would include in the set of skilled coaches also Pulga (5.2%) and Garcia (5.5%). This finding is consistent with the results obtained by the two of them, who, although playing only 38 matches, had excellent performances. In fact, Pulga replaced a coach in 2012-2013 and another in 2013-2014 and, in both cases, he was able to secure the club (Cagliari) from relegation well before the end of the season. As for Garcia, he was appointed as Roma’s coach after a poor season for the team, which ranked 6th in 2012-2013. Notwithstanding the transfer of Lamela –considered one of the most talented players of the roster – to Tottenham, Garcia achieved a remarkable and unexpected second place, also establishing Roma’s ever-time record of points for one season (85).

Overall, our results appear to be much more in line with the financial literature for fund managers, where most managers perform as expected. In order to get more insight, in the next section we are going to assess coaches’ performance game by game and see whether dismissal in some cases was too early or overdue.

Table 2: Coaches' performance according to bootstrap analysis

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(10)
Coach	# of games	Total wages (€million)	Net Transfers (€million)	Actual avg points	Expected avg points based on bootstrap	Diff actual exp points	Performance expected/above/below?	% random draws better
Conte	114	110.00	67.82	2.39	1.98	0.42	Above	0.0%
Garcia	38	92.50	73.39	2.22	1.91	0.31	Expected	5.5%
Benitez	38	74.10	100.70	2.05	1.85	0.20	Expected	34.6%
Andreazzoli	15	95.00	44.32	1.87	1.92	-0.05	Expected	66.7%
Seedorf	19	105.00	27.20	1.84	1.89	-0.05	Expected	68.5%
Allegri	95	129.00	49.12	1.83	1.93	-0.10	Expected	68.5%
Mazzarri	114	49.20	41.42	1.75	1.58	0.17	Expected	38.6%
Reja	59	54.40	25.32	1.66	1.61	0.05	Expected	61.1%
Montella	114	39.10	27.94	1.61	1.40	0.20	Expected	37.0%
Ranieri	26	147.00	39.00	1.54	1.91	-0.37	Expected	88.5%
Guidolin	114	21.13	22.12	1.53	1.16	0.37	Above	2.8%
Stramaccioni	47	109.00	65.32	1.51	1.96	-0.45	Expected	87.3%
Donadoni	97	24.84	17.84	1.48	1.20	0.29	Expected	12.4%
Zeman	23	95.00	44.32	1.48	1.92	-0.44	Expected	82.7%
Luis Enrique	38	76.50	90.00	1.47	1.78	-0.31	Expected	83.5%
Petkovic	55	64.90	6.97	1.47	1.69	-0.21	Expected	75.5%
Mandorlini	38	22.60	7.30	1.42	1.12	0.30	Expected	15.8%
Pulga	38	16.14	10.39	1.37	1.05	0.32	Expected	5.2%
Mangia	15	26.00	45.13	1.33	1.28	0.06	Expected	60.0%
Mihajlovic	36	30.14	11.73	1.33	1.26	0.07	Expected	61.2%
Ventura	76	24.55	15.70	1.28	1.18	0.10	Expected	52.7%
Colantuono	114	23.54	10.60	1.26	1.18	0.08	Expected	57.4%
Corini	58	16.66	4.77	1.24	1.07	0.17	Expected	31.1%
Pioli	89	26.90	12.84	1.22	1.25	-0.02	Expected	63.0%
Maran	59	19.46	8.55	1.17	1.10	0.07	Expected	55.9%
Colomba	17	23.00	12.11	1.12	1.19	-0.07	Expected	58.9%
Di Carlo	58	14.45	8.98	1.10	1.03	0.07	Expected	53.5%
Rossi	59	32.51	16.41	1.08	1.31	-0.22	Expected	69.5%
Cosmi	42	15.86	4.46	1.07	1.06	0.01	Expected	59.6%
Ferrara	17	29.80	17.25	1.06	1.33	-0.27	Expected	82.4%
Gasperini	57	35.63	24.60	1.02	1.31	-0.29	Expected	68.5%
Ballardini	54	26.36	11.46	1.00	1.19	-0.19	Expected	62.5%
Ficcadenti	27	19.09	7.87	1.00	1.15	-0.15	Expected	65.2%
Lopez	32	17.40	1.80	1.00	1.03	-0.03	Expected	70.4%
Mutti	23	26.00	45.13	1.00	1.31	-0.31	Expected	82.7%
Sannino	63	22.05	13.68	0.98	1.14	-0.15	Expected	69.9%
Malesani	27	31.82	45.19	0.96	1.38	-0.42	Expected	81.5%
De Canio	24	27.26	23.44	0.96	1.23	-0.27	Expected	74.5%
Arrigoni	14	14.00	10.45	0.93	1.00	-0.07	Expected	57.2%
Marino	14	36.00	54.18	0.93	1.42	-0.49	Expected	92.9%
Di Francesco	46	18.97	17.10	0.91	1.12	-0.21	Expected	69.6%
Iachini	21	18.90	10.50	0.90	1.07	-0.16	Expected	66.7%
Stroppa	13	10.80	19.58	0.85	1.03	-0.18	Expected	77.0%
Tesser	32	9.00	5.50	0.84	0.93	-0.09	Expected	65.7%
Nicola	23	14.50	4.82	0.74	0.98	-0.24	Expected	78.3%
Bergodi	14	10.80	19.58	0.71	0.94	-0.22	Expected	71.5%
Delneri	13	28.90	25.38	0.62	1.33	-0.72	Below	100.0%
Beretta	15	14.00	10.45	0.40	1.09	-0.69	Below	99.9%
Bucchi	11	10.80	19.58	0.09	0.94	-0.85	Below	100.0%

Source: own data; seasons 2011/2012, 2012/2013, 2013/2014.

5.3. *The sacking time: results from bootstrap analysis*

Thanks to bootstrap analysis we are able not only to detect a poorly performing manager and say whether his contract should have been terminated before it actually occurred, but also to identify potential evaluation errors.

We start by running the bootstrap using a recursive estimation window from the 10th match onwards and we add a further match until the coach is sacked or until we reach the end of our sample period. The bootstrap procedure generates a time-series of average points per match scored by a randomised coach until each point in time. Like in the previous instance, we order the bootstrapped distribution, and then calculate the actual average score at each point in time to see where the actual coach's performance falls.

Figure 2 – 6 plot the number of games on the x axis and the percentage of randomised coaches who would do better than the actual coach on the y axis, based on the ordered distribution of the bootstrapped predicted values.

We start with the top one, Antonio Conte, and see how right after the first season (match 37) he can be consistently found in the top 5% (dotted line). The performance of Guidolin is instead slightly less consistent, as he starts extremely well, then has a long spell, between match 21 and 65, of average performance, to finally stabilise in the top 5%.⁷ A possible reason for the difference in performance of these two top coaches may be the disparity in resources that the two managers could draw from. Additionally, the club coached by Guidolin, Udinese, is well known for relying a lot on young players⁸, who typically have more discontinuous performances.

Among the sacked coaches, Rolando Maran is particularly interesting, since he finished the first season (match 38) in the top 5%, then started a slow and steady decline until dismissal in October 2013. He returned to Catania in January 2014, but could not provide the excellent performance of the first season, so he was sacked again in April 2014.

Similarly, Massimiliano Allegri started off quite well in the first season considered (until game 37), whereas in the following season his performance worsened (although recovering at the end) and progressively declined in the last season until dismissal in January 2014. This result is consistent with

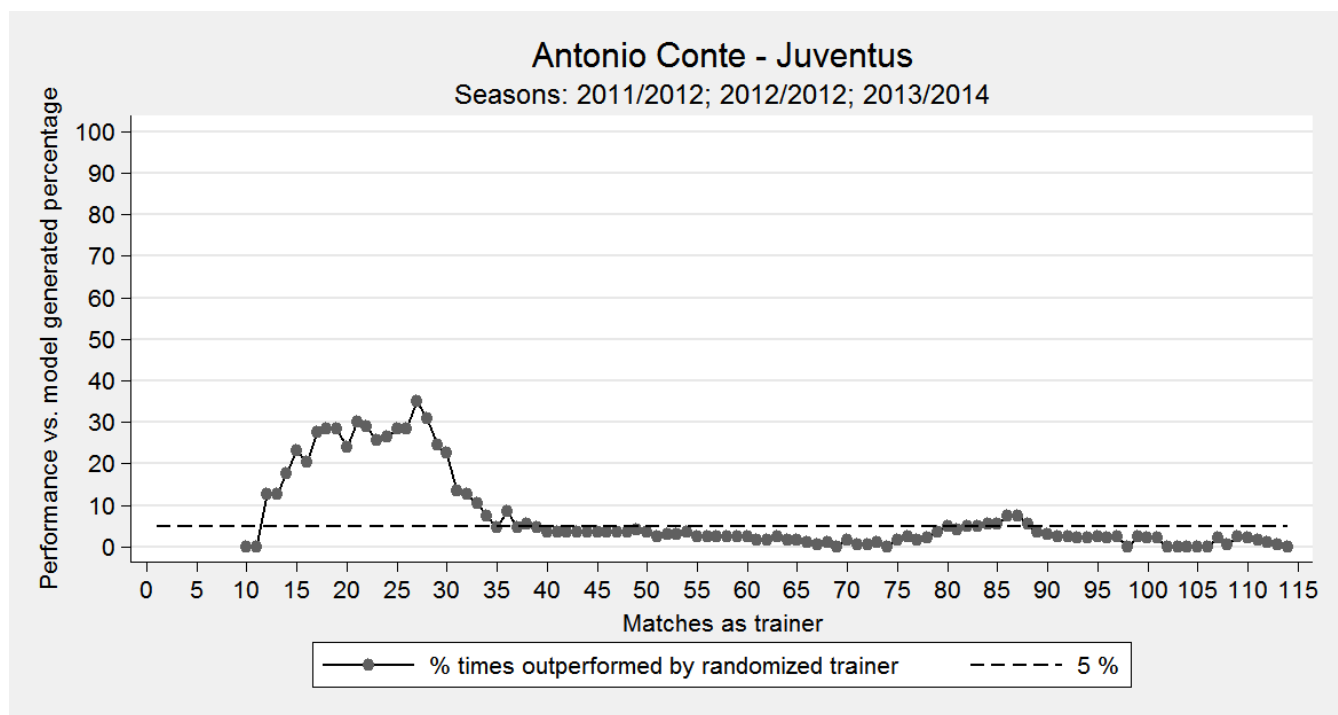
⁷ The same test is not performed over the other two nearly-above coaches, Pulga and Garcia, since they managed only 38 matches and looking at games following the 10th reduces excessively the sample.

⁸ Udinese was, together with Cagliari, the club with the lowest average players' age in the last season (<http://www.calcio mercato.com/news/1-italia-e-un-paese-per-vecchi-ecco-l-eta-media-di-tutte-le-squa-415002>)

the overall ranking obtained in the previous Section where Allegri’s performance results as expected over the whole period during which he managed 95 matches.

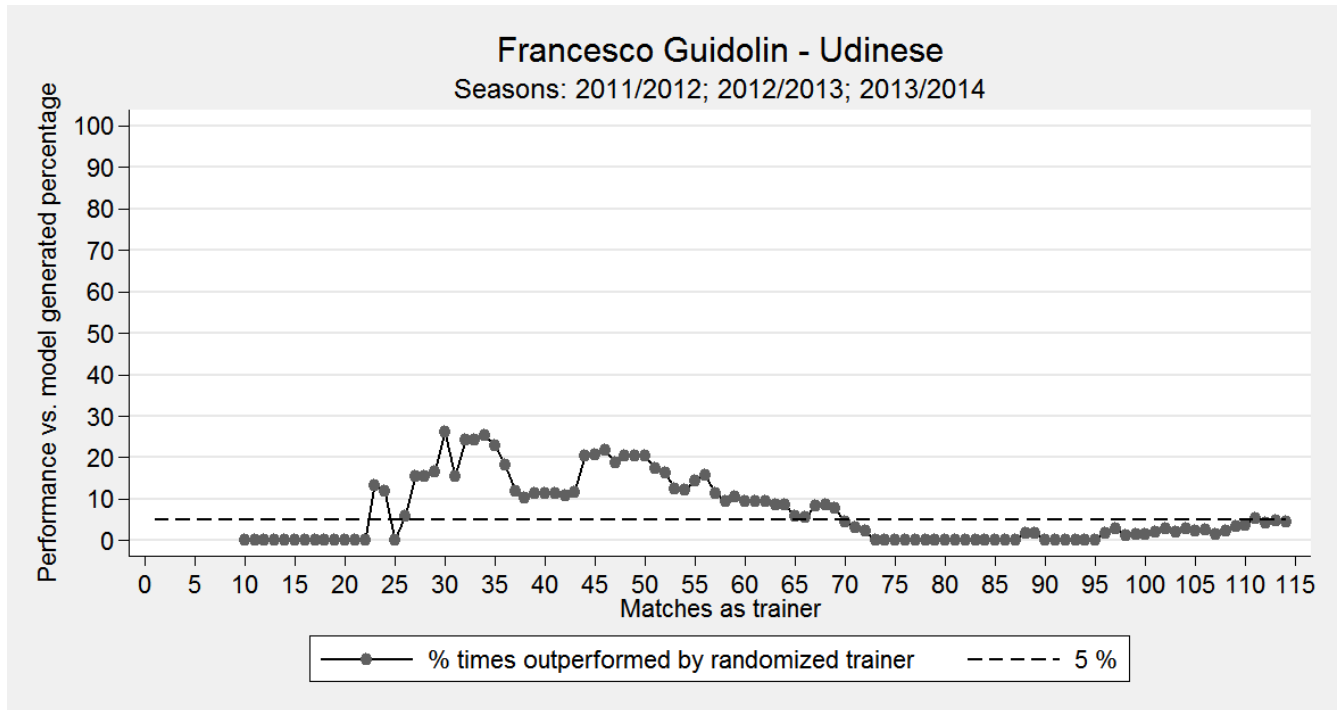
Despite his poor performance, Luis Enrique remained in charge of Roma for the entire season. The decision can be explained by the fact that sacking a coach is harder for a big team, since the management knows it will be difficult to find a new one with similar or higher capabilities and, if so, it will come at a high price that might not be affordable for the club.

Figure 2: Actual coach performance vs. randomized model – Antonio Conte



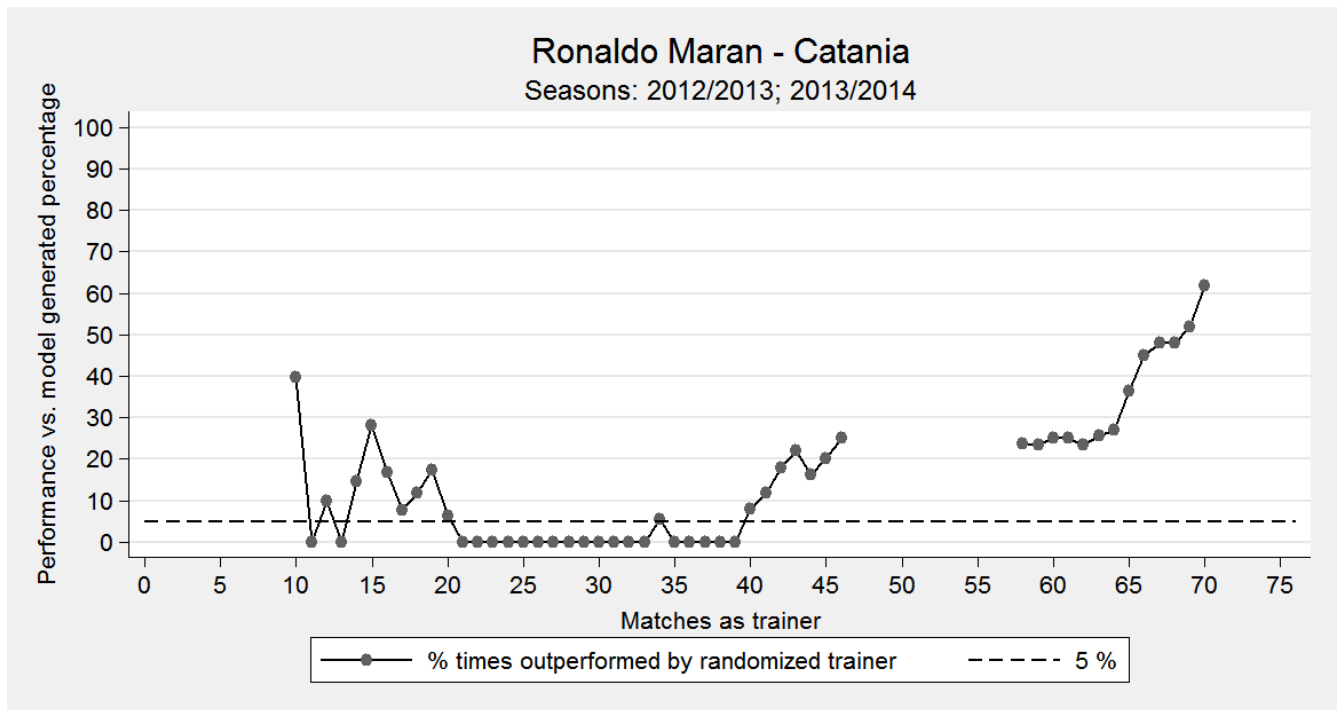
Note: The figure plots the percentage of times that Antonio Conte was outperformed by a randomized manager in the recursive bootstrap.

Figure 3: Actual coach performance vs. randomized model – Francesco Guidolin



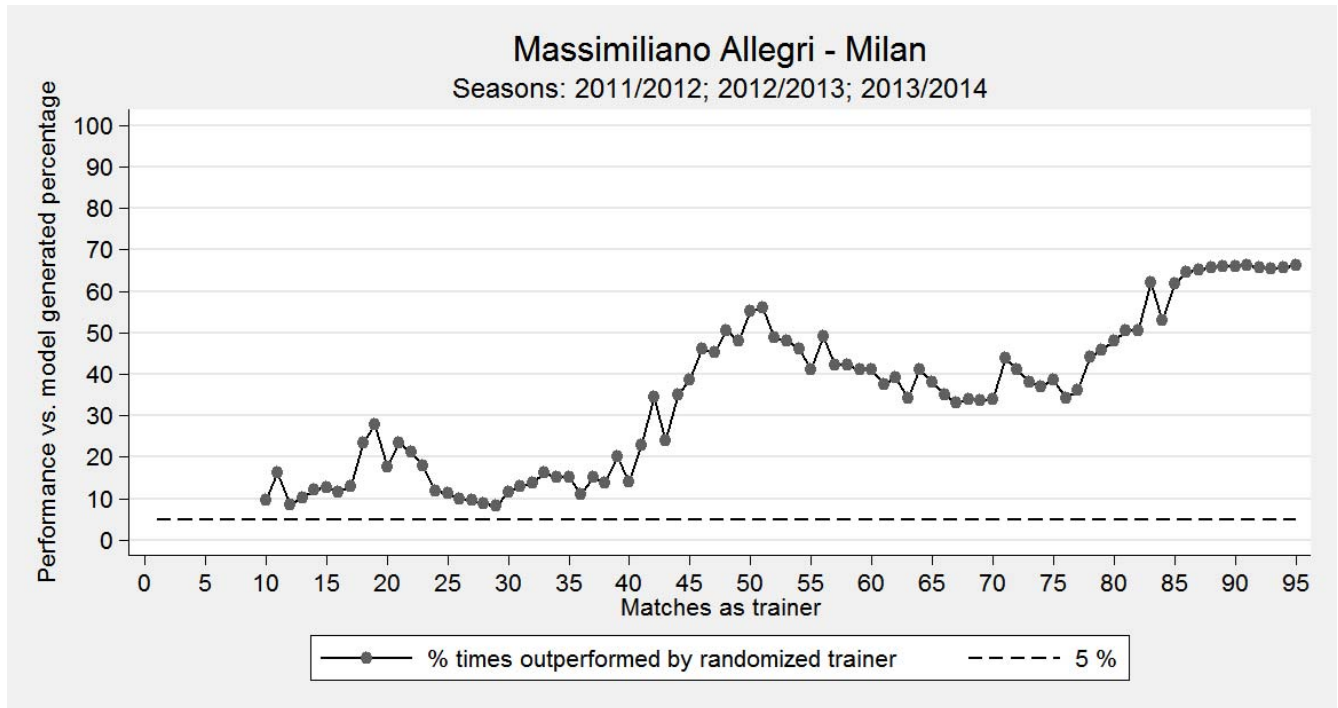
Note: The figure plots the percentage of times that Francesco Guidolin was outperformed by a randomized manager in the recursive bootstrap.

Figure 4: Actual coach performance vs. randomized model – Ronaldo Maran



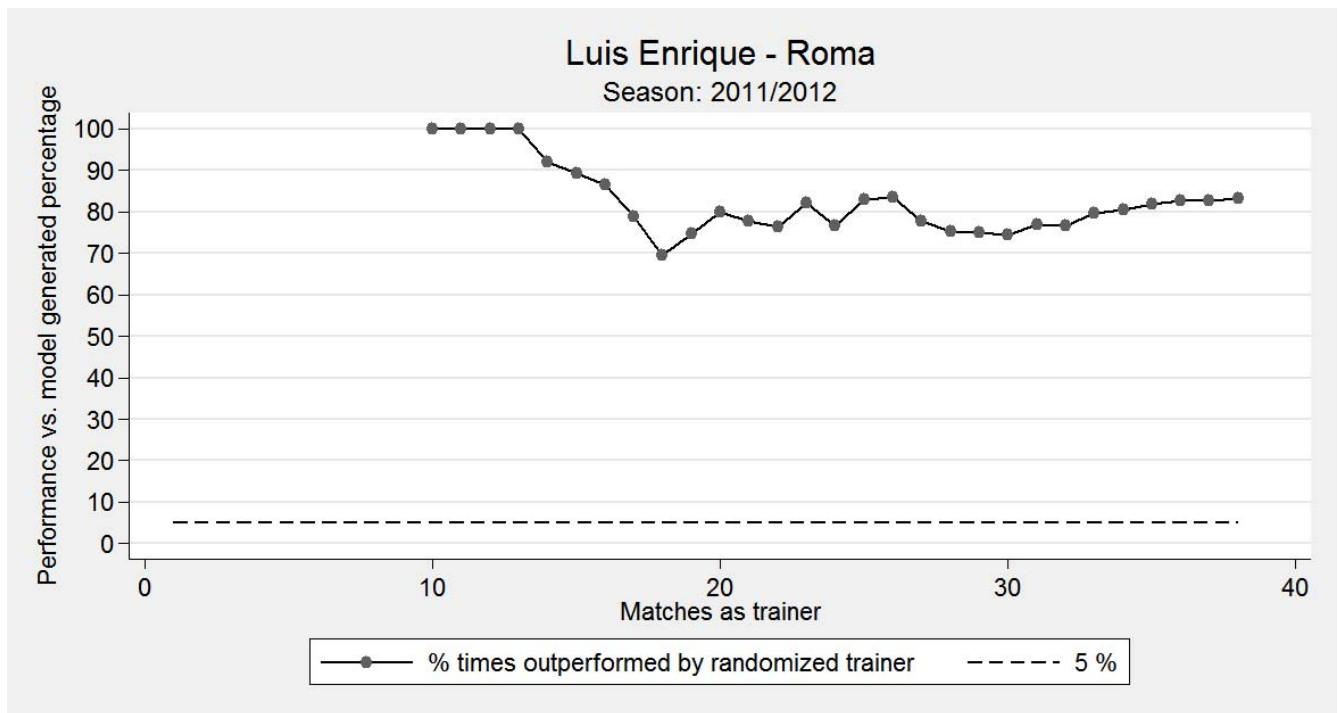
Note: The figure plots the percentage of times that Ronaldo Maran was outperformed by a randomized manager in the recursive bootstrap.

Figure 5: Actual coach performance vs. randomized model – Massimiliano Allegri



Note: The figure plots the percentage of times that Massimiliano Allegri was outperformed by a randomized manager in the recursive bootstrap.

Figure 6: Actual coach performance vs. randomized model – Luis Enrique Martínez García, known as Luis Enrique



Note: The figure plots the percentage of times that Luis Enrique was outperformed by a randomized manager in the recursive bootstrap.

6. A comparison between the Premier League and Italian Serie A: skill or management structure?

Keeping in mind the differences between the two studies as recalled in Section 4 and 5, we proceed by comparing our results with Bell *et al.* (2013). First, it is striking to see that in Serie A only 2/49 (4.1%) of the coaches perform above expectations versus 15/60 (25%) in English Premier League. The comparison of underperforming managers is less striking, but still we have only 3/49 (6.1%) in the Serie A versus 7/60 (11.6%) in Premier League. As a consequence most of the Italian clubs managers perform as expected (91.8% vs. 63.3% in Premier League).

Even though these differences cannot be taken at their face value, a natural question arises: are coaches of Italian clubs really less skilled than their English counterparts as our study would suggest? We believe that an answer to this question can be found in the differences between the two leagues along three main dimensions: management structure, revenue structure and tactical approach.

First of all, Italian coaches have much less power than the Premier League ones, who are in fact correctly addressed as managers, since they have decision power over the roster and the youth academy, which is shaped in line with the first team. By contrast, in Italy it is the director (Direttore Sportivo) that makes final decisions over these issues.⁹ The differences in the role played by football directors in England with respect to other European countries is testified by the room devoted to it by the media in relatively recent past in the U.K. Such differences are well summarized by a quote of the Italian journalist Giancarlo Galavotti of the newspaper *Gazzetta dello Sport*: "The system in England is exactly the contrary to Italy. In England for over 100 years it's all about the manager but in Italy we have a general manager or a sporting director. It is an established fact that the transfer market is the domain of the chairman and the general manager. The coach has to do with whatever the chairman and general manager bring in. They may be able to say 'I want a striker or a defender' but it is up to the chairman to decide whom they get. The involvement of the chairman historically has been of primary importance throughout our history."¹⁰ It follows that in Italy coaches might find themselves working with players they have not personally chosen and might not be the most appropriate to implement their strategies. At the same time, they are left to concentrate on the teamwork, tactics, fitness, and picking

⁹ Premier League managers are in full control of the transfer market. This does not just entail the power to directly negotiate players to be hired, but, notably, also the ability to refuse consistent offers coming from other teams for players already in the roster, as long as the budget allocated by the club is respected. Serie A coaches, on the contrary, can just indicate broad market objective, and they cannot prevent players from being sold when the club considers an offer to be extremely convenient from an economic viewpoint.

¹⁰ "The director of football debate" on BBC 24 November 2004 <http://news.bbc.co.uk/sport2/hi/football/4015605.stm>

the team, and our evidence suggests that in these activities there are quite alike, with a very few exceptions.

Second, with respect to Premier League, most Italian teams cannot afford world's best players, an instance that is connected to differences in the structure of the revenue account in the two leagues. Indeed, revenues of Italian Serie A are mainly represented by broadcast rights and capital gains that, in the season 2011/12, represented 43% and 20% respectively of total revenue (Report Calcio 2013). The increase in capital gains in the latter season is indicating that Italian clubs are becoming more and more net sellers, thus giving up best players. On the other hand, reliance on the other two traditional sources represented by matchday and commercial revenues is limited. In particular, if Serie A is second only to Premier League in terms of broadcast revenues, matchday and commercial ones are comparatively very low. Moreover, although in all the top 5 European Leagues revenue growth is limited to a few eminent clubs, in Italy more than 75% of Serie A revenue growth is accounted for by Juventus alone (Deloitte, 2014).

Finally, the tactical approach prevailing in Italy implies a sort of downward levelling. Specifically, the defensive approach makes scoring a goal difficult also for big clubs, which may find it hard to defeat even theoretically much weaker opponents. This explains why, among the Italian “big clubs”, only Conte outperforms, since he has coached Juventus with a tactical approach which is revolutionary in the Italian panorama being based on a 3-5-2 formation, where the contribution of midfielders was very high, implied more pressing and allowed the team to score more goals.¹¹

7. Concluding remarks

In this paper, we test the performance of football club coaches in the Italian Serie following the methodology proposed by Bell *et al.* (2013) for English Premier League. Our results allow exploring the robustness of this model to a different setup as for the role attributed to the coach, the tactical approach prevailing in the league and the typical club revenue structure.

We first estimate a simple linear regression and show the impact of the team's characteristics on the score gained by the coach. Then, in order to disentangle coach's ability from team's characteristics, we re-estimate the regression imposing no coach fixed effect and use bootstrap analysis to obtain a

¹¹ The approach implies players covering higher running distances throughout the games. Thus, it comes at no surprise that, according to Uefa statistics, Vidal and Pogba are the only Serie A players appearing in the ranking of Champions League midfielders who covered the highest average distances in the 2013-14 season (<http://bleacherreport.com/articles/1956166-ranking-champions-league-midfielders-by-their-average-distance-run-this-season>).

distribution of the performances of each coach due only to team characteristics and luck. By defining coaches in the top (bottom) 5% of the distribution as skilled (unskilled), we obtain that only two coaches outperform expectations: Conte and Guidolin. Unsurprisingly, Delneri, Beretta, and Bucchi are found at the bottom of the rank and were sacked after about a dozen games. Others, like Zeman, Luis Enrique and Stramaccioni are very close to the bottom ranks but managed to stay above the threshold, although all but Luis Enrique were eventually dismissed. To be noted that, should we take a fuzzier threshold, we would include in the set of skilled coaches also Pulga (top 5.2%) and Garcia (top 5.5%), a finding that is consistent with the actual results obtained by them, even if in a smaller number of matches (38). Finally, we assessed coaches' performance game by game and see whether dismissal in some cases was overdue or too early. Conclusions about the appropriate sacking time are not easy since coaches very rarely perform extremely badly (e.g. bottom 5%), in fact, there are many coaches with mediocre performances and the final decision is determined by other instances.

Keeping in mind the differences between the two studies, a comparison of our results with Premier League results provides very interesting suggestions as for the use of this type of models and for future research. Most of the Italian clubs coaches perform as expected (91.8% vs. 63.3% in the Premier) a result that may hint to a lower level of top skills in Serie A. However, we believe it is rather the consequence of differences between the two leagues along three main dimensions: management structure, revenue structure and tactical approach. In fact, some of the decision power of the Premier League managers are given in Italy to the director of football, thus leaving the coach with much less power over the roster. Moreover, in Serie A matchday and commercial revenues are not very relevant and most revenues come from broadcast and capital gains, whose increase in latter seasons is indicating that Italian clubs are becoming more and more net sellers, which means they are giving up best players. Finally, the defensive tactical approach prevailing in Italy implies a sort of downward levelling, since scoring a goal becomes difficult also for big clubs, which may find it hard to defeat opponents that are in theory much weaker. This explains why Conte, by relying on a 3-5-2 formation that is very unconventional in Italy, is the only coach of a big team that outperforms according to the model.

The results obtained call for further investigation on the connection between management structure and coach performance. In particular, our results highlight that, in the presence of the management structure and the tactical approach typical of Serie A, the methodology used can pick up a few very extreme levels of skill but it cannot differentiate among the great majority of coaches. Thus an implementation to a different league such as Spanish Liga, which is more similar to the Premier League, could shed further light on the general validity of the model under different circumstances.

References

- Audas R., Dobson S., Goddard J. (2002) The impact of managerial change on team performance in professional sports, *Journal of Economics and Business*; **54**, 633-650.
- Baldock A., Buelens M. (2007) Does sacking the coach help or hinder the team in the short term? Evidence from Belgian soccer, *University of Gent Working Paper* 2007/430.
- Bell A., Brooks C., Markham T. (2013) The performance of football club managers: skill or luck?, *Economics & Finance Research: An Open Access Journal*, **1**, 19-30.
- Bodansky B. (2013). Kicking the Penalty: Why the European Court of Justice should allow Salary Caps in UEFA, *Fordham International Law Journal*, **36**, 163-197.
- Bridgewater, S. (2009). What is the impact of changing football manager? University of Warwick Business School Working Paper.
- Bruinshoofd A., ter Weel B. (2003) Manager to go? Performance dips reconsidered with evidence from Dutch football, *European Journal of Operations Research*, **148**, 233–246.
- Cuthbertson K., Nitzsche D., O’Sullivan N. (2008) UK mutual fund performance: skill or luck?, *Journal of Empirical Finance*, **15**, 613–634.
- Deloitte (2013) Annual Review of Football Finance, <http://www.deloitte.com>
- De Paola M., Scoppa V. (2008) The effects of managerial turnover: evidence from coach dismissals in Italian soccer teams, *Journal of Sports Economics*, **13**, 152–168.
- Fama E. F., French K. R. (1993) Common risk factors in the returns on stocks and bonds, *Journal of Financial Economics*, **33**, 3–56.
- FIGC (2012) Federazione Italiana Giuoco Calcio Report Calcio 2012.
- FIGC (2012) Federazione Italiana Giuoco Calcio Report Calcio 2013.
- Hope C. (2003) When should you sack a football manager? Results from a simple model applied to the English premiership, *Journal of the Operational Research Society*, **54**, 1167-1176.

Hughes, M., Hughes, P., Mellahi, K. and Guermat, C. (2010) Short term versus long term impact of managers: evidence from the football industry, *British Journal of Management*, **21**, 571–589.

Ibbotson R. G., Kaplan P. D. (2000) Does Asset Allocation Policy Explain 40, 90, or 100 Percent of Performance?, *Financial Analyst Journal*, 26-33.

Jensen M. C. (1968) The performance of mutual funds in the period 1945–1964, *Journal of Finance*, **23**, 389–416.

Kornai J., Maskin E., Roland G. (2003) Understanding the soft budget constraint, *Journal of Economic Literature*, **41**, 1095-1136. 65

Kosowski R., Timmermann A., White H., Wermers R. (2006) Can mutual fund ‘stars’ really pick stocks? New evidence from a bootstrap analysis, *Journal of Finance*, **61**, 2551–2595.

Peeters T., Szymanski S. (2014), Financial fairplay in European football, *Economic Policy*, April, 343-390.

Rasmus K. S., Klaus N. (2012) Soft budget constraint in professional football, *European Sport Management Quarterly*, **12**, 183-201.

Roll R. (1977), A Critique of the Asset Pricing Theory’s Tests Part I: On Past and Potential Testability of the Theory, *Journal of Financial Economics*, **4**, 129-176.

Appendix

Sacked Football Coaches – Seasons 2011/2012, 2012/2013, 2013/2014

Football Club	Date	Coach Sacked	Coach Hired
Bologna	5 Oct 2011	Pierpaolo Bisoli	Stefano Pioli
	7 Jan 2014	Stefano Pioli	Davide Ballardini
Cagliari	8 Nov 2011	Massimo Ficcadenti	Davide Ballardini
	11 Mar 2012	Davide Ballardini	Massimo Ficcadenti
	2 Oct 2012	Massimo Ficcadenti	Ivo Pulga
	7 Apr 2014	Diego Lopez	Ivo Pulga
Catania	20 Oct 2013	Rolando Maran	Luigi De Canio
	16 Jan 2014	Luigi De Canio	Rolando Maran
	7 Apr 2014	Rolando Maran	Maurizio Pellegrino
Cesena	30 Oct 2011	Marco Giampaolo	Daniele Arrigoni
Chievo	2 Oct 2012	Domenico Di Carlo	Eugenio Corini
	11 Nov 2013	Giuseppe Sannino	Eugenio Corini
Fiorentina	7 Nov 2011	Siniša Mihajlović	Delio Rossi
	2 May 2012	Delio Rossi	Vincenzo Guerini (caretaker)
Genoa	22 Dec 2011	Alberto Malesani	Pasquale Marino
	2 Apr 2012	Pasquale Marino	Alberto Malesani
	22 Apr 2012	Alberto Malesani	Luigi De Canio
	22 Oct 2012	Luigi De Canio	Luigi Delneri
	21 Jan 2013	Luigi Delneri	Davide Ballardini
	29 Set 2013	Fabio Liverani	Gian Piero Gasperini
Inter	21 Sep 2011	Gian Piero Gasperini	Claudio Ranieri
	24 May 2013	Andrea Stramaccioni	Walter Mazzarri
Lecce	4 Dec 2011	Eusebio Di Francesco	Serse Cosmi
Lazio	4 Jan 2014	Vladimir Petković	Edoardo Reja
Livorno	13 Jan 2014	Davide Nicola	Attilio Perotti (caretaker)
	21 Apr 2014	Domenico Di Carlo	Davide Nicola
Milan	13 Jan 2014	Massimiliano Allegri	Clarence Seedorf
Novara	30 Jan 2012	Attilio Tesser	Emiliano Mondonico
	6 Mar 2012	Emiliano Mondonico	Attilio Tesser
Palermo	31 Aug 2011	Stefano Pioli	Devis Mangia
	19 Dec 2011	Devis Mangia	Bortolo Mutti
	16 Sep 2012	Giuseppe Sannino	Gian Piero Gasperini
	4 Feb 2013	Gian Piero Gasperini	Alberto Malesani

Football Club	Date	Coach Sacked	Coach Hired
	20 Feb 2013	Alberto Malesani	Gian Piero Gasperini
Parma	9 Jan 2012	Franco Colomba	Roberto Donadoni
Pescara	3 Mar 2013	Cristiano Bergodi	Cristian Bucchi
Roma	2 Feb 2013	Zdeněk Zeman	Aurelio Andreazzoli
Sampdoria	17 Dec 2012	Ciro Ferrara	Delio Rossi
	11 Nov 2013	Delio Rossi	Siniša Mihajlović
Sassuolo	28 Jan 2014	Eusebio Di Francesco	Alberto Malesani
	3 Mar 2014	Alberto Malesani	Eusebio Di Francesco
Siena	17 Dec 2012	Serse Cosmi	Giuseppe Iachini

Note: coaches who left because their contract ended, because they resigned or by mutual consent are not reported.

CEFIN Working Papers ISSN (online) 2282-8168

- 45 *Family ties: occupational responses to cope with a household income shock*, by Baldini, M., Torricelli, C., Urzi Brancati M.C. (April 2014)
- 44 *Volatility co-movements: a time scale decomposition analysis*, by Cipollini, I., Lo Cascio I., Muzzioli. S. (November 2013)
- 43 *The effect of revenue and geographic diversification on bank performance*, by Brighi, P., Venturelli, V. (October 2013)
- 42 *The sovereign debt crisis: the impact on the intermediation model of Italian banks*, by Cosma, S., Gualandri, E. (October 2013)
- 41 *The financing of Italian firms and the credit crunch: findings and exit strategies*, by Gualandri, E., Venturelli, V. (October 2013)
- 40 *Efficiency and unbiasedness of corn futures markets: New evidence across the financial crisis*, by Pederzoli, C., Torricelli, C. (October 2013)
- 39 *La regolamentazione dello short selling: effetti sul mercato azionario italiano (Short selling ban: effects on the Italian stock market)*, by Mattioli L., Ferretti R. (August 2013)
- 38 *A liquidity risk index as a regulatory tool for systematically important banks? An empirical assessment across two financial crises*, by Gianfelice G., Marotta G., Torricelli C. (July 2013)
- 37 *Per un accesso sostenibile delle Pmi al credito (A sustainable access to credit for SMEs)*, by Giuseppe Marotta (May 2013)
- 36 *The unavoidable persistence of forum shopping in the Insolvency Regulation*, by Federico M. Mucciarelli (April 2013)
- 35 *Rating Triggers, Market Risk and the Need for More Regulation*, by Federico Parmeggiani (December 2012)
- 34 *Collateral Requirements of SMEs: The Evidence from Less-Developed Countries*, by Elmas Yaldiz Hanedar, Eleonora Broccardo, Flavio Bazzana (November 2012)
- 33 *Is it money or brains? The determinants of intra-family decision power*, by Graziella Bertocchi, Marianna Brunetti, Costanza Torricelli (June 2012)
- 32 *Is financial fragility a matter of illiquidity? An appraisal for Italian households*, by Marianna Brunetti, Elena Giarda, Costanza Torricelli (June 2012)
- 31 *Attitudes, personality factors and household debt decisions: A study of consumer credit*, by Stefano Cosma and Francesco Pattarin (February 2012)
- 30 *Corridor implied volatility and the variance risk premium in the Italian market*, by Silvia Muzzioli (November 2011)
- 29 *Internal Corporate Governance and the Financial Crisis: Lessons for Banks, Regulators and Supervisors*, by Elisabetta Gualandri, Aldo Stanziale, and Enzo

- Mangone (November 2011)
- 28 *Are defined contribution pension schemes socially sustainable? A conceptual map from a macroprudential perspective*, by Giuseppe Marotta (October 2011)
 - 27 *Basel 3, Pillar 2: the role of banks' internal governance and control function*, by Elisabetta Gualandri (September 2011)
 - 26 *Underpricing, wealth loss for pre-existing shareholders and the cost of going public: the role of private equity backing in Italian IPOs*, by Riccardo Ferretti and Antonio Meles (April 2011)
 - 25 *Modelling credit risk for innovative firms: the role of innovation measures*, by Pederzoli C., Thoma G., Torricelli C. (March 2011)
 - 24 *Market Reaction to Second-Hand News: Attention Grabbing or Information Dissemination?*, by Cervellati E.M., Ferretti R., Pattitoni P. (January 2011)
 - 23 *Towards a volatility index for the Italian stock market*, by Muzzioli S. (September 2010)
 - 22 *A parsimonious default prediction model for Italian SMEs*, by Pederzoli C., Torricelli C. (June 2010)
 - 21 *Average Internal Rate of Return and investment decisions: a new perspective*, by Magni C.A. (February 2010)
 - 20 *The skew pattern of implied volatility in the DAX index options market*, by Muzzioli S. (December 2009)
 - 19 *Accounting and economic measures: An integrated theory of capital budgeting*, by Magni C.A. (December 2009)
 - 18 *Exclusions of US-holders in cross-border takeover bids and the principle of equality in tender offers*, by Mucciarelli F. (May 2009).
 - 17 *Models for household portfolios and life-cycle allocations in the presence of labour income and longevity risk*, by Torricelli C. (March 2009)
 - 16 *Differential evolution of combinatorial search for constrained index tracking*, by Paterlini S, Krink T, Mitnik S. (March 2009)
 - 15 *Optimization heuristics for determining internal rating grading scales*, by Paterlini S, Lyraa M, Pahaa J, Winker P. (March 2009)
 - 14 *The impact of bank concentration on financial distress: the case of the European banking system*, by Fiordelisi F, Cipollini A. (February 2009)
 - 13 *Financial crisis and new dimensions of liquidity risk: rethinking prudential regulation and supervision*, by Landi A, Gualandri E, Venturelli V. (January 2009)
 - 12 *Lending interest rate pass-through in the euro area: a data-driven tale*, by Marotta G. (October 2008)
 - 11 *Option based forecast of volatility: an empirical study in the Dax index options market*, Muzzioli S. (May 2008)
 - 10 *Lending interest rate pass-through in the euro area*, by Marotta G. (March 2008)
 - 9 *Indebtedness, macroeconomic conditions and banks' losses: evidence from Italy*, by Torricelli C, Castellani S, Pederzoli C. (January 2008)
 - 8 *Is public information really public? The role of newspapers*, Ferretti R, Pattarin F.

(January 2008)

- 7 *Differential evolution of multi-objective portfolio optimization*, by Paterlini S, Krink T. (January 2008)
- 6 *Assessing and measuring the equity gap and the equity*, by Gualandri E, Venturelli V. (January 2008)
- 5 *Model risk e tecniche per il controllo dei market parameter*, Torricelli C, Bonollo M, Morandi D, Pederzoli C. (October 2007)
- 4 *The relations between implied and realised volatility, are call options more informative than put options? Evidence from the Dax index options market*, by Muzzioli S. (October 2007)
- 3 *The maximum LG-likelihood method: an application to extreme quantile estimation in finance*, by Ferrari D., Paterlini S. (June 2007)
- 2 *Default risk: Poisson mixture and the business cycle*, by Pederzoli C. (June 2007)
- 1 *Population ageing, household portfolios and financial asset returns: a survey of the literature*, by Brunetti M. (May 2007)