Option hedging of an informed and influent agent:  
FBSDEs under enlarged filtration

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Abstract

We study a market in which an agent, who has an additional information about the future evolution of prices, is a large or influent agent: his portfolio has influence on asset prices. This can be modeled with a forward-backward stochastic differential equations, but the problem of an enlarged filtration makes it impossible to use standard existence and uniqueness theorems. We obtain, similarly as in the case of BSDEs (Eyraud-Loisel 2004), an existence and uniqueness result.

This implies the existence of an hedging portfolio for the informed agent in our model. In order to compare it to the hedging portfolio of a non-informed agent, we use techniques of risk-minimization in incomplete markets developed by Schweizer and Follmer (1991), and we obtain an expression of the hedging portfolio of the non informed trader, under a minimal martingale measure, which minimizes the residual risk.

Keywords: enlargement of filtration, FBSDE, option hedging, insider trading, asymmetric information, incomplete markets, risk minimization.