Premier League Winner Prediction — Final Report

Training, Backtesting, and 2025/26 Season Simulation

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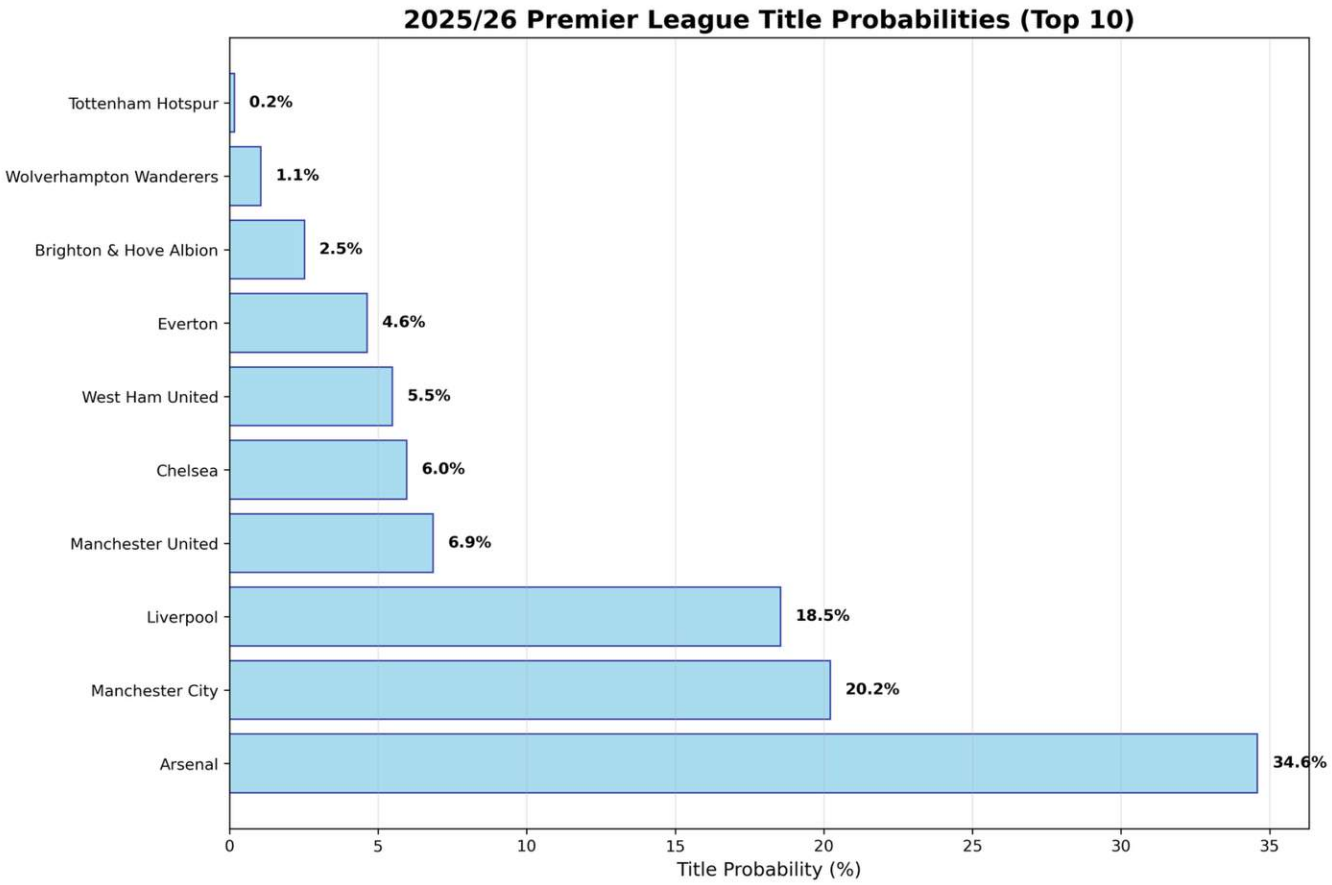

Figure 1. Title probabilities for the 2025/26 Premier League (Top 10).

Executive Summary

This report documents the end-to-end workflow used to forecast outcomes for Premier League matches and simulate the 2025/26 season. A calibrated machine learning model was trained on standardized historical data and evaluated with walk-forward backtesting. Season outcomes were simulated via Monte Carlo to produce title odds.

Predicted Champion: Arsenal with a **34.6%** chance to win the 2025/26 Premier League. Primary challengers: Manchester City (20.2%) and Liverpool (18.5%).

Model highlights:

- Predictive accuracy near 52% on validation data.
- Calibration improved probability quality (Brier score and log loss).
- Elo and rolling-form metrics were the strongest predictors.

Outcome Distribution

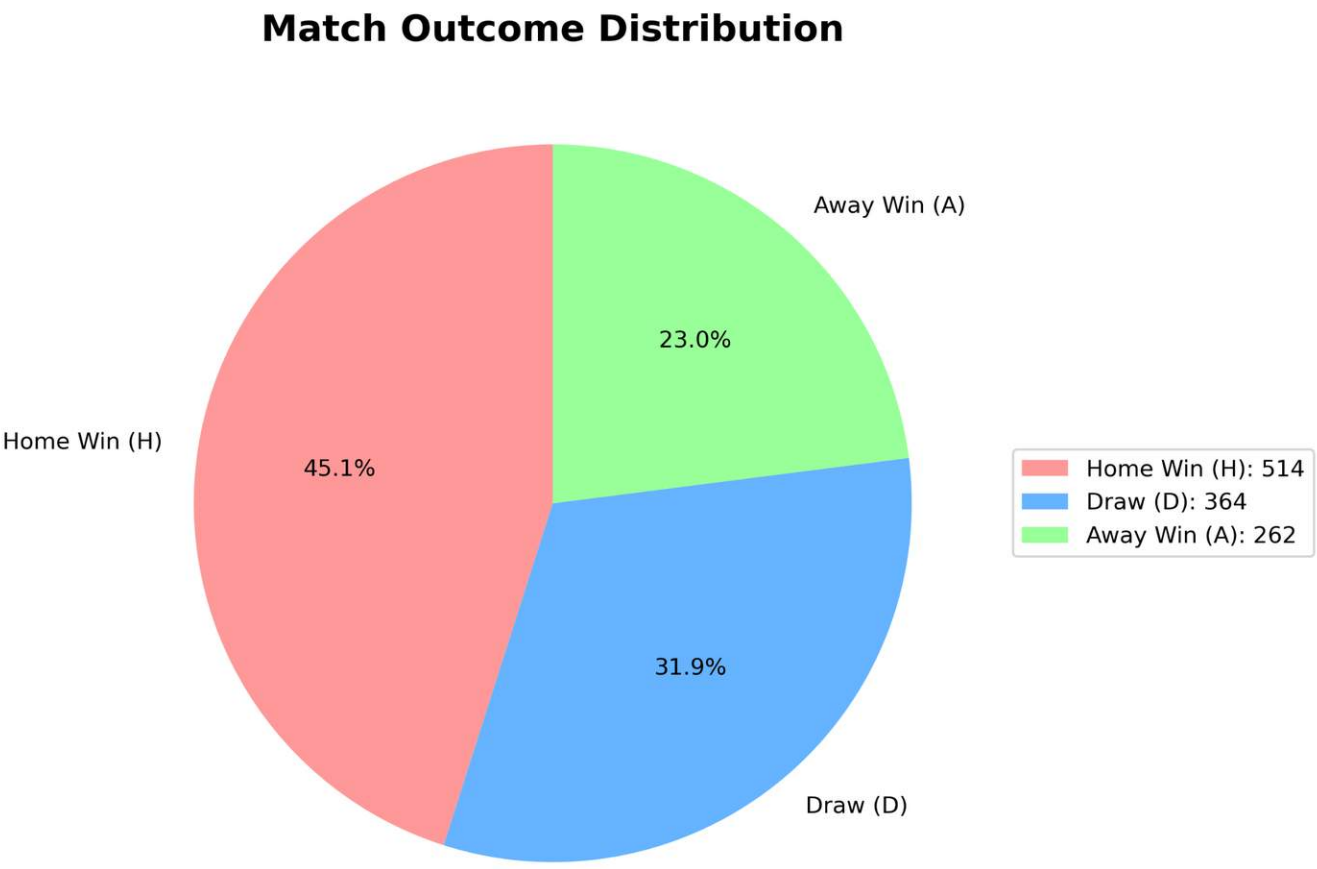

Figure 2. Historical match outcomes.

Modeling Approach

Match prediction is treated as a three-class problem (Home Win, Draw, Away Win). Features include team strength (Elo), recent form (rolling averages of goals and points), and team attributes. Calibrated class probabilities are then used for season simulation.

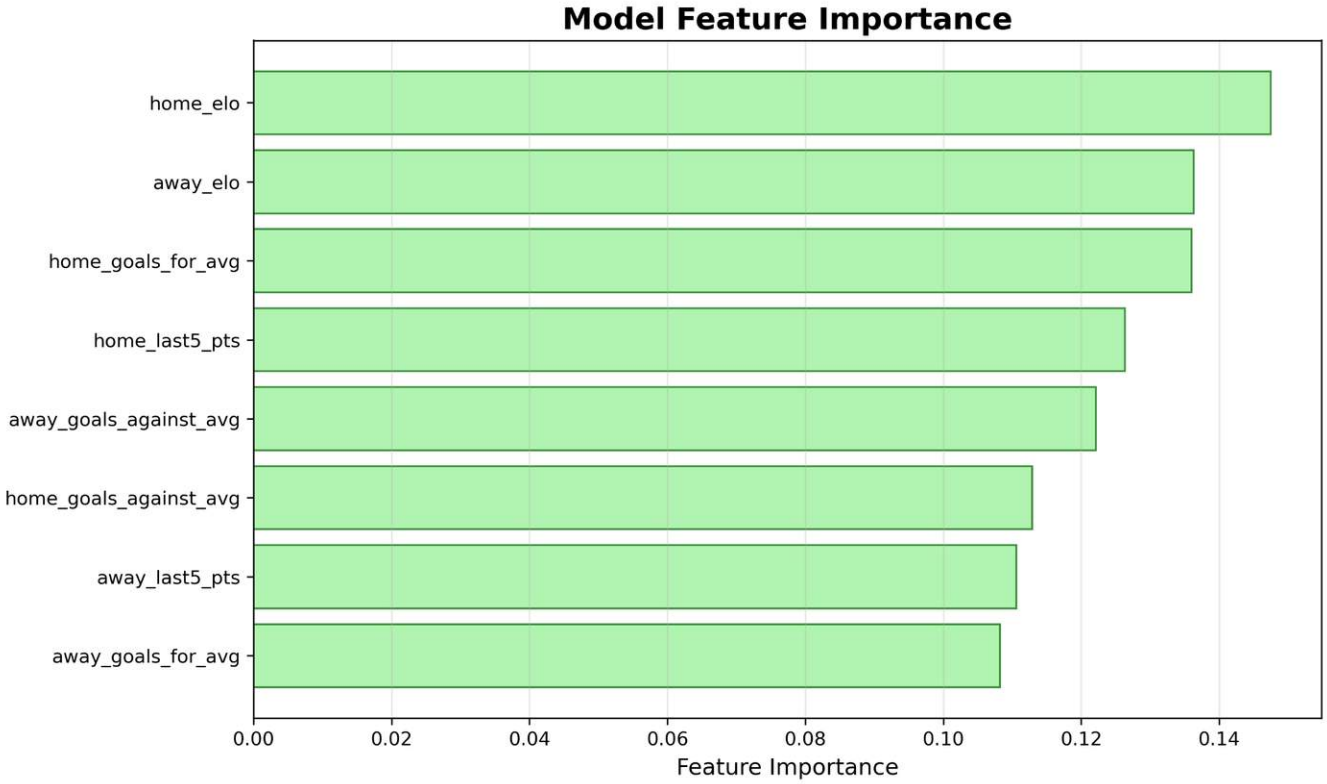

Figure 3. Feature importance.

Probability Calibration

Isotonic regression calibrates classifier outputs. The reliability curve below shows close alignment to the ideal diagonal.

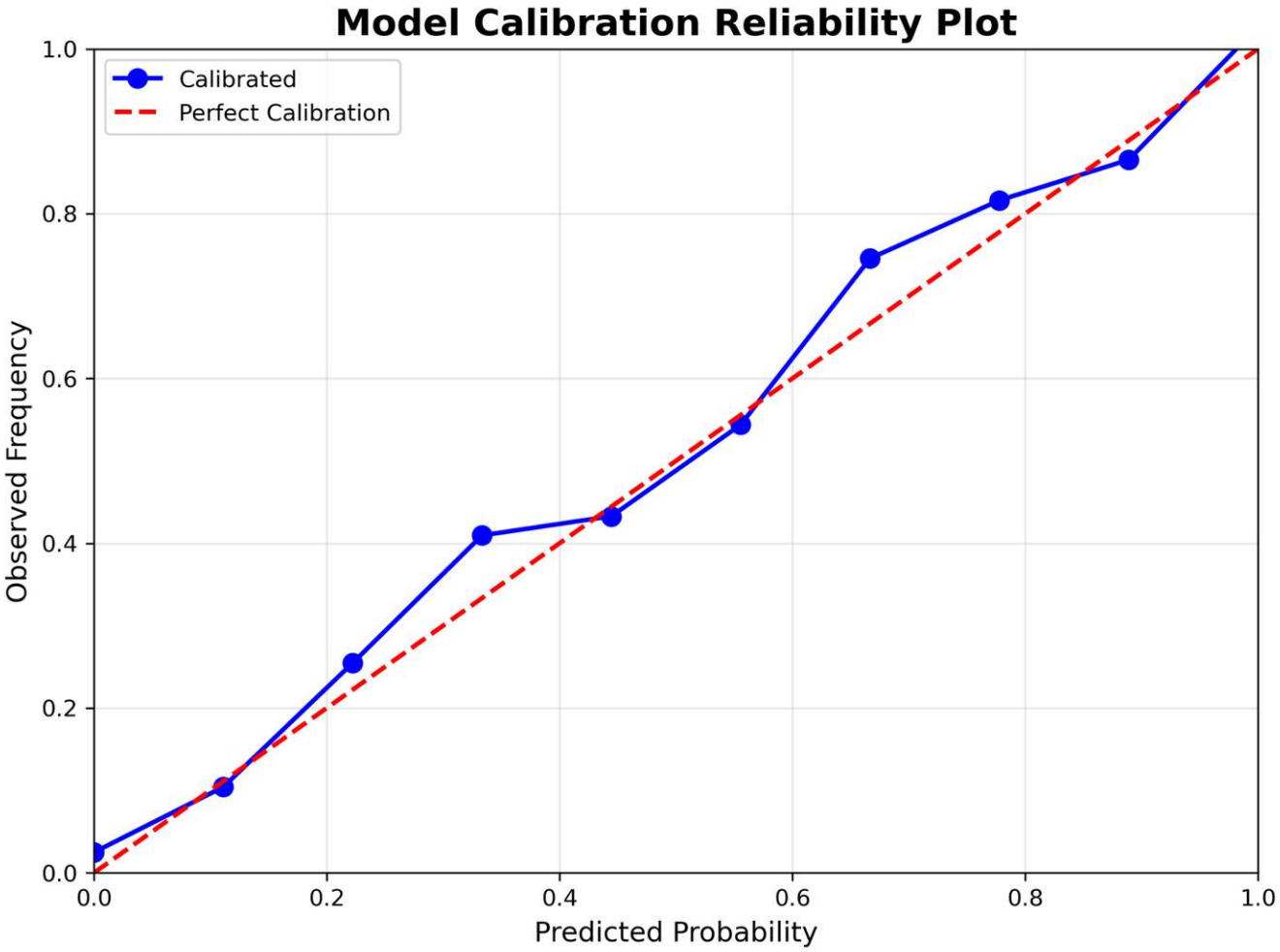

Figure 4. Reliability plot after calibration.

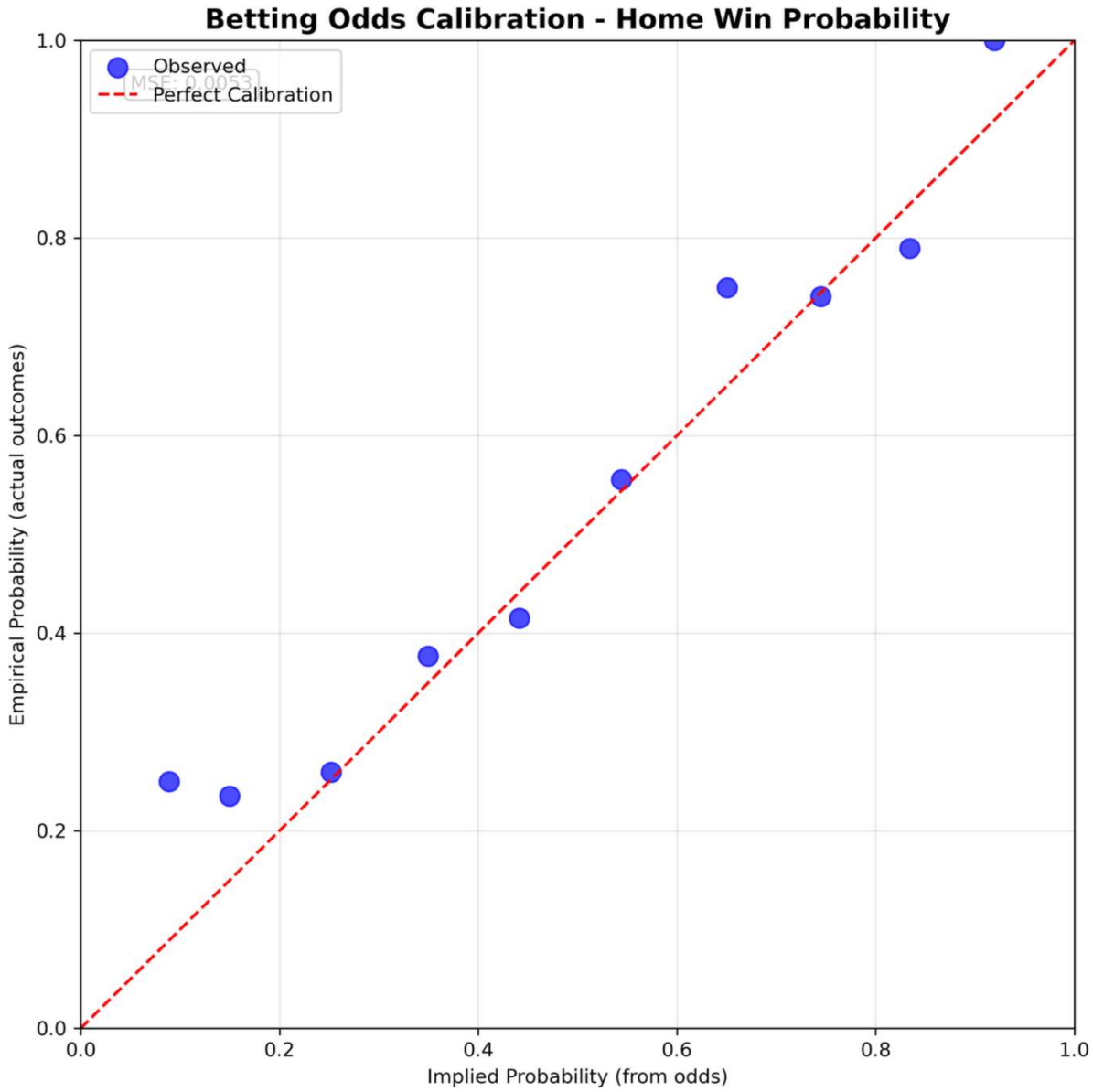

Figure 5. Sanity check versus implied probabilities from betting odds.

2025/26 Season Simulation

Using the calibrated per-match probabilities, 10,000 Monte Carlo simulations of the 2025/26 schedule were run. The figure below shows title probabilities for the leading clubs.

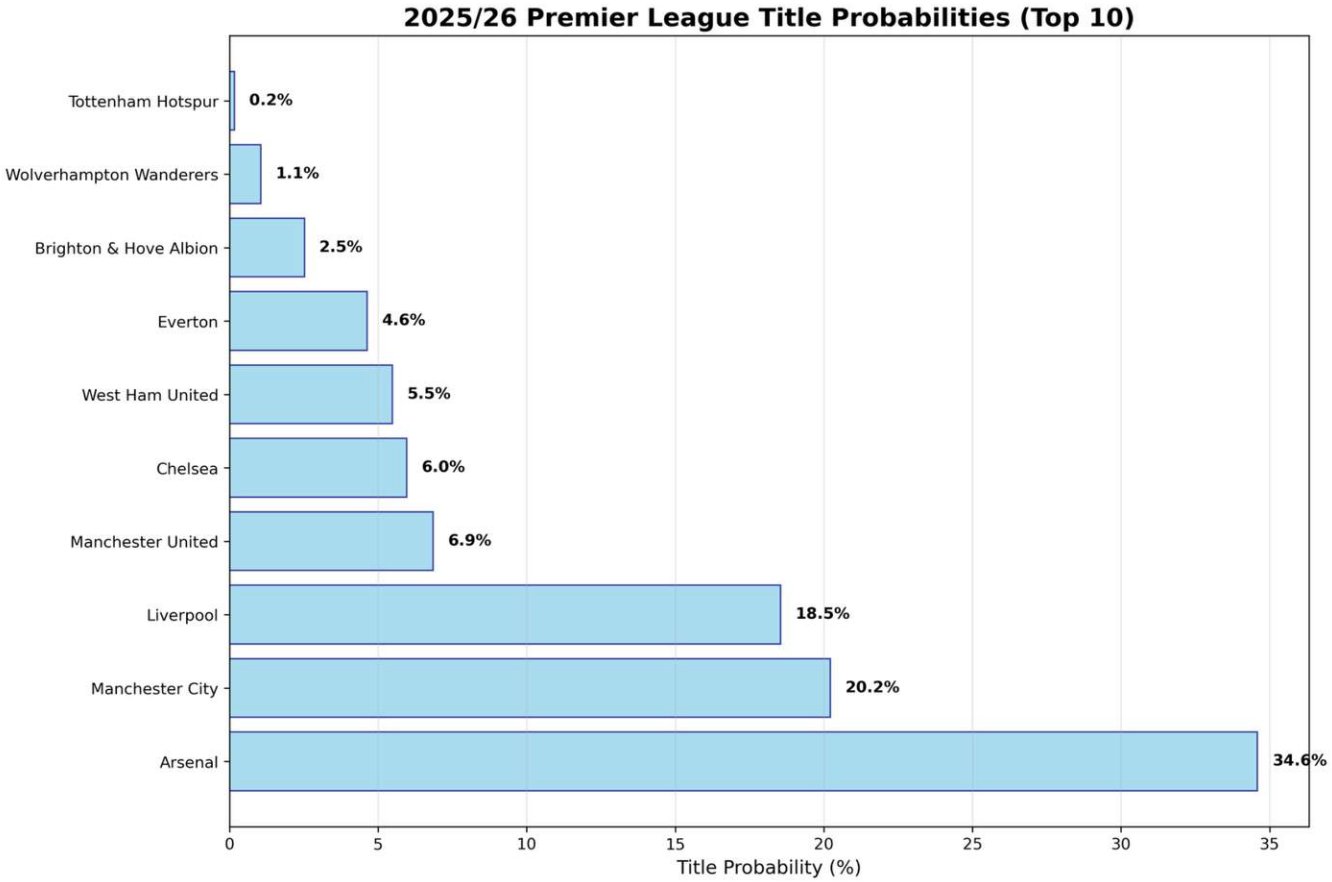

Figure 6. Title probabilities (Top 10).

Predicted Champion

Arsenal is projected to win the Premier League in 2025/26 with a **34.6%** title probability.