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The advantage of scoring just before the halftime break – pure myth? Quasi-experimental evidence from European football

Abstract

We examine whether the moment just before the halftime break is a particularly good time to score a goal. Using detailed data from the top five European football leagues between the 2013/14 and 2017/18 seasons, we exploit the quasi-random occurrence of goals scored just before and just after the halftime break. In the former situation, the game is exogenously interrupted by a break immediately after the goal, whereas in the latter situation, the game continues without interruption. We show that in the case of a goal being scored just before halftime, the scoring team benefits more from the halftime break than the conceding team.

JEL Classification: L83, Z20

Keywords: football, football myth, halftime, scoring, quasi-experiment

1. Introduction

The belief that scoring a goal at a particularly good moment in a game can significantly influence the outcome has persisted in the world of football (soccer) for many years. A supposedly important moment to score a goal is the moment just before the halftime break. Many players, coaches and commentators believe in this "scoring just before halftime" myth (e.g., Ayton & Braennberg, 2008; Baert and Amez, 2018).

The peculiarity of scoring a goal just before halftime is that directly after the goal is scored, a 15-minute rest period follows. Thus, a possible reason for the importance of scoring a goal at this stage of the match is the halftime break itself. The halftime break splits a football game into two halves and gives players time to temporarily relax, on a cognitive and physical level, after the demands of the first half, to rehydrate and to address injury and equipment concerns. In addition, coaches have time to directly motivate their players and to give tactical advice (Russell et al., 2015).

The basic preconditions of the halftime break, i.e., the length of the break and the opportunity for the coaches to directly address their players, are the same for the two opposing teams in a match. Claiming that there is an advantage for the team that scores just before the halftime break implies that the scoring and conceding teams profit differently from the 15-minute rest period despite the similarity of the preconditions. In essence, the "scoring just before halftime" myth conjectures that in the case of a goal scored just before halftime, the scoring team benefits more from the halftime break than the conceding team.

While the literature has addressed similar questions, this specific conjecture has not been properly investigated. In their influential paper, Gauriot and Page (2018) examine whether scoring just before the halftime break is more important for a team's subsequent performance than scoring during other stages of the first half. The authors exploit the quasi-random occurrence of goals after the ball hits the post and find no evidence that the final minutes before the break

are more important than other phases during the first half. However, in their examination, they do not specifically test the effect of the 15-minute rest period if a goal is scored just beforehand. To test the "scoring just before halftime" myth, the most relevant comparison is not between different stages of the first half of the game but between two otherwise identical stages of the game that only differ based on the occurrence of the halftime break.

Baert and Amez (2018) examine whether a goal just before the break has an effect on the final game outcome. The authors thus test the importance of scoring a goal directly before halftime but neglect making a comparison to other stages of the match. Baert and Amez (2018) find that scoring a goal just before the break is detrimental for the home team but has no effect on the performance of the away team. However, the problem in testing the general importance of a goal scored just before the halftime break without a direct comparison to other stages of a match is that past achievement might predict future success. For example, the team that scores a goal directly before the break might be the better team and, thus, may continue at a higher performance level than its opponent after the break. When using an approach that merely focuses on a goal scored just before halftime, a potential endogeneity problem cannot be ruled out—even when controlling for the state of the match at halftime (see Baert & Amez, 2018). In this case, the validation or rejection of the general importance of scoring before the halftime is unfeasible.

In this study, we contribute to the existing literature by isolating the effect of the 15-minute rest period. We consider a quasi-experimental situation in which goals occur immediately before or immediately after the halftime break. This setting has an advantage in that a rest period of fifteen minutes follows only in the former situation and that goals are quasi-randomly distributed between the two scoring situations. Thus, our approach allows us to examine whether a goal scored in the middle of a football game has a different effect on a team's subsequent performance only because it is scored directly before the halftime break. Put differently,

we investigate whether the team that scores just before halftime benefits more from the 15-minute rest period than the conceding team.

Several theoretical mechanisms exist that are in line with the proposed positive effect of scoring just before halftime. One reason might be that individuals in a positive mood and individuals with a higher level of motivation are generally predicted to profit more from the processing of new information (e.g., O'Reilly, 1982; Schwarz, 2011). Thus, players on the scoring team may experience more benefits from coaching input received during the halftime break compared to their "frustrated" opponents. Another beneficial factor for the scoring team might be the opportunity for players to reflect on first half events during the halftime break and its effects on players' confidence level. For example, Baert and Amez (2018) argue that scoring just before the halftime break might lead to a higher boost in confidence than goals scored at other times and, thus, to enhanced performance in the second half. Furthermore, conceding a goal before the halftime break might be detrimental according to the mobilization-minimization model by Taylor (1991). This model posits that in the short run, individuals use more physiological, affective, cognitive and social resources after negative events than after neutral or positive events. In turn, the halftime break might prevent the conceding team from reacting immediately.

However, even though the myth predicts the scoring team will benefit more from the halftime break than the conceding team, there are several theoretical mechanisms that support the opposite, i.e., the conceding team profits more from the halftime break. One mechanism potentially driving the effect in this scenario might be psychological momentum. A goal potentially triggers psychological momentum, which, in turn, might enhance the scoring team's subsequent relative performance (e.g., Iso-Ahola & Mobily, 1980; Adler, 1981; Gilovich et al., 1985; Taylor & Demick, 1994). This experienced effect is predicted to diminish after an interruption (Markman & Guenther, 2007; Iso-Ahola & Dotson, 2014). Thus, the halftime break

might terminate the positive psychological momentum of the scoring team (and the negative momentum that possibly exists for the opponent), whereas in a situation in which a goal is scored just after the halftime break, the momentum effect potentially continues. Another factor might be that the goal conceded just before the halftime may lead to an emotion-focused rather than a problem-focused coping strategy during the break (e.g., Lazarus, 1991; Ntoumanis & Biddle, 1998). Players of the conceding team might feel the urge to make up for the mistake that led to the goal just before the break and, thus, might increase their performance in the second half. Furthermore, outside pressure related to scoring a goal before the break might negatively affect strategy adjustments of the scoring team during halftime (e.g., Baumeister, 1984; Dohmen, 2008). For example, the coach of the scoring team might change to a defensive tactic at a stage within a game that is too early. In turn, these bad tactical choices might negatively affect a scoring team's performance in the second half.

Using detailed data from the top five European football leagues, i.e., the leagues in England, France, Germany, Italy and Spain, between the 2013/14 and 2017/18 seasons, we analyze games in which goals were scored in the period between five minutes before and five minutes after the halftime break. This time period is similar to that used in the study of Croxson and Reade (2013) on efficiency in football betting markets, in which a goal on the cusp of halftime occurs in the five minutes before halftime. In our estimations, we include an indicator variable that measures whether a goal is scored directly before versus directly after the halftime break and two different performance variables that are based on the goal difference within a game.

Our results provide empirical evidence that a team benefits more if it scores directly before the halftime break than directly after the break. Moreover, these results remain robust (i) when we vary the scoring period before and after the halftime break by +/- 2 minutes; (ii) when we include control variables and fixed effects in our regression model; (iii) when we focus on important goals; and (iv) when we use an alternative performance measure based on the concept

of expected goals. However, in our study, we do not directly investigate the mechanism driving the results. Thus, we can only conclude that the net effect of the mechanisms indicates that the scoring team profits more from the halftime break than the conceding team when a goal is scored immediately beforehand.

Our article makes at least three contributions. First, we employ an ideal setting to test the "scoring just before halftime" myth. This setting allows us to exploit the quasi-random occurrence of goals scored directly before and directly after the halftime break. Our approach therefore permits the isolation of the halftime break itself. Second, we provide empirical support for this well-established football myth by showing that the scoring team profits more from the 15-minute rest period than the conceding team. Third, we discuss several potential drivers of the observed effects.

The remainder of this paper is organized as follows. In Section 2, we describe the data and the methodology of our examination. In Section 3, we present our empirical findings. In Section 4, we discuss possible mechanisms driving our results. In Section 5, we conclude.

2. Data and Methodology

2.1. Data

Our data contain detailed match information from the top five European football leagues—9,130 games from the leagues in England, France, Germany, Italy and Spain—between the 2013/14 and 2017/18 seasons. First, our dataset, provided by the data analytics company Nielsen, includes information on all shot attempts (shot blocked, shot wide, shot on goal, bar and post) and goals with the corresponding time—minutes and seconds of the game—and position—angle and distance. Moreover, we have information on whether a goal occurs after a free or penalty kick, after a corner or from an action within the game. Second, we have betting data from the British online gambling company Bet365 containing the pre-play odds for every

game in our dataset. Third, our data contain team quality measures from the website transfermarkt.de: (i) the aggregated market value of all the players on a team at the beginning of the season after the closing date of the summer transfer window and (ii) the final season rank of a team.

2.2. Methodology

A football game lasts ninety minutes, plus any extra time, and is split into two halves. Extra time is added at the end of each half and depends on how long the game is interrupted by substitutions and injury breaks during regular playing time. The actual playing time of both halves is approximately the same. The halftime break at the end of the first half offers the players a fifteen-minute rest period. We aim to exploit the fact that goals are scored directly before and directly after the exogenous halftime break. If a goal is scored just before the halftime break, the game is interrupted shortly afterwards. On the other hand, if a goal occurs after the break, the game continues without a 15-minute break. We thus expect a team's subsequent performance to be a discontinuous function of scoring close to the halftime break.

In our estimation, we apply a regression discontinuity design to examine whether there is a difference between scoring a goal immediately before versus immediately after the halftime break on teams' subsequent performance. Figure 1 depicts the ninety minutes in a football game; the dark gray area shows the 15-minute halftime break, and the light gray area depicts the interval defined as the scoring period of interest, with goals occurring directly before and directly after the halftime break. In our main examination, we define the scoring period of interest as five minutes before and five minutes after the halftime break. Our scoring period of interest is similar to that used in the study of Croxson and Reade (2013) on information and efficiency in football, in which a goal on the cusp of halftime occurs in the five minutes before

the break. To test the robustness of our results, we vary the scoring period of interest in Section 3.2.

Five minutes before and after the halftime break represent the minutes 41 to 50 in a football game.[1] The scoring period of interest after the halftime break lasts from minute 46 to minute 50 of the game. On the other hand, the scoring period of interest before the halftime break starts at minute 41. However, in football, extra time is usually added at the end of the first half, which would extend the scoring period of interest before the halftime break. To avoid this extension and, thus, an uneven split of the scoring period of interest, we measure the seconds and minutes between minute 45 and the minute of the last action of the first half and add this identified time interval to the starting minute 41. For many games, the actual scoring period of interest before the halftime break starts after minute 41.

[Insert Figure 1 near here]

In football, a team's performance is dependent upon the opponent team's performance. For example, it is difficult to define whether a team's exceptionally good performance is due to its own good performance, the opponent team's bad performance or a mix of both. Thus, it is most appropriate to determine a team's performance in relation to the performance of its opponent (see, for example, Gauriot & Page, 2018). We determine performance in football on team level as the difference between the goals scored and the goals conceded.

To examine the effect of scoring close to the halftime break on a team's subsequent performance, we compare a team's performance before the scoring period of interest (*BeforePerformance*) with its performance after the scoring period of interest (*AfterPerformance*). These two periods take approximately the same amount of time because the extra time added to the first and second halves makes up for the interruptions in regular playing time. We individually

subtract the goals a team concedes from the goals a team scores for each time interval. In turn, the difference between the *AfterPerformance* and the *BeforePerformance* of the team scoring a goal close to the halftime break is our dependent variable *PostMinusPreDeltaGoals*. The following example of Team A playing against Team B illustrates our performance measure. In the playing time before minute 41, both teams score one goal. Immediately before the halftime break, Team A scores its second goal and, in the minutes after minute 50, another two goals, while Team B fails to score another goal. In this case, the *BeforePerformance* of both teams is 0 and the *AfterPerformance* is +2 for team A and -2 for Team B. In turn, the dependent variable *PostMinusPreDeltaGoals* takes on a value of +2, which is the difference between the *AfterPerformance* and the *BeforePerformance* of the scoring team, i.e., Team A.

Furthermore, we use a second dependent variable. The variable *PerformanceChange* takes on the value of 1 if the *AfterPerformance* is greater than the *BeforePerformance*, -1 if the *BeforePerformance* is greater than the *AfterPerformance* and 0 otherwise. Consequently, our second performance variable gives less weight to extreme performance changes. The advantage of both of our performance variables is that we are measuring the performance change of a team within a game. Thus, we control for ability differences between the two opposing teams within a game.

We use two different panels to test the effect of scoring close to halftime on a team's subsequent performance. Panel A includes all games in which exactly one goal occurs either before, after or both before and after the halftime break in the scoring period of interest, i.e., a maximum number of two goals in the scoring period of interest. In contrast, Panel B includes all games in which exactly one goal is scored in the whole scoring period of interest, i.e., either a goal immediately before or immediately after the halftime break. In both Panels A and B, the independent variable of interest is the indicator variable *DummyGoalBeforeHT*. This indicator variable takes on a value of 1 if a goal is scored immediately before the halftime break and the

value of 0 if a goal occurs immediately after the halftime break. Panel A consists of 2,388 observations, and Panel B consists of 2,076 observations. In Panel A (Panel B), 1,332 (1,170) goals are scored before the halftime break, and 1,056 (906) goals are scored after the halftime break.

We use an ordinary least squares model (OLS) to test whether a goal in the middle of a game has a different effect simply because it is scored just before the halftime break. Our equation can be written as follows:

$$PerformanceVariable_g = \alpha + \beta_1 DummyGoalBeforeHT_g + \varepsilon_g, \quad (1)$$

where g indicates the game.

2.3. Tests for Quasi-Randomization

We assume that except for the distinct effect of the halftime break, there is no reason why a goal in the middle of the game would have a different effect on teams that score just before versus just after the break. We thus test whether there is a difference between the teams that score directly before and directly after the halftime break regarding the teams' (i) probability to win the game; (ii) final rank in the previous season; and (iii) aggregated market value of all the players on the team at the beginning of the season after the closing date of the summer transfer window. To measure the teams' probability of winning the game, we use implicit winning probabilities calculated based on the pre-play betting odds.[2] In addition, to avoid extreme values, we distinguish between favorites and underdogs based on whether the team's probability of winning the game is greater than 50%. The proportion of favorites scoring a goal just before the halftime should not deviate from the proportion that score just after the break. Furthermore, we examine whether the proportion of home and away teams scoring a goal differs.

Table 1 shows the mean comparisons (t-tests) for all relevant pretreatment variables. For each variable, we find that the average value directly before the halftime break is not significantly different from the average value directly after the halftime break (p-value > 0.10). Thus, teams that score just before the halftime break are not systematically different from the teams that score just after the break.

[Insert Table 1 near here]

3. Results

3.1. Main Results

We estimate Equation (1) from Section 2.2 for the two performance variables *PostMinusPreDeltaGoals* and *PerformanceChange*. For all regressions in Table 2, the independent variable of interest *DummyGoalBeforeHT* is positive and significant. Teams that score a goal immediately before the halftime break increase their subsequent goal difference by 0.1918 in Panel A and by 0.1268 in Panel B compared to teams that score a goal immediately after the halftime break. Additionally, our second performance variable indicates a positive performance change—0.1142 in Panel A and 0.0814 in Panel B—for the teams that score immediately before versus immediately after the halftime break. Altogether, our results show that teams benefit more if they score just before the halftime break than just after the break. We thus find empirical evidence that the team that scores directly before halftime profits more from the subsequent rest period than the conceding team.

[Insert Table 2 near here]

3.2. Additional Analyses

To test the robustness of our main results, we employ further analyses focusing on (i) the length of the scoring period of interest; (ii) additional controls and fixed effects; (iii) important goals; and (iv) an alternative performance measure. In Table 3, we examine whether a change in the length of the scoring period of interest affects our observed results. First, we extend the scoring period of interest to seven minutes before and seven minutes after the halftime break. Second, we reduce the scoring period of interest to three minutes before and three minutes after the halftime break. Third, we account for the possibility that the scoring period of interest of our main analysis is not separated into two equal parts. The time period before the halftime break typically starts when teams are already playing. It is thus possible that within just a couple of seconds, a goal is scored. On the other hand, the time period after the halftime break always starts with a kickoff. Thus, in this time period, it takes longer for teams to create goal chances. We aim to tackle this potential problem by adjusting the scoring period of interest before the halftime break to four minutes—while leaving the scoring period of interest after the halftime break unchanged at five minutes.

Our results in Table 3 show that the independent variable of interest remains positive in all regressions and significant in most of the regressions. Four out of twelve regressions are not, but almost, significant ($0.10 < \text{p-value} < 0.16$). Overall, these results widely confirm that there is indeed a positive effect of scoring directly before the halftime break.

[Insert Table 3 near here]

Although our balance tests indicate that there is no systematic difference between teams scoring directly before and directly after the halftime break, some concerns might remain. For this reason, we re-evaluate our main results while adding both additional control variables and

fixed effects to Equation (1) from Section 2.2. First, we control for the winning probabilities of the two opposing teams. Second, we include an indicator variable that takes on a value of 1 if the home team scores a goal and 0 otherwise to control for home-field advantage (see, for example, Schwartz & Barsky, 1977; Edwards, 1979; Pollard, 1986). Third, we include the difference in the teams' market value to control for the quality of the teams. Fourth, we insert season dummies to control for differences between seasons. Finally, we use team and opponent fixed effects to control for time-invariant heterogeneity among teams.

Table 4 shows the results of these extended models. The independent variable of interest is positive in all regressions and significant in all but one regression. We thus find support of our main result that in the case of scoring a goal just before halftime, the scoring team benefits more from the halftime break than the conceding team.

[Insert Table 4 near here]

Another concern might be that the importance of goals over the course of the match depends on the current score of the game. For example, a goal that ties a game is much more important than a goal that leads to a four-goal lead for one team over its opponent. In an additional analysis, we re-run Equation (1) from Section 2.2 while neglecting unimportant goals scored in the scoring period of interest. These neglected goals potentially influence our main results.

In less than 1% of the cases in our complete dataset, which includes 9,130 games, the losing team was able to turn around the game when it was two or more goals behind. In this analysis, we thus omit goals in the scoring period of interest if the losing team is two or more goals behind. Specifically, we define an unimportant goal as (i) a goal that leads to a three-goal

lead, or more, when the winning team scores a goal or (ii) a goal that does not put the losing team closer than one goal behind the winning team.

Table 5 depicts our results containing only games with important goals scored in the scoring period of interest. The independent variable of interest *DummyGoalBeforeHT* is positive and significant in all regressions in both Panels A and B. Thus, the results that scoring just before the halftime break has a greater beneficial effect on a team's subsequent performance than scoring just after the halftime break is not driven by unimportant goals.

[Insert Table 5 near here]

Finally, in our main model, we empirically test the effect of scoring just before versus just after halftime using 2,388—Panel A—and 2,076—Panel B—matches. In these games, 6,406 and 5,291 goals shape our performance variables. Thus, goals are rare events that potentially bias our results. However, scoring chances occur much more frequently (Brechot & Flepp, 2018; Flepp & Franck, 2019). We thus employ the concept of expected goals to obtain an alternative dependent variable and to test the robustness of our prior findings.[3]

Expected goals are based on the scoring probability of a shot, i.e., the probability that the outcome of a shot will be a goal. We calculate the scoring probability of each shot occurring in the games in Panels A and B using all goal attempts from the top 5 European football leagues between the 2013/14 and 2017/18 seasons, which included 214,194 shots across all 9,130 games. Specifically, we employ a logistic fixed effects model to regress the outcome of a shot, i.e., scored goal versus missed goal, on the distance, the angle, the rule setting of the shot (open play, free kick or penalty kick), and the body part used. To calculate the expected goal value for *BeforePerformanceXG* and *AfterPerformanceXG*, we aggregate the scoring probability of

each shot within the corresponding time interval. We measure the variable *PostMinusPreDeltaXG* by subtracting the *AfterPerformanceXG* value from the *BeforePerformanceXG* value. Moreover, our second performance variable *PerformanceChangeXG* takes on the value of 1 if *AfterPerformanceXG* is greater than *BeforePerformanceXG*, -1 if *BeforePerformanceXG* is greater than *AfterPerformanceXG* and 0 otherwise.

Our results using the concept of expected goals are depicted in Table 6. In both regressions in Panels A and B, the independent variable of interest is positive and significant. We thus find further supporting evidence that the halftime break is specifically important for the scoring team if a goal occurs just before the break.

[Insert Table 6 near here]

4. Discussion

Our findings show that teams benefit more from scoring just before the halftime break than just after. We thus find evidence for the well-established football myth that scoring a goal just before the break is particularly important because the scoring team profits more from the 15-minute rest period than the conceding team.

Several mechanisms are in line with our results. For example, individuals in a positive mood and individuals with a higher level of motivation are generally predicted to benefit more from the processing of new information. Individuals in a positive mood (i) solve problems more intuitively and try to find simple solutions (Isen et al., 1982); (ii) use a more heuristic and less effortful top-down information processing strategy (Schwarz, 1990, 2002; Bless et al., 1996; Melton, 1995); (iii) need less information and make faster decisions (Isen & Means, 1983); and (iv) are more creative when solving problems (Isen et al., 1987). Schwarz (2011) concludes that

individuals in a positive mood may do better on a secondary task and thus outperform individuals in a negative mood because they rely more consistently on the predefined script. Moreover, individuals who have experienced a positive event are more motivated and thus tend to use more updates and external information sources (O'Reilly, 1982). Based on these proposed effects of positive mood and motivation, players potentially process new information, i.e., the goal just before the break, as well as coaching input and tactical changes, more efficiently during the halftime break and might thus improve their subsequent performance compared to that of their opponents.

Furthermore, players typically use the halftime break to reflect on first half events. This reflection time might influence the confidence level of the players. For example, Baert and Amez (2018) posit that a goal scored directly before the break might increase the self-confidence of the scoring team. In turn, this confidence boost is predicted to enhance the team's second half performance. In addition, according to the short-term effects in the mobilization-minimization model by Taylor (1991), individuals use more physiological, affective, cognitive and social resources after negative events than they would otherwise. Thus, conceding a goal might have the beneficial effect of mobilizing these resources to a greater extent but only if not interrupted by the halftime break.

However, in our study, we do not directly examine the mechanism driving the results. It is possible that several different mechanisms account for the effect of scoring directly before the halftime break. Moreover, based on our findings, we cannot reject any mechanism that predicts the opposite, i.e., a team benefits more if it scores just after the halftime break. Altogether, we can only conclude that the net effect of the mechanisms indicates that the scoring team profits more from the halftime break than the conceding team when a goal is scored immediately beforehand.

5. Conclusion

We investigate the well-established football myth that claims that the moment just before the halftime break is a particularly good time to score a goal. Using detailed data from the top five European football leagues, we employ a quasi-experimental situation in which goals occur immediately before and immediately after halftime. Our approach allows us to test whether a goal in the middle of a game has a greater effect on a team's subsequent performance only because it is scored before the break. Our results are in line with the football myth. We find evidence that the scoring team benefits more from the subsequent rest period than the conceding team. Furthermore, we discuss three different mechanisms, i.e., better information processing, boosted confidence and short-term mobilization of resources, that could potentially explain our results.

These findings have important implications for football games. Players on a team might subconsciously reduce their effort and concentration levels in the last minutes before the halftime break. However, our results show that it is important to stay focused and try to score a goal at this stage of a match to make the best use of the subsequent halftime break. We thus suggest a game plan that emphasizes the importance of the minutes just before the halftime break.

However, the biggest caveat of this study is that we only test the importance of scoring before the halftime break but do not investigate the mechanisms behind these effects. There would be different implementation strategies depending on whether our results are driven, for example, by the enhanced information processing capabilities of the scoring team or by the confidence boost the players on the team experience. Further research is necessary to uncover these mechanisms. Specifically, qualitative research on the halftime break might provide valuable new insights in this area.

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Notes

1. Minute 41 starts at 40:00 and ends at 40:59; minute 50 starts at 49:00 and ends at 49:59.
2. Our approach using betting odds to measure a team's probability of winning the game is similar to the approach used by Bartling et al. (2015). As an example of the specific calculations performed in this paper, consider the game of Bayer Leverkusen versus Borussia Mönchengladbach on January 28, 2017. The pre-play odds from Bet365 were 1.85 for Bayer Leverkusen to win, 4.33 for Borussia Mönchengladbach to win and 3.6 for a tie. The inverse of the odds for Bayer Leverkusen to win were, thus, 0.541, i.e., 1/1.85, and for Borussia Mönchengladbach to win were 0.231, i.e., 1/4.33. After excluding the tie odds and after adjusting the inverse of the odds to 1, we obtained a delta winning probability of +0.401 for Bayer Leverkusen and -0.401 for Borussia Mönchengladbach.
3. See Brechot and Flepp (2018) for detailed information on the expected goal measure.

Tables

Table 1: Balance Tests

	Before HT	After HT	Difference	p-value
Panel A (N=2,388)				
Delta Winning Probability	0.1800	0.1778	0.0022	0.91
Proportion: Favorite vs. Underdog	0.6490	0.6501	-0.0011	0.95
Delta Team Rank $_{T-1}$	-2.2065	-2.2348	0.0284	0.93
Delta Market Value	62.60	61.04	1.56	0.86
Proportion: Home vs. Away Team	0.5796	0.5720	0.0076	0.71
Panel B (N=2,076)				
Delta Winning Probability	0.1800	0.1796	0.0004	0.98
Proportion: Favorite vs. Underdog	0.6483	0.6511	-0.0028	0.89
Delta Team Rank $_{T-1}$	-2.1752	-2.2804	0.1051	0.79
Delta Market Value	62.25	60.61	1.64	0.86
Proportion: Home vs. Away Team	0.5846	0.5795	0.0051	0.81

Notes: The table shows the mean comparisons (t-tests) for all relevant pretreatment variables. Panel A includes all games with exactly one goal occurring either before, after or both before and after the halftime break in the scoring period of interest. Panel B includes all games with exactly one goal in the whole scoring period of interest.

Table 2: Main Results

	PostMinusPreDeltaGoals	*PerformanceChange*
Panel A		
Dummy Goal Before HT	0.1918***	0.1142***
	(2.89)	(3.22)
Observations	2,388	2,388
R^2	0.0035	0.0043
Panel B		
Dummy Goal Before HT	0.1268*	0.0814**
	(1.81)	(2.14)
Observations	2,076	2,076
R^2	0.0016	0.0022

Notes: T-Statistics are given in parentheses. *** significant at 1%, ** significant at 5% and * significant at 10%.

Table 3: Additional Analyses: Varying Scoring Period of Interest

	PostMinusPreDeltaGoals			*PerformanceChange*		
	7' vs. 7'	3' vs. 3'	4' vs. 5'	7' vs. 7'	3' vs. 3'	4' vs. 5'
Panel A						
Dummy Goal	0.1679***	0.1395	0.2098***	0.0994***	0.0915**	0.1138***
Before HT	(2.66)	(1.62)	(3.03)	(2.93)	(2.00)	(3.07)
Observations	2,723	1,494	2,176	2,723	1,494	2,176
R^2	0.0026	0.0018	0.0042	0.0026	0.0027	0.0043
Panel B						
Dummy Goal	0.0872	0.1266	0.1514**	0.0685**	0.0728	0.0872**
Before HT	(1.44)	(1.42)	(2.08)	(2.02)	(1.53)	(2.21)
Observations	2,548	1,385	1,916	2,548	1,385	1,916
R^2	0.0008	0.0015	0.0022	0.0016	0.0017	0.0025

Notes: T-Statistics are given in parentheses. *** significant at 1%, ** significant at 5% and * significant at 10%.

Table 4: Additional Analyses: Controls and Fixed Effects

	PostMinusPreDeltaGoals	*PerformanceChange*
Panel A		
Dummy Goal Before HT	0.2047***	0.1173***
	(2.86)	(3.06)
Delta Winning Probability	-0.0131	-0.0164
	(-0.06)	(-0.14)
Home Dummy	0.0565	0.0272
	(1.02)	(0.91)
Delta Market Value	0.0008	0.0001
	(0.77)	(0.26)
Season Dummies	Yes	Yes
Team Fixed Effects	Yes	Yes
Opponent Fixed Effects	Yes	Yes
Observations	2,388	2,388
R^2	0.13	0.12
Panel B		
Dummy Goal Before HT	0.1122	0.0707*
	(1.45)	(1.68)
Delta Winning Probability	0.1946	0.0680
	(0.81)	(0.52)
Home Dummy	-0.0145	0.0005
	(-0.25)	(0.002)
Delta Market Value	0.0009	0.0001
	(0.86)	(0.01)
Season Dummies	Yes	Yes
Team Fixed Effects	Yes	Yes
Opponent Fixed Effects	Yes	Yes
Observations	2,076	2,076
R^2	0.13	0.13

Notes: T-Statistics are given in parentheses. *** significant at 1%, ** significant at 5% and * significant at 10%.

Table 5: Additional Analyses: Important Goals

	PostMinusPreDeltaGoals	*PerformanceChange*
Panel A		
Dummy Goal Before HT	0.1819***	0.1002***
	(2.79)	(2.73)
Observations	2,141	2,141
R^2	0.0036	0.0035
Panel B		
Dummy Goal Before HT	0.1465**	0.0794**
	(2.15)	(2.03)
Observations	1,866	1,866
R^2	0.0025	0.0022

Notes: T-Statistics are given in parentheses. *** significant at 1%, ** significant at 5% and * significant at 10%.

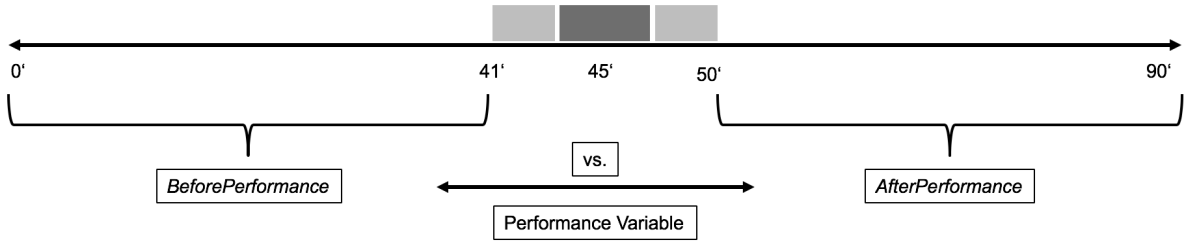
Table 6: Additional Analyses: Expected Goals

	PostMinusPreDeltaXG	*PerformanceChangeXG*
Panel A		
Dummy Goal Before HT	0.0970***	0.0943**
	(2.58)	(2.30)
Observations	2,388	2,388
R^2	0.0028	0.0022
Panel B		
Dummy Goal Before HT	0.0707*	0.0745*
	(1.79)	(1.69)
Observations	2,076	2,076
R^2	0.0015	0.0014

Notes: T-Statistics are given in parentheses. *** significant at 1%, ** significant at 5% and * significant at 10%.

Figures

Figure 1: Scoring Before vs. After the Halftime Break



Notes: The figure shows the 90 minutes in a football game, the halftime break—dark gray area—and the scoring period of interest—light gray area. We obtain the before performance (*BeforePerformance)* and the after performance (*AfterPerformance)* by subtracting a team's conceded goals from its scored goals individually for each time period. In turn, the difference between the *AfterPerformance* and the *BeforePerformance* for the team that scores during the scoring period of interest yields our performance variable.