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ABSTRACT

Social Pressure in the Stadiums: Do Agents Change Behavior without Crowd Support?

Social pressure may have relevant consequences in many contexts but it is hard to evaluate it empirically. In this paper we exploit a natural experiment in soccer to provide clear evidence of its effects. We aim to study how social pressure from the crowd in a stadium affects both players and referees. While in normal matches crowd support may be correlated to a host of variables affecting the outcome of interest, we exploit the fact that after the health emergency for the Covid-19 pandemic in 2020, soccer matches in top European Leagues have been allowed only behind closed doors, that is, without spectators in the stadiums. We use data of first and second division of 5 major European Leagues (Germany, Spain, England, Italy and Portugal) for the last 10 championships and compare several outcomes (determined by players' performance and referees' decisions) of matches played with crowd support to the same outcomes when matches were played without crowd. We find considerable effects of the pressure from the crowd: while with the support of the crowd a considerable home advantage emerges in various measures of performance (points, goals, shots, etc.), this advantage is almost halved when matches are behind closed doors. Similar effects are found for the behavior of referees: decisions of fouls, yellow cards, red cards and penalties that tend to favor home teams in normal matches, are much more balanced without crowd pressing on referees. The evidence we provide strongly supports the idea that social pressure has intense effects on agents' behavior.

JEL Classification: D91, M50, L83, Z2

Keywords: social pressure, crowd support, emotional factors, social approval, performance, home advantage, referee's favoritism, COVID-19

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1. Introduction

Sociologists and psychologists have long recognized the influence of social factors on the decisions and behaviors of agents.[1] Economists only recently have begun to show that social pressure may be an important factor affecting individual preferences and behavior (Akerlof, 1980; Bernheim, 1994; Becker and Murphy, 2000; Benabou and Tirole, 2006).

In Economics it is now usual to assume that individuals are motivated not only by extrinsic or monetary incentives: they are also affected by social considerations, by the need to be approved socially or by the desire to please others or to avoid displeasures for them and people tend to conform to social pressure to receive social recognition or to avoid social sanctions.

Social pressure may have relevant consequences in many contexts but it is hard to evaluate it empirically, since it is hard to observe exogenous changes in the social groups or networks and it can be hard to disentangle social pressure from other factors, since variations in social pressure could be related to a number of other unobserved factors.

In this paper we exploit a natural experiment in soccer to provide clear evidence of its effects. We aim to study how social pressure from the crowd in a stadium affects both players and referees. While in normal matches crowd support may be correlated to a host of variables affecting the outcome of interest, we exploit the fact that after the global health emergency caused by the Covid-19 pandemic in 2020 most government imposed restrictions on large gatherings to contain the spread of the virus and therefore soccer matches in top European Leagues have been allowed since May 2020 only behind closed doors, that is, without spectators in the stadiums. We use data from first and second divisions of top European Leagues (Germany, Spain, England, Italy and Portugal) for the last 10 seasons and compare several matches' outcomes – determined by players' performance and referees' decisions – in matches played with crowd support to the same outcomes obtained in matches played without crowd.

We find considerable effects of the crowd: while with the crowd home teams tend to gain about 0.50 more points (on average, 1.61 for the home team vs. 1.11 for the away team), without the crowd the home advantage in points reduces to about 0.28. Similarly, whereas difference in goals between home and away team is 0.35 in normal matches (1.49 vs. 1.14), this difference is almost halved in matches without spectators. These results are confirmed considering other indicators of team performance: shots, shots on targets, and corner kicks.

Similar effects of the crowd are found as regards the behavior of referees: discretionary decisions on fouls, yellow cards, red cards and penalties that strongly favor home teams in normal matches – in that away teams are awarded more fouls, yellow and red cards and less penalties – are almost balanced without the crowd yelling and pressing the referee to favor the home team.

[1] See, among others, the classical experiments of Asch (1951) and Milgram (1963).

Our paper is related to a bunch of other recent works studying empirically in various contexts the impact of social pressure. DellaVigna, List and Malmendier (2012) in a field experiment on giving money to charities aim to distinguish altruism from social pressure finding that the latter is an important determinant of giving. Mas and Moretti (2009) find that high-productivity cashiers in a supermarket chain increase the productivity of coworkers that are in the same shift and that can observe the effort of the former. In a field experiment with agents providing real effort, Falk and Ichino (2006) find that the behavior of subjects working in pairs is significantly different than the behavior of subjects working alone. Funk (2010) exploits a natural experiment produced by the introduction of voting by mail in Switzerland to study the impact on voting of social pressure – coming from others observing the decision to vote – and find a significant impact in small communities. Gerber, Green and Larimer (2008) conducted a field experiment on voting in US primary elections making people aware of the fact that their neighbors could learn if they did not vote in the elections and obtain strong effects.

In Psychology, the "social facilitation" paradigm (Zajonc, 1965; Hill et al., 2010) maintains that individual decisions and performance can be affected by the presence of others, both when working together with others performing a similar task and when carrying out a task while being observed by an audience. The impact of others on performance could be positive or negative (social inhibition or "choking under pressure", see Dohmen, 2008b).

More related to sports, most of the analyses focus on the effects of social pressure on referees' decisions, arguing that referees can be subconsciously influenced by the noise of a large crowd in the stadium and react by favoring the home team, conceding more injury time to it when it is behind or awarding more penalties and less disciplinary sanctions to the home team (for an exhaustive survey, see Dohmen and Sauermann, 2016). Garicano, Palacios-Huerta, and Prendergast (2005) show that the extra time that referees assign at the end of a match is about twice when this time is likely to advantage the local team (since it is one goal behind) than when it is likely to hurt it (one goal ahead). A similar result has been found by Dohmen (2008a) and Sutter and Kocker (2004) for the German Bundesliga; by Scoppa (2008) for the Italian "Serie A".

Dawson et al. (2007), among others, document that referees show favoritism towards the home team in awarding yellow and red cards in the Premier League and Dawson and Dobson (2010) find that social pressure (but also nationality) affects discretionary decisions by referees in European cup matches.

In an experiment, Nevill et al. (2002) have compared professional referees' decisions (taken watching a videotaped recording of a match) when they hear the reactions of the crowd with their behavior when they watch the match in silence. They show that referees hearing the noise of the crowd were significantly more acquiescent to the home team and in line with the effective decisions taken by the referee on the field. Referees have to make instantaneous decisions, and they tend to focus on the most salient cues, one of which may be the crowd noise. Moreover, they tend to avoid potential displeasure for the crowd.

A strictly related paper is Pettersson-Lidbom and Priks (2010) that consider a few matches played behind closed doors in the Italian "Serie A" in the 2007-2008 season because of security measures adopted

after hooligans' incident. Pettersson-Lidbom and Priks (2010) only consider referees' decisions (fouls, yellow and red cards) and they deal with a very small sample since only 21 matches were played behind closed doors: they show that referees are much more balanced without the pressure of the crowd.[2]

Our paper is also related to sports economics and to the famous "home advantage" – the tendency for the home team to win more often than the away team – that is one of the best documented phenomenon in soccer and in sports in general (for a survey, see Pollard and Pollard, 2005). However, the determinants of the home advantage have been difficult to identify. Three main factors have been recognized and empirically analyzed in the literature: crowd support, familiarity with the stadium[3] and travel fatigue.[4]

To evaluate the strength of the first mechanism some studies have examined the association between crowd size and team performance. The evidence is somewhat mixed. Pollard and Pollard (2005) show no difference in the magnitude of the home advantage despite considerable differences in crowd size between the first and second division in the leagues of Germany, England, France, Spain and Italy. Similarly, Clarke and Norman (1995) find that the home advantage varies little over the four divisions in England. In contrast to these findings, Goller and Krumer (2020) find that in matches played in non-standard days the attendance is lower and the home advantage for the underdogs reduces and Ponzo and Scoppa (2018) show that in same-stadium derbies (matches among teams that share the same stadium and so do not differ in terms of familiarity with the stadium or travel fatigue) the home team enjoys a significant advantage due to a greater support from the crowd and biased referee's decisions.

All in all, although the evidence on the existence of the home advantage is solid, the mechanisms through which it operates are still unclear and in particular the empirical evidence is not conclusive on the relative relevance of crowd support, travel fatigue and stadium familiarity (Courneya and Carron, 1992; Pollard and Pollard, 2005). The present paper contributes to this literature showing that crowd support and referee bias may explain around half of the home advantage.

The paper is organized in the following way. Section 2 describes the dataset we use and presents some descriptive statistics. In Section 3 we carry out the empirical analysis studying the performance of home team vs. away team players. In Section 4 we analyze whether the referee's decisions are different behind closed doors. Section 5 concludes.

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[2] A very recent paper by Reade, Schreyer and Singleton (2020) tries also to evaluate the impact of crowd support on team performance exploiting matches played behind closed doors but the authors use only matches played *before* the Covid-19 pandemic (a quite heterogeneous sample of about 160 observations) since according to the authors the rules of the soccer after the pandemic are quite different than before. We do not share this view and, as argued below, the few rules that have been changed should not affect the *relative* performance of home and away teams.

[3] As regards the familiarity with the stadium, home team players are generally more familiar with their own venue in terms of dimensions, playing surfaces, and other physical features, and exhibit greater confidence when playing in a more familiar environment. The existing evidence shows that teams playing on unusual larger or smaller playing surfaces or on artificial surfaces (rather than on grass) enjoy an additional advantage compared with other teams whose home grounds are more standard.

[4] Researchers have analyzed the role of travel fatigue for the home advantage, arising from the fact that the away team has the disadvantage of traveling and suffer from disruption of the preparation. The evidence on this aspect is quite robust. Oberhofer, Philippovich and Winner (2010) analyze if team performance in soccer is related to the distance from the home and the away location and show that away team performance decreases with this distance. Similar findings are also confirmed in a study of the English Premier League (Clarke and Norman, 1995).

2. Data and Descriptive Statistics

In our empirical analysis, to evaluate the impact of social pressure from the crowd in a stadium on players and referees we exploit the natural experiment represented by the fact that after the global health emergency caused by the Covid-19 pandemic in 2020, almost all European governments imposed tough restrictions on large gatherings to contain the spread of the virus. As a consequence, soccer matches in top European Leagues have been allowed since May 2020 only behind closed doors, that is, without spectators. In each championship that we analyze, about 2/3 of the matches were normally played with the crowd, while 1/3 has been played behind closed doors.

In soccer matches, the home team typically receives a strong support from the crowd, which tends to stimulate players' effort and energy and lead them to perform better. In addition, the noise and the reactions of the crowd tend to subconsciously influence the referee's decisions in favor of the home team. Although supporters of the away team can be present in the stadium, they are usually a minority.

While in normal times crowd support may be correlated to many variables affecting the outcome of interest, the drastic reduction from several thousands of spectators (mean attendance is about 30,000 for first divisions) to zero that we analyze is exogenous to any factor affecting the strength and abilities of teams. In contrast, in previous analyses the home factor has been frequently measured with the crowd size (or crowd density, the number of people relative to the stadium's capacity): we believe that the use of crowd size measures could lead to severe estimation biases, since crowd size is likely correlated either to the quality of the home team or to the quality of the away team that directly affect the outcome of the match. In fact, if the home team is performing well in a season or enjoys some unobservable (to the researcher) factor affecting its quality, crowd size tends to be larger: thus, it is hard to distinguish the impact on the outcome of a stronger team from the effect of a larger crowd, creating an upward bias; on the other hand, crowd size could be greater when the away team is a high quality team or has many top players, imparting a downward bias to the estimated effect.

Although some rules have changed in soccer after Covid-19 pandemic – in particular the possibility to substitute up to 5 players instead of 3 in a match and the fact that matches tend to be played more frequently – these changes should not affect home and away teams differently. In addition, in a regression analysis we can control for some of these characteristics (for example, the number of days of rest of each team before the match).

Basically, in our simple regression analyses we compare several outcomes (determined by players' performance and referees' decisions) in matches played with crowd support to analogous outcomes when matches were played without crowd.

In our analysis we use data from five major European Leagues (Germany, Spain, England, Italy and Portugal) considering both the first and the second division, with the exception of Portugal whose data on the

second division are not available.[5] Therefore, we have data on 9 championships and each is followed for 10 seasons (from 2010-2011 to 2019-2020) for a total of about 35,000 observations. The data have been collected from the website www.football-data.co.uk. In Table A1 in the Appendix we show the number of observations by league and season.

Each League was composed by 18-20 teams. In each season, teams played each other twice (both as the home and away team) for a total of 34-38 matches.[6] For each match we have available data on teams, goals scored and goals conceded (also divided between first and second half of the match), the place and the date when each game was played. We also observe for home and away teams: shots, shots on target, corners. Finally, to evaluate referees' behavior we have data on fouls committed, yellow and red cards, penalties.

According to the rules of soccer, teams are awarded 3 points if they win a game, 1 point in case of draw and 0 points if they lose. The sum of the points obtained in each game determines the final ranking.

Team performance is measured using different indicators of the outcome on the pitch: the number of points gained in each match by the teams (*Points*) and the goals of the home and away teams; the number of shots, shots on target and corner kicks.

In order to explain teams' performance, we consider a number of control variables that capture differences in the quality of opposing teams and some measures of past performance: the *Total Points* earned by the two teams in the current season excluding the current match;[7] the points earned by the two teams, respectively, in the latest 4 and 8 matches. Since these measures are highly correlated, to avoid collinearity we use them separately in our regressions. In some specifications, to take into account teams' fatigue we also use the number of days of rest of each team before the match.

Descriptive statistics for all the matches are reported in Table 1.

[5] Among the top European Leagues, we exclude France since the French government decided to not permit major sports events – including those behind closed doors – in the country before September 2020.

[6] In the first half of the season each team plays once against all its opponents, while in the second half each team plays in the exact same order against the same teams, but a home game played in the first half will be an away game in the second half, and vice versa.

[7] As an alternative measure, we have also used the difference in the ranking positions between the two teams (*Ranking Difference*) and we obtained very similar results.

Table 1. Descriptive Statistics. Data for All the Matches. 9 Leagues for 10 Seasons

Variable	Mean	Std. Dev.	Min	Max	Obs
Closed Doors	0.026	0.160	0	1	34,852
Home Points	1.614	1.303	0	3	34,873
Away Points	1.116	1.251	0	3	34,873
Home Goals	1.490	1.249	0	10	34,873
Away Goals	1.141	1.117	0	9	34,873
Home Shots	13.671	5.088	0	43	24,361
Away Shots	11.088	4.525	0	39	24,361
Home Shots on Target	5.085	2.735	0	24	24,361
Away Shots on Target	4.109	2.411	0	20	24,361
Home Corners	5.753	2.972	0	22	24,361
Away Corners	4.597	2.609	0	20	24,361
Home Fouls Committed	13.026	4.420	0	33	24,360
Away Fouls Committed	13.398	4.476	0	34	24,360
Home Yellow Cards	1.888	1.360	0	11	24,360
Away Yellow Cards	2.181	1.411	0	9	24,361
Home Red Cards	0.090	0.302	0	3	24,361
Away Red Cards	0.120	0.350	0	3	24,361
Home Penalties	0.178	0.414	0	2	5,942
Away Penalties	0.139	0.371	0	3	5,942
Total Points Home	51.694	15.714	0	102	34,873
Total Points Away	52.193	15.732	13	102	34,873
Points latest 4 Home	5.339	2.922	0	12	33,970
Points latest 4 Away	5.573	2.934	0	12	33,968
Points latest 8 Home	10.175	4.705	0	24	33,970
Points latest 8 Away	10.485	4.680	0	24	33,968
Home Rest	6.042	1.423	2	7	34,873
Away Rest	6.040	1.422	2	7	34,873

Leagues: First and second Division of Germany; England; Spain; Italy. First Division of Portugal. Seasons: from 2010-2011 to 2019-2020.
Source: http://www.football-data.co.uk/

About 2.6% of the matches in our dataset are played behind closed doors,[8] corresponding to 917 matches. On average, on the whole sample, home teams show better outcomes than away teams on many dimensions: 1.61 points vs. 1.11, respectively; 1.49 goals vs. 1.14; 13.67 shots vs. 11.08; 5.08 shots on target vs. 4.11; 5.75 vs. 4.60 corner kicks. Referees tend to favor home teams, awarding more fouls, yellow and red cards and less penalties to away teams: 13.03 vs 13.40 committed fouls, respectively, for the home team and the away team; 1.89 vs. 2.18 yellow cards, 0.09 vs. 0.12 red cards; 0.18 vs. 0.14 penalties.

In the next Sections we verify econometrically through a number of models how players and referees have been affected when matches have been played without crowd support.

[8] In the seasons before 2019-2020, some matches (21) were played behind closed doors, especially in Italy. In our analyses we exclude these matches from our regressions, but considering them has no effect on all our findings.

3. Crowd Support and Players' Performance: An Empirical Analysis

In this Section, to provide evidence on the impact of social pressure in the stadium on the performance of players we carry out a regression analysis to compare the home advantage in normal matches and in matches played behind closed doors without spectators.

3.1. Home and Away Team Points and the Home Advantage

To evaluate the extent of the home advantage, we estimate the impact of playing at home on team performance using as dependent variable *Points* and estimating with an OLS estimator.

In this first analysis, following Garicano and Palacios-Huerta (2005) and Ponzo and Scoppa (2018) we consider each match twice, from the perspective of the home team and from the perspective of the away team, clustering standard errors at the match level.[9] This allows to estimate the dummy *Home* and the interaction between *Home* and *Closed Doors* (see below).

To capture the home advantage, we simply use the dummy *Home* (equal to one if the game is played at home and zero if it is played away). In Table 2 in the first two columns we estimate separately for matches played with the crowd (col. 1) and matches played behind closed doors (col. 2), without adding any other explanatory variables. In column (1) we find that the impact of playing at home with crowd support is strong (0.504) and highly significant (*t*-stat is 36.9).[10] In column (2) we find that the impact of playing at home behind closed doors is positive (0.278) and statistically significant (*t*-stat=3.27) but reduced to almost half (55%) of the effect with spectators.

In column (3) we consider only teams playing at home, using the dummy *Closed Doors* for the matches played without crowd support. We find that home teams obtain 0.106 points less (*t*-stat=–2.40) in matches played behind closed doors. Almost symmetrically, in column (4) in which we use only matches played away, we find that away teams obtain 0.12 more points in matches played behind closed doors (*t*-stat=2.78).

In column (5) we use the whole sample and use the dummy *Home*, *Closed Doors* and the interaction term *Home*Closed Doors*. In line with previous estimates, we find that the home advantage is 0.504 points in normal matches and this advantage is reduced of 0.226 when team play behind closed doors (*t*-stat=–2.62).

[9] For example, the match Barcelona-Real Madrid 2-1 produces two observations in the dataset as follows:

Team1	*Team2*	*Goals*	*Home*	*id_match*
Barcelona	Real Madrid	2	1	1
Real Madrid	Barcelona	1	0	1

[10] The home advantage in normal matches does not seem to be related to the attendance level: for example, among first divisions, the home advantage is 0.46 in Germany (average attendance is 42,360); 0.48 in UK (attendance is 39,400); 0.59 in Spain (attendance is 27,700); 0.46 in Italy (attendance is 24,900) and 0.44 in Portugal (attendance is 11,400).

Table 2. Performance of Home and Away Teams with and without Spectators

	(1) Crowd	(2) Closed Doors	(3) Home Team	(4) Away Team	(5) All
Home	0.504***	0.278***			0.504***
	(0.014)	(0.085)			(0.014)
Closed Doors			-0.106**	0.120***	0.120***
			(0.044)	(0.043)	(0.043)
Home*Closed Doors					-0.226***
					(0.086)
Constant	1.113***	1.233***	1.617***	1.113***	1.113***
	(0.007)	(0.043)	(0.007)	(0.007)	(0.007)
Observations	67870	1834	34852	34852	69704
Adjusted R^2	0.037	0.011	0.000	0.000	0.037

Notes: The Table reports OLS estimates. The dependent variable is *Points*. Standard errors (reported in parentheses) are corrected for heteroskedasticity and allowing for clustering at the match level. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

In Table 3, we estimate the last specification (col. 5, Table 2) but we add dummies for each league (col. 1) and for each season (col. 2) to avoid that the effect of interest is driven by specific leagues or seasons. In this way, to estimate the impact of playing behind closed doors we are comparing matches in the same league and in the same season. Results are almost identical to the previous Table: the home advantage decreases of about 0.23 when home teams have no support from the crowd.

In column (3) we focus only on the first divisions. We find an effect of about –0.25, statistically significant (*t*-stat=–2.14). In column (4), focusing only on second divisions, we find a lower effect (–0.19) but almost statistically significant (*p*-value=0.13).

This small difference of 0.06 (far from being statistically significant) in the impact of closed doors can hardly be explained by the difference in the average attendance between first divisions (about 30,000 spectators) and second divisions (about 14,000). In addition, notwithstanding the difference in the average attendance, the home advantage in normal matches turns out to be slightly higher in second division (0.517) than in first division (0.490).

Table 3. Home Advantage: Controlling for League and Seasonal Dummies

	(1)	(2)	(3) First Div.	(4) Second Div.
Home	0.504***	0.504***	0.490***	0.517***
	(0.014)	(0.014)	(0.020)	(0.019)
Closed Doors	0.119***	0.123***	0.132**	0.109*
	(0.043)	(0.043)	(0.059)	(0.063)
Home*Closed Doors	-0.226***	-0.226***	-0.253**	-0.189
	(0.086)	(0.086)	(0.118)	(0.126)
Constant	1.128***	1.131***	1.134***	1.088***
	(0.008)	(0.008)	(0.012)	(0.011)
League FE	YES	YES	YES	YES
Season FE	NO	YES	YES	YES
Observations	69704	69704	34470	35234
Adjusted R^2	0.037	0.037	0.033	0.040

Notes: The Table reports OLS estimates. The dependent variable is *Points*. Standard errors (reported in parentheses) are corrected for heteroskedasticity and allowing for clustering at the match level. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

Next, we consider the relative strength of opposing teams using a number of variables to take into account possible imbalances in the abilities of home and away teams in normal and closed doors matches.

First of all, we run the same regression in Table 3, col. 2, but we add the total points obtained by the home and away teams in the season (except those obtained in the specific match *i*) in column (1) of Table 4. *Total Points* of the home team has a strong positive impact on *Points* gained (10 seasonal points more increases of about 0.2 the expected points obtained in a match, *t*-stat=67) while *Total Points* of the away team has a strong symmetrical negative impact. The *R*-squared of the regression increases significantly. More importantly, when controlling for home and away *Total Points*, the impact of closed doors on the home advantage remains almost identical (–0.226).

In column (2) of Table 4 we control alternatively for the points obtained by the opposing teams in the latest four matches. Our results are confirmed. In column (3) we control for both total points in the season and the points gained in the latest four matches and again we obtain similar results for the home advantage and for its reduction when teams play behind closed doors. In column (4) we control for the points earned in the latest 8 matches and again we find almost unchanged results.

In column (5) we also control for the days of rest of home and away teams to take into account possible imbalances in the days of rest of the two opposing teams (see Scoppa, 2015) – variables that turn out to be not significant – but we do not find any change in the coefficient of interest.

Table 4. Home Advantage: Controlling for the Quality of the Teams

	(1)	(2)	(3)	(4)	(5)
Home	0.523***	0.529***	0.524***	0.525***	0.524***
	(0.013)	(0.014)	(0.013)	(0.013)	(0.013)
Closed Doors	0.123***	0.126***	0.124***	0.124***	0.124***
	(0.042)	(0.043)	(0.042)	(0.042)	(0.042)
Home*Closed Doors	-0.226***	-0.231***	-0.226***	-0.226***	-0.226***
	(0.082)	(0.085)	(0.082)	(0.082)	(0.082)
Total Points Home	0.020***		0.019***	0.019***	0.019***
	(0.000)		(0.000)	(0.000)	(0.000)
Total Points Away	-0.019***		-0.018***	-0.018***	-0.018***
	(0.000)		(0.000)	(0.000)	(0.000)
Points H latest 4		0.054***	0.003		0.003
		(0.002)	(0.002)		(0.002)
Points A latest 4		-0.054***	-0.004**		-0.004**
		(0.002)	(0.002)		(0.002)
Points H latest 8				0.004***	
				(0.001)	
Points A latest 8				-0.004***	
				(0.001)	
Home Rest					0.002
					(0.008)
Away Rest					-0.002
					(0.008)
League and Season FE	YES	YES	YES	YES	YES
Observations	69704	67878	67878	67878	67878
Adjusted R^2	0.132	0.065	0.132	0.132	0.132

Notes: The Table reports OLS estimates. The dependent variable is *Points*. Standard errors (reported in parentheses) are corrected for heteroskedasticity and allowing for clustering at the match level. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

As robustness checks, we have also estimated two alternative models. Given the ordinal nature of the variable *Points* (win, draw and loss) we have estimated our main specifications using an Ordered Probit estimator and we obtain very similar results (see Table A2 in the Appendix).

Then, we define a dummy *Win* if a team wins the match and estimate a Linear Probability Model to verify if the probability of winning depends on playing at home and how much this probability has changed when matches are played behind closed doors (see Table A3 in the Appendix). Similarly to our previous estimates, we find that the probability to win the match for the home team increases by almost 17 percentage points with crowd support, but this advantage is reduced of 7.5 p.p. (to 9.3 p.p.) when teams play behind closed doors.

3.2. Different Impact in the First or Second Half?

Since in our dataset we observe the goals scored in the first and in the second half of the match, we now try to verify if the effects of closed doors are higher or lower in the first or in the second part of the match. To carry out this analysis, we have built a variable *Points First Half* calculating the points considering only the

goals scored in the first half and then *Points Second Half* considering only the goals scored in the second half.

In Table 5, we then run our regressions using first *Points First Half* as a dependent variable and as explanatory variables *Home, Closed Doors* and the interaction *Home*Closed Doors* in column (1), and add league and seasonal dummies in column (2) and home and away *Total Points* in column (3). In column (4)-(6) we run the same regressions using *Points Second Half* as a dependent variable.

In columns (1)-(3) we find that the home advantage in the first half is about 0.33 points in normal matches and this advantage reduces of 0.09 points in matches played behind closed doors, which is not statistically significant at conventional level (*p*-value=0.20).

On the other hand, in columns (4)-(6) we show that the home advantage in the second half is 0.34 points with crowd support, but reduces a lot – of about 0.24 points (*t*-stat=–3.02) – behind closed doors.

Therefore, our estimates show that crowd support is especially helpful in the second half, when players are presumably more tired and the psychological support help them to overcome fatigue and induce them to provide some extra effort. On the other hand, the effect of the crowd seems less important in the first half of the match.

Table 5. Impact of Closed Doors in the First and in the Second Half

	(1)	(2)	(3)	(4)	(5)	(6)
	Points First Half			Points Second Half		
Home	0.326***	0.326***	0.339***	0.344***	0.344***	0.358***
	(0.012)	(0.012)	(0.012)	(0.013)	(0.013)	(0.013)
Closed Doors	0.052	0.052	0.052	0.114***	0.117***	0.117***
	(0.038)	(0.039)	(0.038)	(0.040)	(0.041)	(0.040)
Home*Closed Doors	-0.094	-0.094	-0.094	-0.236***	-0.236***	-0.236***
	(0.076)	(0.076)	(0.074)	(0.080)	(0.080)	(0.078)
Total Points Home			0.013***			0.014***
			(0.000)			(0.000)
Total Points Away			-0.012***			-0.014***
			(0.000)			(0.000)
Constant	1.125***	1.141***	1.112***	1.148***	1.167***	1.134***
	(0.006)	(0.008)	(0.010)	(0.006)	(0.009)	(0.010)
League and Season FE	NO	YES	YES	NO	YES	YES
Observations	69704	69704	69704	69704	69704	69704
Adjusted R^2	0.019	0.019	0.068	0.019	0.019	0.075

Notes: The Table reports OLS estimates. The dependent variable is *Points First Half* (col. 1-3) and *Points Second Half* (col. 4-6). Standard errors (reported in parentheses) are corrected for heteroskedasticity and allowing for clustering at the match level. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

3.3. Impact on Home and Away Goals

In Table 6 we focus on goals scored by home and away teams as an alternative measure of players' performance.

In column (1) we estimate our basic specification, including only *Home*, *Closed Doors* and the interaction term *Home*Closed Doors*. We find that the home team score 0.35 goals more in normal matches. Away teams score 0.11 goals more in matches played behind closed doors (*t*-stat=2.86). Home team score -0.037 goals less (=–0.150+0.113) without the support of the crowd. On the whole, the home advantage in goal decreases of –0.15 (*t*-stat=–2.49) without the support of the crowd, passing from 0.35 to 0.20.

In column (2) we control for league and season fixed effects, in column (3) we control also for *Total Points* of the home and away teams and, finally in column (4) we also include the points gained by the two competing teams in the last 4 matches and the respective days of rest. In all these specifications, our coefficient of interest is around –0.15 and its statistical significance remains unchanged (*t*-stat around 2.6).

Table 6. Home and Away Teams Goals

	(1)	(2)	(3)	(4)
Home	0.353***	0.353***	0.368***	0.370***
	(0.009)	(0.009)	(0.009)	(0.009)
Closed Doors	0.113***	0.096**	0.096**	0.109***
	(0.040)	(0.042)	(0.041)	(0.041)
Home*Closed Doors	-0.150**	-0.150**	-0.150***	-0.152***
	(0.060)	(0.060)	(0.056)	(0.056)
Total Points Home			0.018***	0.017***
			(0.000)	(0.000)
Total Points Away			-0.013***	-0.012***
			(0.000)	(0.000)
Constant	1.138***	1.307***	1.078***	1.041***
	(0.006)	(0.021)	(0.028)	(0.036)
League and Season FE	NO	YES	YES	YES
Observations	69704	69704	69704	67878
Adjusted R^2	0.021	0.026	0.096	0.096

Notes: The Table reports OLS estimates. The dependent variable is *Goals*. Standard errors (reported in parentheses) are corrected for heteroskedasticity and allowing for clustering at the match level. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

It is interesting to note that the total number of goals has not changed significantly in the matches before and after the imposition of closed doors. If we build a variable *Total Goals* as the sum of the Goals scored by the Home and Away Teams and regress this variable on *Closed Doors* (including league and season fixed effects) we find that the number of total goals has risen by 0.029, far from being significant (*p*-value=0.64).

3.4. Other Measures of Performance: Shots, Shots on Target and Corners

In this Section we consider a number of indicators (shots, shots on target and corner kicks) to evaluate if players perform differently when playing without the support of the crowd. Notice that for these outcomes data are missing for older seasons (before 2016-2017) of second division leagues (D2, SP2, I2) and for Portugal.

First of all, we focus on total number of *Shots* toward the opponent goal, defined as clear attempts to score that that go into the net or are saved by the goalkeeper or stopped by a player (shots on target) or go over or wide of the goal or hits the frame of the goal.

In column (1) of Table 7 we consider *Home Team Shots* and in a very simple regression verify if they have changed in matches behind closed doors. We find that shots of the home team reduced of 1.84, corresponding to about 0.36 Standard Deviations, and this effect is strongly statistically significant (*t*-stat=–11.8).

In column (2) we see that away team shots are slightly reduced (–0.17), but the effect is not statistically different from zero. In column (3) and (4) we use the difference in shots between the home and the away team, which is on average 2.58; in column (3) we control for league and season fixed effects while in col. (4) we add controls for total points of home and away teams. In both cases, we find that the difference in shots between home and away team is significantly reduced behind closed doors of about –1.34 (*t*-stat=–5.3), that is, the home advantage in shots is almost halved.

Table 7. Team Performance: Shots

	(1) Home Shots	(2) Away Shots	(3) Shots Diff	(4) Shots Diff
Closed Doors	-1.840***	-0.170	-1.373***	-1.345***
	(0.156)	(0.151)	(0.279)	(0.251)
Total Points Home				0.155***
				(0.003)
Total Points Away				-0.151***
				(0.003)
Constant	13.742***	11.093***	2.657***	2.549***
	(0.033)	(0.030)	(0.208)	(0.261)
League and Season FE	NO	NO	YES	YES
Observations	24341	24341	24341	24341
Adjusted R^2	0.005	0.000	0.002	0.198

Notes: The Table reports OLS estimates. The dependent variable is reported at the top of each column. Standard errors (reported in parentheses) are corrected for heteroskedasticity. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

Similar results are found in Table 8 where we use as a dependent variable *Shots on Target*. This variable for the home team reduces of –0.65 behind closed doors (col. 1) (*t*-stat=–7.6), away team shots on target reduce of 0.07 (col. 2) (not statistically significant). In column (3) and (4), estimating the same specifications of the previous Table, we find that the difference between home and away team shots on target, which is on average 0.97, reduces of 0.35 (*t*-stat=–2.79) when the home team is not supported by the crowd.

Table 8. Team Performance: Shots on Target

	(1) Home Shots on Target	(2) Away Shots on Target	(3) Shots on Target Diff	(4) Shots on Target Diff
Closed Doors	-0.649***	-0.071	-0.366***	-0.352***
	(0.085)	(0.081)	(0.139)	(0.126)
Total Points Home				0.077***
				(0.001)
Total Points Away				-0.070***
				(0.001)
Constant	5.111***	4.112***	1.137***	0.865***
	(0.018)	(0.016)	(0.109)	(0.133)
League and Season FE	NO	NO	YES	YES
Observations	24341	24341	24341	24341
Adjusted R^2	0.002	0.000	0.003	0.189

Notes: The Table reports OLS estimates. The dependent variable is reported at the top of each column. Standard errors (reported in parentheses) are corrected for heteroskedasticity. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

Finally, in Table 9 we focus on the number of corner kicks of the two teams and the same pattern emerge: home team corners are strongly reduced (–0.855) behind closed doors, the away team corners remain almost the same, and the difference in corners of home and away team reduces of 0.794 (from an average of 1.18 in normal matches) (*t*-stat=–5.05).

Table 9. Team Performance: Corner Kicks

	(1) Home Corners	(2) Away Corners	(3) Corners Diff.	(4) Corners Diff.
Closed Doors	-0.855***	0.037	-0.805***	-0.794***
	(0.092)	(0.089)	(0.165)	(0.157)
Total Points Home				0.063***
				(0.002)
Total Points Away				-0.063***
				(0.002)
Constant	5.785***	4.595***	1.048***	1.082***
	(0.019)	(0.017)	(0.118)	(0.159)
League and Season FE	NO	NO	YES	YES
Observations	24341	24341	24341	24341
Adjusted R^2	0.003	-0.000	0.003	0.102

Notes: The Table reports OLS estimates. The dependent variable is reported at the top of each column. Standard errors (reported in parentheses) are corrected for heteroskedasticity. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

Since most of the data used in the last 3 Tables come from first divisions, to check if the effect is driven by first divisions' matches or holds also for the second divisions we have run the same regressions using only the available data for second divisions, obtaining a sample of 8,984 obs. With this sample, estimating specification (4) of the last three tables very similar results emerge (estimates not reported): we

find that behind closed doors shots difference between home and away teams is 1.34 lower (*t*-stat=–3.69), the difference of shots on target is –0.32 (*t*-stat=–1.85) and corner kicks difference is –0.59 (*t*-stat=–2.67).

On the whole, all our measures show a sharp deterioration of the performance of home team players and an improvement of away team performance when the home team is not supported by the crowd.

4. Referees' Decisions with and without Spectators

In the previous Section we have shown that crowd support strongly affects players' performance. A wide literature (see, among others, the survey of Dohmen and Sauermann, 2016) has tried to examine how the crowd affects the decisions of the referee.

To evaluate the effects of crowd support on referees' behavior, we now consider some relevant discretionary decisions of officials for the home and away teams: fouls, yellow cards, red cards and (for a reduced sample) penalties.

Starting from descriptive statistics, it emerges that in normal matches home teams receive a much more favorable treatment by referees: Home Team Fouls are 12.98 against 13.38 for the Away Team (difference=–0.40; *t*-stat=–11.54); yellow cards awarded to the home and to the away team are respectively 1.87 vs. 2.18 (difference=–0.31, *t*-stat= –27.88); red cards are given significantly less to the home team (0.09 vs. 0.12, difference=–0.031, *t*-stat=–10.68); finally, penalties for the home team are on average 0.175 while for the away team are 0.133: the difference is +0.041 (*t*-stat=5.50).

We estimate whether there is a significant difference in fouls committed by home and away teams when the match is played behind closed doors, using OLS and running the same specifications of the last 3 Tables. In column (1) and (2) of Table 10, in which we include no controls, we find that fouls committed by the home team increase by 1.03 behind closed doors while away team fouls are 0.30 higher behind closed doors. In column (3) we estimate the difference in fouls committed between home and away team (controlling for league and season fixed effects) and we find that this difference increases by 0.875 (*t*-stat=4.03), that is, behind closed doors fouls committed by the home team become even more frequent than those of the away teams. In column (4) we also control for the strength of the teams (using Home and Away Total Points) and we show that the fouls committed by the home team minus the fouls of the away team increase by 0.870.

Table 10. Fouls Committed and Closed Doors

	(1) Home Fouls Committed	(2) Away Fouls Committed	(3) Fouls Diff.	(4) Fouls Diff.
Closed Doors	1.033***	0.304**	0.875***	0.870***
	(0.143)	(0.149)	(0.205)	(0.205)
Total Points Home				-0.022***
				(0.002)
Total Points Away				0.033***
				(0.002)
Constant	12.984***	13.386***	-0.849***	-1.333***
	(0.029)	(0.029)	(0.154)	(0.210)
League and Season FE	NO	NO	YES	YES
Observations	24340	24340	24340	24340
Adjusted R^2	0.002	0.000	0.004	0.017

Notes: The Table reports OLS estimates. The dependent variable is reported at the top of each column. Standard errors (reported in parentheses) are corrected for heteroskedasticity. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

In Table 11 we conduct a similar exercise for yellow cards awarded by the referee to the home and away teams. In column (1) we see that home team yellow cards increase by 0.328 behind closed doors, while in column (2) we see that away yellow cards reduce by 0.149, both strongly significant.

The difference between home and away yellow cards increases by 0.50 in column (3) and (4) (*t*-stat=7.41) and, as above, we find that for the matches played without crowd the yellow cards awarded to the home team are even higher than those awarded to the away team (+0.16 is the difference for matches played between closed doors).

Table 11. Yellow Cards and Closed Doors

	(1) Home Yellow Cards	(2) Away Yellow Cards	(3) Yellow Cards Diff.	(4) Yellow Cards Diff.
Closed Doors	0.328***	-0.149***	0.500***	0.497***
	(0.049)	(0.046)	(0.067)	(0.067)
Total Points Home				-0.013***
				(0.001)
Total Points Away				0.012***
				(0.001)
Constant	1.876***	2.187***	-0.381***	-0.320***
	(0.009)	(0.009)	(0.045)	(0.064)
League and Season FE	NO	NO	YES	YES
Observations	24340	24341	24340	24340
Adjusted R^2	0.002	0.000	0.003	0.029

Notes: The Table reports OLS estimates. The dependent variable is reported at the top of each column. Standard errors (reported in parentheses) are corrected for heteroskedasticity. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

In Table 12 we analyze red cards. In column (1) we find that red cards for the home team increase by 0.024 behind closed doors, while column (2) shows that away team red cards do not change. The difference

between home and away red cards increases by 0.034 in columns (3) and (4), and this difference is statistically significant (*t*-stat=2.25). Therefore, in matches played behind closed doors red cards for the home and away teams become almost equal.

Table 12. Red Cards and Closed Doors

	(1) Home Red Cards	(2) Away Red Cards	(3) Red Cards Diff.	(4) Red Cards Diff.
Closed Doors	0.024**	-0.009	0.034**	0.034**
	(0.012)	(0.011)	(0.017)	(0.017)
Total Points Home				-0.001***
				(0.000)
Total Points Away				0.001***
				(0.000)
Constant	0.089***	0.120***	-0.020*	-0.005
	(0.002)	(0.002)	(0.012)	(0.017)
League and Season FE	NO	NO	YES	YES
Observations	24341	24341	24341	24341
Adjusted R^2	0.000	-0.000	0.000	0.003

Notes: The Table reports OLS estimates. The dependent variable is reported at the top of each column. Standard errors (reported in parentheses) are corrected for heteroskedasticity. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

Unfortunately, in the dataset that we use data on penalties are not available. To gather these data we use the website www.football-lineups.com, but since data have to be collected team by team, we decide to focus only on the two most recent seasons (2018-19 and 2019-20),[11] gathering a dataset with almost 6,000 observations.

As above, in Table 13 we first regress penalties awarded to the home team on the dummy *Closed Doors* and we find that home team penalties have increased of 0.24 (*t*-stat=1.50). In column (2) we use as a dependent variable the number of penalties for the away team and we find that these are increased by 0.046 (*t*-stat=2.94). In column (3) and (4) we use the difference in penalties awarded to the home and away team and we find that this difference decreases of 0.023 (that is, the pre-existing difference in penalties is more than halved) but the effect is not statistically significant (*t*-stat=–1.03).

[11] Moreover, penalties for the Spanish second division are not available.

Table 13. Penalties and Closed Doors

	(1) Home Penalties	(2) Away Penalties	(3) Penalties Diff.	(4) Penalties Diff.
Closed Doors	0.024	0.046***	-0.022	-0.023
	(0.016)	(0.016)	(0.022)	(0.022)
Total Points Home				0.003***
				(0.000)
Total Points Away				-0.002***
				(0.000)
Constant	0.175***	0.133***	0.041***	0.005
	(0.006)	(0.005)	(0.007)	(0.037)
League and Season FE	NO	NO	YES	YES
Observations	5940	5940	5940	5940
Adjusted R^2	0.000	0.002	0.000	0.009

Notes: The Table reports OLS estimates. The dependent variable is reported at the top of each column. Standard errors (reported in parentheses) are corrected for heteroskedasticity. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

An important question, which is not easy to tackle in a rigorous way, is whether the decisions of the referees – which turn out to be more or less balanced in matches behind closed doors – are the direct consequences of the absence of the crowd or are affected indirectly by the fact that the home team (as we have seen in Section 3) without the support of the crowd is less aggressive and its play has lower intensity.

In fact, typically fouls committed, yellow and red cards are correlated to the performance of the opposing teams, in that a team playing more offensively tend to receive less disciplinary sanctions and viceversa (see Dawson et al., 2007). In normal matches, for example, home team yellow cards are negatively correlated to home team shots and positively correlated to away team shots.

Therefore, it is interesting to analyze how the referee's decisions would have changed taking as constant – in a regression analysis – the performance of the teams. Obviously, this is only a suggestive analysis since it is difficult to separate teams' performance from referee's decisions, variables that are jointly determined, but to the extent that shots and corners are affected only in part by referee's decisions, this analysis might provide some interesting answers.

First of all, using shots, shots on target and corners we build through a Principal Component Analysis a synthetic measure of *Home Performance* (using only the first component) and we build *Away Performance* in an analogous way.

Then, we re-run specification (4) of previous 4 Tables (with league and season fixed effects) to see how closed doors affected referee's decisions but this time we control for the synthetic measures of home and away performance. The estimates are reported in Table 14. As expected, we find that a better performance of the home team strongly reduces disciplinary sanctions (and increase penalties) and viceversa for the away team performance. More importantly, controlling for these measures we find that *Closed Doors* has a strong impact on the referee's decisions regards *Fouls* (col. 1) and *Yellow Cards* (col. 2) – the magnitude of the effect is only slightly reduced.

On the other hand, once we control for teams' performance we find that red cards and penalties are affected as expected, but their impact is a little lower in magnitude but no longer statistically significant. It is worthwhile to notice that penalties and red cards represent rather rare events (1 or 2 events for each 10 matches) and this could in part explain why it is difficult to find a significant effect.

Table 14. Referees Decisions Controlling for Teams' Performance

	(1) Fouls Diff.	(2) Yellow Cards Diff.	(3) Red Cards Diff.	(4) Penalties Diff.
Closed Doors	0.818***	0.471***	0.017	-0.015
	(0.205)	(0.067)	(0.017)	(0.022)
Home Performance (pca)	-0.127***	-0.065***	-0.043***	0.017***
	(0.028)	(0.009)	(0.002)	(0.006)
Away Performance (pca)	0.192***	0.085***	0.044***	-0.027***
	(0.026)	(0.008)	(0.002)	(0.006)
Constant	-1.349***	-0.326***	-0.008	0.012
	(0.210)	(0.063)	(0.017)	(0.037)
League and Season FE	NO	NO	YES	YES
Observations	24340	24340	24341	5938
Adjusted R^2	0.020	0.036	0.039	0.015

Notes: The Table reports OLS estimates. The dependent variable is reported at the top of each column. Standard errors (reported in parentheses) are corrected for heteroskedasticity. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

5. Concluding Remarks

Social pressure is an important determinant of individual behavior in many contexts but it has been hard to identify it empirically. A growing literature is showing – through randomized or natural experiments – that when individuals are observed, interact or are judged by others, the former tend to change their behavior.

In this paper we have exploited a natural experiment related to the Covid-19 pandemic that induced many governments to permit sports events only behind closed doors. We have used data on soccer from 5 top European Leagues to provide clear evidence on the effect of social pressure from the crowd in the stadiums on players' performance and referees' decisions, essentially comparing a number of outcomes at the match level when the crowd is supporting the home team and when the match is played without crowd. With respect to the existing literature, we exploit a truly exogenous change in crowd size, arguably unrelated to any determinants of the relative performance of the opposing teams.

We have found strong evidence of the impact of the crowd on individual behavior. All our measures (points, goals, shots, shots on target, corner kicks) show a sharp deterioration of the performance of home team players and an improvement of away team performance when the home team is not supported by the crowd. For example, the home advantage in points – a rather stable difference (across leagues and time) between the points earned by the home team with respect to those earned by the away team – decreased by nearly 50%, from 0.50 in normal matches to 0.28 in matches played without crowd.

We have also found that the impact of closed doors is not much different between first and second divisions and that most of the effect of the crowd occurs in the second half of the match.

We have also investigated if the crowd has an impact on referee's decisions and we have shown that the sharp differences in many discretionary decisions (fouls, yellow and red cards, penalties) favoring the home team in matches with the crowd are more than cancelled in matches played behind closed doors. We have also provided some suggestive evidence that the balanced decisions of the referee in matches without spectators are mostly the direct effect of the absence of the crowd rather than the result of a lower intensity play and lower aggressiveness of the home team.

The results of our paper contributes to the empirical literature showing that individual behavior is not driven only by monetary rewards as assumed in traditional economic theories but psychological elements and social contexts can strongly affect individual performance and decisions.

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APPENDIX

Table A1. Number of Observations for Season and League.

Season	D1	D2	E1	E2	I1	I2	P1	SP1	SP2	Total
10-11	306	306	380	552	380	462	240	380	462	3,468
11-12	306	306	380	552	380	462	240	380	462	3,468
12-13	306	306	380	552	380	462	240	380	462	3,468
13-14	306	306	380	552	380	462	240	380	462	3,468
14-15	306	306	380	552	380	462	306	380	462	3,534
15-16	306	306	380	552	380	462	306	380	462	3,534
16-17	306	306	380	552	380	462	306	380	462	3,534
17-18	306	306	380	552	380	462	306	380	462	3,534
18-19	306	306	380	552	380	342	306	380	462	3,414
19-20	306	306	380	552	380	380	306	380	462	3,452
Total	3,060	3,060	3,800	5,520	3,800	4,418	2,796	3,800	4,620	34,874

Notes: D: Germany; E: England; I: Italy; P: Portugal; SP: Spain. 1 stands for First Division; 2 stands for Second Division.
Source: http://www.football-data.co.uk/

Table A2. Home Advantage Behind Closed Doors. Order Probit Estimates

	(1) Crowd	(2) Closed Doors	(3) Home Team	(4) Away Team	(5) All
Home	0.452***	0.246***			0.451***
	(0.012)	(0.076)			(0.012)
Closed Doors			-0.101***	0.101***	0.101***
			(0.039)	(0.039)	(0.039)
Home*Closed Doors					-0.202***
					(0.078)
Cut1	-0.128***	-0.205***	-0.579***	-0.127***	-0.127***
	(0.007)	(0.042)	(0.007)	(0.007)	(0.007)
Cut2	0.580***	0.451***	0.127***	0.579***	0.579***
	(0.007)	(0.043)	(0.007)	(0.007)	(0.007)
Observations	67870	1834	34852	34852	69704
Pseudo R^2	0.018	0.005	0.000	0.000	0.018

Notes: The Table reports Ordered Probit estimates. The dependent variable is *Points*. Standard errors (reported in parentheses) are corrected for heteroskedasticity and allowing for clustering at the match level. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

Table A3. Probability of Winning the Match. Linear Probability Model

	(1) Crowd	(2) Closed Doors	(3) Home Team	(4) Away Team	(5) All
Home	0.168***	0.093***			0.168***
	(0.005)	(0.028)			(0.005)
Closed Doors			-0.030*	0.045***	0.045***
			(0.017)	(0.016)	(0.016)
Home*Closed Doors					-0.075***
					(0.029)
Constant	0.281***	0.326***	0.449***	0.281***	0.281***
	(0.002)	(0.015)	(0.003)	(0.002)	(0.002)
Observations	67870	1834	34852	34852	69704
Adjusted R^2	0.030	0.009	0.000	0.000	0.030

Notes: The Table reports LPM estimates. The dependent variable is the dummy *Win*. Standard errors (reported in parentheses) are corrected for heteroskedasticity and allowing for clustering at the match level. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.