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Two unconditionally implied parameters and volatility smiles and skews

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Abstract

The study examines estimation of parameters of diffusion market models from historical data. The standard definition of implied volatility for these models presents its value as an implicit function of several parameters, including the risk-free interest rate. In reality, the risk free interest rate is unknown and needs to be forecasted, because the option price depends on its future curve. Therefore, the standard implied volatility is conditional: it depends on the future values of the risk free rate. Two implied parameters are studied: the implied volatility and the implied average cumulative risk free interest rate. They can be found unconditionally from a system of two equations. It was found that very simple models with random volatilities (for instance, with two point distributions) generate various volatility smiles and skews with this approach.

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