

Thesis Proposal: Do Stronger Teams Become More Defensive After Taking the Lead in Football?

Project ID: Become_Defensive_After_TakingtheLead

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July 17, 2026

In football, taking the lead may change a team's strategic incentives to defending deeper and relying more on counterattacks to protect its advantage. Although this behaviour is commonly described as "protecting the lead" or "parking the bus," it remains unclear how defensive adaptation should be quantified and whether stronger and weaker teams respond differently after taking the lead. Several studies have reported that teams tend to increase possession when trailing and reduce possession when leading [4, 3], although this pattern may depend on the team and opposition strength and match context [1, 5]. Moreover, reduced possession alone does not necessarily indicate that a team has deliberately adopted a more defensive strategy.

Defensive adaptation may instead involve deeper positioning, greater compactness, lower pressing intensity, fewer attacking actions, or greater reliance on counterattacks. A team may also protect its lead through possession-based control rather than by retreating towards its own goal. Team strength may influence these responses. While stronger teams may be able to dominate possession after taking the lead, they may also choose to be particularly effective at reducing risk and managing the match. Weaker teams may defend more deeply because they are unable to maintain possession against a stronger opponent. Their apparent defensive adaptation may therefore be partly imposed by the opposing team rather than deliberately selected.

Guan et al. [2] used the area occupied by a team as an indicator of defensive cautiousness and found that teams became more cautious when holding a one-goal lead, particularly when the leading team was weaker. Although this provides a useful starting point, defensive behaviour is multidimensional and cannot necessarily be represented by a single spatial

measure. It is therefore necessary to first determine how defensive behaviour can be validly quantified using event, and/or positional data.

Research questions. The thesis will investigate:

- **RQ1 – Quantification of defensive behaviour.** Which indicators can be used to quantify defensive playing styles, and which can be reliably derived from the available data?
- **RQ2 – Team strength.** For which magnitude of relative team strength differences do we see an increased defensive behaviour after taking the lead?
- **RQ3 – Match influence.** What is the effect of changed strategy in terms of match results and/or created/received xG per period?

Methodology. The student will first review how defensive behaviour has been quantified in previous football research and select a small set of indicators that can be derived reliably from the available data (e.g., Statsbomb data).

The analysis will compare team behaviour within (fixed) periods before and after the goals that change the scoreline from level to a one-goal lead. Relative team strength can be estimated using pre-match Elo ratings, bookmaker probabilities, or rolling performance indicators, or can be drawn from existing sources.

Expected contribution. The thesis will provide (a) a theoretically and empirically justified framework for quantifying defensive behaviour, (b) evidence on how teams adapt after taking the lead, (c) an assessment of whether this response differs according to relative team strength, and (d) practical insights into which strategies are associated with successfully protecting an advantage.

Supervisor: Juni.-Prof Pascal Bauer

Scope: Master Thesis

Recommended prerequisite: Basic knowledge of statistics and programming (ideally Python).

Declaration of AI usage: This proposal was drafted with the assistance of Claude AI.

References

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- [2] Tianyu Guan, Jiguo Cao, and Tim B. Swartz. “Parking the Bus”. In: *Journal of Quantitative Analysis in Sports* 19.4 (2023), pp. 263–272. DOI: 10.1515/jqas-2021-0059 (cit. on p. 1).
- [3] Carlos Lago-Peñas and Alexandre Dellal. “Ball Possession Strategies in Elite Soccer According to the Evolution of the Match-Score: The Influence of Situational Variables”. In: *Journal of Human Kinetics* 25.1 (2010), pp. 93–100. DOI: 10.2478/v10078-010-0036-z (cit. on p. 1).
- [4] Carlos Lago. “The Influence of Match Location, Quality of Opposition, and Match Status on Possession Strategies in Professional Association Football”. In: *Journal of Sports Sciences* 27.13 (2009), pp. 1463–1469. DOI: 10.1080/02640410903131681 (cit. on p. 1).
- [5] Joseph B. Taylor et al. “The Influence of Match Location, Quality of Opposition, and Match Status on Technical Performance in Professional Association Football”. In: *Journal of Sports Sciences* 26.9 (2008), pp. 885–895. DOI: 10.1080/02640410701836887 (cit. on p. 1).