

Martin Mandler

Market Expectations and Option Prices

Techniques and Applications

With 64 Figures
and 13 Tables

Physica-Verlag

A Springer-Verlag Company

Contents

1	Introduction	1
----------	---------------------	----------

Part I Theoretical Foundations

2	Arbitrage Pricing and Risk-Neutral Probabilities	7
----------	---	----------

2.1	Arbitrage Pricing in the Black/Scholes-Merton Model	7
-----	---	---

2.2	The Equivalent Martingale Measure and Risk-Neutral Valuation	11
-----	--	----

2.3	Extracting Risk-Neutral Probabilities from Option Prices	13
-----	--	----

2.4	Summary	15
-----	---------	----

	Appendix 2A: The Valuation Function in the Black/Scholes-Merton Model	16
--	---	----

	Appendix 2B: Some Further Details on the Replication Strategy	21
--	---	----

3	Survey of the Related Literature	23
----------	---	-----------

3.1	The Information Content of Forward and Futures Prices	24
-----	---	----

3.2	The Information Content of Implied Volatilities	25
-----	---	----

3.2.1	Implied Volatilities and the Risk-Neutral Probability Density	27
-------	---	----

3.2.2	The Term Structure of Implied Volatilities	29
-------	--	----

3.2.3	The Forecasting Information in Implied Volatilities	30
-------	---	----

3.2.4	Implied Correlations as Forecasts of Future Correlations	43
-------	--	----

3.3	The Skewness Premium	45
3.4	Summary.....	47
4	Presenting and Interpreting Risk-Neutral Probabilities	51
4.1	Interpretation Problems Concerning Risk-Neutral Probabilities	51
4.2	Graphical Presentations of the Risk-Neutral Probability Density.....	54
4.3	Distributional Statistics and Percentiles.....	56
4.4	Summary.....	60
5	Techniques for Extracting Risk-Neutral Probabilities from Option Prices	63
5.1	The Direct Approach ..'	64
5.2	Fitting Density Functions to Option Prices.....	64
5.2.1	Estimating Parametric Density Functions.....	64
5.2.2	Expansion Methods.....	72
5.2.3	Minimization of Deviations from a Prior Density.....	80
5.2.4	The Maximum-Smoothness Criterion.....	84
5.3	Estimating Option-Pricing Functions.....	86
5.3.1	Fitting Polynomials to the Volatility Smile.....	86
5.3.2	A Nonparametric Technique.....	90
5.3.3	The Maximum-Smoothness Criterion for the Volatility Smile.....	92
5.3.4	Further Extensions.....	93
5.4	Process-Based Techniques.....	94
5.4.1	Implied-Volatility Trees.....	94
5.4.2	Estimation of Stochastic Process Parameters.....	100
5.5	Data Selection and Preparation ...;	101
5.6	Summary.....	104
	Appendix 5A: Restrictions to Ensure a Positive Density in the Gram-Charlier Expansion.....	105
	Appendix 5B: Deriving (5.120) and (5.123).....	106

6	The Advantages and Disadvantages of Selected Techniques	109
6.1	Implementation	109
6.2	Comparing the Results	111
6.3	Robustness	114
6.4	Summary	117

Part II Empirical Applications

7	Important Empirical Applications - A Review	121
7.1	Exchange Rates	121
7.2	Interest Rates	126
7.3	Stock Indices	127
7.4	Risk Aversion	128
7.5	Summary	133
8	Central-Bank Council Meetings and Money Market Uncertainty	135
8.1	Estimation Method	136
8.2	Data	138
8.3	Results	140
8.4	Summary	146
9	Central-Bank Council Meetings - Event Studies	149
9.1	Methodology and Data	149
9.2	Results	152
9.3	Summary	196
10	Summary and Conclusions	199

List of Figures. **203**

List of Tables. **207**

Bibliography **209**