Semiparametric Modeling of Implied Volatility (Springer Finance)

Matthias R. Fengler
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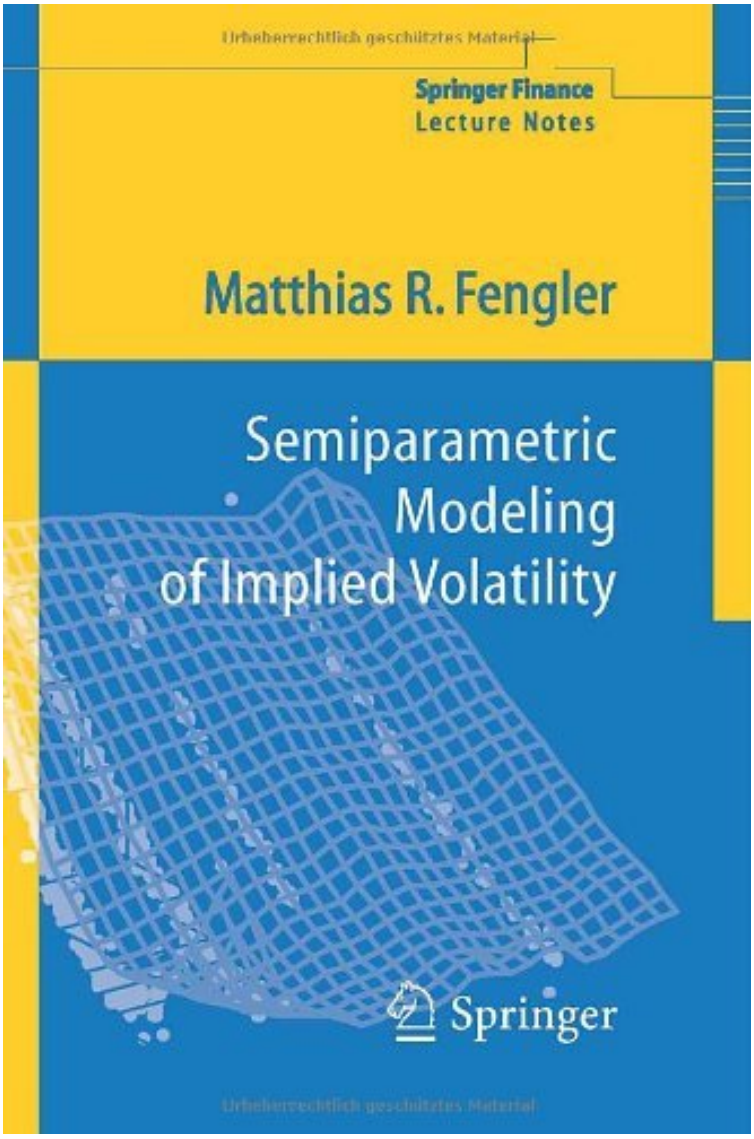

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The implied volatility surface is a key financial variable for the pricing and the risk management of plain vanilla and

exotic options portfolios alike. Consequently, statistical models of the implied volatility surface are of immediate importance in practice: they may appear as estimates of the current surface or as fully specified dynamic models describing its propagation through space and time. This book fills a gap in the financial literature by bringing together both recent advances in the theory of implied volatility and refined semiparametric estimation strategies and dimension reduction methods for functional surfaces: the first part of the book is devoted to smile-consistent pricing appoaches. The theory of implied and local volatility is presented concisely, and vital smile-consistent modeling approaches such as implied trees, mixture diffusion, or stochastic implied volatility models are discussed in detail. The second part of the book familiarizes the reader with estimation techniques that are natural candidates to meet the challenges in implied volatility modeling, such as the rich functional structure of observed implied volatility surfaces and the necessity for dimension reduction: non- and semiparametric smoothing techniques. The book introduces Nadaraya-Watson, local polynomial and least squares kernel smoothing, and dimension reduction methods such as common principle components, functional principle components models and dynamic semiparametric factor models. Throughout, most methods are illustrated with empirical investigations, simulations and pictures.