

How does the *Fortune's Formula*-Kelly capital growth model perform?*

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Abstract

William Poundstone's (2005) book, *Fortune's Formula*, brought the Kelly capital growth criterion to the attention of investors. But how do full Kelly and fractional Kelly strategies that blend with cash actually perform in practice? To investigate this we revisit three simple investment situations and simulate the behavior of these strategies over medium term horizons using a large number of scenarios. These examples are from Bicksler and Thorp (1973) and Ziemba and Hausch (1986) and we consider many more scenarios and strategies. The results show:

1. the great superiority of full Kelly and close to full Kelly strategies over longer horizons with very large gains a large fraction of the time;
2. that the short term performance of Kelly and high fractional Kelly strategies is very risky;
3. that there is a consistent tradeoff of growth versus security as a function of the bet size determined by the various strategies; and
4. that no matter how favorable the investment opportunities are or how long the finite horizon is, a sequence of bad scenarios can lead to very poor final wealth outcomes, with a loss of most of the investor's initial capital.

Hence, in practice, financial engineering is important to deal with the short term used, the strategy has much to commend it, especially in trading with many repeated investments.

*Dedicated to the memory of Kelly criterion pioneers John Kelly and Leo Breiman and Kelly critic Paul Samuelson. A preliminary version of some of the topics discussed here is in MacLean, Thorp, Zhao and Ziemba (2010). Thanks to Frank Fabozzi and a referee for helpful comments on an earlier version of this paper.

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