

Nonparametric Option-Implied Volatility

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We propose a nonparametric estimator for spot volatility from short-dated options. The estimator is based on forming portfolios of options with different strikes that replicate the (risk-neutral) conditional characteristic function of the underlying price in a model-free way. The separation of volatility from jumps is done by making use of the dominant role of the volatility in the conditional characteristic function over short time intervals and for large values of the characteristic exponent. The later is chosen in an adaptive way in order to account for the time-varying volatility. We derive a feasible joint Central Limit Theorem for the proposed option-based volatility estimator and existing high-frequency return-based volatility estimators. The limit distribution is mixed-Gaussian reflecting the time-varying precision in the volatility recovery. Numerical experiments show the efficiency gains from the newly-developed option-based volatility extraction.