

Exploiting the gap between the real-world and risk-neutral probability measures

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The financial markets are marked by the duality of probability measures: real-world measure vs. risk-neutral measure. The gap between the densities under these measures reflects several market phenomena. First, it is an indicator for the risk tolerance of the market players. Second, it can be considered as a predictor of what period is ahead -- low or high volatility.

The report presents the results of deriving the densities for one of the most liquid assets, namely the S&P500 Index, and European style options written on it. A joint calibration method for both probability measures is applied to several stochastic models -- Black-Scholes, Bates, and another stochastic volatility model with tempered stable jump correction.