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The Night Owl Effect in the Premier League

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At a Glance

A novel dataset of all the fixtures in the English Premier League's 2021/2022 season is used to analyse the impact which kick-off time has on home advantage. Results show that late kick-offs significantly increase home advantage. During late kick-offs, home teams are significantly more likely to win fixtures and win fixtures by greater margins compared to early kick-offs. Furthermore, away teams are significantly less likely to keep clean sheets in middle-of-the-day and late kick-offs compared to early kick-offs. The night owl effect is proposed as a term to refer to this finding where late kick-offs facilitate increased home advantage.

Keywords: Football, English Premier League, Fair competitive structure, Performance analysis, Home advantage

Introduction

Home advantage is a very well acknowledged concept within sports economics literature. A greater percentage of a team's wins tends to come from their home fixtures rather than their away fixtures,[1] meaning that the number of home and away games a team must play during a season should be considered a significant determinant of fairness in league competitions. If teams play equal numbers of home and away matches, as is done in the Premier League, then theoretically it could be assumed that home advantage is distributed evenly. However, this fails to take into account the role of kick-off time, which Krumer[2] finds can influence home advantage.

The conceptual reasoning for home advantage is attributed to crowd effects – the psychological impact which crowds have on players and officials.[3] Conceptually, there are two reasons kick-off time could impact home advantage. Firstly, many sport spectators will consume alcohol at sporting events[4] and alcohol consumption can increase aggressive/violent behaviour in sports' spectators.[5] Later kick-off times could potentially facilitate greater levels of alcohol consumption among crowds and, thus, create more hostile atmospheres for away

teams. Secondly, later kick-off times can decrease the demand for fixtures due to the increased costs/difficulties associated with attending them.[6] Thus, away teams may have fewer travelling supporters for later kick-offs, which would provide a reduced amount of psychological support for away teams via crowd effects. Consequently, there could be significant differences in the impact which home advantage has on fixtures with kick-off at different times.

The Premier League is the top tier men's football/soccer competition in England. Kick-off times in the Premier League take place throughout the entire day and can start as early as 12/12:30 or as late as 20:00,[7] meaning there is quite a lot of variation between kick-off times which could facilitate scheduling effects. This paper uses publicly available Premier League and Transfermarkt data to analyse the relationship between kick-off time and home advantage in the 2021/2022 Premier League season. This can be considered an appropriate season to analyse due to the lifting of COVID restrictions, which would have significantly reduced crowd attendance in the two previous seasons. Krumer[2] provides one of the only contributions to this area and finds that home advantage decreases in Europa league football fixtures kicking off at 21:05 (CET) instead of 19:00 (CET). While this is an important contribution, it only analyses kick-off times taking place during the evening/night, which vary by just 2 hours and 5 minutes. Comparatively, kick-off times in the Premier League take place throughout the entire day and can vary by as much as 8 hours and 15 minutes.[7]

Variation in Kick-Off Times

Throughout the course of the Premier League season there are normally ten fixtures per matchweek and these usually take place over the course of three matchdays. Fixtures are typically spread out over the course of weekends with Saturday, Sunday, and Friday (or Monday) fixtures.[7] Saturday fixtures generally kick-off at 12/12:30, 15:00, and 17:30 (GMT), while Sunday games will typically kick-off at 14:00 and 16:30 (GMT). Both Friday and Monday fixtures typically kick-off at 19:30, 19:45 or 20:00 (GMT). This analysis groups these kick-off times into early (12/12:30), middle-of-the-day (14:00 to 16:30), and late kick-offs (after 16:30). A breakdown of these kick-off times for the 2021/2022 Premier League Season can be seen below in Table 1. Kick-off times have all been directly sourced from BPL.[7]

Kick-Off Times:	Frequency:	Percent:
12/12:30	31	8.16
14:00 to 16:30	226	59.47
After 16:30	123	32.37
Total	**380**	**100**

Table 1: Premier League Kick-Off Times 2021/2022 Season.

As can be seen above, the most common kick-off time in the Premier League is the middle-

of-the-day kick-off (59.47%). This fixture generally takes place on Saturday during the black-out period, where live matches cannot be broadcast in the UK.[8] The second most common and least common kick-off times are the late (32.37%) and early (8.16%) kick-off times respectively. A point of note regarding these kick-off times is that they are not equally allocated amongst all teams. The 'Big Six' teams (Arsenal, Chelsea, Liverpool, Manchester City, Manchester United, and Tottenham Hotspur) seem to get fewer 15:00 kick-offs than other teams. This could potentially be attributable to the higher demand for the fixtures which the Big Six are involved in. This higher demand seems to result in fixtures involving the Big Six teams kicking off at times where they can be televised, meaning the fixtures involving the Big Six teams tend to be played outside the 14:45 - 17:15 black-out period on a Saturday so that they can be broadcast.

Kick-Off Times:	Frequency:	Percent:
12/12:30	27	13.64
14:00 to 16:30	96	48.48
After 16:30	75	37.88
Total	**198**	**100**

Table 2: Premier League Kick-Off Times 2021/2022 Season for the Big Six Teams.

As can be seen above, the Big Six teams play far fewer games which might take place within the Saturday blackout period. Subsequently, this means the Big Six clubs play far more games early and late than they do in the middle-of-the-day compared to non-Big Six clubs, illustrating that the allocation of kick-off times are not evenly distributed across all teams in the Premier League.

Analysis

In order to examine how kick-off time influences home advantage, ordered probit and probit statistical estimation tests are performed on 4 separate variables which indicate the performance of the home and away teams. These include (i) the number of points the home team received (3 for win, 1 for draw, and 0 for loss), (ii) the marginal result of the home team (lost by 3 or more goals, lost by 2 goals, lost by 1 goal, drew, won by 1 goal, won by 2 goals, or won by 3 or more goals), (iii) a binary variable which indicates whether the home team kept a clean sheet (did not concede a goal), and (iv) a binary variable which indicates whether the away team kept a clean sheet. The probit test estimates the influence which a late kick-off variable has on the likelihood of a binary event occurring e.g., a team not conceding a goal. Meanwhile, the ordered probit test can estimate the influence which a late kick-off variable has on influencing ordered outcomes occurring e.g., a team accumulating 0, 1, or 3 points in a match. These tests are performed while also controlling for the difficulty of the fixture for the home team, crowd

attendance, geographical distance between teams, red cards for the home team, red cards for the away team, mean relative age of the home team compared to the away team, and the time of the season the fixture takes place in.

Three key findings emerge from this analysis. These are (i) later kick-offs increase the likelihood of a home team win,(ii) later kick-offs increase the margin by which a home team wins, and (iii) later kick-offs decrease the likelihood the away team will keep a clean sheet. Marginal effects estimations show that home teams are nearly 15% more likely to accumulate 3 points (win the match) in later kick-offs compared to early kick-offs. Results regarding the marginal result of a home team during a late kick-off can be seen below in Figure 1.

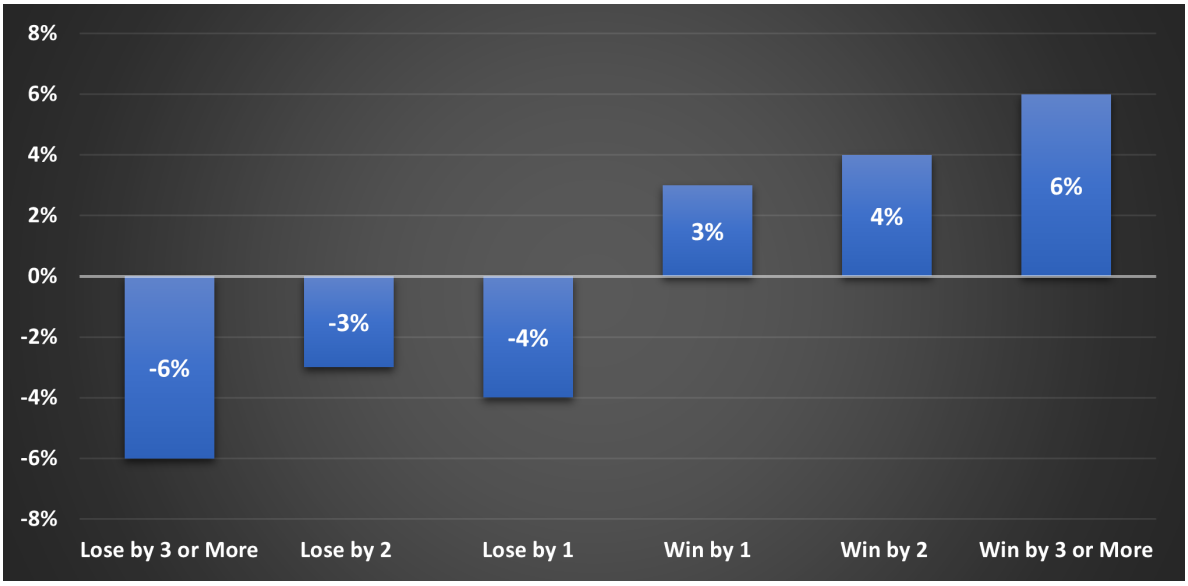

Figure 1: Likelihood of a Specific Result Occurring for a Home Team During a Late Kick-Off Compared to an Early Kick-Off. Note 1: The above percentages are based off the dy/dx marginal effects calculations performed. Note 2: There is no statistically significant relationship between the likelihood of a home team drawing and whether a fixture is a late kick-off. As a result, draw is not presented in the above graph.

Home teams are also 6% more likely to win the fixture by three or more goals in late kick-offs compared to early kick-offs. Accordingly, the home team is also just under 15% less likely to lose the match and 6% less likely to lose by 3 or more goals in later kick-offs compared to early kick-offs. Finally, while late kick-offs seem to have no significant impact on the home team's likelihood of keeping a clean sheet, they do reduce the likelihood the away team will keep a clean sheet by just over 26%. Additionally, away teams are also 24% less likely to keep a clean sheet during middle-of-the-day kick-offs (14:00 – 16:30).

Ultimately the results of this analysis suggest that home advantage is intensified in the Premier League by later kick-offs. For ease of discussion this intensifying of home advantage due to later kick-off times will hitherto be referred to as a night owl effect. Conceptually, this could be attributable to late kick-offs negatively impacting away fan attendance due to decreased demand,[9] or later kick-offs facilitating greater alcohol consumption among fans as alcohol consumption is generally a part of the night-time economy.[10]

Conclusion

This paper conducts an empirical analysis of the effect which kick-off time has on home advantage in the Premier League 2021/2022 season. Results indicate that later kick-offs significantly increase home advantage. The night owl effect is proposed as a term to refer to this finding where later kick-off times increase home advantage. During later kick-offs, home teams are significantly more likely to win fixtures and win fixtures by greater margins compared to early kick-offs. Furthermore, away teams are significantly less likely to keep clean sheets in later kick-offs compared to early kick-offs.

Implications emerging from this research suggest that teams which have a relatively small allocation of late away games and a relatively large allocation of late home games could be considered advantaged. Theoretically, this advantage could be removed by playing all fixtures at the same time. In reality, this may not be possible due to logistical and broadcasting issues. Therefore, the Premier League could consider significantly reducing the variation between kick-off times so as to mitigate against the night owl effect. For example, spreading fixtures out over the entire match-week with ten fixtures played over five matchdays would reduce the level of variation between kick-off times compared to the Premier League's current format of ten fixtures played over just three matchdays.[7] Weekend fixtures could be prioritised for clubs playing in European competitions which require teams to play midweek.

While this paper has made a contribution to the home advantage literature, it is not without its own limitations. The results from this paper apply specifically to Premier League football teams. Examinations of how kick-off time influences home advantage in other divisions and sports would provide useful results to further the understanding of night owl effects. Additionally, this analysis attributes the existence of the night owl effect to later kick-off times intensifying the crowd effects which support home teams and weakening the crowd effects which support away teams. However, the analysis is unable to identify exactly whether it is the case that home teams play better or away teams play worse during late kick-offs. Qualitative analyses could provide more in-depth examinations of fixtures and find out how much of this effect relates to improved home team performances or poorer away team performances.

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Declaration of Interests

There are no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Author Bio

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