

# OPTIMAL BETTING STRATEGIES FOR SEQUENTIAL GAME

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## Abstract

This paper considers the problem of optimal betting strategy in the context of sequential decision making using Kelly Criterion with investors wanting to maximise their expected logarithmic return. A sequential investment model is formulated to analyse how investors make optimal dynamic investment decisions which are a function of their information about risk of failure and potential final value. The relative impact of varying degrees of access to information at the end of stage 1 on subsequent investment decisions is also analysed. Risk profile and betting behaviour is studied through an experimental setting with the participants being exposed to sequential and fair gambles in a two-stage process spread over multiple rounds. The results show that the bet size for investment 1 reduces as probability of opportunity of investing in bet 2 rises. Contrary to our model, when occurrence of bet 2 is certain, subjects exhibited sunk cost fallacies in their betting behavior to make up for shadow losses, with them raising the amount invested in second stage when they lost game 1 while they exhibit risk averse behaviour when the occurrence of bet 2 is uncertain. When the additional information shared has a positive outcome subjects wager larger fraction in bet 2 when probability of opportunity of investing in bet 2 is uncertain ascribing to Hot hand fallacy.