

Economics 355: Game Theory
Project Cover Sheet
github.com/dtboss19/gametheorylol

Topic: League of Legends Worlds 2025 Finals Draft Nash Equilibrium Analysis (KT vs T1)

Players:

- Blue-side draft decision maker (B = Blue)
- Red-side draft decision maker (R = Red)

Environment:

- Roles $\mathcal{R} = \{\text{TOP, JUNGLE, MID, BOT, SUPPORT}\}$
- Champion pool with role restrictions
- Player-champion comfort (historical win rates)
- Champion matchup data and team composition synergies
- Champions selected in game t are banned in game $t + 1$

Strategy / Actions:

- Each game is a distinct game state due to evolving champion availability
- Blue chooses two champions for remaining open roles
- Red observes Blue's choices and selects one champion for its remaining role

Payoffs(Zero-Sum Game) :

Weighted Components $w_1 = 0.15$, $w_2 = 0.25$, $w_3 = 0.60$, and $\alpha = 0.02$.

Blue teams payoff:

$$Z = \alpha + w_1 \sum_{r \in \mathcal{R}} (M_r^B - M_r^R) + w_2 \sum_{r \in \mathcal{R}} (W_r^B - W_r^R) + w_3 (S^B - S^R),$$

The Blue-side win probability is given by the logistic function:

$$\pi^B = \Pr(\text{Blue Win}) = \frac{1}{1 + e^{-Z}}.$$

M_r : Champion-versus-champion lane matchup values for role r W_r : Player-champion historical win rates for role r S : Team composition synergy bonuses derived from champion interactions

Red's payoff:

$$\pi^R = 1 - \pi^B.$$

Solution Concept: Subgame Perfect Nash Equilibrium in a sequential draft game with observable actions and evolving strategy sets.

Analysis Highlights: Key Result: In the Worlds 2025 Finals, actual draft choices coincided with the model's equilibrium-optimal picks in 6 out of 15 decisions.