Research Article

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

A Multi-League Bayesian Investigation

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.
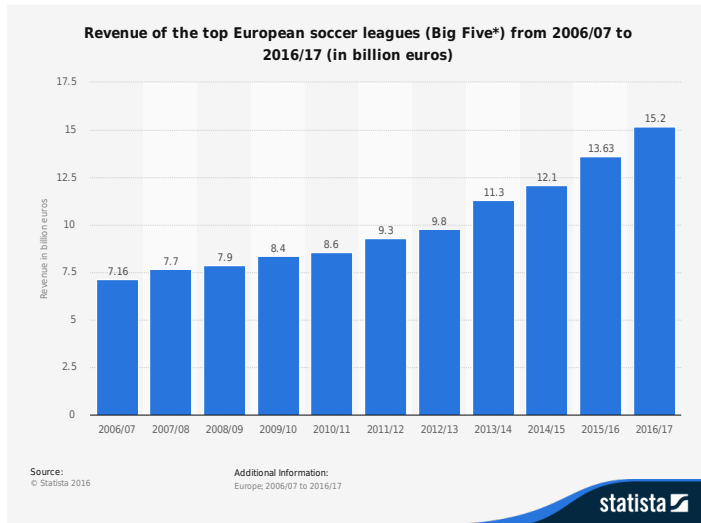
1 Introduction

Accompanying the wide-spreading notoriety in the general populace is the ever-increasing availability and volume of data associated with games, players, teams, and sports.

(Gajewski, 2006) (Carron et al., 2005)

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) 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.

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

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

2 Review of Literature

2.1 Data and Analyses

2.2 Sources

2.3 Results

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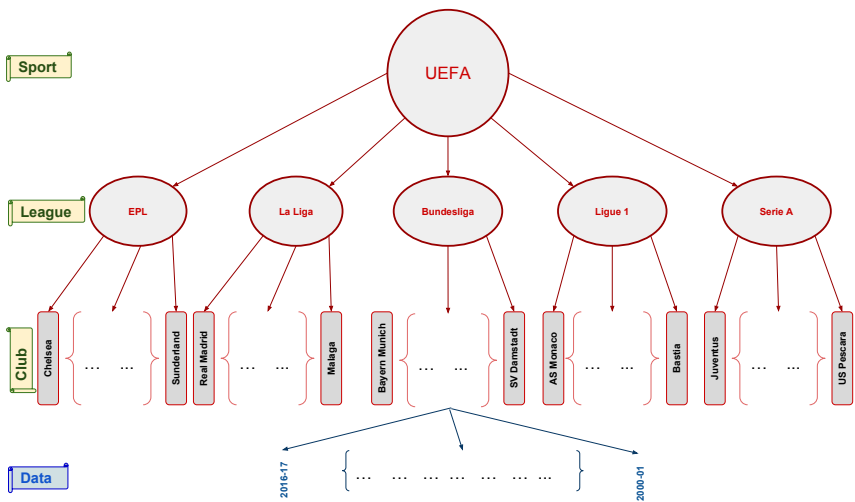
Fig. 2: The Hierarchical Model of Home Field Advantage

Fig. 3: Home Field Advantage Posterior Plot at Sport and League Levels
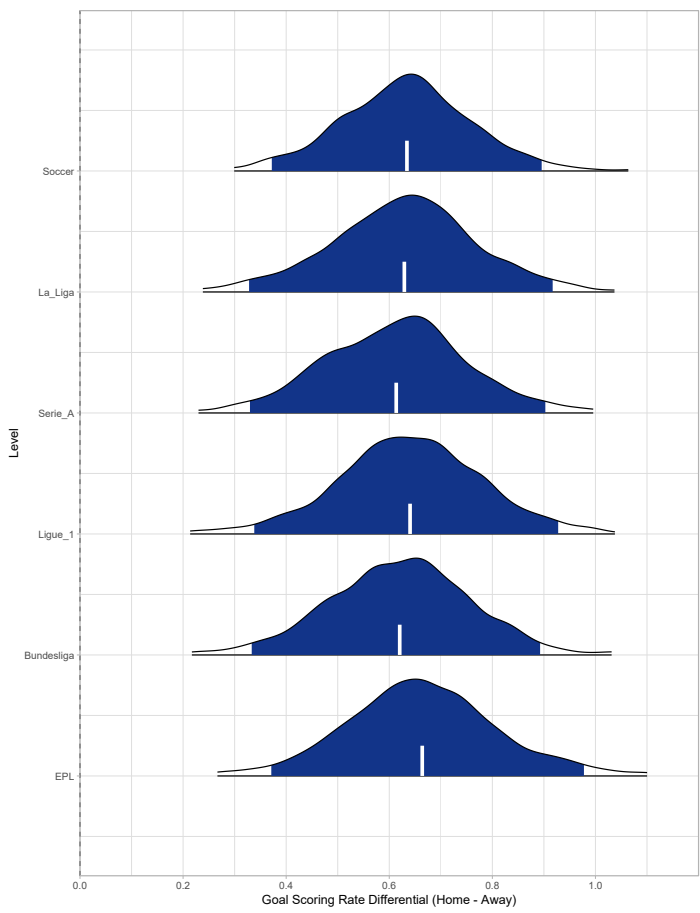
Fig. 4: Home Field Advantage Posterior Plot for La Liga Teams
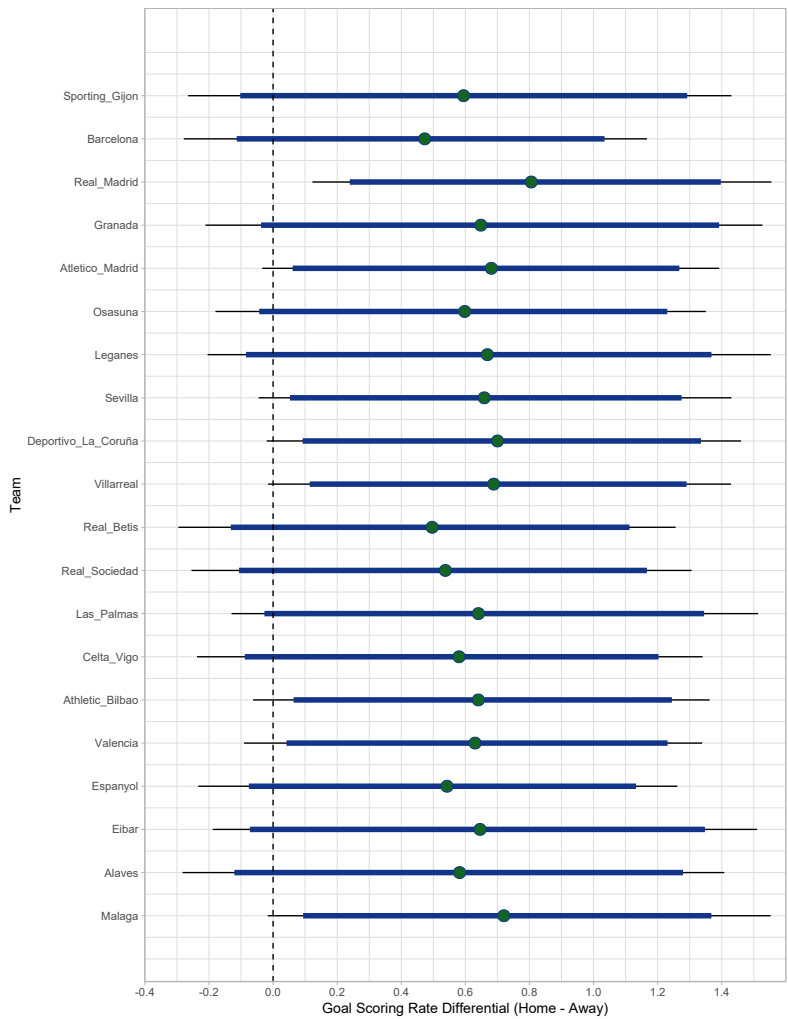
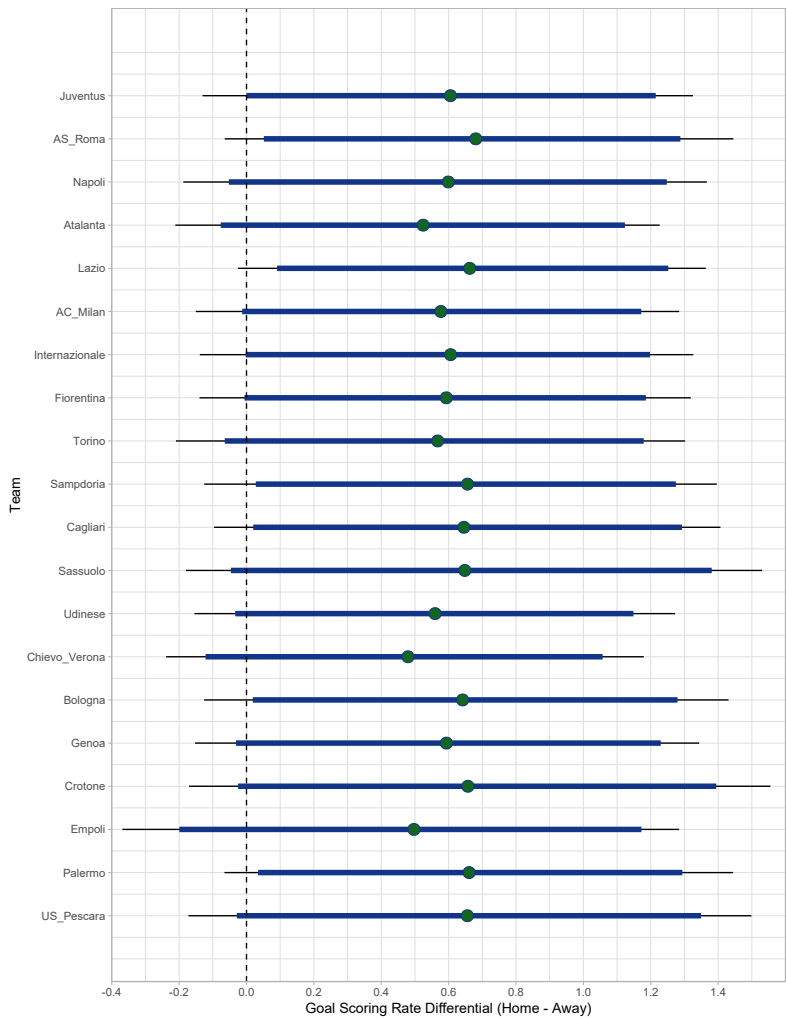**Fig. 5:** Home Field Advantage Posterior Plot for Serie A Teams

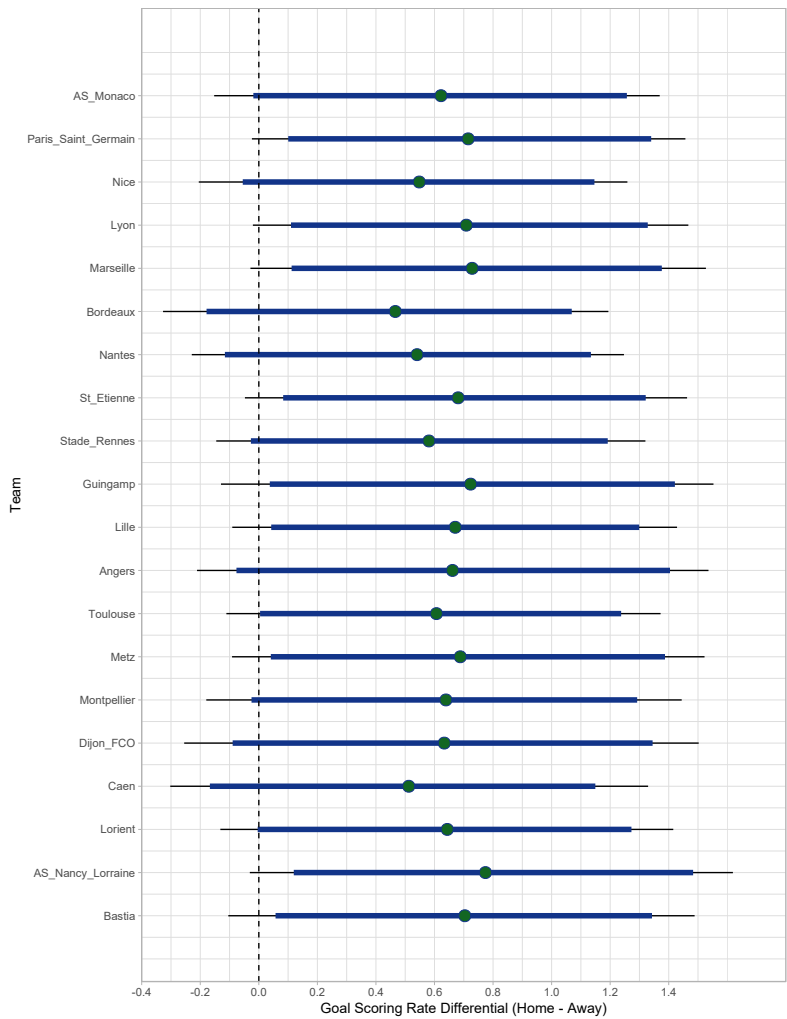**Fig. 6:** Home Field Advantage Posterior Plot for Ligue 1 Teams

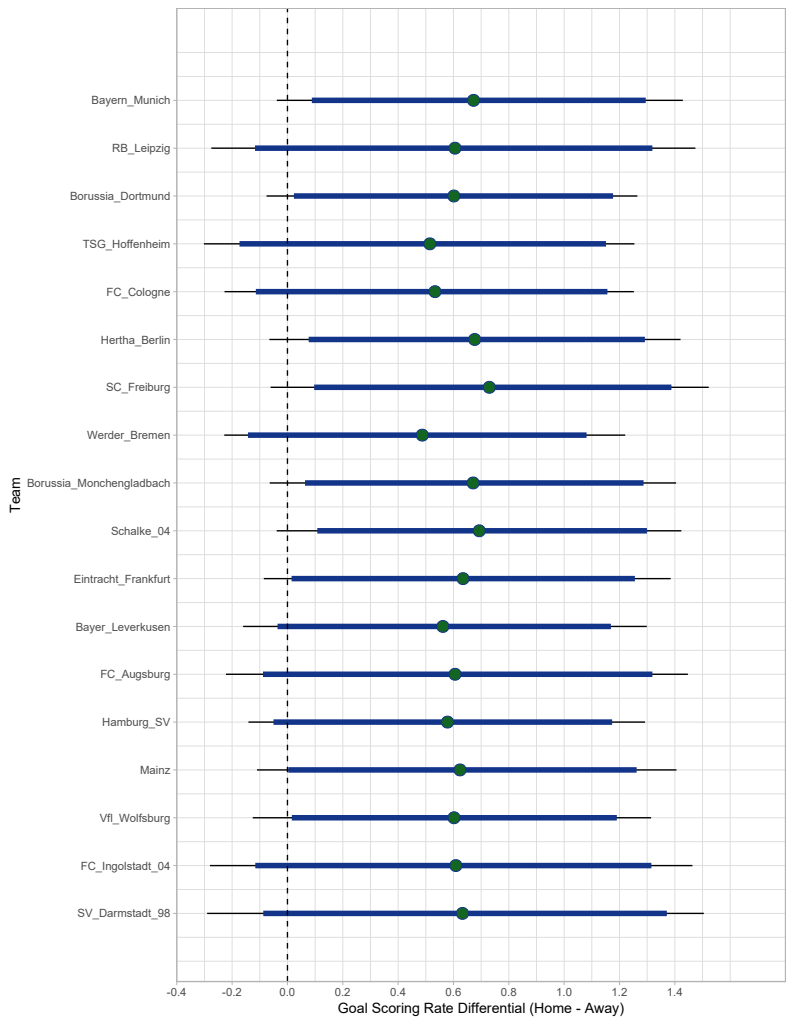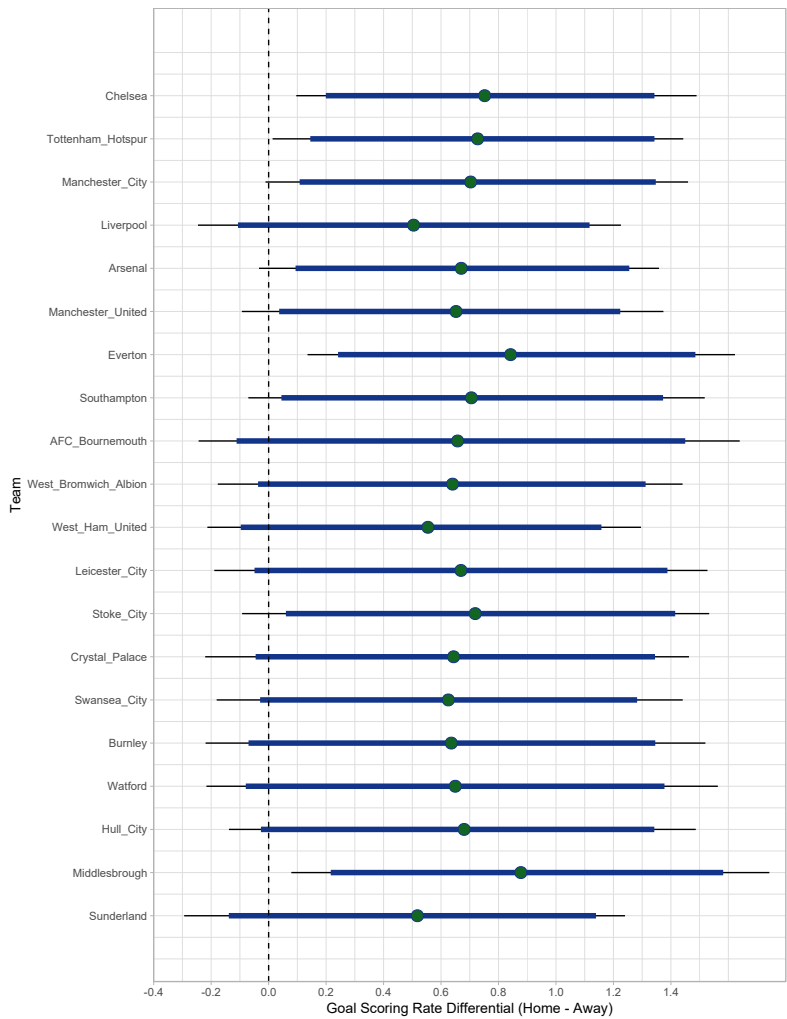**Fig. 7:** Home Field Advantage Posterior Plot for Bundesliga Teams

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

References

Carron, A. V., Loughhead, T. M., and Bray, S. R. (2005). The home advantage in sport competitions: Courneya and carron's (1992) conceptual framework a decade later. *Journal of Sports Sciences*, 23(4):395–407.

Gajewski, B. J. (2006). There's no place like home: Estimating intra-conference home field advantage in college football using a bayesian piecewise linear model. *Journal of Quantitative Analysis in Sports*, 2(1).