

Research Article

C.J.(Chaojie) Duan*

How Much Does Home-Field Advantage Matter in Professional Soccer?

A Multilevel Bayesian Investigation

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Abstract: Using 2001 to 2017 seasonal data,, we fit a Bayesian multilevel nested model to the parameters in a Home-Field Advantage (HFA) model, allowing information obtained from the team level to inform the inferences at the upper league and sport levels.

Keywords: European Professional Soccer Leagues, Home Field Advantage, Poisson generative process, Stan

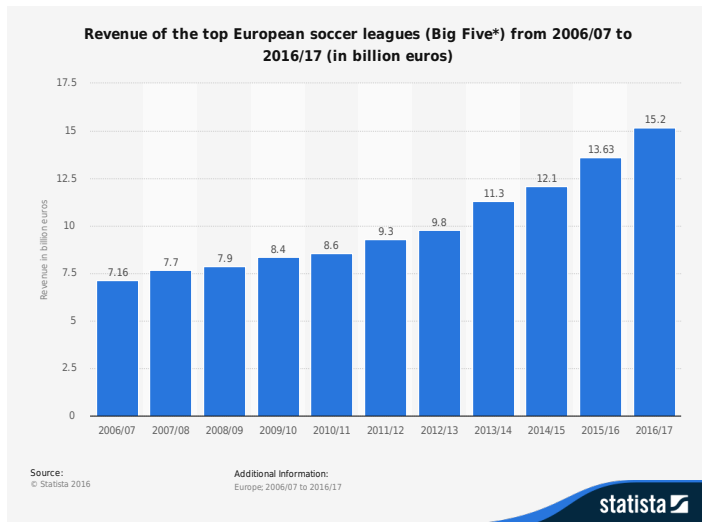
1 Introduction

In professional team sports, the term home field advantage (HFA) – also called home advantage, home ground or home court advantage, defender’s advantage, home-ice advantage – describes the benefit that the home team is believed to gain over the visiting opponent. Its scientific definition is “the consistent finding that home teams in sport competition win over 50% of the games played under a balanced home and away schedule” (Courneya and Carron, 1992, p. 13). Due to the existence of HFA, many vital games, such as playoff or elimination matches, in major professional sports have special rules for determining which match is played at which place. In particular, the Union of European Football Associations (UEFA) institutionalized the ruling that a second leg of any Champions League knock-off series is favorable to playing away with the the scores still in balance after the first leg competition (Atkins, 2013).

A second motivator for this study is related to the hotly debated topic of home field advantage (HFA) in soccer competition. The contributions we made in this paper are (1) highlighting the different generative process underlying most sports performance metrics and suggesting corresponding solutions. (2)

*Corresponding author: C.J.(Chaojie) Duan, Dulun Consulting Group, research@dulun.com

Fig. 1: Revenue of the top European soccer leagues (Big Five*) from 2006/07 to 2016/17 (in billion euros)



investigating the long and firmly held belief of HFA simultaneously at sport, league, team levels. (3) using season performance data to rule out incidental game specifics.

2 Review of Literature

3 Data and Analyses

3.1 Sources

Tab. 1: Descriptive Statistics

	Mean	Median	Std. Dev.	Min.	Max.	Skewness	Kurtosis
MHG	3.634	4	1.676	0	9	0.246	0.034
MAG	2.884	3	1.676	0	10	0.627	0.786

Fig. 2: The Hierarchical Model of Home Field Advantage

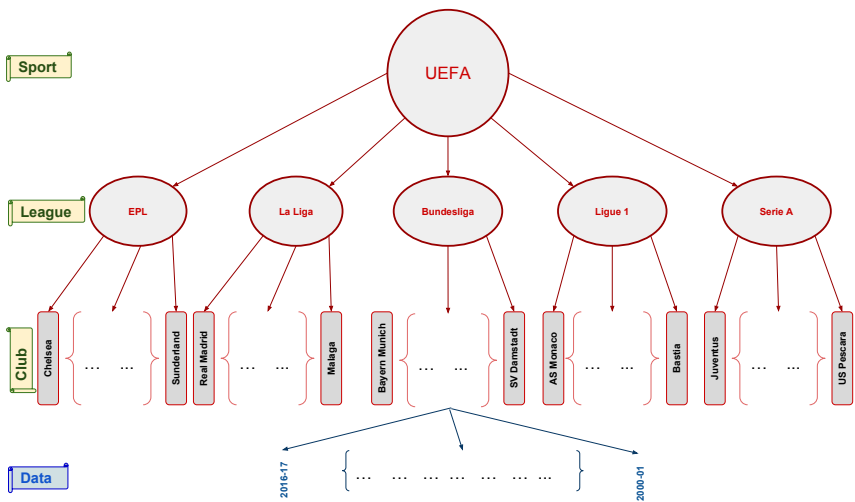
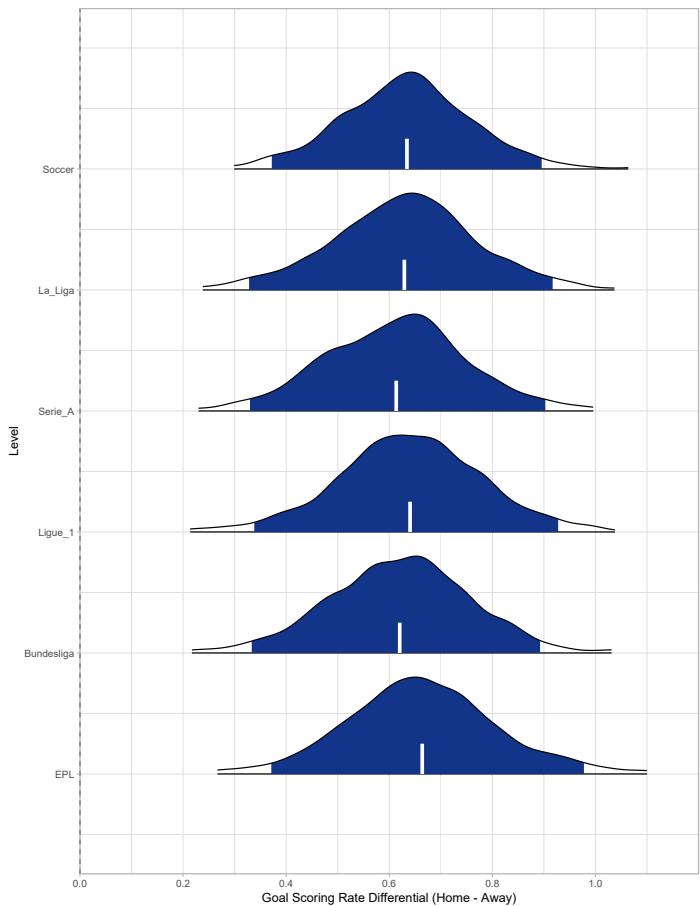


Fig. 3: Home Field Advantage Posterior Plot at Sport and League Levels



3.2 Results

Acknowledgment: We would like to thank ESPN FC for compiling the season-level club performance data and allow public access.

Fig. 4: Home Field Advantage Posterior Plot for La Liga Teams

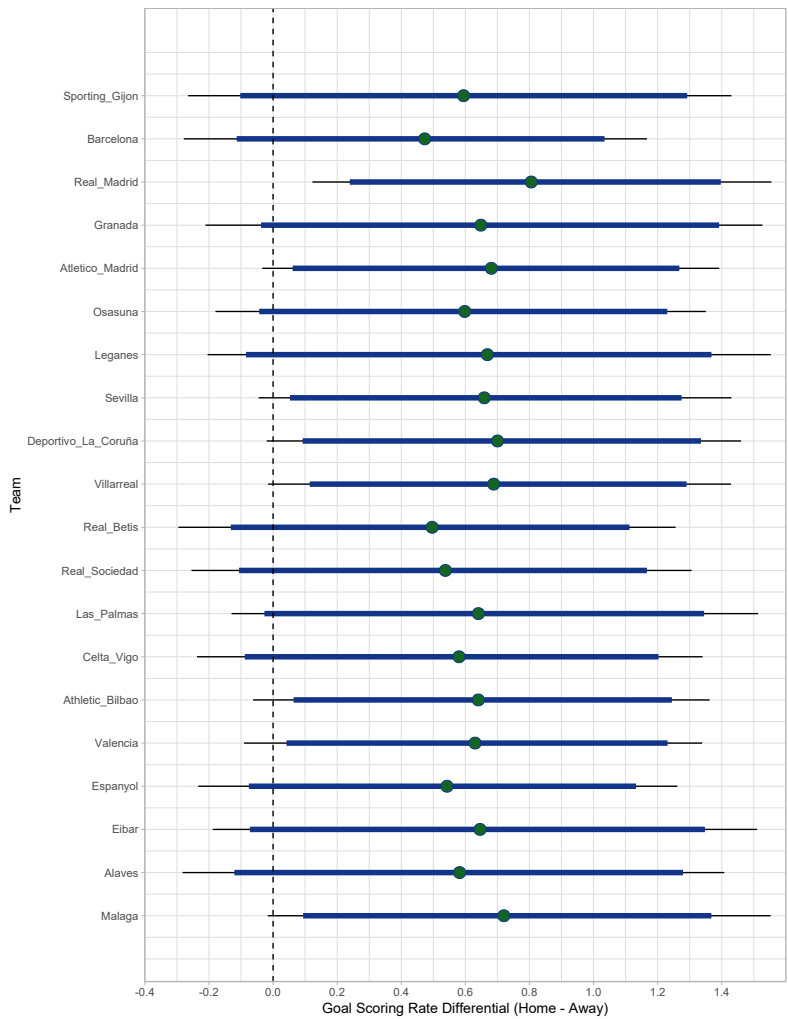


Fig. 5: Home Field Advantage Posterior Plot for Serie A Teams

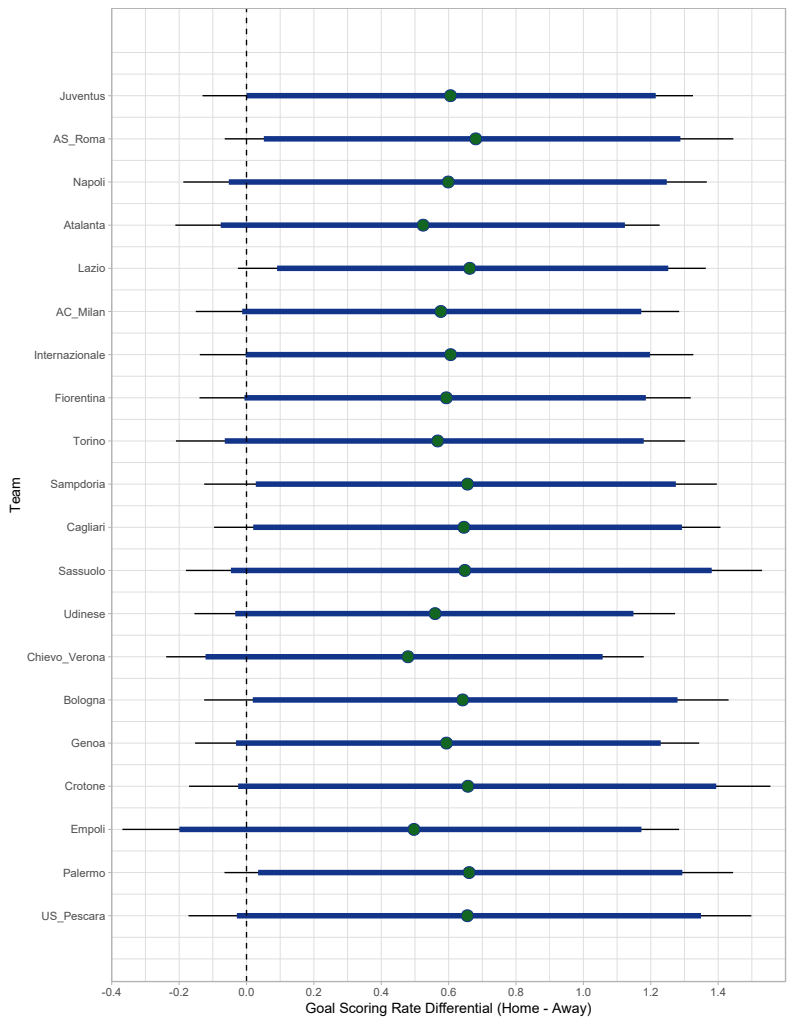


Fig. 6: Home Field Advantage Posterior Plot for Ligue 1 Teams

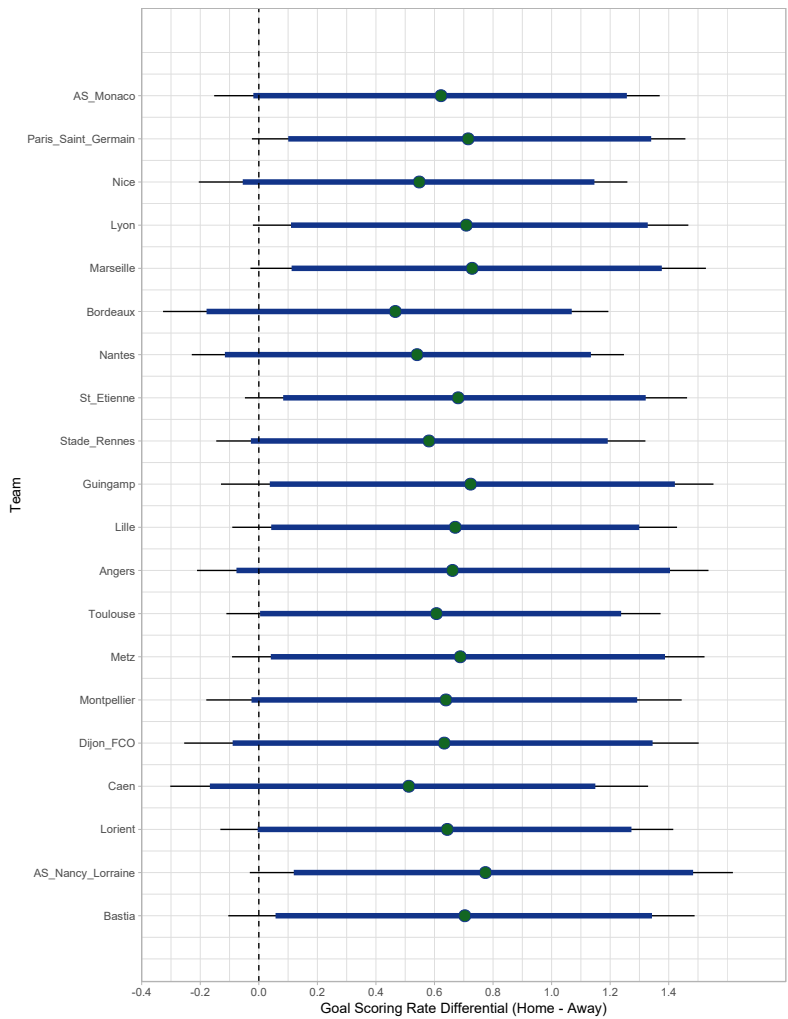


Fig. 7: Home Field Advantage Posterior Plot for Bundesliga Teams

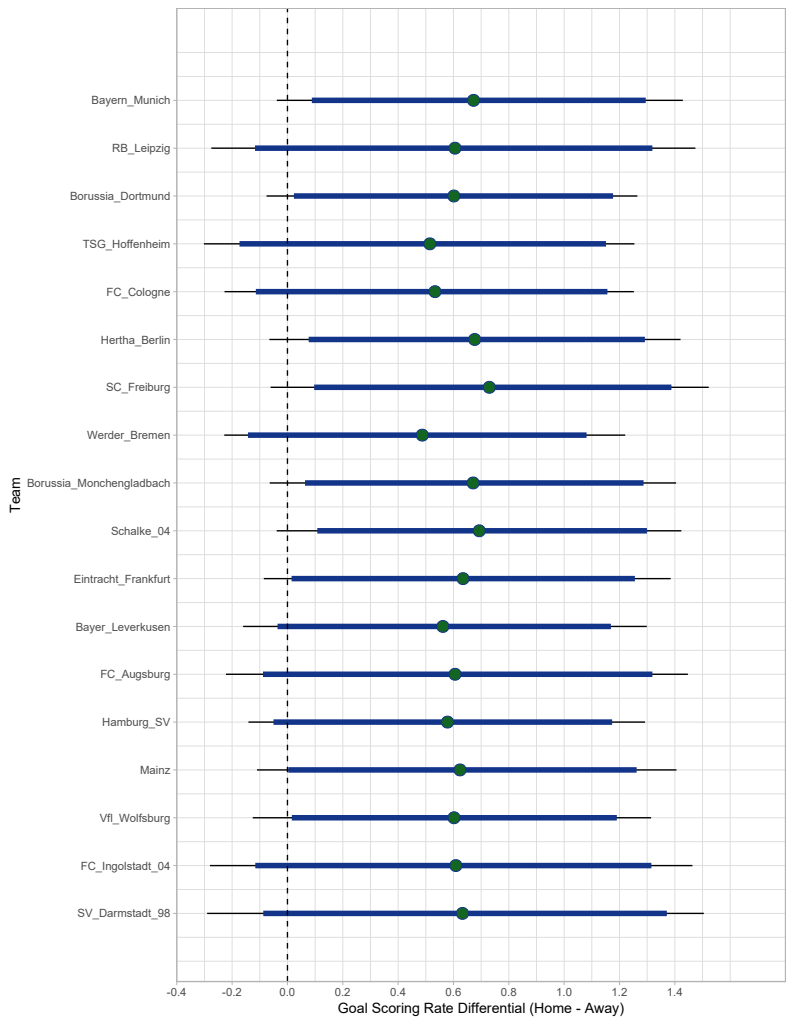
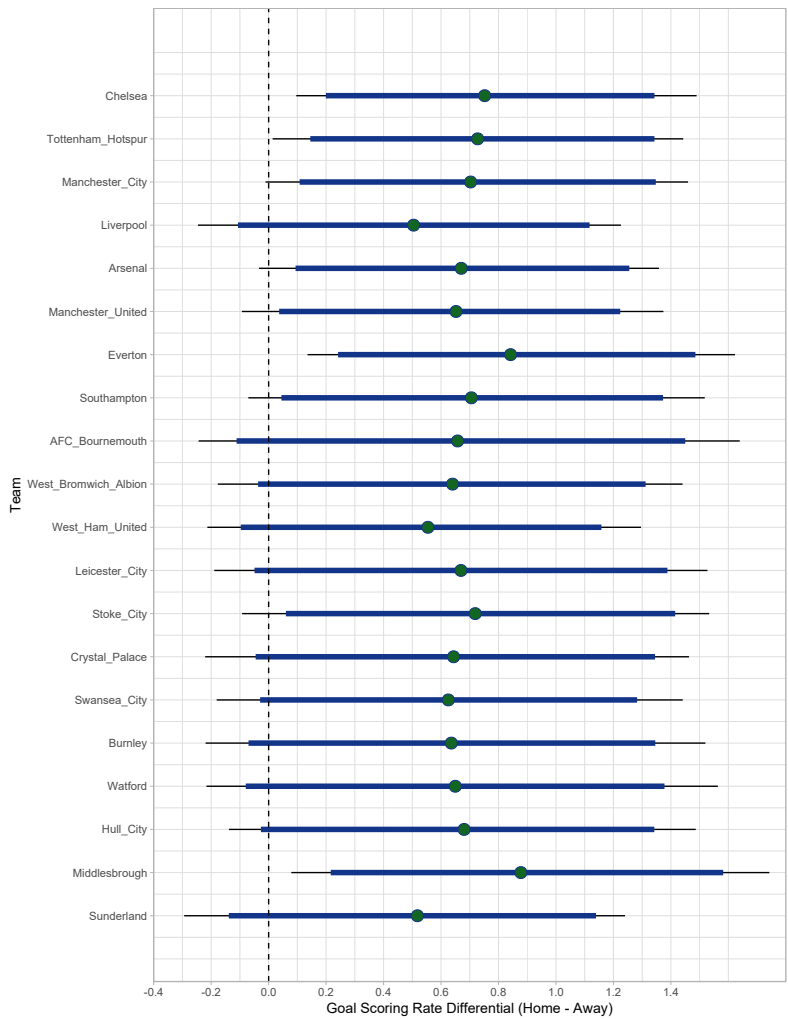


Fig. 8: Home Field Advantage Posterior Plot for English Premier League Teams



References

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