

# Optimal Stopping in Binomial Casino Gambling?

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Abstract

The binomial tree casino gambling problem under CPT model is shown to be an optimal stopping problem in the discrete time. The analytical solution is solved indirectly through Skorohod embedding problem where optimal stopping times are recovered from probability distribution functions. We find that the optimal probability distribution varies with risk preference where risk attitudes are reflected in the utility function and the probability distortion function. Strategies are usually divided into stop-loss type and stop-gain type in the ill-posedness. In some cases with relatively high degree of loss-aversion the gambler will turn down the bet at all. To recover the stopping that is uniformly integrable, there always exist a convergent sequence of UI stopping times with respect to natural iteration of the random walk. We can enlarge the filtration by adding independent randomization so that the embedded stopping time is UI. One possible embedding is through the discrete AY-like stopping times, that is to stop if the relative loss is large.