A survey of recent results on models with transaction costs

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ABSTRACT

Leland's approach to the hedging of derivatives under proportional transaction costs is based on an approximate replication of the contingent claim V_T using the classical Black–Scholes formulae with a suitably enlarged volatility. At the moment, this is the most important method of pricing derivatives on markets with low liquidity. The formal mathematical framework is a scheme of series, i.e. a sequence of models with the transaction costs coefficients $k_n = k_0 n^{-\alpha}$ where $\alpha \in [0, 1/2]$ and n is the number of the portfolio revision dates. The enlarged volatility $\widehat{\sigma}_n$, in general, depends on n except the case $\alpha = 1/2$. For the case of call option where $V_T = (S_T - K)^+$ the approximation errors $V_T^n - V_T$ converge to zero in probability for $\alpha > 0$ and to a non-trivial random variable ξ for $\alpha = 0$. In this talk we give a survey of recent results on rate of convergence covering the models with non-uniform grids as well as more general pay-off functions.