



THE UNIVERSITY OF
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DEPARTMENT OF STATISTICS

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Dingyu Guo

Department of Statistics
The University of Chicago

“A Possession-Based Forecasting Framework for NBA Games”

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Abstract

This thesis develops a forecasting framework for NBA games using 2024–2025 play-by-play data. The framework is centered on a possession-based simulator and is extended with a post-simulation prediction layer that incorporates pregame team, schedule, player, and injury information.

The model is evaluated in two ways. First, I compare the raw simulator with the version that includes the prediction layer to see whether the second stage improves forecast quality. Second, I evaluate the full model in a rolling walk-forward setting, where each day's forecasts use only information available before that date.

The results show that the raw simulator provides a useful baseline, but performs better when combined with the prediction layer. In the rolling evaluation, the model retains predictive signal, although performance varies across the season and is not equally strong in all periods. Comparisons with sportsbook lines also suggest mixed results rather than clear evidence of a stable market-beating edge.

Overall, the thesis shows that NBA forecasting can be approached through a hybrid framework that combines possession-based simulation with pregame prediction adjustment.