The Impact of Microstructure Noise on Delta-Hedged Option Returns

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Abstract

When calculating delta-hedged option returns, the rebalancing frequency of the position in the underlying security dramatically affects the magnitude of the observed returns in the presence of microstructure noise. We show in a simulation environment that the mean bias of a delta-hedged return compared to an error-free benchmark increases with rising hedge frequency due to that noise. Also, standard asset pricing tests falsely yield significant option-return premiums for the illiquidity of the underlying asset. Because bias adjustments taken from the existing literature do not properly address this issue, we suggest a new simple adjustment method by using lagged hedge ratios for rebalancing the position in the underlying. Finally, we show that despite lower rebalancing frequencies exhibit lower biases, they, on the other hand, cannot capture actual return premiums in the transaction-cost model of Leland (1985).

Keywords: Option Returns, Market Microstructure, Asset Pricing

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