Kelly Criterion: Optimization & Simulation

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Kelly Criterion

$$\begin{array}{ll} \underset{b}{\text{maximize}} & \sum_{j=1}^{K} \pi_j \log(r_j^T b) \\ \text{subject to} & b \geq 0, \quad \sum_{i=1}^{n} b_i = 1. \end{array}$$

The Kelly Criterion comes from this idea: “what is the optimal amount of my wealth to wager to maximize the growth rate of my wealth?”

Given: probabilities of outcomes, returns for each outcome at each time step, and the number of periods played, we can find b.

This strategy is:

- Not dependent on time; the portion of your wealth you wager is fixed.
- Is dependent on the game probabilities.
- Is dependent on the game returns.
- Not guaranteed to make you win.
- Used by Warren Buffet.

Our Work in Progress...

Next Steps:

- Add Naive Bets as a contrast.
- Use real stock data.
- Adjust the rule to be more aggressive/more conservative.