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Social pressure in football matches: An event study of "Remote Matches" in Japan

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Social pressure in football matches: An event study of "Remote Matches" in Japan*

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Abstract

We examine the effect of social pressure on the outcomes of football matches by assessing those matches that did not have spectators as a result of the COVID-19 pandemic. From the results of 768 matches with 43 unattended matches in Japan's top two divisions for the 2020 season, we find significant evidence for referee bias due to social pressure by the home team's supporters. With spectators in the stadium, the number of fouls awarded to home teams decreases significantly by about 1.05. In addition, we find that the absolute number of spectators is more dominant in the cause of referee bias than the share of the home team's supporters in the stadium by estimating the model that considers the detailed audience cap amid the pandemic.

Keywords: Social pressure, football, COVID-19, natural experiment, no spectators.

JEL classification: C90, D91, L83, Z20.

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1 Introduction

Economics has been concerned with exploring behavior under social pressure since the pioneering work of Akerlof (1980). As one strand of the literature, some studies have reported that the social pressure of spectators may affect match outcomes in professional sports (e.g., Garicano et al., 2005; Dohmen, 2008; Pettersson-Lidbom and Priks, 2010; Dohmen and Sauermann, 2015). The key to identifying social pressure in sports matches is to exploit a situation where spectators are exogenously removed. The COVID-19 pandemic is a natural experiment that provides us with an exogenous and not one-off situation where no spectators can unexpectedly watch the match in the stadium. This study contributes to the literature by using the data for the 2020 season in the top two divisions of the Japanese professional football league (the J1 and J2 leagues), where 43 out of 768 games (5.6% of all games) were played without spectators due to the COVID-19 pandemic. Based on a difference-in-differences regression, we examine how the social pressure of spectators affects the match outcomes.

The main findings of this study are as follows. Compared with the matches that did not have spectators, the number of fouls awarded to home team in the matches with spectators decreases significantly by about 1.05, while the number of yellow cards received by the home team seemed unaffected. Moreover, we conducted additional analyses by exploiting detailed information about the attendance cap in the matches after the pandemic and fund evidence that the number of spectators in the stadium is more important than the percentage of spectators in determining referee bias due to social pressure.

Many studies recently analyzed the effect of social pressure in football matches by using the COVID-19 pandemic era as a natural experiment (e.g., Endrich and Gesche, 2020; Bryson et al., 2021; Scoppa, 2021). While our results compliment those in the literature by using Japanese data, the salient feature of this paper is to explore the source of referee bias in football matches. Based on the detailed information on the difference in the attendance cap during the pandemic, we examine the main source of referee bias: the absolute number of spectators or the share of the home team's supporters in the stadium. Endrich and Gesche (2020) also examines the effect of the presence of the away team's supporter on the referee bias, but our analysis advances theirs in the sense of exploiting more precise information regarding audience cap.

2 Data

We use the data from the 2020 season of J1 and J2 League, the top two divisions of Japan's professional football league, because the use of between-seasons may allow factors rather than social pressure to compound the match outcomes (e.g., promotion and relegation of the division or introduction of the video assistant referees), as noted in Bryson et al. (2021). There are 768 games, with 18 teams playing against 17 teams twice in J1 and 22 teams playing against 21 teams twice in J2. The season started in February and ended in December, but was suspended until June due to the spread of COVID-19, after the first section in late February was held as usual. The matches resumed on July 4 for J1 and June 27 for J2 but were held without spectators, along with the next section in early July. A match without spectators is called "Remote Match" in Japan. Some restrictions were relaxed after July 10, allowing a maximum of 5,000 people or 50% of the stadium capacity, but three games were still played without spectators due to the infectious status in the area where the games were held.[1] Overall, 43 out of 768 matches are categorized as "Remote Matches" in our benchmark analysis.

3 Empirical analysis

3.1 Model

We use the difference-in-differences regression, described as:

$$\begin{aligned} y_{i,m} = \alpha + & \beta_1 Home_{i,m} + \beta_2 Spectators_m \\ & + \beta_3 Home_{i,m} \times Spectators_m + \gamma Controls_m + u_{i,m}, \end{aligned} \tag{1}$$

where $y_{i,m}$ is an outcome variable for team i in match m. Each match is counted twice, once from the perspective of the home team and once from the perspective of the away team (see Garicano et al., 2005; Ponzo and Scoppa, 2016; Endrich and Gesche, 2020),

[1]The matches held in Okinawa, located south of Japan, on August 12, 19, and 29 were without spectators due to the infection situation in the area.

so that we cluster standard errors on the match level. The variables $Home_{i,m}$ and $Spectators_m$ are indicators for the home team and for the matches with spectators, respectively. In this specification, the outcomes of the away team in the remote match are regarded as the control group, thereby interpreting β_1 as the gap of the outcome between the control group and the home match without spectators; β_2 as the gap between the control and the away matches with spectators, and β_3 as the treatment effect are of particular interest to us. The coefficient β_3 represents the home advantage effect stemming from playing the matches in front of spectators (see Pettersson-Lidbom and Priks, 2010). As for the $Controls_m$, we follow Bryson et al. (2021) and add a fixed effect for each team i, opponent dummies, referee dummies, and the number of spectators. The opponent dummy is assigned to each opponent who plays against the team i in the match m, and the referee dummy is assigned to all 40 referees. We also add the number of fouls in the control when the dependent variable is the number of yellow cards.

3.2 Estimated Results

Table 1 shows the estimated coefficients in equation (1). The signs and approximate magnitude of the coefficients are all the same across the specifications, but the estimates tend to be significant with the control variables, therefore we discuss only the results with the control variable below.

Column 1a in Table 1 presents the result for the number of fouls. The coefficient β_1 indicates that the home teams were issued by 1.012 more fouls in the remote matches than the away teams, while the estimate for Remote (β_2) indicates that fouls awarded to the away teams increased significantly by 1.391 in the matches played in front of spectators compared with remote matches. Most importantly, the treatment effect β_3 is estimated to be -1.046, meaning that the presence of spectators in the stadium causes the home team to be called for 1.046 fewer fouls. This estimate is likely to support the referee bias for home teams stemming from social pressure. As for the result for the number of yellow cards in column 2a, we find that home teams received 0.147 fewer yellow cards than did away teams when no spectators were present in the stadium. However, the coefficients for the spectator dummy and the interaction term are not significantly estimated.

Table 1: Effect of Remote Matches on match outcomes

	Fouls		Yellow cards	
	(1a)	(1b)	(2a)	(2b)
Home (β_1)	1.012*	0.744	−0.147**	−0.133
	(0.594)	(0.704)	(0.233)	(0.225)
Spectators (β_2)	1.391***	0.809	−0.034	−0.066
	(0.419)	(0.576)	(0.181)	(0.187)
Home× Spectators (β_3)	−1.046*	−0.762	0.048	0.032
	(0.623)	(0.732)	(0.240)	(0.231)
Fouls			0.071***	0.084***
			(0.008)	(0.007)
Controls	yes	no	yes	no
R^2	0.368	0.001	0.228	0.114
Obs. (# of Remote)	1536 (86)	1536 (86)	1536 (86)	1536 (86)

Notes: This table shows OLS estimates with the robust standard error clustered on the match level in round brackets. The 1%, 5% and 10% significance levels are denoted by $***$, $**$ and $*$, respectively.

3.3 Subdivision of the matches with spectators

All the matches except remote matches are categorized into matches with spectators in the analysis above. However, except for the first section, there were some attendance limits even though the matches were not completely "remote". For surely, after the second and third sections being held without spectators, the attendance cap was set at 30% of the stadium capacity or 5000, whichever is larger, until September 30. After a transition period until October 30, the attendance limit was relaxed to 50% of the stadium capacity. Moreover, the away team supporters could mobilize to the stadium after October 30. To exploit these attendance limits, we subdivide the matches with spectators into three groups: Pre_Covid, $\text{Limit}^{\leq 30\%}$, and $\text{Limit}^{\leq 50\%}$. Notably, a small number of spectators, who all support the home team, were in the stadium during the $\text{Limit}^{\leq 30\%}$ period. In contrast, during the $\text{Limit}^{\leq 50\%}$ period, the number of spectators increased, but the share of spectators supporting the home team decreased due to the installation of seats for supporters of the away team. Hence, a comparison between the $\text{Limit}^{\leq 30\%}$ and $\text{Limit}^{\leq 50\%}$

periods can reveal whether the share of the home team supporters or the absolute number of spectators is the more important factor in determining social pressure on the referee's decision.

The model can be rewritten as follows:

$$
\begin{aligned}
y_{i,m} = \alpha + & \beta_1 Home_{i,m} + \beta_2 Pre\_COVID_m + \beta_3 Limit_m^{30\%} + \beta_4 Limit_m^{50\%} \\
& + \beta_5 Home_{i,m} \times Pre\_COVID_m + \beta_6 Home_{i,m} \times Limit_m^{30\%} \\
& + \beta_7 Home_{i,m} \times Limit_m^{50\%} + \gamma Controls_m + u_{i,m},
\end{aligned} \tag{2}
$$

where Pre_Covid, Limit$^{\leq 30\%}$, and Limit$^{\leq 50\%}$ are the indicator variables that take one for the matches held before the COVID-19 outbreak, after the fourth section until October 30, and after October 30, respectively. The coefficient on each interaction term represents the treatment effect on the match outcomes of home teams in matches with no attendance cap (β_5), tight restrictions (β_6), and relaxed restrictions (β_7), respectively. Hence, our interest centers on the values of these interaction terms in this subsection.

Table 2 shows the results for equation (2) in the same manner as Table 1. As in the benchmark, we treat the specification with control variables as preferred ones to observe a significant effect in the coefficients of interest. Column 1a in Table 2 presents the results for the number of fouls received. The point estimate of β_5 is 0.117, but it is not statistically significant due to the small number of matches before the COVID-19 outbreak in the sample. The estimate β_6 is -0.755, but it is not statistically significant, while the parameter β_7 is estimated to be -1.384 with a 5% significance level. Judging from the comparison between β_6 and β_7, we can conclude that the number of spectators is more important than the percentage of spectators. This is because the referees' decisions were more likely to favor the home team in a match with many home team supporters and fewer away team supporters than in a match only with a small number of home team supporters in the stadium. We also estimate the number of yellow cards, but the coefficients of interest are not significantly estimated, as seen in column 2a in Table 2. This suggests that the pressure from spectators does not affected the yellow card decision.

Table 2: Effect of Remote Matches on match outcomes

	Fouls		Yellow cards	
	(1a)	(1b)	(2a)	(2b)
Home (β_1)	0.900	0.775	−0.171	−0.190
	(0.610)	(0.728)	(0.248)	(0.240)
Pre_COVID (β_2)	−0.575	−1.050	−0.187	−0.012
	(0.834)	(0.870)	(0.371)	(0.330)
Limit$^{\leq 30\%}$ (β_3)	1.015**	0.691	−0.096	−0.100
	(0.426)	(0.612)	(0.193)	(0.199)
Limit$^{\leq 50\%}$ (β_4)	1.582***	0.930	−0.163	−0.156
	(0.493)	(0.637)	(0.202)	(0.204)
Home × Pre_COVID (β_5)	0.117	−0.375	−0.423	−0.394
	(1.160)	(1.387)	(0.420)	(0.393)
Home × Limit$^{\leq 30\%}$ (β_6)	−0.755	−0.561	0.097	0.116
	(0.650)	(0.768)	(0.256)	(0.247)
Home × Limit$^{\leq 50\%}$ (β_7)	−1.384**	−1.331	0.064	0.084
	(0.694)	(0.814)	(0.263)	(0.255)
Fouls			0.071***	0.084***
			(0.008)	(0.007)
Controls	yes	no	yes	no
R^2	0.372	0.007	0.232	0.117
Obs.	1536	1536	1536	1536

Notes: This table shows OLS estimates with the robust standard error clustered on the match level in round brackets. The 1%, 5% and 10% significance levels are denoted by $***$, $**$ and $*$, respectively.

4 Conclusion

This paper investigate how social pressure impacts a referee's decision in remote matches in Japan's football league as a natural experiment. Our benchmark results are consistent with the findings in the literature, indicating that the number of fouls for the home teams becomes fewer in the matches with spectators. We also find that the number of the home team supporters is likely to be a source of referee bias, such that fewer fouls are issued against the home team in matches with spectators.

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