

"Implied Density Models for Dynamics Asset Pricing"

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This paper addresses aspects of the interesting and still largely unsolved problem of how best to model the dynamics of an asset when one is given option prices for a range of strikes and maturities as initial data. The approach taken is to model the risk-neutral probability density process for the asset price. In particular, it is assumed that the density process satisfies an infinite dimensional stochastic differential equation driven by one or more Brownian motions, with a restriction on the volatility structure that is sufficient to ensure that the relevant normalisation condition is preserved. The resulting system is put into integral form, and several specific models of increasing generality are examined in detail, for which explicit solutions are constructed. The solutions are obtained in a surprising way by use of a filtering technique. (Work carried out in collaboration with Damir Filipovic, Vienna Institute of Finance, and Andrea Macrina, King's College London.)