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Abstract

We examine whether the three-point rule—the increase in rewards for a win from two- to three points that FIFA adopted in 1995—makes Bundesliga games become more exciting. Using regression discontinuity design as the empirical strategy, we do not find evidence that the three-point rule makes games more decisive, increases the number of goals, or decreases goal differences. We only find some evidence that the three-point rule increases the second-half goals of losing first-half teams. Overall, our results suggest that, in the case of Bundesliga games, the three-point rule does not work as FIFA intended.

Keywords: *three-point rule; soccer; regression discontinuity design*

JEL classification: L83, C23, D01

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Introduction

Fédération Internationale de Football Association (FIFA) adopted the three-point rule, raised the rewards for a win from two- to three points, in 1995 to make soccer games more exciting. The extra point, FIFA hoped, would induce teams to play more aggressively. Teams would abandon overly defensive plays; they would attempt to score more goals; games would become more decisive; and fans would crowd stadiums or be glued to their TV screens watching exciting soccer games.[1]

The literature is, however, mixed on whether the three-point rule works. Brocas and Carrillo (2004), for example, theoretically show teams may play more defensively under the three-point rule; Haugen (2008), on the other hand, shows the opposite. Empirical findings also vary by sample of games, measure of outcomes, type of competitions, and empirical strategy. Dilger and Geyer (2009), for example, using difference-in-differences, find the three-point rule decreases the probability of tied games in Bundesliga games. But, Guedes and Machado (2002), using regression control strategy, find the three-point rule does not affect teams' offensive moves in the Portuguese first division league except those of underdog teams. Moreover, the direct effects are not as intended: Underdog teams become more defensive.

Two concerns complicate the estimation of the effects of the three-point rule. One, the theoretical effects of the three-point rule may be subtle—they may vary by the phase of games or the interim results, which mean the results may also vary by measure of outcomes (Brocas and Carrillo, 2004; Guedes and Machado, 2002; Haugen, 2008). Two, more importantly, it is difficult to ensure that games under the three-point rule are compared with

[1] The English Football League is the first to introduce the three-point rule in the 1981-82 season to woo fans back to the games after the league saw crowds dwindled by almost half compared to the game's highpoint in the 1950s. FIFA has also applied the three-point rule since the 1994 World Cup in the US to reduce the probability of tied games, which FIFA feared would not sit well with the US audiences.

the right control group; if not, the counterfactuals and the estimates of the effects will be biased.

This paper contributes to the literature by addressing the above two issues. One, we analyze the Bundesliga whose game archives are rich in detail and publicly available, which we use to create various measures of outcomes such as goal differences in decisive first-half games or the number of goals by winning or losing first-half teams, in addition to the widely used outcomes such as the number of goals and whether games are decisive. Two, we use regression discontinuity (RD) design as the empirical strategy: We compare games around the time when FIFA adopted the three-point rule in 1995—games that, we argue, are similar except for the three-point rule. The RD design, hence, provides good counterfactuals to which we compare games under the three-point rule, which mean our estimates eschew omitted variable bias problem unlike those from regression control strategy, difference-in-differences, or fixed effects models. Unlike these empirical strategies, the RD design excludes the effects of other changes in the rules of the game (e.g., back-pass rule or offside rule) or those of characteristics of the games (e.g., tactical evolutions, ball technology, or international player mobility) during the period of analysis so that we can attribute observed outcome differences at the time of the rule change in 1995 to the three-point rule.

We do not find evidence that the three-point rule makes Bundesliga games more decisive, increases the number of goals, or decreases goal differences. The only statistically significant result we find is that the three-point rule increases the second-half goals of losing first-half teams. Overall, our results suggest that, in the case of Bundesliga games, the three-point rule does not work as FIFA intended.

We proceed as follows. We review the literature and describe the empirical strategy and data in the next two sections. Then, we discuss the results. The last section concludes.

Literature Review

Theoretically, the effects of the three-point rule are subtle. Guedes and Machado (2002), for example, show that the effects of the three-point rule may vary by the relative strength of teams in matches. If the two teams in a match are equally strong (or equally weak), the three-point rule induces more offensively plays. Underdog teams, however, may play more defensively under the three-point rule if the opponents are strong.

Brocas and Carrillo (2004) argue that the effects of the three-point rule depend on the dynamics of games: They show that, unlike the two-point rule, the three-point rule induces teams to play more offensively in the second half compared to the first half. However, if games are tied, the three-point rule induces teams to play more offensively, but only towards the end of the games. Moreover, under some conditions, the new rule also induces teams to play more defensively early in games. On average, therefore, the three-point rule makes teams play more defensively. Haugen (2008), however, shows that teams do not play more defensively under the three-point rule. If anything, they play more offensively, which mean that, overall, the three-point rule leads to more offensive plays.[2]

Some empirical papers show the three-point rule works. Moschini (2010), for example, finds that, using fixed-effects models of games in 35 countries over 30 years, the three-point rule increases the number of goals and decreases the probability of tied games. His analyses by country show that the three-point rule in many non-European countries makes games more exciting, but in European countries the magnitude of the effects are smaller and in some cases the signs are the opposite.[3] Aylott and Aylott (2007) find that, in league games in seven countries, the number of goals increases in two to three years after the

[2] Haugen (2008) also finds the three-point rule leads to greater competitive imbalance among teams.
[3] The effects of the three-point rule on the number of goals for Germany, Austria, and the Czech Republic, in particular, are negative and statistically significant.

rule change except in Germany.[4] An "exciting index", which they define as a function of the number of goals and whether games are decisive, also increases in all countries although it levels off after four to five years. Dilger and Geyer (2009) also find that, using difference-in-differences, the Bundesliga's fraction of tied games and goal differences in decisive games decrease after FIFA adopted the three-point rule.

However, some other papers show mixed results. Guedes and Machado (2002), for example, find that, in the Portuguese first division league, the three-point rule affects the offensive moves of underdog teams only: Underdog teams become more defensive. Palacious-Huerta (2004), who analyzes the structural breaks in the English league games during the period of 1982-1996, finds that the three-point rule and the back-pass rule affect the variability of goals, but not their averages.

We want to provide a more convincing empirical evidence of the effects of three-point rule: Following Dilger and Geyer (2009), we examine Bundesliga games to see whether their favorable results are robust to the use of an RD design as the empirical strategy. Perhaps, the RD design would provide a better control group for the games under the three-point rule than Dilger and Geyer's (2009) control group, i.e., the German Cup games, which may have different characteristics than those of Bundesliga games. We also see the fractions of tied games in Bundesliga and Cup games diverge before the rule change, which may compromise the use of difference-in-difference or fixed-effects models as the empirical strategy.[5] Moreover, after FIFA adopted the three-point rule, the fraction of tied games in the Bundesliga does not decline immediately while the fraction of tied games in Cup games increases for some reasons over time, which mean the favorable results that Dilger and Geyer (2009) identify may be driven by games played long after the rule change, not necessarily by the three-point rule only.

[4] The leagues are in Albania, Brazil, England, Germany, Poland, Romania, and Scotland.
[5] See Figure 1 in Dilger and Geyer (2009).

Empirical Strategy and Data

Empirical Strategy

We use regression discontinuity (RD) design to identify the effects of the three-point rule on whether soccer games become more exciting. Winners in the 1994-95 or earlier seasons get two points; those in the 1995-96 or later seasons three points. There is, therefore, a deterministic and discontinuous treatment of wins—the points awarded to winners—between the 1994-95 and 1995-96 seasons, which fits an RD design.[6]

Identification relies on the plausible assumption that characteristics of games, players and teams—the skills sets of players, coaches' philosophy of plays, teams' popularity and finances, stadiums' size and shape, and so on—around the discontinuity in the 1994-95 and 1995-96 seasons are similar on average. Most players play in both seasons; most coaches coach the same teams in both seasons; most teams play in both seasons. The rules of play are also identical except for the three-point rule. Therefore, if we see discontinuities in some measures of outcomes between the 1994-95 and 1995-96 seasons, we can attribute the discontinuities to the three-point rule.

Formally, we estimate the effects of the three-point rule using the following regression

$$y_i = \alpha + \beta D_i + f(season) + \gamma X + \varepsilon_i \quad (1)$$

where y_i is a measure of outcome of game i such as whether game i is decisive or the number of goals scored in the game; D is an indicator equals one for games in the 1995-96 or later seasons, it equals zero otherwise; *f(season)* is a polynomial function of *season*, the assignment variable; X is a vector of control variables such as the round the game is played

[6] The RD design is proposed by Thistlethwaite and Campell (1960). Many papers in economics have used this empirical strategy in the past decade or so (Dunning, 2012). See van der Klaaw (2008), Imbens and Lemieux (2008), and Lee and Lemieux (2010) for reviews of this literature.

and the identities of home and away teams; and ε is the error term. In the basic specifications we use the quartic polynomial function of *season*, though in some specifications we also use its cubic or quintic function. As part of robustness checks, we use *round* instead of *season* as the assignment variable. Because the data fits an RD design, we do not have to include *X* in Equation (1)—its inclusion would not change the estimate of β; but, we do include the vector of control variable *X* in some specifications to increase the precision of the estimate.

The coefficient of interest is that of *D*. If the three-point rule makes games more exciting, we expect β to be positive in regressions whose dependent variable is the number of goals or whether games are decisive. We expect it to be negative in regressions of goal differences (because lopsided games are boring). Along the lines of Brocas and Carrillo's (2004) results, we expect β to be positive (negative) in regressions of second-half goals of losing (winning) first-half teams.

Data

We get the data from Deutcher Fussball-Bund, which archives Bundesliga games since the 1960s.[7] We use games played during the period of fifteen years before and after the 1995-96 season, i.e., the 1980-2010 seasons. The sample includes 9,560 games played in 31 seasons with 34 rounds each.[8]

We create five sets of outcome measures: whether games are decisive, the number of goals, goal differences, second- and first-half comparisons, and second-half goals. We look at whether games are decisive, the number of goals, and goal differences because the objective of the three-point rule is to promote attacking plays, which lead to more decisive games,

[7] We download the data from http://www.dfb.de/index.php?id=320005 (retrieved 27 March 2013).
[8] All seasons have 34 rounds except the 1991-92 season, the season after the German unification in 1990. Two additional teams from East Germany compete in the Bundesliga that season, which expands the number of teams to twenty and requires a season of 38 games (WSC, 2010). The year after, the number of teams competing in the Bundesliga goes back to eighteen.

larger number of goals, and smaller goal differences. Further, to test some aspects of the theoretical predictions of the three-point rule by Brocas and Carrillo (2004), to see whether game dynamics change from the first- to the second half, we compare first- and second-half outcomes and examine second-half goals.

We define *decisive games* (at half time and full time, for all games and for a sub-sample of tied first-half games) equals one if a game is decisive and zero otherwise; *number of goals* equals the sum of goals scored in a game, both by home and away teams (we consider the number of goals in the first half, in the second half, and at full time); *goal differences* equals the absolute value of the difference between goals scored by the home and away teams (we consider goal differences in the first half, in the second half, at full time; we also look at goal differences in a sub-sample of decisive first-half games). We define *second- and first-half comparisons* equals the difference between the number of goals scored in the second half less that in the first half. Finally, we define *second-half goals* by a sub-sample of teams or games: second-half goals by winning first-half teams, by losing first-half teams, and in tied first-half games.

The summary statistics in Table 1 presents mixed evidence on whether the three-point rule makes soccer more exciting. The fraction of decisive games in the 1995-2010 seasons at full time, for example, is higher than that in the 1980-1994 seasons, though the difference is insignificant statistically (Panel A). The number of goals declines on average after the adoption of the three-point rule (Panel B), so do goal differences (Panel C). Winning first-half teams score more second-half goals, losing first-half teams score fewer goals in the second half, and the number of goals in tied first-half games decline (Panel D).

<Insert Table 1 here>

Results

The Number of Goals and whether Games are Decisive

Graphs in Figure 1 illustrate the effects of the three-point rule on the number of goals and whether games are decisive. They plot the average number of goals or the fraction of decisive games by season. The vertical dash line indicates the discontinuity, the season after which the Bundesliga uses the three-point rule. The graphs also fit a quartic polynomial function of *season*, the assignment variable, that may jump between the 1994-95 and 1995-96 seasons.

<Insert Figure 1 here>

Teams score more goals and games are more decisive in the 1980s: The trend lines decline slightly. The trend lines seem to rise between the 1994-95 and 1995-96 seasons, which suggests the three-point rule increases the number of goals and makes games more decisive. The magnitude of the jumps is small, however, and they are also insignificant statistically.

Table 2 confirms the trend lines in Figure 1. Teams score fewer goals under the three-point rule as column (1) of Panel B shows. There is no evidence that the three-point rule increases the number of goals, however, once we control for the quartic polynomial of season (column (2)): The estimates are positive, but they are insignificant statistically with standard errors bigger than the estimates. We get similar results after we add round dummies and home- and away teams dummies (columns (3-4)). As we expect, because the data fits an RD design, the estimates are stable across the different specifications in columns (2-4).

<Insert Table 2 here>

Not only that the estimates are insignificant statistically, the magnitude of the effects is also small. The number of goals in the first half, for example, increases by 0.02 goal, which

is about 1.6% increase. The increase in the number of goals in the second half is larger, 0.12 goal (7%), which mean the three-point rule increases the number of goals in the second half by one goal in every eight games on average. Games do not become more decisive either. The fraction of decisive games at full time, for example, increases by only one percentage point (1%). The increase in the fraction of decisive games at half time is larger, however, about three percentage points (5%). Again, none of the estimates is significant statistically.

Goal Differences

Graphs in Figure 2 show the three-point rule does not seem to lower goal differences: The trend line does not fall between the 1994-95 and 1995-96 seasons. In fact, it rises for goal difference in the second half. All estimates seem to be insignificant statistically because of the large variations of the average differences.

<Insert Figure 2 here>

Panel A of Table 3 shows that goal differences are smaller under the three-point rule (column (1)), but none of the estimates are significant statistically once we include the quartic polynomial of seasons in the regression (column (2)). The magnitude of the effects also remains similar when we include round dummies and home and away teams dummies (columns (3-4)). Again, the estimates are insignificant statistically, which mean that there is no evidence that the three-point rule decreases goal differences in the first half, in the second half, at full time, or in decisive first-half games.

<Insert Table 3 here>

The small estimates mean the effects are probably indifferent from zero. The effects on goal differences in decisive first-half games in particular are very small, 0.1-0.2

percentage point. Only the estimates of the effects on goal differences in the second half are large, 0.13 goals (13%), though they are insignificant statistically.

There is no evidence that the three-point rule reduces the difference between the number of goals in the second- and first half either (Panel B). The estimates are positive and large, 0.1 goal (24%), but insignificant statistically.

Final Outcomes Given First-half Outcomes

It is possible that the three-point rule induces teams to change their strategies given early outcomes of games. For example, teams may play more offensively in the second half if games are tied at the half (Brocas and Carrillo, 2004). A losing team in the later stages of a game may attack aggressively because it does not have much to lose; on the contrary, a winning team may play defensively to prevent equalizers to protect their lead.

Graphs in Figure 3 illustrate the effects of the three-point rule on second-half goals by winning and losing teams as well as outcomes of tied first-half games. The trend lines seem to rise between the 1994 and 1995 seasons, which indicate the three-point rule induces teams to change their strategies later in games.

<Insert Figure 3 here>

Table 4 presents the estimates of the jumps. All RD estimates in columns (2-4) are positive, but only the effects on second-half goals by losing first-half teams are significant statistically. When we include season quartic polynomial in column (2) or the polynomial of round dummies in column (3), the estimate is significant at 5% level. When we include home- and away teams dummies further in column (4), it becomes significant at 1% level. The estimates are not large, but not trivial either, 0.12 goal (15%), which mean losing first-half teams score one more goals in the second half in 8-9 games on average.

<Insert Table 4 here>

While there is no evidence of winning first-half teams scoring more goals in the second half, there is also no evidence that they play more defensively either: The estimates are positive with standard errors about twice as large. Overall, there is no evidence that the three-point rule makes tied first-half games more decisive or that it increases second-half goals in tied first-half games.

Robustness Checks

We do some robustness checks. One, we examine a sub-sample of games in the second half of seasons only to focus on games that matter the most for teams that fight for the championship or those battling against relegation. Two, we use alternative polynomial of *season*. Three, we use *round* instead of *season* as the assignment variable to increase the similarity of games near the discontinuity in 1995.

Table 5 presents the estimates on key outcome measures using games in the second half of seasons only. Overall, the results are robust. There is no evidence that the three-point rule makes games more decisive or decreases goal differences. There is also no evidence that it induces winning first-half teams to play more defensively or increases the second-half goals in tied first-half games. Nonetheless, we do find some evidence that losing first-half teams score more goals in the second half; the estimates are similar to those in table 4 and significant statistically at 5% level when we includes round as well as home and away teams dummies in the regression (column (4) of row (5)).

<Insert Table 5 here>

Table 6 presents the estimates of the effects of the three-point rule using alternative function of *season* (cubic and quintic polynomial of season) in columns (1-2) and alternative

assignment variable, *round*, instead of *season* in columns (3-5). Overall, the basic results are robust. There is no evidence that the three-point rule makes games more decisive, increases the number goals, or decreases goal differences. However, we find some evidence that losing first-half teams score more second-half goals; the estimates are stable across the various specifications and are significant statistically at 5% level except when we use quintic polynomial of *round* (column (5) of row (5)).

<Insert Table 6 here>

Concluding Remarks

There is no evidence that the three-point rule makes Bundesliga games become more decisive, increases the number of goals, or decreases goal differences. Most of the estimates are positive, which mean the three-point rule increases the fraction of decisive games (as we expect if the three-point rule works), the number of goals (as we expect), and goal differences (the opposite of what we expect); but, their magnitude is small, and none of the estimates is significant statistically.

However, there is some evidence that the three-point rule increases the second-half goals of losing first-half teams. The estimates are significant statistically and robust across various specifications. They are also large, about nine to twelve percentage points, which mean the three-point rule increases the second-half goals of losing first-half teams by 12-15%.

These results show no convincing evidence that the three-point rule makes soccer games more exciting. If anything, the three-point rule seems to induce losing teams to play more aggressively later in the games, which probably also mean that winning teams play

more defensively to preserve the lead. Not only that the three-point rule fails to increase the number of goals, but it also induces winning teams to play defensively to deny goals.

It is likely, therefore, at the margin, the three-point rule makes stronger teams play conservatively earlier in games, and play defensively once they are leading.[9] Weaker teams may play more aggressively if they are losing, though they may find it difficult to score goals because the leading, and usually stronger, teams play more defensively.

Our results differ from those of Dilger and Geyer (2009) who find that the three-point rule makes Bundesliga game more decisive and lowers goal differences. They use difference-in-differences as their empirical strategy and the German Cup games as the control group to estimate the counterfactuals of Bundesliga games under the three-point rule. But, perhaps, these German Cup games are not the right control group. Besides, the implicit assumption of difference-in-differences that games in the treated- and control groups have the same trends may be unsatisfied. In contrast, our empirical strategy, the RD design, relies only on the assumption that the games near the discontinuity are similar. If the three-point rule works, we should see jumps of trend lines of game outcomes at the discontinuity in 1995. The fact that we do not perhaps indicates that the three-point rule does not make games more exciting.

Our results are, to some extent, in line with the theoretical predictions of Brocas and Carrillo (2004). We do not find statistically significant evidence that winning teams play more defensively later in games, but we do find that losing teams play more aggressively later in the games.

There are concerns that (1) the three-point rule does not affect teams' behaviour immediately; (2) games further away from the discontinuity may not be comparable and, therefore, should be excluded from the analysis; and (3) the estimates are mostly insignificant because of the lack of power to reject the null hypotheses. If the first is true, it means the RD

[9] This interpretation is in line with Corral, Prieto-Rodríguez, and Simmons (2010) who find that winning teams are more likely to commit fouls under the three-point rule.

design would fail to capture the effects of the three-point rule. But, we see that the trend lines are flat throughout the period of analysis, which indicates that this worry is unwarranted. If the trend lines decline, mostly they do in the 1980s; the trend lines in the few years around the discontinuity are mostly flat. To address the second concern, we redo the analyses using fewer number of seasons around the discontinuity; we still find no evidence that the three-point rule makes games more exciting, though the fewer the number of seasons we use, the lower the power will be. The third concern is legitimate, and there is no way for us to address it. But, we take comfort of the fact that we consistently find significant estimates of the effects of the three-point rule on the number of goals of losing first-half teams, which mean that the power of the tests in our analyses is perhaps sufficiently high.

Our results suggest that the three-point rule does not make Bundesliga games more exciting: It does not increase the number of goals, nor it makes games more decisive. It does not mean that the three-point rule does not work in other countries, however. Therefore, it would be interesting to apply the RD design to other leagues as well. If it turns out that the results are robust, perhaps leagues and FIFA should consider introducing more winning incentives in soccer games, such as penalty shoot-outs in the event of draws or the controversial golden goal rule, to make soccer games even more exciting.[10]

[10] The Norwegian First Division and the Major League Soccer in the US had experimented with these rules.

References

Aylott, M., & Aylott, N. (2007). A meeting of social science and football: Measuring the effects of three points for a win. *Sport in Society: Cultures, Commerce, Media, Politics*, 10, 205-222.

Brocas, I., & Carrillo, J.D. (2004). Do the "three-point victory" and "golden goal" rules make soccer more exciting? *Journal of Sports Economics*, 5, 169-185.

Corral, J., Prieto-Rodríguez, J., & Simmons, R. (2010). The effect of incentives on sabotage: The case of Spanish football. *Journal of Sports Economics*, 11, 243-260.

Dilger, A., & Geyer, H. (2009). Are three points for a win really better than two? A comparison of German soccer league and cup games. *Journal of Sports Economics*, 10, 305-318.

Dunning, T. (2012). *Natural experiments in the social sciences: a design-based approach*. Cambridge: Cambridge University Press.

Guedes, J.C., & Machado, F.S. (2002). Changing rewards in contests: Has the three-point rule brought more offense to soccer? *Empirical Economics*, 27, 607-630.

Haugen, K. K. (2008). Point score systems and competitive imbalance in professional soccer. *Journal of Sports Economics*, 9, 91-210.

Imbens, G.W., & Lemieux, T. (2008). Regression discontinuity design: A guide to practice. *Journal of Econometrics*, 142, 615-35.

WSC (2010). *Bundesliga 1991-92*. http://www.wsc.co.uk/the-archive/23-Season-in-brief/7587-bundesliga-1991-92 (Retrieved 16 May 2013).

Lee, D.S., & Lemieux, T. (2010). Regression discontinuity designs in economics. *Journal of Economics Literature*, 48, 281-355.

Moschini, G. (2010). Incentives and outcomes in a strategic setting: The 3-points-for-a-win system in soccer. *Economic Inquiry*, 48, 65-79.

Palacious-Huerta, I. (2004). Structural breaks during a century of the world's most popular sport. *Statistical Methods and Applications*, 13, 241-258.

Thistlethwaite, D.L., & Campbell, D.T. (1960). Regression-discontinuity analysis: An alternative to the ex post facto experiment. *Journal of Educational Psychology*, 51, 309-17.

van der Klaaw, W. (2008). Regression-discontinuity analysis: A survey of recent development in economics. *Labour*, 22, 219-45.

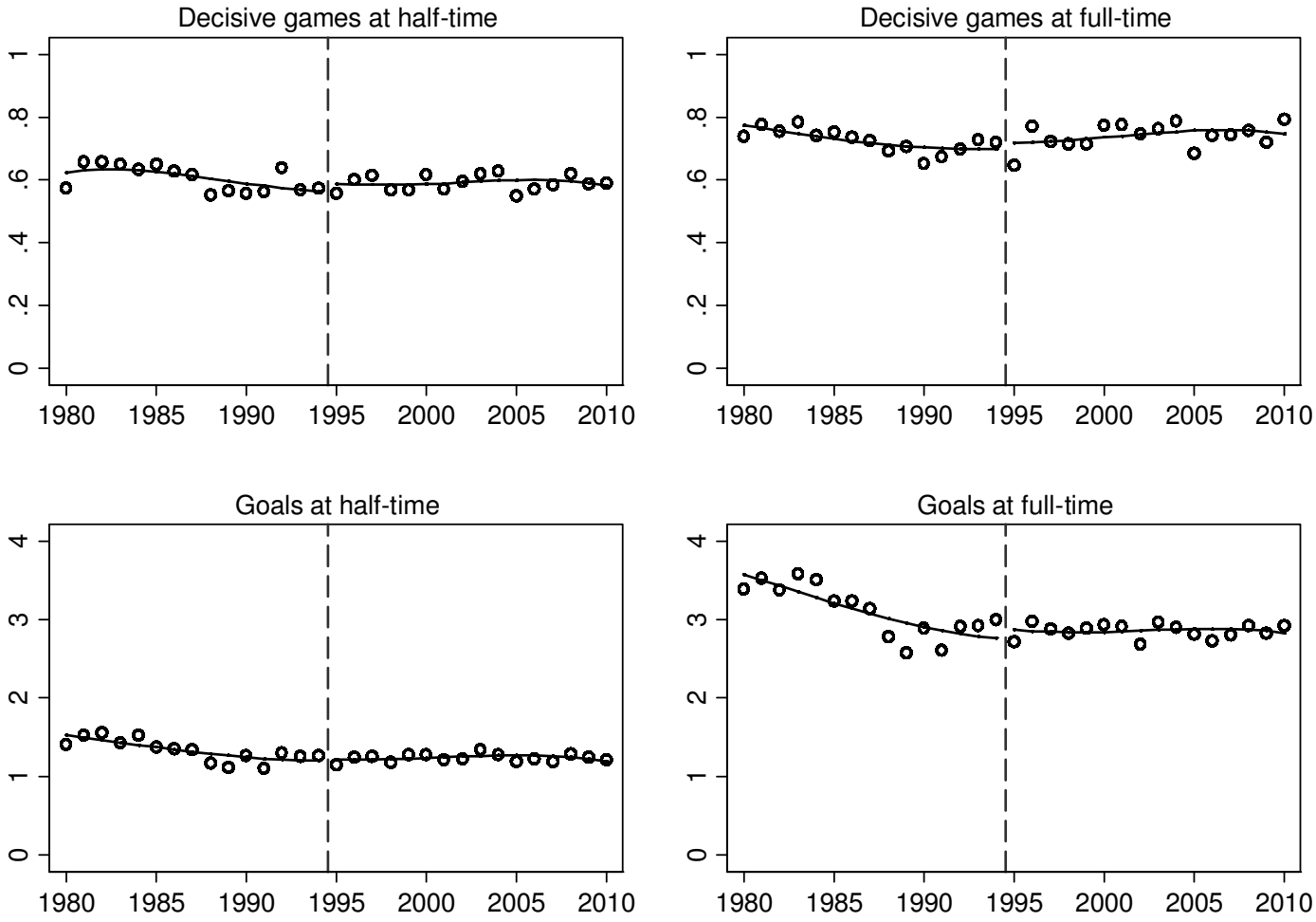

Figure 1 Decisive games and number of goals at half time and full time

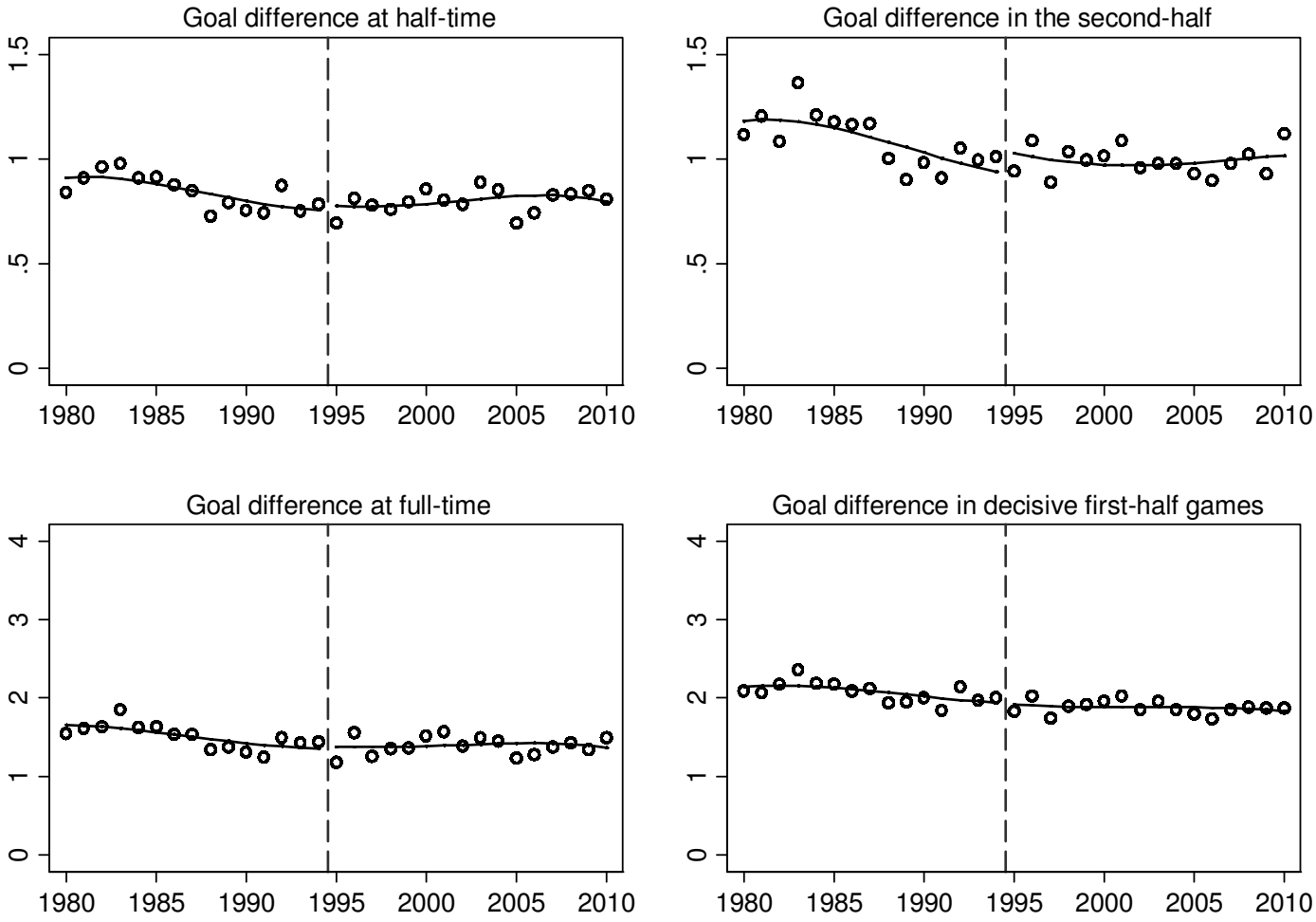

Figure 2 Goal differences at half time and full time

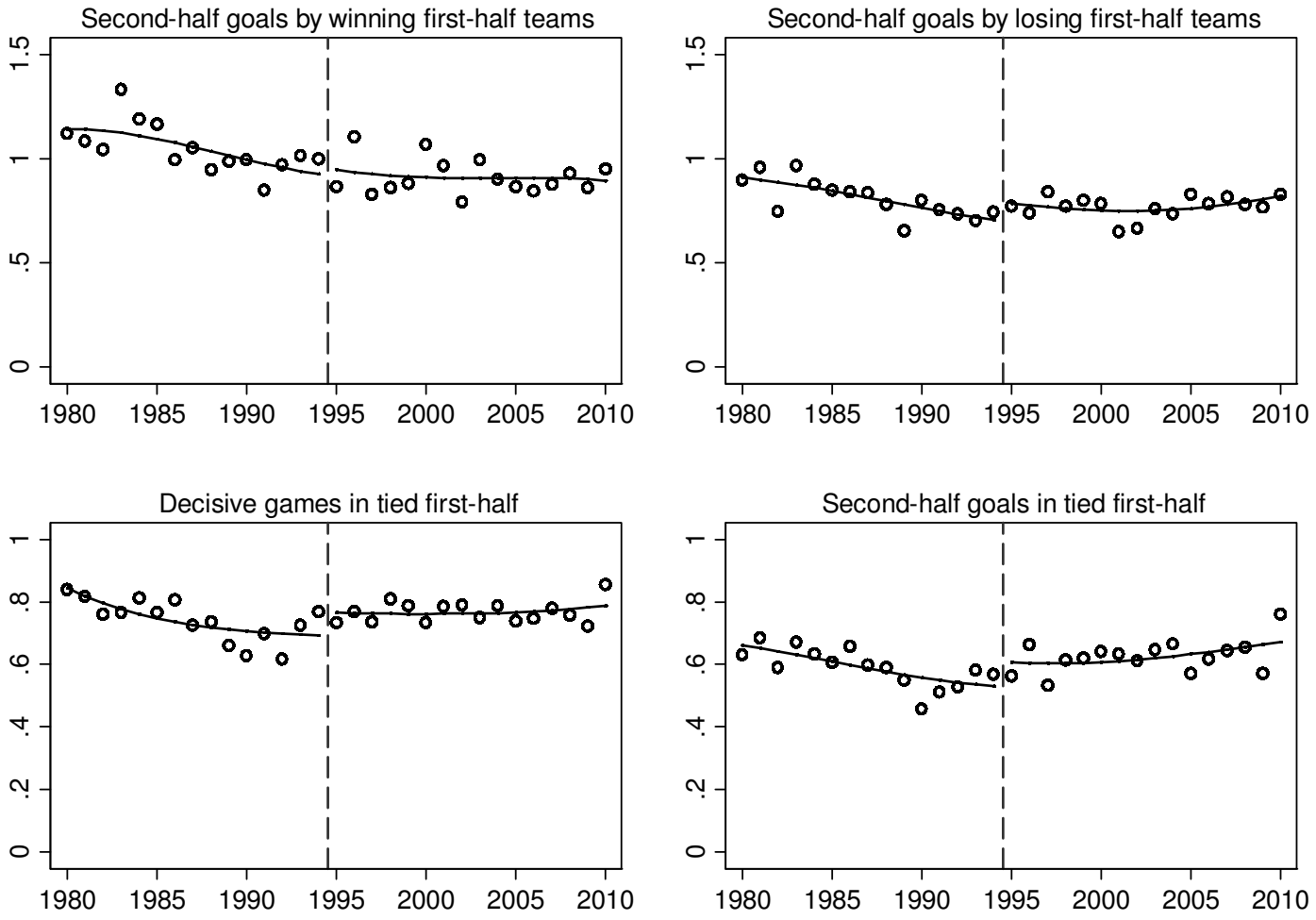

Figure 3 Second-half goals and decisive games given first-half results

Table 1 Summary statistics

Variable	1980-1994 seasons	1995-2010 seasons	1980-2010 seasons
A. Decisive games			
At half time	0.61	0.59	0.60
	(0.49)	(0.49)	(0.49)
At full time	0.72	0.74	0.73
	(0.45)	(0.44)	(0.44)
In tied first-half games	0.74	0.77	0.75
	-0.44	-0.42	-0.43
B. Number of goals			
In the first half	1.33	1.24	1.28
	(1.14)	(1.10)	(1.12)
In the second half	1.78	1.62	1.70
	(1.36)	(1.25)	(1.31)
At full time	3.11	2.86	2.98
	(1.83)	(1.71)	(1.77)
C. Goal differences			
In the first half	0.84	0.80	0.82
	(0.85)	(0.82)	(0.84)
In the second half	1.09	0.99	1.04
	(1.04)	(0.93)	(0.98)
At full time	1.50	1.40	1.45
	(1.39)	(1.22)	(1.31)
In decisive first-half games	2.08	1.88	1.98
	(1.21)	(1.04)	(1.13)
D. Second- and first-half comparisons			
Number of goals	0.45	0.38	0.41
	(1.72)	(1.62)	(1.67)
E. Second-half goals			
By winning first-half teams	1.05	0.91	0.98
	(1.07)	(0.96)	(1.02)
By losing first-half teams	0.81	0.77	0.79
	(0.91)	(0.88)	(0.90)
In tied first-half games	0.59	0.63	0.61
	(0.49)	(0.48)	(0.49)

Notes: The number in each cell is the mean. The figures in parentheses are standard deviations.

Table 2 The number goals and whether the games are decisive

		(1)	(2)	(3)	(4)
A. Decisive games					
At half time	(1)	-0.02	0.03	0.03	0.03
		(0.01)	(0.03)	(0.03)	(0.03)
At full time	(2)	0.02	0.02	0.02	0.01
		(0.01)	(0.04)	(0.04)	(0.04)
B. Number of goals					
In the first half	(3)	-0.09*	0.02	0.01	0.02
		(0.04)	(0.07)	(0.06)	(0.07)
In the second half	(4)	-0.16**	0.11	0.11	0.12
		(0.05)	(0.10)	(0.10)	(0.11)
At full time	(5)	-0.25**	0.13	0.12	0.14
		(0.09)	(0.16)	(0.16)	(0.17)
Controls					
Season quartic polynomial			✓	✓	✓
Round dummies				✓	✓
Home- and away team dummies					✓

Notes: The number in each cell is the estimate of *three-point rule* from a regression of a measure of outcome, which is listed on the left column, on *three-point rule* and a set of control variables listed at the bottom rows. *Three-point rule* of a game equals one if it is in the 1995 or later seasons; it equals zero otherwise. The figures in parentheses are robust standard errors clustered by season. One and two stars indicate statistical significance at a level of five and one percent, respectively.The number of oberservations is about 9,560.

Table 3 Goal differences

		(1)	(2)	(3)	(4)
A. Goal differences					
In the first half	(1)	-0.04	0.03	0.02	0.01
		(0.03)	(0.05)	(0.05)	(0.06)
In the second half	(2)	-0.10*	0.11	0.11	0.13
		(0.04)	(0.08)	(0.08)	(0.09)
At full time	(3)	-0.11*	0.04	0.04	0.03
		(0.05)	(0.13)	(0.13)	(0.15)
In decisive first-half games	(4)	-0.19**	0.004	-0.001	0.002
		(0.04)	(0.10)	(0.09)	(0.11)
B. Second- and first-half comparisons					
Number of goals	(5)	-0.07	0.09	0.10	0.10
		(0.03)	(0.06)	(0.07)	(0.07)
Controls					
Season quartic polynomial			✓	✓	✓
Round dummies				✓	✓
Home- and away team dummies					✓

Notes: The number in each cell is the estimate of *three-point rule* from a regression of a measure of outcome, which is listed on the left column, on *three-point rule* and a set of control variables listed at the bottom rows. *Three-point rule* of a game equals one if it is in the 1995 or later seasons; it equals zero otherwise. The figures in parentheses are robust standard errors clustered by season. One and two stars indicate statistical significance at a level of five and one percent, respectively. The number of oberservations is about 9,560.

Table 4 Final outcomes given first-half outcomes

		(1)	(2)	(3)	(4)
A. Decisive games					
In tied first-half games	(1)	0.03	0.07	0.07	0.05
		(0.02)	(0.05)	(0.05)	(0.05)
B. Second-half goals					
By winning first-half teams	(2)	-0.14**	0.04	0.03	0.05
		(0.04)	(0.09)	(0.09)	(0.09)
By losing first-half teams	(3)	-0.04	0.09*	0.09*	0.12**
		(0.03)	(0.03)	(0.04)	(0.04)
In tied first-half games	(4)	0.04	0.08	0.08	0.06
		(0.02)	(0.05)	(0.05)	(0.05)
Controls					
Season quartic polynomial			✓	✓	✓
Round dummies				✓	✓
Home- and away team dummies					✓

Notes: The number in each cell is the estimate of *three-point rule* from a regression of a measure of outcome, which is listed on the left column, on *three-point rule* and a set of control variables listed at the bottom rows. *Three-point rule* of a game equals one if it is in the 1995 or later seasons; it equals zero otherwise. The figures in parentheses are robust standard errors clustered by season. One and two stars indicate statistical significance at a level of five and one percent, respectively. The number of oberservations varies from 3,800 to 5,800.

Table 5 Using a sample of second half of seasons only

		(1)	(2)	(3)	(4)
A. Decisive games					
At full time	(1)	0.01	-0.01	-0.01	-0.03
		(0.02)	(0.04)	(0.04)	(0.05)
In tied first-half games	(2)	0.02	0.07	0.08	0.03
		(0.03)	(0.07)	(0.07)	(0.07)
B. Goal differences					
At full time	(3)	-0.12	-0.04	-0.04	-0.07
		(0.06)	(0.15)	(0.15)	(0.17)
C. Second-half goals					
By winning first-half teams	(4)	-0.16**	0.03	0.03	0.05
		(0.05)	(0.13)	(0.13)	(0.13)
By losing first-half teams	(5)	-0.05	0.12	0.12	0.14*
		(0.04)	(0.07)	(0.08)	(0.06)
In tied first-half games	(6)	0.04	0.04	0.05	-0.01
		(0.03)	(0.06)	(0.07)	(0.06)
Controls					
Season quartic polynomial			✓	✓	✓
Round dummies				✓	✓
Home- and away team dummies					✓

Notes: The number in each cell is the estimate of *three-point rule* from a regression of a measure of outcome, which is listed on the left column, on *three-point rule* and a set of control variables listed at the bottom rows. *Three-point rule* of a game equals one if it is in the 1995 or later seasons; it equals zero otherwise. The figures in parentheses are robust standard errors clustered by season. One and two stars indicate statistical significance at a level of five and one percent, respectively. The number of oberservations varies from 2,000 to 4,800.

Table 6 Using alternative polynomial of season and using round as the assignment variable

		(1)	(2)	(3)	(4)	(5)
A. Decisive games						
At full time	(1)	0.01	-0.05	0.01	0.01	-0.06
		(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
In tied first-half games	(2)	0.07	0.003	0.08	0.08	0.01
		(0.05)	(0.04)	(0.05)	(0.05)	(0.04)
B. Goal differences						
At full time	(3)	0.02	-0.23	0.03	0.04	-0.22
		(0.13)	(0.13)	(0.14)	(0.14)	(0.13)
C. Second-half goals						
By winning first-half teams	(4)	0.04	-0.08	0.04	0.05	-0.07
		(0.09)	(0.10)	(0.09)	(0.10)	(0.11)
By losing first-half teams	(5)	0.09*	0.09*	0.08*	0.09*	0.09
		(0.03)	(0.05)	(0.04)	(0.04)	(0.05)
In tied first-half games	(6)	0.08	0.002	0.08	0.08	0.01
		(0.05)	(0.04)	(0.05)	(0.05)	(0.04)
Controls						
Season cubic polynomial		✓				
Season quintic polynomial			✓			
Round cubic polynomial				✓		
Round quartic polynomial					✓	
Round quintic polynomial						✓

Notes: The number in each cell is the estimate of *three-point rule* from a regression of a measure of outcome, which is listed on the left column, on *three-point rule* and a set of control variables listed at the bottom rows. *Three-point rule* of a game equals one if it is in the 1995 or later seasons; it equals zero otherwise. The figures in parentheses are robust standard errors clustered by season. One and two stars indicate statistical significance at a level of five and one percent, respectively. The adjusted R-squared is about; the number of oberservations varies from 3,800 to 9,650.