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SUSPENSION BY CHOICE
DETERMINANTS AND ASYMMETRIES

Urban
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Suspension by choice – determinants and asymmetries

Abstract: We investigate whether soccer players collect their fifth yellow card and their suspension by choice. Using data for the German Bundesliga for the seasons 13/14 to 16/17, we show that the quality of the player's own team, the quality of the teams participating in the next matches, and whether a team wins or not increase the probability of a player collecting his fifth yellow card.

Keywords: Soccer, decision making, suspension by choice
JEL: L83, D91, C23
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Introduction

Athletes should not have any incentive to collect yellow cards (warnings for unfair offences) or to induce a suspension. This paper analyzes whether, by contrast, soccer players in German Bundesliga collect yellow cards by choice. For example, players could intentionally collect their fifth (or tenth) yellow card in order to pause before an upcoming, less important game and to rest for a subsequent, potentially more important game. We investigate whether, among other determinants, there is any difference in the behavior of team members depending on the ranking of the team. We argue that teams at the top of the table, playing for the national championship, do not display the described behavior, while lower ranked teams do.

In general terms, we add to strands of the literature that have analyzed behavioral divergences from the ideal of fairness in sports and a maximum and unbiased performance of athletes and referees. One strand of literature, starting with (Schwartz and Barsky, 1977), analyses the home advantage. In an experimental study by (Nevill et al., 2002), referees had to judge different tackles on videotape; referees that watched these tapes with sound (including the crowd reactions in the stadium) displayed home

bias. (Dawson and Dobson, 2010) find that referees in Champions League games tend to favor home teams when punishing fouls or unfair movements, evidenced by the propensity to give fewer yellow cards to the home team. (Page and Page, 2010) and (Boyko et al., 2007) find that the biased behavior of referees depends on crowd size.[1] With respect to the behavior of players, several studies analyze the psycho-strategic behavior of goalkeepers and players on the occasion of penalty kicks (Chiappori et al., 2002; Coloma, 2007).

We also contribute to literature that has assessed the awarding of yellow cards. In an experimental study using video-tapes, (Unkelbach and Memmert, 2008) find that referees who watch scenes in the context of the game award fewer cards than those who see a random order of scenes from the game. They also find that referees who watch scenes without context deviate more from actual decisions made in the beginning of the game but converge towards the actual decisions during the game. The authors apply the psychological consistency model of (Haubensak, 1992) and show that referees need to calibrate a judgement scale within each game for suspension decisions.

We add to the aforementioned literature in important respects; we add to the literature on yellow cards and suspensions by focusing on athletes rather than referees. We test whether players maximize team success by choosing their suspensions strategically and whether such behavior is influenced by other psychological or image effects by testing whether the strengths of the teams play a role in the behavior. We argue that members of teams with top rankings do not intentionally collect fifth yellow cards as often as players from teams playing against relegation.

Section 2 of this paper describes the individual decision process, the data used and the empirical strategy. Section 3 analyzes and discusses the results, and section 4 presents our conclusion.

[1] In a more general setting, Anderson et al. (2012) illustrate the different perceptions of referees, players and fans. On the basis of a questionnaire, they find that the aspect of the home environment accounts for the most superior performance for each group at the home stadium.

Decision process, data, and empirical strategy

The yellow card and the red card are the main instruments of the referee to sanction players who commit unfair offences within a game. Red cards have an immediate effect; players receiving a red card need to leave the pitch, and the National Sports Council decides afterwards if and for how many games a player will be suspended. Yellow cards, however, are counted throughout the season and for each championship.[2] If a player collects two yellow cards in one game, he will be forced to leave the match immediately and will be suspended for the next game. Players are also suspended for the subsequent game if they collect their fifth or tenth yellow card during a season in one competition, but they are not forced to leave the pitch early when collecting the card. Further, no Sports Council will decide how long the suspension will be. This regulation was introduced before the 1979/1980 season in Germany.[3]

A player who has already collected four/nine yellow cards during a season may be inclined to strategically seek a fifth/tenth yellow card, depending on his perceived marginal productivity to team success in the upcoming matches. His marginal productivity may depend on the relative perceived strength of the opponents of the next and subsequent match. For example, for a player on a weaker team, a "potentially (un)beatable opponent" may induce a larger (lower) marginal productivity. Vice versa, a player on a stronger team may have a low (large) marginal productivity against a much weaker (another string) team. Accordingly, players might strategically collect their fifth yellow card in the game before a match against an "unbeatable" or a much weaker opponent.

We collected data for the four seasons 2013/14 to 16/17 of the German "Bundesliga" from

[2] At the beginning of each season, each team in Germany participates in at least two different championships: the national championship, which is played with 34 match days during the normal season, and the League Cup (DFB-Pokal).

[3] Different rules apply in other nations.

the kicker database.[4] One season includes 34 match days, each with 18 teams and nine matches. After 34 match days, the two clubs at the bottom of the ranking are relegated to the Second Bundesliga. In exchange, the two best teams from the Second Bundesliga are promoted to the first division. Further, the 16th team of the first Bundesliga and the third team of the second Bundesliga match against each other for the right to participate in next season´s first division. In total, we analyze the described behavior of 23 different teams that had been part of Bundesliga in our observation period. Thirteen of these clubs have been part of the Bundesliga throughout all seasons included in the analysis; four teams have been part of the Bundesliga for only one season (Table A1).

For each club and each match day of every season we collected the quantity of yellow cards awarded for each player, the number of fifth and tenth yellow cards, points won at this match day, whether it is a home or away game (home = 1), the ranking position of the current opponent, and the ranking position of the next opponent. Our dependent dummy variable was set as 1 if a player has collected his fifth/tenth yellow card. Further, we generated a dummy variable for whether or not a club has won the game on this match day from the data of points won (win = 1).

To quantify the relative strength of the team, we followed two approaches: in a first version, we include a dummy "position" = 1, if the team's position in the ranking is 10th or worse. In a second version, we include the relative position variables. We generate variables that provide the relative ranking of the team's own position compared to the ranking of the next opponent and then the following opponent in order to test the following hypothesis: first, teams at the top of the rankings have less incentive to collect suspensions intentionally. In these teams' case, it does not matter against what team they play and what positions in the ranking these teams are in. Second, athletes of teams lower in the rankings choose to collect their fifth yellow card before a match against a "potentially unbeatable opponent". This might especially be the case if the

[4] The kicker database dates back until the season 1963/64 and collects all key indicators of all German soccer leagues as well as European major leagues (kicker, 2017).

upcoming opponent is a team that is in the same range of the ranking as the club or a "beatable" opponent.

We generate four variables for the relative rankings from the existing data for the team's positions. First, we calculated the difference between the team's own position in the rankings and the position of their next opponent. This variable ranges from 17 to -17, and we split this variable into a positive (difference: 1 – 17) and a negative (difference: -17 – 1) variable. A positive difference indicates that the team's own ranking is worse than its opponent's; a negative difference shows the opposite. Second, we generated a variable displaying the difference between the team's own position and the position of its second upcoming opponent, splitting this variable in the same way as the variable before.

For each of the four seasons, the sample starts at match day 5, since this match day is the first at which players are able to collect their fifth yellow card.

Table 1 Descriptive statistics

Variable	Mean (Std. Dev.)	Min	Max.
Yellow Cards	1.85787 (1.240689)	0	6
…Bayern München	1.243243 (1.105492)	0	4
…Borussia Dortmund	1.375 (0.891653)	0	4
...Eintracht Frankfurt	2.571429 (1.183325)	0	6
Fifth yellow card	0.1662037 (0.4202675)	0	5
Home 1 = home game	0.5009588 (0.500119)	0	1
Positive relative position difference with the next opponent	3.108242 (4.212583)	1	17
Negative relative position difference with the next opponent	-3.101787 (4.208674)	-17	0
Positive relative position difference with the opponent after next	3.089374 (4.206299)	1	17
Negative relative position difference with the opponent after next	-3.089374 (4.215265)	-17	0

Note: N=2,114

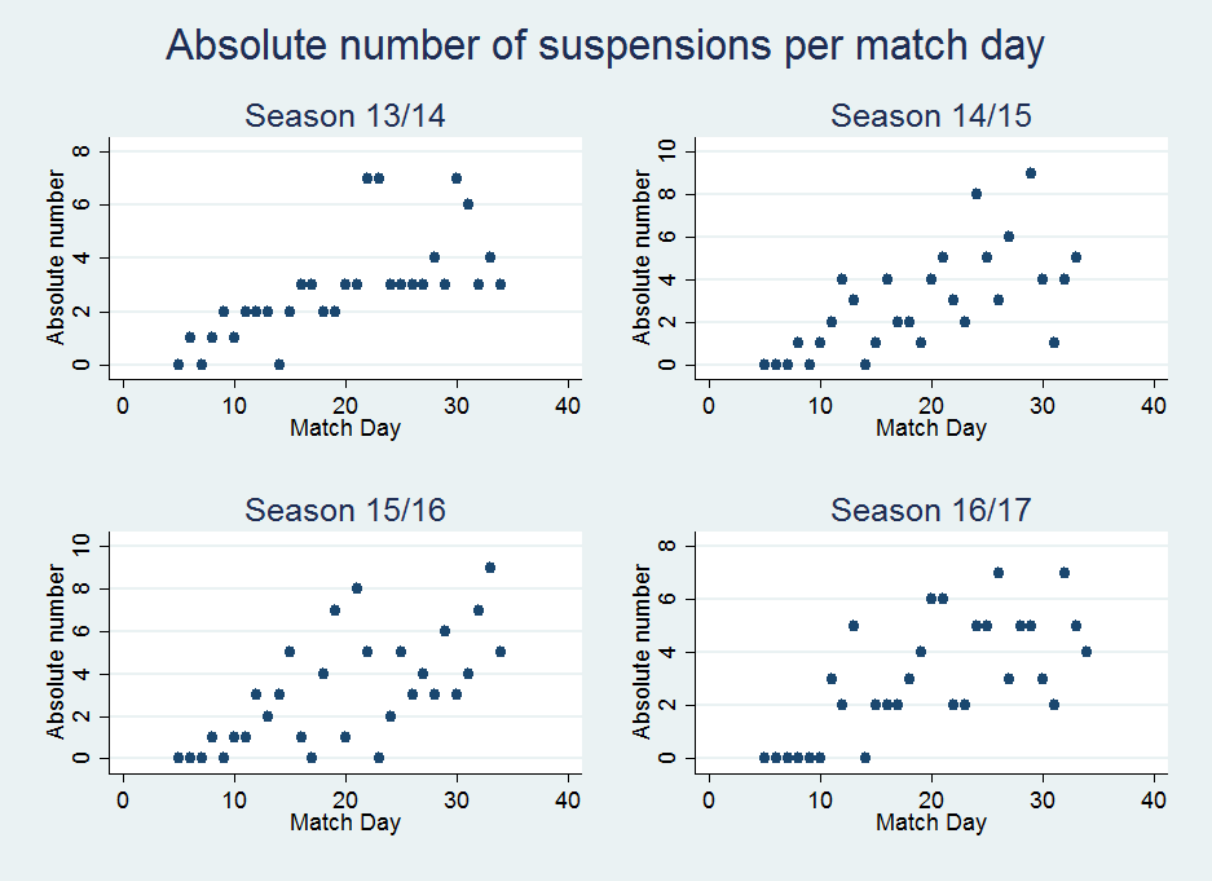
Sources: Data basis: kicker (2017); own calculations.

Descriptive statistics for the panel data can be found in Table 1. The minimum number of collected yellow cards in one match is zero, and the maximum is six. The descriptive statistics for the cards for the three clubs Bayern München, Borussia Dortmund and Eintracht Frankfurt are enlightening. The first two clubs, which are regularly on top of the rankings, collect on average 1.2 or 1.3 yellow cards per game, while the mean number of yellow cards collected per game for Eintracht Frankfurt (regularly ranked lower, the team with the most yellow cards) is at approximately 2.5. The maximum number of players who have collected their fifth or tenth yellow card for one team is five.[5] The home variable equals 1 when a team plays on their home pitch. In one season, each team

[5] The value of five players collecting their fifth yellow card belongs to Darmstadt 98, standing at the 11th position of the ranking at the 21st match day in the season 15/16. This happened before a game against Bayern München, the leading team at that time.

plays 17 games at home and 17 games on an opponent's pitch. The deviation from 0.5 results from the cut of the data at match day 5. During one season, each team plays 17 games on their home pitch and 17 away games that are normally in a weekly rotation. Sometimes, the schedule might deviate from that scheme, however. Therefore, several teams have more home than away games in our (reduced) data set. Figure 1 shows the suspensions per match day for each team due to fifth or tenth yellow cards collected across the four seasons for all teams. In season 14/15 as well as in season 15/16, there is one match day each in which in nine suspensions were awarded. The first match day in the sample on which a player got a suspension was the sixth (season 13/14; team: Borussia Mönchengladbach). The number of suspensions increases as the season proceeds due to the accumulation of yellow cards.

Figure 1 Absolute number of suspensions per match day for each season.



Analysis and results

We estimate a random effects logit panel model, a model widely used in sports economics, for example, in (Kokolakakis et al., 2012) and (Price et al., 2010):

$$logit(P_{fifth}) = \log\left(\frac{P_{fifth}}{1 - P_{fifth}}\right) = \beta_0 + \beta_1 cards + \beta_2 win + \beta_3 home + \beta_4 ownposition + \varepsilon_i,$$

where *cards* is the absolute number of awarded yellow cards in one match, *win* is 1 if the teams wins, and *home* = 1 as a variable for the home games. *Ownposition* is a variable that captures the (relative) ranking of the teams. Error terms are assumed to be independent and normally distributed (Long, 1997). We use robust standard errors.

In a first step, we proxy the ranking position of the teams by a dummy variable = 1 if the team is ranked in the table on the positions 10-18, thus in the lower half. Table 2 displays four different model specifications and their goodness of fit.

Table 2 Fifth yellow card; Logit estimates

Fifth(Pr=1)	Model 1 (M1)	Model 2 (M2)	Model 3 (M3)	Model 4 (M4)
Constant	-2.913713*** (0.1533252)	- 2.777739*** (0.1634887)	-2.853527*** (0.164364)	- 2.800939*** (0.1941314)
Cards	0.5434338*** (0.0465609)	0.5332193*** (0.0464729)	0.5394037*** (0.0453471)	0.5323638 *** (0.0458499)
Win		-0.333212** (0.1332474)	-0.3559955*** (0.1360392)	-0.3303314*** (0.1350271)
Home			0.1427982 (0.0954458)	
Ownposition				0.0024774 (0.0095415)
Number of observations	2,086	2,086	2,086	2,086
Log pseudolikelihood	-816.1483	-813.15947.	-812.55604	-813.14009
Wald Chi²	136.22	139.82	155.52	144.42
Prob > Chi²	0.0000	0.0000	0.0000	0.0000
AIC	1638.297	1634.319	1635.112	1636.28
BIC	1655.226	1656.891	1663.327	1664.495

Note: Standard errors are in parentheses. ***/**/* = significant at the 1/5/10% level.

According to Akaike and Bayesian information criteria, the most parsimonious model M1 confirms our expectations that the number of collected cards on this match day would have a positive impact on the probability of collecting a fifth yellow card. Model M2 includes the dummy variable "win" and indicates that the probability for a fifth yellow card decreases if the team wins on this match day. Models 3 and 4 include "home" and "own position", with both coefficients insignificant.

Next, we substitute the dummy variable "ownposition" (= 1 for teams 10th in ranking or worse) for the more subtle variable. We create the relative ranking of the own position compared to the ranking of the next opponent and the then following opponent. We differentiate between teams with rankings at the top and at the bottom.

Teams playing against relegation

We begin with the analysis of teams with a lower ranking, including the relative position variable with a positive difference (model (1) in Table 3).

Table 3 Logit estimates; inclusion of rank differences

Fifth(Pr=1)	(1)	(2)	(3)	(4)
Constant	-2.906632*** (0.1729223)	-2.950161*** (0.1683194)	-2.889051*** (0.1805587)	-2.925752*** (0.1858728)
Cards	0.5352141 *** (0.0487826)	0.536945 *** (0.0487781)	0.5360041*** (0.0489882)	0.5369652*** (0.0489233)
Win	-0.2884381** (0.1250539)	-0.2931094** (0.1277202)	-0.2924948* (0.1263108)	-0.2944242** (0.1277788)
Positive difference of ranking towards next opponent	0.0205425** (0.0098703)	0.0239741** (0.0097458)	0.024057** (0.0107937)	0.0253218** (0.0104448)
Negative difference of ranking towards the opponent after next		-0.0099849 (0.0117676)		-0.0070614 (0.0131745)
Positive difference towards the opponent after next			-0.00093055 (0.0127832)	-0.0062132 (0.0143312)
Log pseudolikelihood	-767.7195	-767.55471	-767.56566	-767.50037
Wald(Chi²)	150.78	147.90	149.47	148.38
Prob >Chi²	0.0000	0.0000	0.0000	0.0000
AIC	1545.439	1547.109	1547.131	1549.001
BIC	1573.478	1580.757	1580.779	1588.256

By including the variable "Positive difference of ranking towards next opponent", we include only the teams that will play against a better ranked opponent on their next match day. The analysis shows that "cards" and "win" are still significant determinants of the probability of collecting a fifth yellow card. From the perspective of a team that stands in the lower half of the rankings, we found that the relative difference regarding the next opponent plays a role as well. In each model specification, the variable capturing the positive difference towards the next opponent is significantly positive at the 5 % level. Since this variable can be between 1 and 17, a higher difference therefore also indicates a higher probability to collect a fifth yellow card. The inclusion of the ranking of a team's opponent after the next game (models 2 and 3 in Table 3) does not have a significant impact, no matter whether this relative difference is positive or negative. Model specification 4 includes both distance variables regarding the opponent after next, but additionally, in this setting, no significant effects can be found. Information criteria lie in the same range, but model (1) provides the most efficient model.

Teams from the top of the ranking

We conduct the same analysis for teams that face an upcoming opponent with a negative difference in ranking, teams that are worse than a player's own team (model specification (1) in Table 4).

Table 4 Logit estimates; inclusion of rank differences for teams from the top

Fifth(Pr=1)	(1)	(2)	(3)	(4)
Constant	-2.877726*** (0.1900294)	-2.869486*** (0.1833262)	-2.896169*** (0.220964)	-2.886149*** (0.2194362)
Cards	0.5407741*** (0.0510007)	0.5402852*** (0.0506383)	0.5405964*** (0.0507717)	0.5403334*** (0.0505792)
Win	-0.301209** (0.126391)	-0.2994469** (0.1277639)	-0.2993658** (0.1267418)	-0.2987387** (0.1275884)
Negative difference of ranking towards next opponent	-0.0102707 (0.0138071)	-0.0118896 (0.01533982)	-0.011821 (0.0159152)	-0.0124335 (0.0163762)
Negative difference of ranking towards the opponent after next		0.0041782 (0.0117676)		0.0026368 (0.0144809)
Positive difference towards the opponent after next			0.0043091 (0.0145929)	0.0031643 (0.0152575)
Log pseudolikelihood	-768.45342	-768.4249	-768.41937	-768.41041
Wald(Chi^2)	157.43	161.81	161.85	163.16
Prob >Chi^2	0.0000	0.0000	0.0000	0.0000
AIC	1548.45342	1548.85	1548.839	1550.821
BIC	1574.946	1582.497	1582.486	1590.076

Information criteria vary in the same range, but the absolute value also suggests choosing model specification model (1) in this setting. Conducting the same analysis for teams at the top of the ranking (implying that the relative ranking difference might be negative in the next game and positive or negative in the following game) does not provide any significant effects. Players on teams in the upper half of the rankings do not seem to collect their suspensions with respect to upcoming opponents. Players on better teams do have different incentives or motives than players from teams playing against inferior opponents. The variables win and cards still have a significant effect, however; a win still reduces the probability of strategically collecting a fifth card. Teams playing for the National Championship need to win as many matches as possible, and players do not have any motivation to skip a game due to a fifth yellow card.

Conclusion

We test whether players seek suspension by choice. We find that winning a match reduces the probability of a fifth yellow card. Playing at home or away does not have

any significant effects. Concerning lower ranking teams, the (better) ranking position of the next opponent positively impacts the probability of collecting a fifth/tenth yellow card. The opponent following the next opponent does not play a significant role. For teams with a lower ranking, a suspension might be a helpful opportunity to rest in games against unbeatable opponents. A potential reason for this choice may be the relatively smaller size of the squads of teams playing in the lower half, since these teams might have tighter budgets than teams that play in at least one international championship each season. Due to the scarcity of athletes, their capacities may be overstretched.

In contrast, players on better teams do not have a tendency to seek suspension by choice. These players are often potential players for the national team, and each of their games played presents a chance to get appointed to the national team. Additionally, these players do not want to take the risk of getting injured by an intentional foul. The rivalry between more successful teams might be bigger than in other teams, implying larger costs for an intentional suspension.

Appendix

Table A1 List of included clubs and number of seasons in the first German Bundesliga.

Club	Seasons included in analysis
FSV Mainz 05	4
TSG 1899 Hoffenheim	4
Bayer 04 Leverkusen	4
Borussia Dortmund	4
Borussia Mönchengladbach	4
Eintracht Frankfurt	4
FC Augsburg	4
FC Bayern München	4
FC Schalke 04	4
Hamburger SV	4
Hertha BSC Berlin	4
Werder Bremen	4
VfL Wolfsburg	4
Hannover 96	3
VfB Stuttgart	3
SC Freiburg	3
1. FC Köln	3
FC Ingolstadt 04	2
Darmstadt 98	2
Eintracht Braunschweig	1
1. FC Nürnberg	1
SC Paderborn 07	1
RB Leipzig	1

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