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Pricing options on illiquid assets with liquid proxies using utility indifference and dynamic-static hedging

Igor Halperin, Andrey Itkin

(Submitted on 15 May 2012)

This work addresses the problem of optimal pricing and hedging of a European option on an illiquid asset Z using two proxies: a liquid asset S and a liquid European option on another liquid asset Y. We assume that the S-hedge is dynamic while the Y-hedge is static. Using the indifference pricing approach we derive a HJB equation for the value function, and solve it analytically (in quadratures) using an asymptotic expansion around the limit of the perfect correlation between assets Y and Z. While in this paper we apply our framework to an incomplete market version of the credit-equity Merton's model, the same approach can be used for other asset classes (equity, commodity, FX, etc.), e.g. for pricing and hedging options with illiquid strikes or illiquid exotic options.

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