Simplified Hedge for Path-dependent Derivatives

Carole Bernard

Dept. of Statistics and Actuarial Science, University of Waterloo
200 University Avenue West, Waterloo, ON, Canada N2L 3G1
carole.bernard@uwaterloo.ca
1-519-888-4567 ext. 35505

Junsen Tang
(The speaker during the IME sessions)
Dept. of Statistics and Actuarial Science, University of Waterloo
200 University Avenue West, Waterloo, ON, Canada N2L 3G1
junsen.tang@uwaterloo.ca
1-647-866-5872

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Abstract

Path-dependent derivatives are typically difficult to hedge. Traditional dynamic delta hedging does not perform well because of the difficulty to evaluate the greeks and the high cost of constantly rebalancing. We propose to price and hedge path-dependent derivatives by constructing simplified alternatives that preserve the distributional properties of the terminal payoffs. In particular, we construct a hedge of the original path-dependent options by semi-static replication. It is generally more robust to model risk than standard dynamic hedging. We illustrate the method in the Black-Scholes setting, in which explicit forms of the simplified derivatives are derived in the case of geometric Asian options. Our work demonstrates that the newly designed semi-static hedge is efficient to hedge path-dependent derivatives.

Key words: derivatives pricing, derivatives hedging, simplified path-dependent derivatives, semi-static replication.