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The Effects of Prior Shocks on Managerial Risk Taking: Evidence from Italian Professional Soccer*

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Abstract

A growing empirical literature documents that managerial risk taking is linked to an individual's history of relevant shocks. Using male soccer data on 32 teams and 2160 matches covering eight seasons of the Italian premier league ("Serie A"), we provide clean evidence that change in managerial risk taking – proxied by a team coach's decision to alter the initial system of play in a match – significantly depends on having experienced wins or defeats in the recent past. In particular, we show that prior shocks matter, as change in risk taking strongly and positively depends on prior defeats. Single defeats and heavy defeats make the coaches more risk seeking (opting for more offensive systems of play). In contrast, passing through multiple defeats in a row and experiencing single wins are associated with more cautious risk-taking behavior. Changing risk taking, though, does not seem to pay off in terms of match outcomes. Finally, we interestingly document that in top teams managerial risk taking is *not* sensitive at all to prior shocks, regardless of their positive or negative direction.

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"When defeat comes, accept it as a signal
that your plans are not sound, rebuild those plans,
and set sail once more toward your coveted goal".
Napoleon Hill

1. Introduction

Understanding the determinants of managerial risk taking is one of the key challenges for current research in economics, finance and management science. A growing body of evidence on top executives' decision-making suggests that differences in management "style" across individuals at the helm of firms play an important role in shaping corporate policies (Bertrand and Schoar, 2003; Dittmar and Duchin, 2016; Bernile et al., 2017a). As pointed out by Schoar and Zuo (2017), "Traditional theories about firm decisions such as capital structure or investment abstract away from the role of CEOs or assume that rational managers will behave identically if faced with the same problem. However, the more recent literature suggests that CEOs are heterogeneous and matter to the firms that they run" (p. 1425). In this regard, a specific topic that has been increasingly investigated is how managerial traits interact with different forms of CEO compensation, as available evidence clearly indicates that the characteristics of top managers' compensation significantly impact their risk-taking behavior (Low, 2009).

In the last years, a fast-growing stream of literature has been focusing on the effects of *prior shocks* on managerial risk taking. As noted by Dittmar and Duchin (2016), we know from psychology studies that "experience may lead individuals to make decisions that differ from those based on expected utility theory because they only have access to samples of past outcomes and not the full outcome distributions" (p. 566; see, on this, also Weinstein, 1989, and Hertwig et al., 2004). Relatedly, Malmendier et al. (2017), building on Tversky and Kahneman's (1974) seminal work on availability bias as well as on evidence on the effects of learning from experience vs. description, develop a theoretical framework for the analysis of "experience effects" based on the idea that investors' learning processes tend to overweigh lifetime experiences and exhibit recency bias.

As we document in Section 2 in this paper, recent work on managerial risk taking examines shocks taking the form of either personal experiences that the manager passed through in her life (including events occurred in the distant past) or professional experiences related to prior employment, to see whether and to what extent they affect corporate policy. In our work, we depart from existing studies by specifically examining the impact of shocks that a manager recently passed through *during his mandate* at the helm of a firm. In other words, we are interested in understanding whether, *once a manager is at the helm of a firm*, the occurrence of shocks directly related to firm performance, influences her subsequent risk taking. Therefore, a further key difference between the present study and the extant literature is that our focus will be on shocks that might *frequently* occur, rather than on shocks that can be perceived as extreme, rare events.

To this aim, we believe that field data from male elite soccer provide us with an ideal testing ground. Our dataset is from the Italian premier league ("Serie A") between playing seasons 2009 and 2016. In a modern professional soccer team, the coach can be viewed as the CEO with regard to team behavior in training sessions and matches: he is an agent to which the owner (i.e., the principal) delegated power over a series of daily decisions concerning the team players, including training methods and times,[1] and, importantly, over which players to choose for the line-up in each match and how to position them on the field, i.e. through which systems of play. In this environment, we view a change in risk taking as a deviation from a manager's ex ante risk-taking strategies, in terms of tactical decisions over the formation. More specifically, as we better explain in Section 3, we proxy change in risk taking by change in the system of play of the initial formation.

The main advantages of using round-robin tournament data from professional soccer are as follows. First, Italian "Serie A" is an environment characterized by extremely *high stakes* that exerts a *strong competitive pressure* on all teams and, in particular, on their *experienced coaches*, throughout each playing season. Therefore, coaches' choices over their team composition are highly incentivized real-world decisions made by experienced managers. Second, these data allow us to *symmetrically* investigate the short-run effects of wins and

[1] Coaches in modern elite soccer have a staff of professionals that help them to manage the team's daily activities. However, the members of this staff are usually chosen by the coach (and follow him when he gets hired by a different team), who is ultimately responsible for the team performance.

defeats on risk taking by considering a long series of comparable shocks. In the field, the lack of strictly enforced rules such as the ones that characterize modern elite soccer makes it difficult to have clean data allowing researchers to rigorously compare shocks with one another as well as positive and negative shocks. Due to this, it comes as no surprise that most existing field studies in the literature on managerial risk taking asymmetrically focus only on the effects of rare, extremely adverse events, such as natural disasters or recessions (see Section 2 on this), rather than of frequent shocks. Third, in firms it is often the case that CEOs' decisions pass through key interactions with other actors (e.g., board, CFOs), so that changes in risk taking are not easily attributable to managers only. In contrast, coaches in professional soccer are clearly *accountable* with regard to tactical decisions[2] and they are the ones who get easily fired in the face of a series of bad outcomes (see on this De Paola and Scoppa, 2012). Fourth, as we make clear in Section 3, these data allow us to shed light on the role independently played by (1) the *number* of consecutive shocks that occurred, (2) their *intensity* and (3) their expected vs. unexpected *nature* in shaping managerial attitudes towards risks.

Our study makes several contributions to the literature. Teams that usually adopt a risk tolerant system of play are more likely to change in their risk-taking behavior. We offer clear evidence of experience-based adjustments in managerial risk taking, as changes in systems of play strongly and positively depend on passing through prior defeats ("negativity bias"). Single defeats and heavy defeats make the coaches more risk seeking (opting for more offensive systems of play). In contrast, passing through multiple defeats in a row and experiencing single wins are associated with more cautious risk-taking behavior. Changing risk taking, though, does not seem to pay off in terms of match outcomes. Finally, we interestingly document that in top teams managerial risk taking is *not* sensitive at all to prior shocks, regardless of their positive or negative direction.

[2] In modern professional soccer, the coach is responsible for all tactical decisions, usually after consulting with his staff. Though sometimes the media reported cases in which allegedly the team owners approached their coach in order to influence the latter's tactical decisions (e.g., AC Milan President Berlusconi with coach Ancelotti, in the last part of Ancelotti's 2001-2009 period at the helm of the team), we argue that on the whole, also due to coaches' personality, experience and beliefs, this influence on changes in risk taking is negligible, so that in modern elite soccer it is plausible to view tactical decisions as purely managerial ones.

The remainder of the paper proceeds as follows. Section 2 provides a selective review of the major lines of inquiry in the economics literature examining the effects of prior shocks on risk taking. Section 3 describes our data and methodology. Section 4 illustrates our key results and Section 5 concludes.

2. The Effects of Prior Shocks on Risk Taking

In economics, a growing body of empirical research has been investigating the effects of prior shocks on risk-taking behavior, in the short-run as well as with regard to shocks occurred earlier in life, through both experimental and non-experimental methods. As pointed out by Imas (2016), "Understanding how prior outcomes affect risk attitudes is critical for the study of choice under uncertainty in many economically important contexts" (p. 2086). According to standard expected utility theory, prior outcomes should not affect current risk taking, unless there is a substantial change in wealth (Savage, 1954; Thaler and Johnson, 1990; Imas, 2016). In contrast, available evidence increasingly documents that risk taking is also dependent to a significant extent on an individual's history of gains and losses (Imas, 2016).

Laboratory evidence on this includes Thaler and Johnson's (1990) classical study, based on Kahneman and Tversky's (1979) prospect theory, as well as, more recently, Weber and Zuchel (2005), Langer and Weber (2008) and Cohn et al. (2014). Thaler and Johnson (1990) offer evidence of "house money effects" (i.e., higher risk seeking in the wake of a prior gain) and "break-even effects" (i.e., outcomes that offer the opportunity to break even are very attractive, when losses occurred). As they note, "Current choices are often evaluated with the knowledge of the outcomes which have preceded them. Such knowledge can often be a handicap. While students of economics and decision theory are implored to concentrate only on incremental costs, it is well established that real decision makers are often influenced by historical or sunk costs" (p. 643). Weber and Zuchel (2005) find that by manipulating the presentation format of a decision problem it is possible to induce different risk-taking behavior following losses and gains. Langer and Weber's (2008) work focuses on the effects of feedback frequency and period of commitment on individuals' willingness to invest in a

risky asset and reveals that the period of commitment turns out to be far more important than the feedback frequency. Cohn et al. (2014) provide experimental evidence that financial professionals turn out to be more averse to risk when they are primed with a financial crash compared to a boom.[3]

A growing number of studies rely on field and experimental data to shed light on individuals' risk taking in the wake of real-world, extremely negative experiences (such as wars, natural disasters, economic crisis and personal life events). Eckel et al. (2009) show that after the Hurricane Katrina the evacuees displayed a greater willingness to take risks, whereas Cameron and Shah (2015) offer experimental evidence from Indonesia that individuals who experienced floods or earthquakes were less risk loving (see on this also Cassar et al.'s, 2017, findings on the 2004 tsunami in Thailand). Malmendier and Nagel (2011) find that experiencing a large macroeconomic shock such as the Great Depression led households with higher expected stock market returns to take more financial risks later in life. Kim and Lee (2014) analyze the effects of an early childhood exposure to the Korean War and show that it was associated with a persistent increase in risk aversion.[4] Drawing on research in psychology suggesting that traumatic events can produce wide-ranging consequences on one's dispositions, Bucciol and Zarri (2015) test the idea that individuals who passed through traumatic events out of their control might significantly differ in their willingness to take financial risks. They document that individuals were less willing to take financial risks if they had been victim of a serious physical attack or they had suffered from the loss of a child earlier in life. The detected effects seem to operate through a shift in preferences more than due to a change in beliefs.[5]

Since the focus of this paper is the effects of prior shocks on *managerial* risk taking, the most closely related line of inquiry includes recent economics fieldwork examining the effects on risk taking of shocks directly experienced by managers. As noted by Bernile et al.

[3] On the short-run relationship between prior trading outcomes and subsequent risk taking among professional traders, see Coval and Shumway, 2005, and Liu et al., 2010.

[4] Other research investigates the link between exposure to violence and subsequent risk-taking behavior (see, in particular, Voors et al.'s, 2012, and Callen et al.'s, 2014, experimental studies run in Burundi and Afghanistan, respectively).

[5] These effects likely operate through psychological channels where emotional factors arguably play an important role (see on this Loewenstein et al., 2001). Relatedly, Guiso et al., forthcoming, find experimentally that, in the short run, scary experiences are associated to higher risk aversion.

(2017a), available evidence from this body of research indicates that to some extent the heterogeneity in CEOs' managerial styles reflects the variation in individual life and career experiences. Graham and Narasimhan (2004) document that the leverage levels of CEOs who lived through the Great Depression dropped after the crisis. They also interestingly provide evidence of persistence of shocks at the firm level, as they show that in the 1940s the use of debt increased at firms for which the Depression-era manager retired or left the company. Malmendier et al. (2011) analyze CEOs who passed through formative early-life experiences such as growing up during the Great Depression and serving in the military. Their findings reveal that CEOs who grew up during the Great Depression are averse to debt and lean excessively on internal finance and that CEOs with military experience tend to pursue more aggressive policies.

Dittmar and Duchin (2016) focus on the effects of professional experiences on corporate policies and find that, when they were operated by CEOs who experienced distress *at another firm*, companies had less debt, saved more cash and spent less than others on capital expenditures. More recent experiences have a more significant impact. Next, they also interestingly disentangle the effect of professional experiences from personal ones and other traits (i.e., passing through the Great Depression, serving in the military and overconfidence), documenting that the former keeps on being relevant for corporate policies, with the effect of professional experience being frequently stronger than that of other variables. Bernile et al. (2017a) examine the relationships between CEOs' early-life exposure to natural disasters and subsequent corporate risk taking by employing different measures of CEO early-life disaster experience and firm decisions and outcomes on which CEOs typically have a large influence. Their findings point to a *non-monotonic* relation between the intensity of exposure to prior shocks and attitude towards risk taking: while managers who passed through natural disasters but without extremely negative consequences led firms more aggressively, CEOs who experienced an extreme level of fatal disasters turned out to behave more conservatively. Bernile et al. (2017b) show that mutual fund managers who passed through severe natural disasters were less prone to take risks, though the effects on portfolio gradually disappear over time. The shift in risk taking seems to be mainly driven by the systematic rather than idiosyncratic component of fund risk. Additional tests point to an increase in managerial risk

aversion as the most plausible explanation of the detected decrease in risk-taking behavior. In line with a large management science literature on the importance of the early-career stage as a key imprinting period, Schoar and Zuo (2017) document that initial labor market conditions influenced a manager's career paths and managerial styles later in life: managers who started working during recessions were quicker in becoming CEOs, but at smaller firms. Next, their managerial style was more conservative (i.e., characterized by lower leverage and more cost cutting).

Building on these relevant and fast-growing strands of economics literature, the main objective of this paper is to contribute to our understanding of whether managerial risk taking is affected by prior shocks. However, we depart from the aforementioned studies as, thanks to our field data from Italian elite soccer, we will explore the effects on risk taking of shocks that a manager recently passed through during his mandate at the helm of a team. Next, our data allow us to shed light on the effects of both positive and negative outcomes on managerial risk taking within a round-robin tournament framework in which shocks – far from being viewed as extreme and rare events – frequently occur.

3. Data

We collected data over the eight seasons from 2009 to 2016 of the men's first division of soccer in Italy ("Serie A"). The division is made of 20 teams, which may change from one season to another because of relegations to the second division and promotions in the first division. Overall, 32 teams took part in any of the eight seasons under investigation, and 10 of them took part in all the eight seasons.

During a season, each team plays against each other twice, once at the home stadium and once away, in the home stadium of the opponent, for a total of 38 matches. In a single match, the team scoring more goals wins. Points are assigned when winning or drawing a match (3 and 1 points, respectively), while no point is assigned after a defeat. Teams aim to earn as many points as possible in order to reach positions allowing them to win the title (the so called "Scudetto"), gain the right to participate in the European competitions (Champions League and Europa League) or avoid relegation to the second division.

Our dataset contains information on the outcome of each match (win, draw, or defeat), on the name of the coach and the names of the eleven players who started the match for each team. For the coach and the players, we know their age, nationality, experience with the team and with the first division. For the players, we are also informed about their role and salary. We collected this unique dataset by combining data from three sources: the "Serie A" official website (www.legaseriea.it) for the matches' outcome and participants, the website www.tuttocalciatori.net for coaches' and players' statistics, and the popular sports newspaper *La Gazzetta dello Sport* for players' wages.

Our aim is to study if the team composition changes in response to past outcomes of the team itself. Specifically, we are interested in understanding whether the team plays with a different initial composition compared to the previous match and, when this is the case, we interpret the decision to opt for an initially *more defensive* (resp., *more offensive*) playing tactics as an indication of *lower* (resp., *higher*) willingness to take risks on the part of the manager.[6] For our purpose, it is crucial that the team roster remains the same all over the season.

The team roster, however, may change with the players' transfer market, which in Italy takes place from the end of a season until the end of August, and in the middle of a season in the month of January. During these periods, teams can trade players with other teams. To avoid this problem, and leave the same set of alternatives for each choice, in our analysis we focus only on the matches played between September and December of each season. We also exclude matches played since February because we do not have information on the salaries of the players who got transferred. Another important reason why we consider only the matches played in the first part of each season is that, in the last part of the season, team composition choices are likely affected to a relevant extent by considerations over a team's placement in the league. Furthermore, in the second part of the season, a coach's tactical decisions before facing a given opponent team risk being influenced by the specific experience he had with the same team in the first part of the season.

[6] In their analysis of reference-dependent behavior based on soccer data, Bartling et al. (2015) consider coaches' strategic adjustments that are implemented through player substitutions during a match and argue that such adjustments might reflect coaches' risk-taking behavior, as "substituting, say, a defender with a striker increases the probability of scoring a goal but also increases the probability of receiving one" (p. 2647). See on this also Grund and Gurtler (2005).

Table 1 reports summary statistics on our dataset, which is made of 2,160 observations overall. The unit of analysis is the single match of a team. Each team's line-up is made of eleven players, covering different areas of the field. The standard distinction is between goalkeepers, defenders, midfielders and forwards. A team plays with one goalkeeper and ten further players belonging to any of the three remaining categories. We record the initial formation of each team in each match. In Italy, due to a well-known, long tradition of coaches committed to tactical reasoning, the decision over where to place players in the field is particularly stressed; overall, we observe 13 different settings in our sample. The most common system of play involves four defenders, four midfielders and two forwards (4-4-2 in short), chosen by a team in 48.33% of the observations included in our sample; other popular settings involve four defenders, three midfielders and three forwards (4-3-3, chosen in 11.76% of the observations in the sample) and four defenders, five midfielders and one forward (4-5-1, chosen in 11.02% of the observations). The variable "any change" is a dummy equal to one if the setting of the formation changed compared to the previous match (e.g., it moved from 4-4-2 to 4-3-3). The variables "more defensive" and "more offensive" are two dummies equal to one if the setting becomes more defensive or more offensive, respectively. We consider more defensive a setting with more defenders and/or fewer forwards, and more offensive a setting with more forwards and/or fewer defenders. We complete the set of dependent variables with two dummies equal to one if the team eventually won or drew the match. Table 1 shows that the team setting changed in 46.7% of the cases, roughly equally split between more defensive and more offensive settings.[7]

The set of explanatory variables includes dummy variables on the team performance in the past few matches. We create a variable equal to one if the previous matches (two or more consecutive matches) were defeats ("defeats in past matches") and a variable equal to one if just the previous match was a defeat ("defeat in past match").[8] Corresponding variables to indicate past victories are defined similarly. By so doing, we are able to separately analyze the effects of a *single* shock (i.e., a single win or defeat) and of *multiple* consecutive shocks (i.e., two or more consecutive wins or defeats) on risk taking.

[7] Only in 3.98% of the cases, the change induced more defensive and more offensive systems of play at the same time: more frequently, it is the case of moving from a 3-5-2 setting to a 4-3-3 one.

[8] This variable is then set to zero when the team experienced two or more defeats in the past matches.

As shown by Bernile et al. (2017a), it is not simply exposure to events that might affect managerial risk taking, but also the *intensity* of prior shocks that impacts their attitude towards risk. Therefore, we also seek to understand whether the intensity of shocks matters in altering a team coach's risk attitude in the subsequent match, by focusing on the effects of heavy defeats (and wins, that, again, we define similarly) on risk taking by creating a variable equal to one if the past match ended with a severe defeat, with the team scoring three or more goals less than the opponent ("heavy defeat in past match").

In a recent paper, Imas (2016) provides evidence on what he calls the "realization effect": by distinguishing between realized versus paper losses, he interestingly documents that while after a realized loss individuals are less willing to take risks, if the same loss is not realized (i.e., a paper loss) they tend to take on greater risk. Therefore, we also test, in a high-stakes environment where decisions are taken under strong competitive pressure by experienced managers, the closely related idea that it is not only experiencing a loss versus a gain that matters, but also passing through an *unexpected* "loss" or "gain" that influences subsequent risk taking: we wonder whether a team is more or less willing to take risks after an unexpected defeat (resp., win), i.e. after losing (resp., winning) a match that, ex ante, was supposed to end with a win (resp., a defeat). To this aim, we create a variable equal to one if the past match was an unexpected defeat, that we define as being defeated by an opponent team with average wages lower by 50% or more ("unexpected defeat in past match").[9] Also in this case, we similarly define "unexpected win in past match".

Finally, in our analysis we control for a set of variables that could affect the team performance and the team composition: a dummy for playing at home, the number of assists made in the match, the salary of the team and the opponent, plus statistics on the coach (foreign, new in the team, in the team after clearance of another coach during the season, years of experience in Serie A)[10] and the players (average age, fraction of foreigners, fraction of new players in the team, average years of experience in Serie A).

Importantly, we also include two dummy variables that we call "risk tolerant team" and "risk averse team", to categorize teams based on their *prevailing* system of play. We consider

[9] Results are preserved if we change this threshold (we tried with 33% and 67%).

[10] Prior work in different domains indicates that the degree of experience of managers significantly shapes their willingness to take risks (see e.g., Menkhoff et al., 2006).

as risk neutral a team usually playing with a 4-4-2 setting. A risk tolerant team usually plays with a more offensive setting including more forwards and/or fewer defenders (typically 3-5-2 or 4-3-3), while a risk averse team usually plays with a more defensive setting including more defenders and/or fewer forwards (typically 4-5-1 or 5-3-2). This distinction splits the sample in two groups of similar size (26.1% observations for risk tolerant teams and 25.6% observations for risk averse teams), similarly distributed among major and minor teams.[11]

TABLE 1 ABOUT HERE

Figure 1 displays the fraction of times teams changed formation toward more defensive or more offensive settings, after two or more consecutive defeats (panel a) or two or more consecutive wins (panel b). We take these particular shocks as representative of all the shocks included in our analysis. We notice that changes in the formation setting (whether more defensive or more offensive) are more likely after consecutive defeats and less likely after consecutive victories. The difference in the fractions is always statistically significant,[12] and suggests that teams are generally more responsive to negative shocks, whereas they do not react to positive ones – following popular sayings such as "Do not change a winning team" or "If it ain't broke, don't fix it". The purpose of the next section is to understand if this result holds after controlling for a variety of potentially relevant dimensions.

FIGURE 1 ABOUT HERE

[11] For instance, in our data we see that coaches known for their offensive tactical attitude such as Sarri (SS Calcio Napoli) and Spalletti (AS Roma) usually played with a risk tolerant setting (4-3-3), whereas coaches known for their defensive attitude such as Guidolin (first Udinese Calcio and then Parma Calcio 1913) and Mazzarri (first SS Calcio Napoli and then FC Internazionale Milano) usually played with a risk averse setting (5-3-2).

[12] We compare the fractions with a t-test on the equality of the means. Past defeats, more defensive: t-test: -4.175, p-value <0.01. Past defeats, more offensive: t-test: -2.449, p-value: 0.014. Past wins, more defensive: t-test: 2.193, p-value: 0.028. Past wins, more offensive: t-test: 2.251, p-value: 0.025.

4. Analysis

In this section we comment on the key results of our analysis. We perform a set of five probit regressions, with five different dependent variables, and standard errors clustered at the team-season level. The specification includes our set of eight dummy variables on the occurrence of past shocks (four negative, four positive), two dummy variables for risk tolerant and risk averse teams, one dummy variable for home playing, the logarithms of the average salary of the team and the opponent (to control for the skills of the team and the opponent), plus a battery of control variables regarding the coach (whether foreign, new in the team, succeeded to clearance of another coach, and years of experience in Serie A), the players (average age, the fraction of foreigners, the fraction of new in the team, and the average years of experience in Serie A) and dummy variables for each season considered (from 2009 to 2016). Tables 2-4 report average marginal effects from the analyses; in what follows we comment only on the effects that are significant at 5% or lower level.

Table 2 reports results from our benchmark analysis. Column (1) measures the effect of prior shocks on the probability to make *any change* in team composition. i.e., to produce a shake in risk-taking behavior, regardless of its specific direction. We learn that the probability increases after a defeat (+8.1%), after multiple defeats (+14.6%), after a heavy defeat (+12.2%, to be added to the effect of a generic single defeat, +8.1%), and decreases after a win (-7.9%) and after multiple wins (-11.6%).[13] In contrast, we detect no effect of unexpected defeats or wins. All in all, the results show clear evidence of "negativity bias",[14] with coaches displaying more willingness to react and change the initial setting after negative shocks ("losses") rather than positive ones ("gains").[15] We also notice that changes are more frequent among risk tolerant teams (+10.5%).

As we anticipated above, changes in risk taking may imply opting for either a more defensive or a more offensive team setting, with respect to the previous match (i.e., opting for lower or higher risk taking, respectively). In Columns (2) and (3) we wonder whether

[13] The effects of one and multiple defeats are not statistically different at the 5% significance level (Chi-squared test: 2.74; p-value: 0.098). Similarly, the effects of one and multiple wins are not statistically different (Chi-squared test: 0.75; p-value: 0.386).

[14] See Taylor (1991) for a review of pioneering work in psychology offering evidence of "negativity bias", i.e., showing that negative events evoke stronger reactions compared to neutral or positive ones.

[15] On a similar vein, Dittmar and Duchin (2016) find that positive professional experiences do not affect corporate policy.

different shocks correlate more with a specific change of direction. Overall, it seems that changes in risk taking leading toward more offensive settings are more responsive to prior shocks, as they are more likely after a single defeat (+8.1%) and a heavy defeat in the past match (+8.0%, to be added to 8.1%), and less likely after a single win (-6.3%). In contrast, the probability of observing a change toward a more defensive team setting increases after multiple defeats (+11.7%) and decreases after an unexpected win in the past match (-7.2%).

Table 2 ends with two columns analyzing the effectiveness of the change, measured as the probability to win a match (Column 4) or the probability to win or draw a match (Column 5). The last column is added to take into account that, for minor teams, a draw is often considered a success. The specification is the same as in Columns (1)-(3), with the inclusion of three further variables: the dummy for a more defensive setting and the dummy for a more offensive setting (i.e., our dependent variables in Columns 2-3), and – as a control variable – the number of assists made. Compared to the models in Columns (1)-(3), we also exclude two variables, on the unexpected defeats and wins, because the model would otherwise use those variables to predict the outcome perfectly.[16]

We find no effect of playing with a more offensive team; rather, in Column (5) we detect a negative effect (-5.1%) of playing with a more defensive team. This suggests that changing the team system of play ultimately does not pay off, in terms of match outcomes, and, in case, it is counterproductive as it reduces the probability to win or draw a match.

TABLE 2 ABOUT HERE

4.1. Top Teams and Weak Teams

We then repeat our analysis in two sub-samples of observations, making a distinction between top teams and weak teams. By "top teams" we mean the teams that typically compete for the highest positions in the ranking (the ones granting the "Scudetto" or access to European competitions); such teams typically have a large number of supporters, more resources available for paying the highest salaries and, therefore, attracting the best players. We define as top teams those with average salary above 1,000,000 EUR. Seven teams

[16] In our dataset, the team always wins after an unexpected win, and always loses after an unexpected defeat.

playing in all the eight seasons under investigation belong to this category. Among Italian supporters these teams are commonly known as the "Seven Sisters" (as the media termed them) and are the following: ACF Fiorentina, FC Internazionale Milano, Juventus FC, SS Lazio, AC Milan, SS Calcio Napoli, and AS Roma. In contrast, we define as weak teams those with average salary below 500,000 EUR. Seventeen teams belong to this category.[17] Their aim is typically to avoid relegation in the second division; on average they played 3 out of the 8 seasons in our dataset. The reason why we make this distinction is that we conjectured that managers in top and weak teams may display different reactions to past events. Our hypothesis is that top team coaches are less affected by past performances, and tend to follow a more stable behavior due to pre-set seasonal objectives that make these teams far less sensitive than others to contingent outcomes – regardless of their being positive or negative.

The two tables strongly support the idea that it is key to distinguish between top and weak teams, with the correlations we found in the benchmark analysis preserved only in Table 4 for weak teams. Top team managers are *not affected at all* by past match outcomes. For weak teams we also show that neither becoming more defensive nor becoming more offensive ultimately pay off, in the sense that both tactical decisions reduce the probability to win.

TABLE 3 ABOUT HERE

TABLE 4 ABOUT HERE

5. Conclusions

In this paper we have sought to understand whether, for a manager, passing through firm-specific bad and good experiences (i.e., wins and defeats of the teams) leads to short-run shifts in risk taking. Our findings indicate that also in a highly competitive and highly incentivized environment such as professional soccer, managerial risk taking is sensitive to

[17] Specifically: Atalanta Bergamasca Calcio, FC Bari, Brescia Calcio, Cagliari Calcio, Carpi FC, Calcio Catania, Cesena Calcio, AC ChievoVerona, FC Crotone, Empoli FC, Frosinone Calcio, US Lecce, AS Livorno Calcio, Novara Calcio, Delfino Pescara, SS Robur Siena, Hellas Verona FC.

prior shocks. In particular, we offer clear evidence of "negativity bias" in experience-based adjustments in managerial risk taking, as changes in systems of play strongly and positively depend on passing through defeats. More specifically, we find that single defeats and heavy defeats make the coaches more risk seeking. In contrast, passing through multiple defeats in a row and experiencing single wins are associated with more cautious risk-taking behavior. As we documented in Section 2, several recent studies on managerial risk taking indicate that, in the face of negative shocks, their willingness to take risks is lower. However, as we noted in the paper, there are some key differences between those works and ours: while prior research focuses on extremely adverse events occurred before the manager was appointed at the helm of the firm, our data refer to recent positive and negative shocks that occurred frequently and during the manager's mandate. In this environment, we showed that managers react to recent professional losses (including severe ones) by *increasing* their willingness to take risks, likely due to the attempt to win the next match. In contrast, in the face of multiple consecutive losses, they prefer to take *less risks*.

We also provided evidence that in top teams managers behave differently from weak team coaches. In weak teams, coaches strongly react to prior shocks, but neither opting for a more offensive system of play nor becoming more defensive ultimately pay off, as both types of change are associated to a lower probability to win a match. In contrast, in top teams managerial risk taking is *not* sensitive to prior shocks, regardless of their positive or negative direction. We speculatively argue that the reason why in top teams risk taking is not affected by prior shocks is that these teams typically pursue well-defined goals, *set by their owners before a playing season begins*, so that a managers' mandate is driven by them, rather than by favorable or unfavorable contingent outcomes throughout the season.

However, it is fair to say that with the current data we are not able to understand whether the relevant differences we detect between top and weak teams are mainly due e.g., to specific managerial characteristics (e.g., cognitive factors, personal histories or traits such as overconfidence, that might characterize mainly top coaches), corporate governance features, corporate culture or other variables that we do not take into account in our analysis. A further limitation of our dataset is that it does not allow us to understand whether the detected change in managerial risk taking in the face of prior shocks operates through a change in preferences

or via a shift in beliefs. These questions are left as interesting avenues for future research on the theme.

References

Bartling, B., Brandes, L., & Schunk, D. (2015), "Expectations as Reference Points: Field Evidence from Professional Soccer," Management Science, 61(11), 2646-2661.

Bernile, G., Bhagwat, V., & Rau, R. (2017a), "What Doesn't Kill You Will Only Make You More Risk-Loving: Early-Life Disasters and CEO Behavior," Journal of Finance, 72(1), 167-206.

Bernile, G., Bhagwat, V., Kecskés, A., & Nguyen, P. (2017b), "Are the Risk Attitudes of Professional Investors Affected By Personal Catastrophic Experiences?," Working Paper.

Bertrand, M., & Schoar, A. (2003), "Managing with Style: The Effect of Managers on Firm Policies," Quarterly Journal of Economics, 118, 1169-1208.

Bucciol, A., N.J. Foss & M. Piovesan (2014), "Pay Dispersion and Performance in Teams," PLoS One, 9(11), 1-16.

Bucciol, A., Zarri, L. (2015), "The Shadow of the Past: Financial Risk Taking and Negative Life Events," Journal of Economic Psychology, 48, 1-16.

Callen, M., Isaqzadeh, M., Long, J.D., & Sprenger, C. (2014), "Violence and Risk Preference: Experimental Evidence from Afghanistan," American Economic Review, 104, 123-148.

Calvet, L.E., Campbell, J.Y., & Sodini, P. (2009), "Fight or Flight? Portfolio Rebalancing by Individual Investors," Quarterly Journal of Economics, 124, 301-348.

Cassar, A.,. Healy, A., & von Kessler, C. (2017), "Trust, Risk, and Time Preferences After a Natural Disaster: Experimental Evidence from Thailand," World Development, 94, 90-105.

Cameron, L., & Shah, M. (2015), "Risk-Taking Behavior in the Wake of Natural Disasters," Journal of Human Resources, 50(2), 484-515.

Cohn, A., Engelmann, J., Fehr, E., & Maréchal, M.A. (2014), "Evidence for Countercyclical Risk Aversion: An Experiment with Financial Professionals," American Economic Review, 105(2), 860-885.

Coval, J.D., & Shumway, T. (2005), "Do Behavioral Biases Affect Prices?," Journal of Finance, 60(1), 1-34.

De Paola, M., & Scoppa, V. (2012), "The Effects of Managerial Turnover: Evidence from Coach Dismissals in Italian Soccer Teams," Journal of Sports Economics, 13(2), 152-168.

Dittmar, A., & Duchin, R. (2016), "Looking in the Rearview Mirror: The Effect of Managers' Professional Experience on Corporate Financial Policy," Review of Financial Studies, 29(3), 565-602.

Eckel, C.C., El-Gamal, M.A., & Wilson, R.K. (2009), "Risk Loving After the Storm: A Bayesian-Network Study of Hurricane Katrina Evacuees," Journal of Economic Behavior and Organization, 69, 110-124.

Graham, J.R., & Narasimhan, K. (2004), "Corporate Survival and Managerial Experiences During the Great Depression," Working Paper.

Guiso, L., Sapienza, P., & Zingales, L., "Time-Varying Risk Aversion," Journal of Financial Economics, forthcoming.

Grund, C., & Gurtler, O. (2005), "An Empirical Study on Risk-Taking in Tournaments," Applied Economics Letters, 12(8), 457-461.

Hertwig, R., Barron, G., Weber, E.U., & Erev, I. (2004), "Decisions from Experience and the Effect of Rare Events in Risky Choice," Psychological Science, 15(8), 534-539.

Imas, A. (2016), "The Realization Effect: Risk-Taking after Realized versus Paper Losses," American Economic Review, 106(8), 2086-2109.

Kim, Y., & Lee, J. (2014), "The Long-Run Impact of a Traumatic Experience on Risk Aversion," Journal of Economic Behavior and Organization, 108, 174-186.

Langer, T., & Weber, M. (2008), "Does Commitment or Feedback Influence Myopic Loss Aversion?," Journal of Economic Behavior and Organization, 67, 810-819.

Liu, Y., Tsai, C., Wang, M., & Zhu, N. (2010), "Prior Consequences and Subsequent Risk Taking: New Field Evidence from the Taiwan Futures Exchange," Management Science,

56(4), 606-620.

Loewenstein, G., Weber, E.U., Hsee, C.K., & Welch, N. (2001), "Risk as Feelings," Psychological Bulletin, 127, 267-287.

Low, A. (2009), "Managerial Risk-Taking Behavior and Equity-Based Compensation," Journal of Financial Economics, 92(3), 470-490.

Malmendier, U., & Nagel, S. (2011), "Depression Babies: Do Macroeconomic Experiences Affect Risk-Taking?," Quarterly Journal of Economics, 126, 373-416.

Malmendier, U., Tate, G., & Yan, J. (2011), "Overconfidence and Early-life Experiences: The Effects of Managerial Traits on Corporate Financial Policies," Journal of Finance, 66(5), 1687-1733.

Malmendier, U., Pouzo, D., & Vanasco, V. (2017), "A Theory of Experience Effects," Working Paper.

Menkhoff, L., Schmidt, U., & Brozynski, T. (2006), "The Impact of Experience on Risk Taking, Overconfidence, and Herding of Fund Managers: Complementary Survey Evidence," European Economic Review, 50(7), 1753-1766.

Schoar, A., & Zuo, L. (2017), "Shaped by Booms and Busts: How the Economy Impacts CEO Careers and Management Styles," Review of Financial Studies, 30(5), 1425-1456.

Taylor, S.E. (1991), "Asymmetrical Effects of Positive and Negative Events: The Mobilization-Minimization Hypothesis," Psychological Bulletin, 110(1), 67-85.

Thaler, R.H., & Johnson, E.J. (1990), "Gambling with the House Money and Trying to Break Even: The Effects of Prior Outcomes on Risky Choice," Management Science, 36(6), 643-660.

Tversky, A. & Kahneman, D. (1974), "Judgment under Uncertainty: Heuristics and Biases," Science, 4157, 1124-1131.

Voors, M.J., Nillesen, E.E.M., Verwimp, P., Bulte, E.H., Lensink, R., & van Soest, D.P. (2012), "Violent Conflict and Behavior: A Field Experiment in Burundi," American Economic Review, 102, 941-964.

Weber, M., & Zuchel, H. (2005), "How Do Prior Outcomes Affect Risk Attitude? Comparing Escalation of Commitment and the House-Money Effect," Decision Analysis, 2(1), 30-43.

Weinstein, N. (1989), "Effects of Personal Experience on Self-protective Behavior," Psychological Bulletin, 105, 31-50.

Table 1. Summary Statistics (2160 observations)

	Mean	Std. Dev.	Minimum	Maximum
Dependent variables				
Any change *	0.467	0.499	0	1
More defensive *	0.258	0.438	0	1
More offensive *	0.249	0.432	0	1
Win *	0.366	0.482	0	1
Win or draw *	0.632	0.482	0	1
Explanatory variables				
Defeat in past match *	0.225	0.418	0	1
Defeats in past matches *	0.089	0.285	0	1
Heavy defeat in past match *	0.060	0.237	0	1
Unexpected defeat in past match *	0.064	0.245	0	1
Win in past match *	0.224	0.417	0	1
Wins in past matches *	0.087	0.282	0	1
Heavy win in past match *	0.059	0.235	0	1
Unexpected win in past match *	0.076	0.266	0	1
Control variables				
Risk tolerant team *	0.261	0.439	0	1
Risk averse team *	0.256	0.436	0	1
Home playing *	0.500	0.500	0	1
N. assists made	1.895	1.871	0	15
Average salary (k EUR)	976.448	848.497	148.182	4,409.091
Average salary opponent (k EUR)	976.448	848.497	148.182	4,409.091
Coach: foreign *	0.144	0.352	0	1
Coach: new in team *	0.486	0.500	0	1
Coach: after clearance *	0.121	0.326	0	1
Coach: years in Serie A	4.306	3.806	0	16
Players: average age	27.385	1.416	23.364	32.636
Players: foreign	0.489	0.224	0	1
Players: new in team	0.357	0.172	0	1
Players: avg. years in Serie A	4.541	1.528	0.909	10.273

Note: Variables indicated with * are dummies.

Table 2. Benchmark Analysis

	(1) Any change	(2) More defensive	(3) More offensive	(4) Win	(5) Win or draw
More defensive				-0.040*	-0.051**
				(0.022)	(0.020)
More offensive				-0.028	0.008
				(0.022)	(0.021)
Defeat in past match	0.081***	0.014	0.081***	-0.010	-0.032
	(0.029)	(0.025)	(0.023)	(0.026)	(0.027)
Defeats in past matches	0.146***	0.117***	0.061*	0.022	-0.003
	(0.042)	(0.037)	(0.031)	(0.035)	(0.035)
Heavy defeat in past match	0.122***	0.041	0.080**	-0.092**	-0.077*
	(0.043)	(0.037)	(0.036)	(0.042)	(0.042)
Unexpected def. in past match	0.012	0.027	-0.047		
	(0.047)	(0.038)	(0.040)		
Win in past match	-0.079***	-0.036	-0.063**	-0.012	-0.012
	(0.029)	(0.027)	(0.026)	(0.025)	(0.024)
Wins in past matches	-0.116***	-0.074*	-0.060*	0.007	0.008
	(0.039)	(0.039)	(0.033)	(0.033)	(0.036)
Heavy win in past match	-0.051	-0.035	-0.032	0.015	-0.073
	(0.042)	(0.044)	(0.042)	(0.045)	(0.044)
Unexpected win in past match	-0.017	-0.072**	0.052		
	(0.040)	(0.036)	(0.032)		
Risk tolerant team	0.105***	0.058***	0.046**	-0.008	-0.002
	(0.037)	(0.022)	(0.023)	(0.022)	(0.022)
Risk averse team	0.039	0.023	0.018	0.040	-0.001
	(0.036)	(0.022)	(0.023)	(0.025)	(0.025)
Home playing	-0.030	-0.077***	0.036*	0.182***	0.186***
	(0.018)	(0.021)	(0.019)	(0.018)	(0.019)
N. assists made				0.047***	0.041***
				(0.005)	(0.006)
Ln(average salary)	0.032	0.010	0.020	0.128***	0.138***
	(0.026)	(0.017)	(0.016)	(0.017)	(0.019)
Ln(average salary) opponent	-0.002	0.023	-0.026**	-0.128***	-0.138***
	(0.014)	(0.014)	(0.013)	(0.013)	(0.011)
Coach characteristics	YES	YES	YES	YES	YES
Players characteristics	YES	YES	YES	YES	YES
Season effects	YES	YES	YES	YES	YES
Pseudo-R^2	0.051	0.034	0.049	0.175	0.166
Observations	2,160	2,160	2,160	2,160	2,160

Note: Standard errors clustered at the team/season level in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 3. Top Teams (Salary > 1,000,000 EUR)

	(1) Any change	(2) More defensive	(3) More offensive	(4) Win	(5) Win or draw
More defensive				-0.002	0.004
				(0.040)	(0.030)
More offensive				-0.039	0.000
				(0.040)	(0.035)
Defeat in past match	0.064	0.062	0.005	-0.020	-0.013
	(0.054)	(0.048)	(0.045)	(0.048)	(0.044)
Defeats in past matches	0.046	0.043	0.086	0.111	0.084
	(0.094)	(0.086)	(0.076)	(0.082)	(0.081)
Heavy def. in past match	0.095	0.117	0.040	-0.112	0.018
	(0.112)	(0.091)	(0.120)	(0.144)	(0.108)
Unexpected def. in past match	0.032	-0.007	0.009		
	(0.061)	(0.044)	(0.049)		
Win in past match	-0.061	-0.025	-0.040	-0.036	-0.022
	(0.047)	(0.038)	(0.051)	(0.042)	(0.035)
Wins in past matches	-0.027	-0.012	-0.010	-0.000	0.031
	(0.051)	(0.045)	(0.055)	(0.047)	(0.044)
Heavy win in past match	-0.012	-0.015	-0.005	0.029	-0.053
	(0.053)	(0.052)	(0.056)	(0.063)	(0.047)
Unexpected win in past match	0.091	0.083	0.032		
	(0.111)	(0.088)	(0.082)		
Risk tolerant team	0.163***	0.093***	0.074**	-0.003	-0.014
	(0.043)	(0.029)	(0.033)	(0.040)	(0.035)
Risk averse team	-0.037	-0.035	-0.027	0.029	-0.021
	(0.059)	(0.034)	(0.039)	(0.044)	(0.032)
Home playing	0.008	0.074**	-0.066*	0.179***	0.115***
	(0.032)	(0.032)	(0.040)	(0.029)	(0.023)
N. assists made				0.049***	0.043***
				(0.010)	(0.008)
Ln(average salary)	0.021	0.014	0.016	0.135***	0.049
	(0.065)	(0.040)	(0.044)	(0.040)	(0.036)
Ln(average salary) opponent	-0.040	-0.052**	0.004	-0.140***	-0.125***
	(0.026)	(0.022)	(0.024)	(0.022)	(0.016)
Coach characteristics	YES	YES	YES	YES	YES
Players characteristics	YES	YES	YES	YES	YES
Season effects	YES	YES	YES	YES	YES
Pseudo-R^2	0.060	0.069	0.027	0.150	0.168
Observations	756	756	756	756	756

Note: Standard errors clustered at the team/season level in parentheses; *** p<0.01, ** p<0.05, * p<0.1

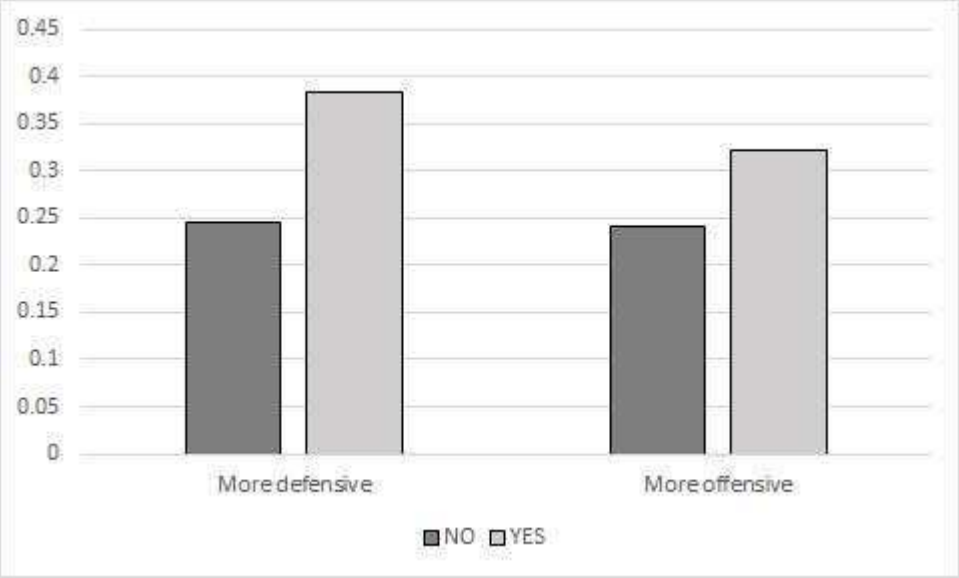
Table 4. Weak Teams (Salary < 500,000 EUR)

	(1) Any change	(2) More defensive	(3) More offensive	(4) Win	(5) Win or draw
More defensive				-0.081**	-0.113**
				(0.033)	(0.044)
More offensive				-0.067**	-0.003
				(0.032)	(0.038)
Defeat in past match	0.090**	0.061*	0.060*	-0.070	-0.081
	(0.043)	(0.037)	(0.035)	(0.043)	(0.052)
Defeats in past matches	0.218***	0.062	0.168***	-0.040	-0.063
	(0.056)	(0.051)	(0.047)	(0.054)	(0.058)
Heavy def. in past match	0.160***	0.069	0.045	-0.077	-0.056
	(0.055)	(0.047)	(0.043)	(0.050)	(0.060)
Unexpected def. in past match	0.088	0.034	0.043		
	(0.209)	(0.228)	(0.173)		
Win in the past match	-0.026	-0.013	-0.046	-0.033	-0.062
	(0.051)	(0.050)	(0.042)	(0.039)	(0.051)
Wins in past matches	-0.175**	-0.055	-0.180**	0.043	-0.066
	(0.081)	(0.074)	(0.081)	(0.067)	(0.079)
Heavy win in past match	-0.470***	-0.251*		-0.014	-0.045
	(0.157)	(0.141)		(0.085)	(0.108)
Unexpected win in past match	-0.055	-0.003	-0.063		
	(0.045)	(0.041)	(0.053)		
Risk tolerant team	0.193***	0.121***	0.108***	0.004	-0.001
	(0.058)	(0.037)	(0.039)	(0.037)	(0.036)
Risk averse team	0.077	0.044	0.057	0.029	0.057
	(0.078)	(0.047)	(0.053)	(0.064)	(0.044)
Home playing	-0.019	0.018	-0.056*	0.176***	0.221***
	(0.033)	(0.033)	(0.033)	(0.031)	(0.035)
N. assists made				0.046***	0.042***
				(0.011)	(0.013)
Ln(average salary)	0.045	0.147*	-0.048	0.040	0.115
	(0.123)	(0.084)	(0.076)	(0.079)	(0.075)
Ln(average salary) opponent	0.020	-0.008	0.029	-0.147***	-0.162***
	(0.024)	(0.022)	(0.026)	(0.022)	(0.023)
Coach characteristics	YES	YES	YES	YES	YES
Players characteristics	YES	YES	YES	YES	YES
Season effects	YES	YES	YES	YES	YES
Pseudo-R^2	0.127	0.079	0.077	0.194	0.148
Observations	704	704	704	704	704

Note: Standard errors clustered at the team/season level in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Figure 1. Frequency of More Defensive and More Offensive Settings

a) Defeats in past matches



b) Wins in past matches