OPTIMAL CONTROL OF PORFOLIO LIQUIDATION

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Abstract

Institutional traders will be faced with expensive execution costs in portfolio transaction. The existence of these costs in°uences their pro¯ts severely. Almgren and Chriss(1999,2000,AC hereafter) have de¯ned optimal execution as the strategy that minimizes the execution cost under the constraint of volatility risk over a ¯xed period of time. Our paper follows AC's framework. We consider the problem in continuous time, while their work is in discrete time. The assets prices are assumed to follow the r-dimension Brownian motions. As AC's paper, we distinguish the price impacts between temporary impacts and permanent impacts, which the functions are both linear. If the price impacts of di®erent securities do not interact each other, the coe±cient matrix of temporary impacts and permanent impacts are diagonal. Applying the calculus of variation, we get the analytical solution of the optimal strategy .The optimal strategy is the linear combination of the time's sinhyperbola formation and assets' properties have e®ects on it. The simulation shows that di®erent assets have dissimilar optimal strategy. The result suggests that a trader should construct the portfolio with securities having little covariance and choose to execute a block of an illiquid security less rapidly than a liquid security in the liquidation.