

Limit Theorems for Partial Hedging Under Transaction Costs

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We study shortfall risk minimization for American options with path dependent payoffs under proportional transaction costs in the Black-Scholes (BS) model. We show that for this case the shortfall risk is a limit of similar terms in an appropriate sequence of binomial models. We also prove that in the continuous time BS model for a given initial capital there exists a portfolio strategy which minimizes the shortfall risk. In the absence of transactions costs (complete markets) similar limit theorems were obtained in Dolinsky and Kifer (2008, 2010) for game options. In the presence of transaction costs the markets are no longer complete and additional machinery required. Shortfall risk minimization for American options under transaction costs was not studied before.

Subjects: **Computational Finance (q-fin.CP)**; Probability (math.PR); Pricing of Securities (q-fin.PR)

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